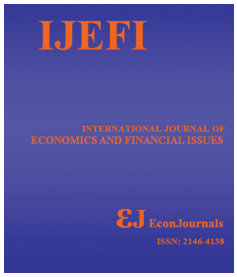

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Credit Default Swap and Liquidity

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ABSTRACT

The recent global economic downturn that erupted in the mid 2007 saw an increase of the Credit Default Swaps (CDS) by hundred basis points and severe liquidity crunch in the financial sector of the United States. The recession phase highlighted the importance of the liquidity for the investors and underlined the importance of understanding the connection between the liquidity of the market and the credit markets. In depth, this study tries to understand the relation between the liquidity risk in the CDS market and the credit risk. Along the same line of this study, a study conducted on the different Swiss and German companies revealed that credit risk is not the direct originator of the liquidity risk, but it created by a negative credit shock. In addition, this paper focuses on the causes that intensified the global crisis of (2007) as well as the macro-prudential policies are highlighted that will prevent a similar type of crisis in the future.

Keywords: Credit Risk, Liquidity, Financial Crisis
JEL Classifications: G31, G33

1. INTRODUCTION

In the year 1998, long-term capital management hedge fund collapsed in the Russian crisis and a decade later. In the year 2007, the global economic crisis erupted and emphasized on the importance of the liquidity for the investors. This period seen an increase in the Spread of Credit Default Swaps (CDS) by hundred basis point (bp) and one bp is hundredth of a percentage point (Hertrich, 2014). This created severe illiquidity in the market and many investor as well as hedge funds had to close their trading positions, which triggered a fire sale. Fire sale stands for a position, in which securities, mostly unwanted ones, have very less financial values sold to the known clients who just have no idea about what those securities are. This incidence emphasized on the values of the liquidity in the credit market and the risk models in the turmoil phase.

For investors, policy makers and the researcher in the field of financial market research, it is very important to know the importance of the CDS spreads and the size of the CDS market for measuring the financial health, stability and health of the sector. It is important to understand the intensifying factors that played a major role in the recent crisis. Cifuentes et al. (2005) in their article relates to the relationship between credit risk and liquidity. They add that the recent crisis felt the perfect need to put an importance to the restricted use of the CDS and importance of having a liquid position in the market. Moreover, the article focuses on the rationality of treating the liquidity as a weak exogenous in the time series sense when compared to credit risk or the vice versa. Finally, they reveal that around 39% of the Swiss and German companies felt that credit risk is a weak endogenous for liquidity while around 4.5% of the companies suggested that the vice-versa is true.

The trading scenario was changing just before the global crisis and the market for the derivatives expanded rapidly. The liquidity of the markets dealing with derivatives assumes to have a higher value than the liquidity of the underlying assets and likely corporate bonds. Underlying assets mean the value of the securities depends on the underlying assets. If the underlying asset is corporate bonds then the amount that the investor will get is the value underlying holds at the date of the maturity. The global crisis made people knowledgeable about the actual scenario leading to the value of the underlying assets. To gauge the liquidity of the assets and other securities different models, both advanced financial and statistical used to deal with the issue of liquidity.

This study focuses on the non-us markets and conducted very recently, just after the market crash of (Chen, Lesmond and Wei 2007). In addition, it is the first one to focus on the reasons of the changes in the bid ask spread, the impact of the financial markets in general and CDS market in particular as well as the liquidity related to it (Hamilton, 1994). Section 2.1 of the study covers the literature review, and Section 2.2 discusses in detail the risk measures required. Section 3 is the methodology used to determine the co-relation between both risks. While Section 4 presents the samples and the subsamples used and Section 5 is the empirical section divided in three parts. In this study, different financial jargons are used such as CDS, bid-ask price, trade volume, quotations and others.

2. LITERATURE REVIEW AND THEORY

2.1. Liquidity and Liquidity Risk

The term liquidity means the ease at which particular assets can convert into cash. Assuming a situation where the investors prefer more liquid assets and those assets priced at a higher price, and the trading costs associated with it lowered and bid – ask spreads of the assets has to split up. Liquidity itself has a risk associated with it and liquidity risk related to the probability that the asset cannot trade when liquidity is stochastic (Cont and Wagalath, 2013). Liquidity risk tends to be high when the probability of the tradability of the assets becomes less. This becomes at an alarming position when the probability reaches one and the market becomes illiquid. So, when the market is liquid and the liquidity risk is low then the bid ask spread found to be small and stable.

2.1.1. Literature review and theoretical background

The risk component, which is the same for all the market makers, is only dependent on the market structure called exogenous liquidity risk. On the other hand, the liquidity risk which varies with the size of the trading position is within the control of the market maker is called endogenous risk. The exogenous liquidity risk often cited as the bid-ask spread. In this study, both risks cited exclusively and used interchangeably. The bond market scenario has changed a lot, and the current trend has used the credit derivatives market from where the investors can take positions regarding various securities and shed off the risky positions. This helped in the emergence of the new problem in the fixed income analysis of the bonds that spread of the corporate bonds into credit risk and liquidity component. In the recent financial risk, the lack of liquidity of the investors made the events take a serious turn, and it literally shook the world (Cifuentes et al., 2005). The spread of the corporate bond is determined as the gap between the duty free interest rate given in the default free interest rate and the yield to maturity rate of the bonds.

2.1.2. The relationship between liquidity risk and credit risk

The loss which triggered by the default of a debtor is called credit risk, and the risk is maximum when the probability becomes one. No such empirical theories clearly states how the risk factors interact dynamically with each other. In the Merton model, corporate bond uses as an underlying and a relation draws between the credit and liquidity risk. Whenever the credit risk increases, the liquidity risk also increases at the same time. In the recession, the liquidity shortages accompany by the rising CDS spreads, and the similarity between the bonds and CDS have made a positive relation between liquidity and illiquidity risk. Whereas another model states that in the case of short selling, the illiquid assets may often make higher prices than liquid assets depending upon the investment horizon and risk-taking capacity of the short seller.

Liquidity itself finds to be a multi-dimensional concept and cannot observe directly, so it measures by a variable associated with the bid-ask spread. The cost incurred relates to the taxes and fees associate with the trading as well as the associated costs relate to it. The absolute bid price is determined as the difference between the highest and the lowest of the bid prices. Upon comparing different liquidity measures of the US Treasury securities, it is found that the bid ask spread is found to be the best proxy as per the liquidity risks. On the other hand, another model shows that alternative liquidity measures and bid ask price are highly co-related and alternative liquidity measures include the effective spread of the trading volume. Bonds, which have a rating of say AAA, known to be default free, and they often trade at a positive spread, which remains quite high as compared to the yield on treasury bonds. This paper discusses thoroughly how the difference in the value of the spread can take a significant turn and affect the liquidity position of the entire market (Bongaerts, De Jong and Driessen 2012).

2.2. Risk Measures

Credit risk or the CDS mid-rate considered to have several advantages and calculated as the mean value of the risk and the bid price of the each company.

$$MID_T=A_C+B_{C/2} \quad (1)$$

The CDS mid-rate $MID_T(A_C+B_C)$ is the corresponding of CDS risk (highest) and CDS bid prices of an organization at a given time.

CDS spreads normally trades on the standardized items and provide a pure pricing of the risk of the underlying assets. On the other hand, the bond spreads severely affected by the gap of chosen risk free benchmark and contractual agreements (Breitenfellner and Wagner 2012). Another merit of CDS spreads is that they are effective indicator of assessing the credit risk and respond quickly to the changes in the credit run than credit spreads as a result of the short sale restrictions and the funding issues associated with it. The researcher shows that about one-quarter of the corporate credit spread could define as a default prone or risky in nature due to the difference in the market spread against other different bonds (Hertrich, 2014).

The data of the study has a senior single of 5-year CDS risk and bid prices quoted in bps and determined in Euros, which figured out on August 24, 2007 to 2010, 01 June. This period marks the entire tenure of the financial crisis from the collapse of the Lehman Brothers to the end of the financial crisis. In addition, this paper consists of 5-year maturity CDS only as the CDS contracts thought to be the most liquid of all the contracts (Bolton and Oehmke, 2013). The focus here is on the short-term relationship

between the liquidity risk and the credit risk, and the imbalances are present in the liquidity risk supply and demand impact liquidity. On the other hand, in the cross sectional regression analysis, there is a tremendous amount of positive co relation between the default and liquidity components of the bond yield spread of the securities.

3. DATA AND METHODOLOGY

The collected data is from the database of the Credit Market Analytics, which holds the maximum number of credible data of the most active and the largest buy side investors: Asset managers, hedge funds and the global investment banks. Even if the CDS markets operates as an over the counter market, the using data from the large number of investors and majority of being blue chip companies makes the data more credible and helps to mitigate the problem. One can observe that daily the CDS risk and bid prices are comparatively stable over the sampling period. Around spring 2008, just after the global investment bank bear Stearns signed a deal with J P Morgan for a merger agreement. On March 16, 2008 just after Lehman Brothers filed for bankruptcy, the bid- risk prices exhibited large amount of spikes. These incidences were one-off incidence and the prices showed volatility in those cases whereas in normal cases the bid-risk prices were low and stable (Hertrich, 2014).

This study is made to identify whether at the time of time series the credit risk changes are weakly exogenous with the liquidity risk changes. Various finance models are used, namely vector autoregression (VAR) model. The stationary test of Kwiatkowski shortened as KPSS model, which tests whether the mid-rate and the bid risk spread are stationary. This particular method is helpful in case of examining the causality in the stochastically trending variables. In a while, the researcher has moved forward from KPSS model to the Granger causality analysis in a bivariate VAR. It is assumed in the relative models that the mid-rate and bid ask spread are to be weakly stationary. The VAR allows only for a maximum of seven lags as this removes any sort of serial correlations. The optimal number of lags calculates by lowering the value of the Akaike criterion of information.

Before calculating the Granger causality test, the properties and the model assumptions are checked, which helps to test the residuals for conditional heteroscedasticity, auto co relation and the non-normality method by using the related multivariate test statistics. Other methods for calculating the multivariate tests like autoregressive conditional heteroscedastic-LM models and multivariate Jarque–Bera test used exclusively to reach at the desired conclusions (Hertrich, 2014).

4. EMPIRICAL FINDINGS

Different advanced time series properties like bid ask spread stationarity, mid-rate stationarity, bid ask spread and mid-rate auto co relation used in the study. Bid ask spread stationarity looks for a time trend in the mid-rate and bid ask spread. It is found that as per the KPSS test, the bid ask spread are non-stationary whereas the changes are highly stationary. As such and until date, it is found to

Table 1: Granger causality test for Swiss companies AQ1

Company	ΔBAS GrC ⇏ ΔMID	ΔMID GrC ⇏ ΔBAS
ABB	0.330	1.006
CS	1.192	2.228
HOLCIUM	1.159	3.061
SwissRe	2.022	2.517
UBS	1.410	1.187

(Source: Ang, Goetzmann and Schaefer 2010)

Table 2: Granger causality test for German companies AQ1

Company	ΔBAS GrC ⇏ ΔMID	ΔMID GrC ⇏ ΔBAS
BASF	0.615	2.084
Dialmer	0.330	1.379
DBank	0.500	1.184
Lufthansa	1.065	1.802

(Source: Corò, Dufour and Varotto 2013)

be no agreement on the fact that CDS bid ask spread be stationary or not. Another hypothesis also comes into play that mid-rate and bid ask spread both bounded from zero, and the traditional unit root is rejecting the null hypothesis of the unit root.

The mid-rate stationarity helps in determining the difference between the mid-rate levels of the KPSS tests and a null hypothesis is included as an intercept. The findings of these test helps in according with the time series properties of the CDS spreads, and the data presented in the study is taken from 9th August 2007 to 29th March 2010 included German and Swiss companies (Hamilton, 1994). The companies that taken in the study are, ABB, Roche, Swiss Re and many others across different sectors namely; insurance, chemicals, electric, healthcare and others. The ratings of the bonds vary as per the companies are holding the bonds and normally they are in the range of CCC to AAA. In the mid-rate segment, the average is around 93% of the bonds has a default risk component and 65% has a risk to the total bond spread whereas 35% of the total of the corporate bonds known to have a liquidity risk component.

Bid risk spread analyzes the changes in the mid-rate and the bid risk spread taking into consideration a very large lags and the null hypothesis serially rejected in the co related time series. The CCF determines the direction, and the co relation of the two time series observed (Campbell and Taksler, 2003). Even the CCF is helpful in making important lags and leads of the mid-rate changes or the bid risk spread changes, and the stationary difference exhibits largely in the stationary difference. It is found in the study that the time difference is responsible for the change in the mid-rate changes and the bid risk price changes. This particular theory thoroughly used in the study and deductions have been made based on the above models. Also from the study, it is observed that in case of the companies from Switzerland, a major co relation co efficient found among them but not at all a healthy sign of operations. Although the epicenter of the global financial crisis was in the United States, but the repercussions stroked throughout the world and Switzerland is not an exception. Switzerland also felt the severity of the crash, which affected all of the companies (Hertrich, 2014). Other studies are focused mainly on the economy and companies of us, but this study focuses exclusively on the non-US operations.

In addition, the timing of the study took place during 2007-2010, in the turmoil phases.

Another finding in this study is that a liquidity enhanced capital asset pricing model or a value at risk model. This inculcates the fact that liquidity should be treating as an endogenous and the control for the interaction among the liquidity with the credit risk as against the standard price method that used until date. Different models applied taking the real life scenario and the data of the study took from the recession period when the economy was showing sign of recession in mid-2007 to the end of 2010 where the economy was showing signs of improvement (Hull, 2006). The recession began with the collapse of the century old Investment bank Lehman Brothers and many business houses and hedge funds close down their operations. Bear Sterns is one such investment bank that acquired by another big giant company called J P Morgan and ultimately the two companies merged.

5. CONCLUSION

Many economists cited the collapse of the markets caused by the illiquid market and the CDS factors. This study has thoroughly researched to the cause of particularly the bonds and the effect it presented on the overall market. Illiquid market is always a matter of concern to particularly the investors and the governments as well. The investors do not get their return at the right time and the government is unable to pay off the dues and spend on the public. The findings of the study show that how the policies the government regulatory body takes should align with the risk taking ability of the entire market. In addition, solution is providing as to how a further 2007 like incidence can avert from coming.

Different views are discussing as regards to the mathematical and financial models with their application in the corporate bonds. So, the effects of applying standard testing procedures over time series analysis and the alternative methods of the application in the alternative casualty tests in the discrete time series are discussing. This study will be helpful in averting another 2007 like scenario and the government regulatory body investors will be extra cautious in investing in a particular bond.

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Author Queries???
AQ1: Kindly cite Tables 1 and 2 in text part