

Determinants of Credit Default Swap Spreads: The Case of Korean Firms

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한국 기업들의 신용부도스왑 스프레드에 대한 결정요인 분석

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Abstract Among several macroeconomic missteps blamed for the recent global financial crisis including the social problems of income distribution and the lack of proper financial remedies, two of them have received particular attention: the global BOP(Balance of Payment) imbalance and the misguided monetary policy. Such BOP imbalance was blamed for massive foreign exchange investment flows from Asia into the U.S., triggering the financial and real estate bubble in America. The latter refers to the excessively loose monetary policy of the U.S. Federal Reserve, which pushed financial institutions and households into reckless investment behavior in search of higher returns. Given the abuse of certain innovative financial techniques and new investment instruments that have been created in recent decades, both collateralized debt obligations (CDOs) and credit default swaps (CDS) enjoyed a symbiotic and toxic relationship prior to the financial crisis. This paper is organized as follows: The first section analyzes the real causes of the recent financial crisis. The second details the role of CDOs and CDS. Then, to identify key determinants of the CDS spreads in an emerging capital market, the sample data of major Korean firms' CDS spreads are used to estimate the risk premium by utilizing the multiple regression analysis. The empirical test result indicates that Korean 3-year treasury bond rate(TYIELD), market to book value ratio(MV/BV), and assets size(INASSETS) are shown to demonstrate statistically significant influences on the changes of the CDS premium for sample firms.

요약 최근(2008년) 국제금융위기를 초래한 여러 변수들 중, 사회적인 소득불균형과 금융위기에 대한 대응책의 미흡 등의 문제들을 포함한 거시경제변수들 중, 특히 2가지 요인들에 주목할 필요가 있다. 즉, 2000년 이후부터 지속되어 온, 국제적 무역 불균형과 통화정책 상의 오류라는 요인들이다. 특히 후자의 경우, 2000년대 초반부터 지속된 경제의 불확실성 확대가 연방중앙은행이 저금리정책을 유지하게 된 주된 요인이 되었으며, 이로 인한 자본시장의 과도한 유동성이 시장참여자들로 하여금 시중 금리이상의 수익률을 추구하는 금융상품을 찾기에 비정상적 노력을 기울이도록 유도하였다. 본 논문에서는 상기 거시경제적인 변수와 관련하여, 국제금융위기의 직접적이고 미시적인 원인으로 간주되고 있는 장외파생상품에 대한 분석과 실증적 연구를 수행하였다. 금융위기 상황 이전의 장외파생상품들에 대한 과도한 투자열기, 특히, 신용부도스왑(Credit Default Swap, CDS)의 국제 자본시장에서의 과열된 매매가 최근의 국제금융위기를 초래한 직접적인 원인이 되었다고 판단되기 때문이다. 본 논문의 기여점으로는 자본선진국들에서는 CDS의 스프레드(프리미엄)에 대한 결정요인들에 대한 연구가 지속적으로 이루어 졌으나, 국내 기업들에 대한 결정요인에 대한 연구는 상대적으로 미약하였다는 점이라 할 수 있다. 본 연구의 방법론으로서 산업효과를 고려한 다중회귀식을 이용한 결정요인들에 대한 유의성 검증이며, 설명변수들 중에서, 국고채(만기 3년) 수익률, 시가-장부가 비율, 그리고 기업규모가 국내 기업들의 CDS 스프레드 의 유의한 결정요인이었다. 첫 장에서는 최근의 국제금융위기관련, 그에 대한 원인분석을 서술하였으며, 둘째 장에서 부채담보부증권과 신용부도스왑에 대한 구체적 개념을 설명하였다. 다음으로 국내 기업들 중, 국제적으로 CDS 스프레드가 거래되는 표본기업들을 대상으로 결정요인 분석을 실증적으로 수행하였다. 마지막 장의 결론 부분에서는 요약과 향후 연구에 대한 내용을 서술, 제시하였다.

Key Words : CDS Spreads, CDO, AIG, Emerging Capital Markets, Korean Case

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1. Introduction

Credit default swaps (CDS) are relatively new financial instruments that have been blamed, along with collateralized debt obligations (CDOs), for their role in the recent global financial crisis of 2008-09. Although CDS have been around since the 1990s, they are one of the least understood instruments among various financial derivatives. CDS are a type of credit derivatives and its outstanding volume had risen from \$919 billion in 2001 to \$26,264 billion in the first half of the year of 2010, after peaking in 2007 at \$62 trillion.[1] Duffie[2] defines that “The classic credit swap can be thought of as an insurance contract, in which the insured party pays an insurance premium in return for coverage against a loss that may occur because of a credit event.” Accordingly, if the credit event is designated as a default, the credit swap is classified as a credit default swap. This paper first assesses the role of CDS in the recent global financial crisis, which spread quickly during the 2007-2008 period from Wall Street to Main Street and from the U.S. financial markets to global markets including many emerging markets such as Korea. We intend to analyze also the behavior of the CDS market and the risk premium of firms during the crisis as measured by the CDS spreads of major Korean firms.

This paper is organized as follows: The first section analyzes the origin and the real causes of the recent financial crisis. The second section discusses the role of CDOs and CDS in the crisis. Then, in order to identify key determinants of the CDS spreads (or premium) in an emerging capital market, the sample data of six major Korean firms’ CDS spreads are used to estimate the risk premium by utilizing the multiple regression analysis. The final section presents a summary and conclusions.

1.1 The true causes of the recent financial crisis

The global financial crisis of 2007-08 first emerged publicly in the summer of 2007, when two relatively small German banks, IKB and SachsenLB that had invested heavily in esoteric U.S. subprime mortgage-related securities, suffered huge losses and had to be bailed out by the German government in August 2007. Then, the crisis spread to Great Britain the

following month when Northern Rock, Britain's 5th largest mortgage lender, suffered the first bank run in the country in 150 years and had to be also bailed out by the British government. The crisis continued to snowball and by early 2008, giant banking institutions in Wall Street and Europe announced huge write-offs related to their exposure to subprime mortgage-related investments. In March 2008, Bear Stearns, the fifth largest investment bank in Wall Street, had to be forcibly merged into JPMorgan Chase. Finally in September that year, two giant Federal mortgage financing institutions, Fannie Mae and Freddie Mac, had to be rescued by the U.S. government and then the crisis subsequently reached its crescendo, resulting in forced liquidation or emergency bailouts of such legendary American pillars of finance as Lehman Brothers, Merrill Lynch, AIG, Morgan Stanley, Goldman Sachs, etc.

Several macroeconomic missteps have been blamed for causing the global financial crisis including the social problems of income distribution and the lack of proper financial remedies, and two of which have received particular attention: the global imbalance and the misguided monetary policy. The former refers to the chronic global BOP imbalance in the recent decades between the surplus East Asian countries of China, Japan and Korea on the one hand and the chronic deficit countries represented by the United States and many EU bloc nations on the other. Such imbalance was blamed for massive foreign exchange investment flows from Asia into the U.S. resulting in extremely low interest rates, finally triggering the financial and real estate bubble in America. The latter refers to the excessively loose monetary policy of the U.S. Federal Reserve under former Chairman Alan Greenspan in the wake of the 2000-01 tech-stock collapse and the subsequent 9-11 disaster, which contributed to a prolonged period of excessive liquidity and super-low interest rates which pushed financial institutions and households around the world into reckless investment behavior in search of higher returns.

While the above factors certainly played a role in the global financial crisis, they were not the primary causes of the crisis. The root cause of the current international financial crisis was the abuse of certain innovative financial techniques and new investment instruments that

have been created in recent decades. The world financial markets have experienced a sharp acceleration in the pace of financial innovations over the years. Major innovations have emerged in the fields of new financial products, funding and investment tools, as well as trading and risk management techniques. Both the richness and complexity of these new financial products and techniques bear a testimony to the robust spirit of financial innovation that has pervaded global financial markets since 1960s. While these innovations have improved the market efficiency in general, some of them have been misused and abused by a certain group of market participants out of ignorance and/or outright greed.

A careful observer has to conclude that the recent financial crisis was primarily the direct result of the abuse of some of the latest and most innovative financial techniques, most of which are too esoteric and technical to be comprehended fully by both government regulators and academic researchers. Many financial crises are often a byproduct of the cycle of financial innovations. First, new sophisticated financial products or techniques are developed and utilized exclusively among the few early innovators to a great advantage. At the second stage, as the innovation is copied and spread to a wider circle of market participants, some of the participants start to abuse them either out of ignorance or outright greed. At this stage, regulatory authorities have not caught up with the full implications of the new innovation and there appears a regulatory vacuum as far as the new innovative product or technique is concerned, which tends to embolden the early abusers to push the envelope to an extreme extent. At the next stage, such abusive practices are further copied and imitated by a wider circle of market participants, resulting in a full-blown crisis. At the final stage, both government authorities and general market practitioners start to take corrective actions, including introduction of new regulations and new supervisory tools. By this time, however, the damage has already been done to a significant sector of the economy. Among the financial innovations, we shall see in the following section that both CDOs and CDS enjoyed a symbiotic and toxic relationship prior to the crisis and that they were the most responsible for causing the recent financial crisis.

2. The role of CDOs and CDS in the recent financial crisis

Starting from the traditional securitization of mortgage loans in the form of MBS (mortgage-backed securities) and CMOs (collateralized mortgage obligations), Wall Street, ever hungry for more profitable business, launched in late 1990s a new type of CDOs whose collaterals were not just new mortgage loans but also already existing MBS, CMOs, and ABS (asset-backed securities) backed by mobile home loans, car loans, airplane leases and credit card receivables, as well as other CDOs and even CDS linked to these mortgage securities. Typically, CDOs are created in tranches of the underlying debt that have different degrees of riskiness. This allows CDO creators in Wall Street to market CDOs to a wide range of investors on a separate and individual tranche basis, commensurate with their own risk preference. For example, a bond pool of \$100 million is divided into three tranches and is expected to earn 15%, or \$15 million in interest per annum. The pool is divided into 3 tranches, A (\$25 million), B (\$50 million) and C (\$25 million), where A is senior to B, and B is senior to C. The associated interest rate with each tranche is 10%, 15% and 20% respectively. Therefore, if none of the bonds default, A receives \$2.5 million, B receives \$7.5 million, and C receives \$5 million. However, if there is a default and the interest income is reduced to \$11 million – (in this case, since A and B are senior to C,) they will be settled before C can be cleared. As a result, tranche A and B investors receive their full interest of \$ 2.5 million and \$7.5 million respectively, whereas tranche C investors only receive \$ 1 million.[3] The basic principle behind a CDO issue involves the re-packaging of fixed income instruments (either loans or securities) and the division of their cash flows according to a strict water fall structure. A CDO issue is constructed by creating a “brain-dead” company, known as a special purpose entity (SPE), which buys the collaterals and issues bonds (CDOs) backed by the collaterals’ cash flows. CDOs are divided into a number of tranches with different hierarchies of claims on the principal and interest cash flows generated by the collateral pool.

The main advantage of such CDOs over traditional structured products such as MBS and CMOs was the fact

that they did not need as collaterals a new supply of mortgage loans, since their collaterals need not be confined to “new” mortgage loans but already existing securities or even derivatives like CDS. The financial industry originally made massive profits from the traditional mortgage loan securitization in the form of MBS and CMOs, but Wall Street was hampered by the increasing difficulty of meeting its insatiable demand for the new supply of mortgage loans as collaterals for more MBS and CMOs, even though it encouraged mortgage lenders to make more and more subprime mortgage loans to be used as collaterals. However, the creation of CDOs solved the collateral scarcity problems for Wall Street once and for all. CDOs could utilize as collaterals not only new mortgage loans but also existing securitized instruments like MBS, CMOs and ABS or even derivatives linked to them such as CDS, thus enabling Wall Street to create almost an unlimited amount of new securitization, raking in huge sums of additional fee income in the process. Investment banks underwriting CDOs earned typical fees of 2.5% to 3.5%, implying as much as \$35 million income for a typical \$1 billion CDO issue.

While the first generation CDOs utilized as collaterals such traditional assets as mortgage loans, MBS, CMOs, and ABS, the next development was the creation of the notorious “CDO squared” and the occasional “CDO cubed”, which repackaged the hard-to-sell mezzanine CDO tranches as collaterals to create more AAA-rated CDO bonds. Finally, the latest, third generation CDOs known as “synthetic CDOs” were created by Wall Street, significantly altering the evolution of the CDO market and opening the door to rampant market abuses and resulting in the eventual collapse of the huge securitization market triggering the global financial crisis. Rather than relying upon cash assets such as bonds and loans as collaterals, synthetic CDOs are created from pools of CDS, which are derivatives similar to insurance contracts protecting against certain credit risks. The use of CDS as collateral pools in CDOs could give the same payoff profile as cash assets but did not require the upfront cash funding for buying the traditional collateral asset pools. Furthermore, using CDS as opposed to cash bonds gave CDO managers in Wall Street the freedom to securitize any cash flows without the need to locate, purchase, or own the specific

collateral asset pools prior to CDO issuance. With the development of synthetic CDOs, the CDS market became even more valuable to Wall Street, and the volume of both CDS and CDOs experienced an exponential growth.

At first, CDS contracts were originally developed to provide credit institutions and investors the hedging tool against their credit risks. For example, if BOA provides \$100 million 5-year loan to Lehman Brothers, it can hedge against the Lehman’s potential loan default by purchasing 5-year \$100 million CDS on the Lehman credit risk from, say, AIG at the price of 150 basis points. BOA then pays AIG each year \$1.5 million (150 basis points on \$100 million), but if Lehman Brothers either defaults on its \$100 million loan or goes bankrupt, BOA can collect \$100 million from AIG, who is the seller of CDS in this case. Later, however, this useful financial innovation for credit risk hedging has turned into speculative tools, as many speculators such as hedge funds bought Lehman CDS even without any credit exposure to Lehman Brothers in the first place. These are known as “naked CDS” and those who buy naked CDS have essentially shorted the underlying assets or entity. Although precise data are not available, it is estimated that naked CDS accounted for almost 80% of the CDS market in 2008 just prior to the financial crisis.

Bear attacks on an entity such as Lehman Brothers can take place if enough speculators started to buy Lehman CDS, driving its price from 150 basis points initially to 300 to 500 or 700 points, making it extremely difficult or even impossible for Lehman to get credits from the market, forcing it into bankruptcy. Even if Lehman does not go into bankruptcy, early purchasers of naked Lehman CDS at 150 basis points can earn huge profits as Lehman CDS price goes up from 150 basis points to 500 or 700 points. As a massive seller of CDS to the tune of \$500 billion on the opposite side of the CDS trades, AIG was mortally wounded in the end by its excessive exposure to CDS, which provides an asymmetrical risk-reward outcome for a CDS seller. Sellers of CDS contracts such as AIG are exposed to unlimited risk on the downside while reaping only limited reward on the upside. On the other hand, the risk-reward profile for the buyers of CDS such as hedge funds and other speculators in CDOs is the opposite. AIG mispriced its potential risk exposure in a financial crisis, and both speculators and counterparties

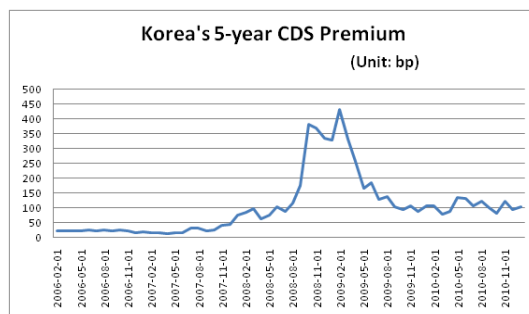
pushed it on the verge of bankruptcy on September 16, 2008.[4]

CDS has two main types: single-named CDS and multi-named CDS. In single-named CDS, the reference party is normally an individual corporation or government. The succession provision will define actions in the event of takeover or spinoff involving the reference entity. Multi-named CDS, however, are extremely complicated, with a portfolio or group of assets such as bonds and debts acting as reference assets. There are three types of multi-named CDS: basket CDS has a portfolio of two to ten reference assets or entities, portfolio CDS has dozens or more of reference entities, and index CDS can have more than 100 reference entities in the bucket. CDS can also have two distinct payment profiles. In regular CDS, a credit default event triggers a one-off payment, after which the CDS contract expires. However, more complicated CDS known as PAUG (pay-as-you-go) is often used in synthetic CDOs. PAUG CDS protects the holders of bonds such as CDOs against interest shortfall, principal shortfall and write-downs, making them ideal as collaterals for CDOs. For example, when according to a waterfall the interest payment of a certain month falls short of available funds cap, the protection seller will need to make the floating payment to the protection buyer to cover the shortage. But if in the following months the interest payments from collateral pools are recovered, the protection buyer will reimburse the protection seller. Such a structure makes the payment flows of PAUG CDS two-way.

3. Determinants of the CDS premium (spreads) for an emerging capital market: Korean case

This paper now examines an empirical issue that has received little attention in the finance literature: the determinants of the CDS premium in an emerging market such as Korea. The Korean CDS market has been actively utilized by both domestic and foreign entities, with the gross notional amount estimated at \$126 billion as of early 2010.[5] Trading of Korean CDS products is carried out for both hedging and speculative purposes. Because of the critical role played by CDS in the global financial

markets, it may be useful to find the key determinants or characteristics in the Korean CDS market, especially because very little empirical research in this field has been done in the emerging markets such as Korea. Moreover, a comparison of the empirical results between advanced and emerging capital markets for key CDS determinants may be useful for the traders and financial institutions active in both markets, given the increasing internationalization of the financial markets. One can easily see that the Korean CDS market was not immune to the recent global financial crisis, as the following chart indicates. During the height of the financial crisis, the CDS premium on 5-year Korean Treasury bonds shot up to almost 450 basis points from the pre-crisis level of less than 50 basis points. Similarly sharp market fluctuations were also observed for the CDS premium on major Korean firms. In this section, we intend to analyze the key determinants of the CDS premium for representative Korean firms.



[Fig. 1] Korea's CDS Premium(Source: Bloomberg)

3.1 Literature Survey

Blanco et al.[6] performed their study to model the dynamics of the two measures of credit risk, such as CDS prices and credit spreads. With the sample data of 33 reference entities in the U.S. and Europe, empirical tests were conducted to identify the dynamics of the credit risks by using several categories of the independent variables. They found that macro-variables including interest rates, term structure, equity market returns, and equity market implied volatilities have a larger immediate impact on credit spreads than on CDS prices, while firm-specific variables such as equity returns and implied volatilities have a greater effect on CDS prices than on

spreads, both in terms of absolute magnitude and level of significance. They described that lagged adjustments of the credit spreads to the CDS prices may be necessary for price discovery, since both CDS prices and credit spreads are equally sensitive to these variables in the long run. Abid et al.[7] also tested the possible determinants of CDS price and the drivers of default risk during the period of May 2000 through May 2001. A sample data for 73 credits were obtained from eleven European countries. Among the five independent variables, credit ratings were found to be the most statistically significant attribute to explain the prices of CDS. While the slope of the yield curve and free risk interest rate showed their significant influence on the CDS prices, systematic risk and standard deviation on equity return were found to be insignificant. The study by Avramov et al.[8] tested the potential determinants of credit spread changes, not its level. Based upon a large number of the sample data (2,375 corporate bonds including high-yield bonds), the test results revealed that idiosyncratic volatility and the price-to-book ratio had statistically significant influence on the time-series variation in corporate credit-spread changes. Overall, there was strong evidence that company-level variables combined with common factors explained more than 53 percent of the variation in credit-spread changes (measured in adjusted R²), which was statistically significant. The research by Ericsson et al.[9] was aimed at finding any relationship between CDS spreads and independent variables including firm leverage, volatility, and riskless yields. The data for the spreads covering the period of 1999–2002 on senior debt were utilized as the sample. On the general results of the levels regression and the difference regression obtained in this study, the estimated sign for the statistically significant coefficient on leverage was positive, as expected a priori in finance theory. Second, the estimated sign for the coefficient on volatility was positive with its coefficient being statistically significant. Third, the coefficient on the 10-year yield as a proxy for riskless yield also conformed to theoretical expectations because it showed a negative sign.

The study performed by Greatrex[10] utilized regression analyses to explore the ability of structural variables to explain the variation in CDS spread changes. The study employed the five-year maturity contract prices

to calculate the changes of the spread, taking into account its accessibility with most commonly traded maturities. Especially, two legs of CDS spread changes were used to control for autocorrelation in the study. By employing nine explanatory variables to be applied to the multi-variate regressions, the study found that leverage and volatility were key determinants of CDS spread changes, since these two variables explained about half of the variation for the dependent variable. The coefficient on a CDS rating-based index was consistently positive in its sign and statistically significant in the estimated models. Kim & Lee[11] suggested two methods for determining Korean won (KRW)-denominated CDS spread: One method used the market quotes of dollar-denominated CDS, whose reference assets were dollar-denominated bonds issued by Korean domestic firms. The other one utilized the credit spreads of won (KRW)-denominated risky bonds. In testing for the determinants of KRW-denominated CDS spread by utilizing the former method, they found that volatility of KOSPI200 options and KOSPI200 returns were statistically significant as the most important factors affecting the spread. However, the Korean Treasury bond yields and the spreads between Korean long-term bond yields and short-term yields were the significant factors in the latter method, but not in the former.

3.2 Data and Methodology

3.2.1 Data collection and methodology

This study conducts an empirical test of the CDS spreads of six major Korean firms in different industries, utilizing the most recent financial data and independent variables. The sample is composed of the following firms: Hyundai Motor, KT Telecom, Korea Electric Power, POSCO, SK Telecom, and Samsung Electronics. Both financial firms and regulated industries are excluded from the sample set. Our criteria for selecting the sample firms are based on the following characteristics: First, the firms are in the population of the Bloomberg Database and the KISvalue III for Korea. Second, all the data for each corporation should be available continuously for at least two years from 2008 to 2009. Third, linear interpolation is utilized, if necessary, in order to obtain daily estimates used in the model as also employed in Blanco[12] and

Greatrex[13],[14]

To find key determinants of the CDS premium for the Korean sample firms, two separate tests with and without dummy variables for industry effect are carried out using a multiple regression analysis.

The following regression model is estimated by the OLS procedures:

$$\begin{aligned} \text{CHANGE}_{it} = & \mathbf{b}_0 + \mathbf{b}_1\text{INASSETS}_{it} + \mathbf{b}_2\text{PFT}_{it} + \mathbf{b}_3\text{STD}_{it} \\ & + \mathbf{b}_4\text{LEVERAGE}_{it} + \mathbf{b}_5\text{MVBV}_{it} \\ & + \mathbf{b}_6\text{TYIELD}_{it} + \mathbf{b}_7\text{FOS}_{it} + \mathbf{b}_8\text{IND1}_{it} + \mathbf{b}_9\text{IND2}_{it} \\ & + \mathbf{b}_{10}\text{IND3}_{it} + \mathbf{b}_{11}\text{IND4}_{it} + \mathbf{e}_{it} \end{aligned} \quad (1)$$

Where,

$i = 1,2,3 \dots\dots,6$ (companies),

$t =$ From 1/4/2008 to 12/30/2009.

CHANGE = Daily percentage change of CDS premium as dependent variable (DV)

INASSETS, PFT, STD, LEVERAGE, MVBV, TYIELD, and FOS as independent variables (IDVs)

Ind1 = 1 if a sample firm belongs to the automobile industry. 0, otherwise.

Ind2 = 1 if a sample firm belongs to the electricity and gas industry. 0, otherwise.

Ind3 = 1 if a sample firm belongs to the telecommunication industry. 0, otherwise.

Ind4 = 1 if a sample firm belongs to the steel industry. 0, otherwise.

e_{it} is the error term assumed to be normally distributed, homoscedastic, and independent.

3.2.2 Definition of the variables employed in the regression

As a proxy for the CDS premium for the Korean sample firms, the percentage change of the CDS premium on a daily basis (CHANGE) has been used as the dependent variable in the multiple regression model. With respect to the independent variables (IDVs), seven variables are employed to test for the possible determinants of the CDS premium for the sample firms. These IDVs are based upon their commonalities as the IDVs tested in the previous literature described earlier, and they can facilitate a comparison between the test results obtained in the developed and emerging capital markets. The IDVs selected are size(INASSETS), profitability(PFT), volatility(STD), leverage(LEVEAGE), market value to book value of equity (MVBV), risk-free

interest rate(TYIELD), and foreign ownership for each sample firm (FOS). Besides these seven IDVs, industry dummy variables are added to find any significant industry effect on the CDS premium, as the industry effect has been one of the controversial issues in the finance literature.[15],[16] Therefore, total eleven IDVs are tested in the multiple regression model including the four industry dummy variables for the Korean sample firms.

[Table 1] Definition of the Independent Variables (IDVs):

Definition	Proxy Variable	Measurement
Size	INASSETS	Natural Log of Book value of assets at the fiscal year-end
Profitability	PFT	Earnings before interest and taxes(EBIT)/Book value of assets at the fiscal year-end
Volatility	STD	Standard deviation of the changes in EBIT during the sample period
Market value based leverage	LEVERAGE	Total liabilities at book value / (Total liabilities at book value + Total preferred stock at book value + common equity at market value)
Market- to book- value of equity	MVBV	Market value of equity / book value of equity
Risk-free interest rate	TYIELD	Three-year Korean treasury yield
Foreign ownership	FOS	Foreign ownership of each Korean sample firm
Industry	IND1, IND2, IND3, IND 4	Dummy variable representing the corresponding industry to which each Korean sample firm belongs. Base industry: the semiconductor industry IND1: the automobile industry IND2: the electricity and gas industry IND3: the telecommunication industry IND4: the steel industry

3.3 Results and analyses

3.3.1 Results:

The following results (Table 2: Result A and Result B) are obtained by the ordinary least squares (OLS) procedures for the sample firms.

[Table 2] Results from the regressions:

Result A: Without including Industry Dummy Variables:	
Change = 0.20717 - 0.00919INASSETS + 0.11390PFT + 1.15825E-14 STD	(t-statistic) (0.68) (-0.87) (1.01)
+0.00687LEVERAGE - 0.02471 MVBV	(0.19) (-2.30)*
+0.01441 TYIELD + 0.0005971 FOS	(8.70)* (1.41)
F-value* = 12.92, R ² = 3.26%, Adjusted R ² =3.00%	
*: Significant at the 5% level of significance.	

Result B: With including Industry Dummy Variables:	
Change = 1.55542 - 0.04751INASSETS + 0.045PFT - 5.6722E-14 STD	(t-statistic) (1.90)** (-1.81)**
(0.45) (-0.83)	
+0.00687LEVERAGE - 0.02120MVBV	(0.84) (-1.29)
+ 0.01429 TYIELD + 0.0005391 FOS	(6.81)* (0.85)
- 0.09989IND1 - 0.06468IND2	(-1.15) (-1.60)
- 0.18281IND3 - 0.09941IND4	(-1.48) (-1.44)
F-value* = 8.80, R ² = 3.48%, Adjusted R ² =3.09%	
*: Significant at the 5% level of significance.	
**: Significant at the 10% level of significance.	

3.3.2 Analyses:

The empirical test result indicates that TYIELD, MV/BV, INASSETS are shown to demonstrate statistically significant influences on the changes of the CDS premium for the Korean sample firms. First, the three-year Korean Treasury yield as a proxy for the risk-free rate exhibits its significant and positive influence on the changes of the CDS premiums (CHANGE) as described in the Result A and Result B.[17] The ex ante expectations relating to the relationship between the interest rate effect and a firm’s CDS premium may be

statistically significant, but the result is opposite from the previous empirical findings such as Avramov et al.[18] and Greatrex[19]. The upward trend of the risk-free (spot) rates may increase a firm’s value mainly due to higher reinvestment rates and in turn can reduce the firm’s default risk. [20] Avid et al.[21] also found that the variable of the free risk interest rate is negatively correlated to the levels of credit default swap prices. In general, the positive sign of the estimate for TYIELD in this study is different from the previous empirical researches, but this result may be due to the different stages of the domestic capital market development. While most previous empirical studies were performed for the sample firms in the developed capital markets, this research is conducted with the sample firms in Korea, which may be still classified as an emerging capital market. In other words, it is possible that macroeconomic variables such as country risk may offset the benefits of higher reinvestment rate, especially for the firms belonging to emerging markets. Moreover, Kim & Lee[22] found that there was a positive (even if statistically insignificant) relationship between the CDS spread and the ten-year Korean Treasury yield in their multiple regression model, after employing only domestic macroeconomic variables for the Korean sample data.

Second, any size effect as a possible determinant of CDS premium was not tested in the previous studies. In Result B, the coefficient for INASSETS shows a negative and statistically significant influence, which indicates that the larger size of a firm is related to a lower dependent variable (DV), which is expected in the finance theory. In other words, the advantage of diversification to reduce a firm’s total risk exposure may be more applicable to larger firm in sales or assets as described in Kim & Berger[23]. As the sample firms utilized in this study are among the biggest in size as measured by assets, sales or market capitalization in the Korean economy, a higher degree of diversification may reduce their total risk perception, which, in turn, may result in lower CDS premium.

Third, Barclay et al.[24] found that the degree of a firm’s “growth options” relative to its “assets in place” could be measured by its market-to-book value ratios. In this study, MV/BV as the proxy for growth opportunities for a company shows its statistical significance at the 5%

level with a negative coefficient in Result A. This finding is consistent with the test result in Avramov et al.[25]. They argued that improving prospects of both growth and profitability would decrease the probability that the company may reach the default threshold. Therefore, the result on the MV/BV variable seems to imply that a firm with higher growth opportunities can reduce the default risk, as measured by the changes of its CDS premium in this study.

4. Concluding remarks

This paper has studied both the history and root causes of the recent global financial crisis. Special attention is given to the nature and role of both CDOs and CDS in the unprecedented financial crisis. An empirical test has also been performed to find key determinants of the CDS spread (or premium) in an emerging capital market, utilizing the data for six major Korean non-financial firms. This study has its weaknesses. Given the data availability, a relatively small number of Korean firms are included in the study, given that only a small population of Korean firms has their CDS actively traded in the market. More robust results are expected in future research by utilizing a wider spectrum of industries and a larger sample data set. More importantly, there may be other important explanatory variables such as credit rating, which might affect the Korean CDS premium. The constant term in the time series and cross-sectional OLS regression model (Result B) in this study, which represents the average effects of omitted variables, is found to be statistically significant ($p = 0.0577$). Due to the data limitations, most of the sample Korean firms employed in this study were among the investment-grade levels in credit rating or quality.[26] However, Avid et al.[27] found that credit ratings were the most statistically significant attribute to explain the CDS spreads. Credit rating was also found to be statistically significant in the Greatrex's study[28].

Despite these limitations, this paper makes a positive contribution to the scant literature on the key determinants of the CDS spreads in emerging capital markets. By taking into account the results obtained in this study, a comparison between the two capital markets may be

beneficial for both scholars and industry practitioners, especially in the current environment of rapid integration of the global financial markets.

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