

# AN ANALYSIS OF CREDIT DEFAULT SWAPS: 2002-2009 PERIOD

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## ABSTRACT

*We analyze whether the CDS market released any abnormal signals that could have been discerned prior to the 1988 subprime chaos that brought about the global financial crisis. In particular, an examination of the conformity of this market with the standard day-to-day market factors is our aim. Our results indicate that the CDS market was linked to a number of other financial entities, that it affected and was affected by a select major financial variables, and that it was functioning normally in the sense of being similar to other financial markets. However, while the market was riding on the interplay of its forces, very regrettably the underlying trust and assumptions were never questioned.*

for instance, Norden and Weber, 2004, 2009; Jorion and Zhang, 2007).

## 1. INTRODUCTION

Before the massive breakdown of the financial market started to eke out, credit derivatives were considered among the most significant and successful financial innovations. According to the Bank for International Settlements (BIS) reports and Berndt et al. (2005), the credit derivative market had significantly and increasingly played a vital role in the financial markets. Today, obviously, such views are substantially mitigated, if not fully reversed.

To enhance liquidity and return, a significant number of financial institutions including mutual funds, hedge funds, and institutional investors used credit derivatives intensively over the period 2000-2008. The most popular credit derivative that was employed during this period was credit default swap (CDS). CDS allows an entity that purchases it to manage and protect the credit risk of the reference entity in the same manner as hedging against the other risks. This was the textbook definition that we used to use. Today, we have learned that CDS is similar to an insurance product, but it was not called insurance. The term “swap” was used in lieu of insurance to bypass the legal ramifications and the reserve requirements that insurance products had to abide by. Thus, CDS, though incorrectly labeled, acts as insurance premium which a buyer periodically pays to insure the credit risk of reference entity while a seller receives premium and obliges to buy the reference entity from the buyer at the face value in case that a negative credit event could occur.

Notwithstanding all the issues that currently surround this product, it is of interest to examine if this product had any relations with other markets or financial variables; whether it followed any theoretical construct that could explain its paths; or whether it was empirically linked with or governed by one or more major financial market determinants. Given the notoriety that is currently *a priori* assigned to this product, one gets a feeling that CDSs may resemble, or may have acted, like loose cannons in the global financial markets. This runs counter to some prior research on CDS that have documented the efficiency of this product (see,

During the current financial turmoil, it has also become increasingly acceptable to consider CDSs as the major root of the problem. If the CDS market has been efficient or if this market has not had any significant linkages with the other markets, then no financial contagion should have occurred. If correct, the damage should have been limited to the CDS market. This obviously has not been the case. The reality thus does not seem to support efficiency and zero linkages. An investigation to reconcile this controversy is thus in order.

The purpose of this paper is to examine whether the CDS market has been abnormal in the past, or whether it has released any dysfunctional signals that could have been discerned by the financial market prior to the crisis. In particular, whether it has been driven by one or more financial market variables. The remainder of the paper is organized as follows. Section 2 provides an overview of prior related literature. Section 3 describes the data that are employed. Section 4 establishes the methodology. Section 5 presents and discusses the results. The last section provides summary and conclusion.

## 2. PRIOR LITERATURE

We limit this review to the existing research in the CDS market. The prior literature on CDS is relatively scant. In general, three categories of research could be cited: CDS in light of other financial markets, the impact of credit announcement on CDS spread, and the efficiency in CDS market.

In the first category, the first notable findings are by Norman and Weber (2004). Using weekly and daily data from an international sample of 58 firms over the period 2000-2002, they study the relation between CDS, bond, and stock markets. They find that the stock returns generally lead the changes in CDS spread and bond spread; and CDS spread changes Granger cause bond spread changes. Using cointegration and vector error

correction model, CDS market displays a higher level of price discovery than the bond market, especially for the US reference entities. These results are later confirmed by Blanco et al. (2005).

The above findings support the weaker results that were already reached by Longstaff et al. (2005) within their VAR framework of analysis. Later, Berndt and Ostrovnaya (2008) investigate the relation between the CDS, stock, and option markets. During negative earnings releases, large incremental spillovers from CDS to stock markets seem to exist. During the period before releasing negative news, if the information has not been reflected by CDS premiums, the equity market does not seem to respond to abnormal changes in options prices. These findings, more vividly today, raise the first question of what determines the CDS spread.

Callen et al. (2007) study the impact of earnings on CDS. They show that changes in earnings and earning-surprises are negatively significantly correlated with the changes in CDS spreads. In this regard, a second question could be raised as to whether the drop in earnings or the change in CDS spread may entail the downturn in the stock market.

On the second category of the research on CDS, i.e., the impact of credit announcements, some scant results are available. Historically, investors have relied on credit rating agencies to guide their investment decisions. The rating agencies in turn have played a vital role in investors' decisions, particularly in fixed-income market. Ratings are initiated when a security is publicly offered, and thereafter are reviewed periodically. Over time, the ratings change based on the performance of the underlying assets and the probability of default.

Norman and Weber (2004) investigate the relation between the stock and the CDS markets and the rating announcements by three leading credit rating agencies, i.e., Standard and Poor's, Moody's, and Fitch. They employ the traditional event study methodology over the period 2000-2002. Two separate events are considered: the actual rating changes, and the reviews of the rating changes. Their results show some interesting findings. First, stock and CDS markets anticipate rating downgrades by all agencies. Second, negative events provide significant abnormal return while positive events

have no effect. Third, for the actual downgrade events, cumulative stock abnormal returns decline constantly before the event date. But, for the reviews of rating changes, the decline happens within 30-10 days before the event date. Fourth, the reviews for downgrade by Standard and Poor's and Moody's yield significant abnormal return in both markets while the actual downgrades do not. The Fitch actual downgrade and the reviews for downgrade have no significant impact in both markets. Last, the prior rating history significantly affects both markets while the difference between the old rating and the average rating by all agencies affects significantly only the CDS market.

Hull et al. (2004) also demonstrate the relationship between CDS spreads, bond yields, and credit rating announcements. They confirm that the CDS spreads of a company is inversely associated with its credit rating. The lower the credit rating, the larger the credit spreads. Surprisingly, only reviews of downgrade, not the actual downgrades, and negative outlook show significant abnormal return.

On the last category of the research in CDS, i.e., the informational efficiency, some researchers have made novel, though indirect, contributions in this regard. Jorion and Zhang (2007) study the intra-industry information transfer effect between the stock and CDS markets around various types of credit events. Positive (negative) correlations across CDS spreads imply contagion effects (competitive effects). Their analysis indicates that contagion and competitive effects are caused, respectively, by Chapters 11 and 7 bankruptcies. This evidence is notably stronger in the CDS market. Archarya and Johnson (2007) analyze the role of insider trading in the CDS market. They employ a microstructure approach and use the data on the quoted CDS premium and the spread for cross-sectional U.S. firms over the period of January 2001 to October 2004. They find information flow from the CDS to the equity markets. The degree of information flow is positively related to the entities with significant bank relationships, and is intense on bad-news days or if the entities are likely to have negative shocks. These results suggest the existence of insider trading in the CDS market, a view that was not taken seriously when it was most needed. Interestingly, the evidence does not show that the level of insider trading affects negatively the prices or the liquidity in the equity and the CDS markets. Thus a merry-round-for-

all market was left to itself and was not identified to be in need of any interventions or probes.

Norden (2008) studies how CDS market reacts to the credit rating announcements based on public and private information. The public information is measured by means of the general media coverage of CDS and corporate news. Private information is measured by the firms' number of major bank lenders in the market for large commercial and syndicated loans. His results indicate the existence of spillover effect: private information flows through CDS trading, a conclusion that is consistent with the result of Archarya and Johnson (2007).

Imbierowicz and Cserna (2008) study the efficiency in the CDS market by using a global database over the period 2002-2006. They look for capital structure arbitrage opportunities based on mispricing in the CDS market. Their theoretical CDS spread is based on the methodologies of the Credit Grades (2002), Leland and Toft (1996), and Zhou (2001). They find that, at the beginning, the CDS market is inefficient; nevertheless, the level of efficiency improves over time. On the average, all models seem to overestimate the CDS premiums: 32 basis points by the Credit Grades (2002) model, 26 basis points by Leland and Toft (1996) model, and 34 basis points by Zhou (2001) model. The arbitrage profit, including transaction cost, is positively significant but has diminished over time. Furthermore, the higher the arbitrage profit, the riskier the obligors. The results support the traditional risk-return tradeoff concept that we are all familiar with.

### 3. DATA CHARACTERISTICS AND SOURCES

Our period of analysis is from Jan 1, 2002, to May 31, 2009. Daily information about CDS is obtained from Bloomberg which provides CDS spread from various sources. Because CDS is traded in the OTC market, the information is not systematically collected and gaps in the data are frequent. However, Bloomberg provides daily CDS spread data on a historical and more consistent basis. Yet, the data are not fully consistent across the different CDSs. The maturity of CDS covers 1, 3, 5, 7, and 10 years in USD, Euro, and Japanese yen. The CDS spread from Bloomberg is EOD Mid/Last spread (New York time).

The Par Credit Default Swap Spread for a given maturity is the deal spread that makes the CDS of the maturity price to par.

Except for the CDS data, the rest of our daily data is obtained from DataStream. On the CDS spread, we limited our choices to only the 5-year maturity. We believe this is the most relevant and acceptable period given the scope of our study.

The data have the following characteristics: a) 5-year maturity spread, b) separate USD and Euro currency unit CDSs, and c) daily over the period of Jan 1, 2002, to May 31, 2009. Based on these selection criteria, there are 77 countries in our sample but in most of these countries less than 5 CDSs are traded. We thus limited our scope to the countries that have at least more than 5 CDSs trading. Also, the CDS data cover all sectors, i.e., basic material, communications, consumer (cyclical), consumer (non-cyclical), diversified, energy, financial, government, industrial, technology and utilities.

In our final sample, the number of CDSs that are trading in each country is reported in Table 1. Some details of the major variables that are employed are included in Table 2.<sup>1</sup>

### 4. METHODOLOGY

Our scope at this point is to link the CDs in general with a host of relevant financial variables to see if any abnormal situations may be detected. A set of select major financial variables are employed (see Table 2). For simplicity, we cast all of these variables into CDS spread (SPR, henceforth) and financial and economic variables (FEV); and we postulate that, based on the literature on the derivatives market, and particularly swaps, some relations between these two sets of variables may be hypothesized. Without being bogged down with the specification details of such relations, we start with the following general functional form:

$$SPR = f(FEV) \quad (1)$$

Considering primarily macro-financial variables, among the battery of the prospective FEVs two variables stand out, i.e., interest rate and

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<sup>1</sup> The details of the reference CDSs over companies and countries are available upon request.

exchange rate. These variables are well established in the prior literature in both theoretical and empirical fronts. Given that the CDS market may also be driven directly and independently by its own constituency, an approach similar to CAPM that links each CDS spread with its market premium on SPR suggests itself. Inclusion of a CDS index, or a CDS market premium, among the FEVs is thus in order. Also, assuming that the CDS market in general is not fully autonomous and that it may have some links with other markets, particularly with the overall financial market, leads us to consider a general financial market index among the FEVs.

Given the above assumptions and postulates, a more detailed version of relation (1) may be expressed as:

$$SPR = f(IR, FOREX, SPRIND, MIND) \quad (2)$$

where IR is interest rate, FOREX is currency rate, SPRIND is CDS spread index, and MIND is a financial market index.

Prior to empirical application, the exact specification of relation (2) has to be established. This requires not only theoretical support, but also some fine-tuning that could arise due to the nature of the data. These include consideration of: a) leads and lags in the variables, b) separate specifications and estimation of relation (2) to address the time-domain of our analysis, c) inclusion of a set of dummy variables on the right hand-side of relation (2), and d), given that our data is daily, proper choice of an estimation methodology.

## 5. EMPIRICAL RESULTS

We first consider relation (2) under its most simplistic specifications, i.e., keeping and thus examining the effect on the CDS spread of only a major independent variable. We then consider the more extended version of relation (2). Prior to this task and to gain insight into the relations among the variables, we examine correlations among them.

Our preliminary results on the correlations are included in Table 3. There is a wide range of values here indicating various degrees of possible linkages of CDS with other financial factors.

As to the estimation of relation (2) and the choice of the estimation technique, given that our data is daily and thus noisy, we have resorted to GARCH (1, 1) technique. In our preliminary steps, we also estimated all the specifications under OLS. For conciseness, the OLS estimation results are not reported here but are available upon request. We therefore concentrate on the results that are obtained under GARCH (1, 1). These are presented in Table 4.

Overall, based in the results of Table 4, the majority of the t-statistics for the estimated parameters indicate statistical significance at high levels. Thus CDS relations and linkages with other markets and variables are statistically highly established. The CDS market seems to be functioning similar to other financial markets. No anomaly is discerned. Given the realities of the past year and half, it appears that participants in the CDS market had put their full trust in the operation of the market.

## 6. CONCLUSIONS

In this paper we have examined whether we could identify any abnormal signals in the CDS market that could have guided us to foresee or prevent the collapse of the 2007-2008 financial markets. The current writings that attribute the collapse of the financial markets to the subprime mortgage and/or to the CDs in general now abound. But, none seem to have existed prior to the early days in 2008. This puzzling absence of any signals is still mind bothering. In this paper, we reached the surprising results, and to some extent we may have aggravated the situation, by concluding that the market seemed normal in its operation, even under some theoretical and statistical re-examinations. This should not signal that under a more complex and rigorous analyses, our conclusions may not change. We acknowledge that in this paper, within the limit of our data, our approach may be considered relatively simple, but probably a good starting point.

It is now widely accepted that the subprime debacle and its associated CDSs brought about the chaotic global financial crisis that are still with us. Notwithstanding our current knowledge about this market, we have found, though still puzzling, that this market seemed to function well in conformity with the standard day-to-day functions of other financial markets. Was it an Adam Smith type of market operation or by a

clever design? Though we tend towards the former, it remains to be seen. In sum, at least at this juncture of our analyses, our results indicate that the CDS market was linked to a number of other financial entities, that it affected and was affected by a select major financial variables, and that it was functioning normally in the sense

of being similar to other financial markets. Apparently, while the market was riding on the interplay of its forces, the underlying trust and assumptions were, very regrettably, never questioned.

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**Table 1. Number of CDSs per currency that are trading in each country.**

<b>USD Currency Unit</b>		<b>Euro Currency Unit</b>	
Australia*	41	Austria*	8
Canada	29	Belgium*	6
Hong Kong	10	Denmark*	9
Japan*	12	Finland	6
Korea**	17	France*	63
Singapore	12	Germany*	55
Switzerland*	6	Ireland	10
UK*	6	Italy*	37
US	476	Luxemburg	8
		Netherlands*	39
<b>Total</b>	<b>609</b>	Norway	6
		Portugal*	7
		Spain*	25
		Sweden*	23
		Switzerland	19
		UK	121
		US	7
		<b>Total</b>	<b>450</b>

\*, \*\*. These include 1 (\*) and 3 (\*\*) CDSs that are issued by the respective governments.

**Table 2. Details of the major variables.**

<b>Variable</b>	<b>Unit</b>	<b>Source</b>	<b>Period</b>
CDS Spread*	Basis Point	Bloomberg	01/01/2002-05/31/2009
US Dollar Index	USD Index	Bloomberg	01/01/2002-05/31/2009
Federal Fund Rate (FFR)	Percentage	Bloomberg	01/01/2002-05/31/2009
CDS Index*	Basis Point	Bloomberg	07/20/2004-05/31/2009
Euro Index	Euro Index	DataStream	01/01/2002-05/31/2009
Stock Market Index	USD and EURO Index	Yahoo Finance	01/01/2002-05/31/2009

Note: \* 5-year maturity. For the CDS index, the data are unavailable prior to 07/20/2004.



**Table 3. Daily return correlations in different markets/countries over the period of 07/20/2004-05/31/2009.**

**Australia**

	CDS	Dollar Index	FFR	CDS Index	Euro Index	Stock Market
CDS	1.0000					
Dollar Index	0.1265	1.0000				
FFR	-0.0196	-0.0557	1.0000			
CDS Index	0.3339	0.0599	-0.0443	1.0000		
Euro Index	-0.1166	-0.6302	-0.0077	-0.0356	1.0000	
Stock Market	-0.4881	-0.1667	-0.0232	-0.1560	0.1614	1.0000

**Canada**

	CDS	Dollar Index	FFR	CDS Index	Euro Index	Stock Market
CDS	1.0000					
Dollar Index	0.0909	1.0000				
FFR	0.0435	-0.0557	1.0000			
CDS Index	0.0806	0.0599	-0.0443	1.0000		
Euro Index	-0.0557	-0.6302	-0.0077	-0.0356	1.0000	
Stock Market	-0.0899	-0.2361	-0.0775	-0.0479	0.1947	1.0000

**Hong Kong**

	CDS	Dollar Index	FFR	CDS Index	Euro Index	Stock Market
CDS	1.0000					
Dollar Index	0.0466	1.0000				
FFR	-0.0034	-0.0557	1.0000			
CDS Index	0.2799	0.0599	-0.0443	1.0000		
Euro Index	-0.0769	-0.6302	-0.0077	-0.0356	1.0000	
Stock Market	-0.2732	-0.1505	-0.0539	-0.1505	0.1616	1.0000

**Japan**

	CDS	Dollar Index	FFR	CDS Index	Euro Index	Stock Market
CDS	1.0000					
Dollar Index	0.0631	1.0000				
FFR	0.0365	-0.0557	1.0000			
CDS Index	0.2581	0.0599	-0.0443	1.0000		
Euro Index	-0.0724	-0.6302	-0.0077	-0.0356	1.0000	
Stock Market	-0.2878	-0.1527	0.0039	-0.1370	0.1606	1.0000

**Korea**

	CDS	Dollar Index	FFR	CDS Index	Euro Index	Stock Market
CDS	1.0000					
Dollar Index	0.0863	1.0000				
FFR	0.0050	-0.0557	1.0000			
CDS Index	0.1785	0.0599	-0.0443	1.0000		
Euro Index	-0.0840	-0.6302	-0.0077	-0.0356	1.0000	
Stock Market	-0.3355	-0.1248	0.0517	-0.1678	0.1471	1.0000

**Singapore**

	CDS	Dollar Index	FFR	CDS Index	Euro Index	Stock Market
CDS	1.0000					
Dollar Index	0.0390	1.0000				
FFR	0.0187	-0.0557	1.0000			
CDS Index	0.1552	0.0599	-0.0443	1.0000		
Euro Index	-0.0937	-0.6302	-0.0077	-0.0356	1.0000	
Stock Market	-0.1795	-0.1240	-0.0502	-0.0939	0.1408	1.0000

**Switzerland**

	CDS	Dollar Index	FFR	CDS Index	Euro Index	Stock Market
CDS	1.0000					
Dollar Index	0.0828	1.0000				
FFR	0.0276	-0.0557	1.0000			
CDS Index	0.0461	0.0599	-0.0443	1.0000		
Euro Index	-0.0408	-0.6302	-0.0077	-0.0356	1.0000	
Stock Market	-0.1270	-0.1319	-0.0522	-0.1115	0.1404	1.0000

**UK**

	CDS	Dollar Index	FFR	CDS Index	Euro Index	Stock Market
CDS	1.0000					
Dollar Index	0.1197	1.0000				
FFR	-0.0555	-0.0557	1.0000			
CDS Index	0.2026	0.0599	-0.0443	1.0000		
Euro Index	-0.1298	-0.6302	-0.0077	-0.0356	1.0000	
Stock Market	-0.2867	-0.1876	-0.0585	-0.1008	0.2440	1.0000

**US**

	CDS	Dollar Index	FFR	CDS Index	Euro Index	Stock Market
CDS	1.0000					
Dollar Index	0.0784	1.0000				
FFR	0.0909	-0.0557	1.0000			
CDS Index	0.1611	0.0599	-0.0443	1.0000		
Euro Index	-0.0487	-0.6302	-0.0077	-0.0356	1.0000	
Stock Market	-0.0776	-0.0965	-0.1089	-0.0150	0.0780	1.0000

**Table 4. The GARCH estimation results (all specifications).**

$$CDS\ Spread_{avg} = \alpha + \beta_1 Dollar\ Index$$

Country	Intercept	Dollar Index	$\alpha_0$	$\alpha_1$	$\beta_1$	R <sup>2</sup>
Australia	-55.88 (-193.01)	0.96 (308.02)	0.35 (12.55)	1.01 (12.40)	0.00 (0.05)	0.0000
Canada	-425.51 (-11.66)	6.44 (15.51)	12328 (16.33)	0.50 (3.61)	-0.00 (-0.00)	0.1255
Hong Kong	-1038 (-68.75)	12.44 (71.21)	5.48 (9.96)	0.84 (9.25)	0.20 (7.70)	0.0000
Japan	-301.16 (-360.37)	3.78 (416.36)	2.34 (10.51)	1.03 (9.18)	0.00 (0.00)	0.0000
Korea	35.11 (0.78)	0.27 (0.51)	9852 (20.42)	0.57 (3.54)	-0.00 (-0.00)	0.0000
Singapore	-189.56 (-525.62)	2.47 (644.18)	0.69 (11.65)	0.98 (13.60)	0.01 (0.51)	0.0000
Switzerland	134.64 (80.51)	-1.23 (62.55)	1.31 (7.18)	0.67 (14.83)	0.00 (0.00)	0.0000
UK	-28.33 (-61.96)	0.80 (151.21)	0.23 (18.82)	1.00 (11.43)	0.01 (0.68)	0.0000
US	117.20 (2.47)	-0.16 (-0.30)	21315 (19.85)	0.56 (3.67)	0.00 (0.00)	0.0000

$$CDS\ Spread_{avg} = \alpha + \beta_2 FFR$$

Country	Intercept	FFR	$\alpha_0$	$\alpha_1$	$\beta_1$	R <sup>2</sup>
Australia	29.11 (1166.02)	-0.53 (-66.84)	0.05 (14.67)	1.07 (14.68)	0.00 (0.00)	0.0000
Canada	210.25 (24.54)	-26.05 (-5.35)	9957 (19.34)	0.60 (2.92)	0.00 (0.00)	0.2352
Hong Kong	36.18 (6334.05)	-1.45 (-1146.4)	0.01 (8.60)	1.06 (40.99)	0.01 (13.29)	0.0000
Japan	106.30 (408.59)	-17.78 (-329.09)	0.89 (11.55)	0.53 (9.68)	0.49 (18.09)	0.2071
Korea	70.73 (838.98)	-9.60 (-345.81)	-0.38 (7.76)	0.40 (9.66)	0.57 (18.44)	0.0000
Singapore	50.87 (1107.49)	-5.00 (-351.93)	0.46 (13.15)	0.87 (12.89)	-0.00 (-0.00)	0.0000
Switzerland	42.32 (618.12)	-3.56 (-205.82)	0.21 (9.46)	0.68 (10.95)	0.24 (5.23)	0.0000
UK	46.54 (1449.74)	-1.40 (-135.87)	0.10 (18.69)	0.91 (18.68)	0.10 (6.68)	0.0000
US	139.70 (11.65)	-13.10 (-2.46)	16445 (19.71)	0.55 (3.62)	0.00 (0.00)	0.0370

$$CDS\ Spread_{avg} = \alpha + \beta_2 CDS\ Index$$

Country	Intercept	CDS Index	$\alpha_0$	$\alpha_1$	$\beta_1$	R <sup>2</sup>
Australia	-6.03 (-200.79)	1.38 (1439.33)	0.01 (2.62)	0.55 (11.01)	0.49 (27.40)	0.9409
Canada	55.13 (426.62)	1.44 (1164.61)	4.97 (18.07)	1.04 (17.42)	0.00 (0.00)	0.8611
Hong Kong	-4.61 (-120.25)	1.25 (1550.43)	0.23 (9.57)	1.03 (19.11)	0.12 (4.53)	0.8241
Japan	2.73 (38.10)	0.88 (304.02)	0.08 (7.41)	1.00 (9.97)	0.06 (1.68)	0.7459
Korea	6.55 (104.73)	1.08 (405.44)	0.07 (5.35)	0.87 (20.23)	0.29 (15.01)	0.8292
Singapore	2.05 (83.56)	1.12 (5617.62)	0.17 (9.36)	10.10 (38.61)	0.09 (6.23)	0.9256
Switzerland	15.21 (404.44)	0.57 (629.60)	0.22 (10.70)	0.92 (12.30)	0.15 (5.58)	0.8547
UK	26.67 (1066.67)	0.69 (2738.11)	0.14 (8.03)	0.94 (16.92)	0.14 (6.95)	0.8101
US	22.36 (330.11)	2.32 (3516.93)	0.66 (7.61)	0.86 (27.51)	0.26 (14.31)	0.9484

$$CDS\ Spread_{avg} = \alpha + \beta_4 Euro\ Index$$

Country	Intercept	Euro Index	$\alpha_0$	$\alpha_1$	$\beta_1$	R <sup>2</sup>
Australia	-618.27 (-335.69)	7.09 (373.24)	3.88 (4.75)	0.94 (5.96)	0.06 (0.61)	0.2945
Canada	519.28 (7.72)	-4.16 (-5.90)	15374 (16.66)	0.53 (3.37)	0.00 (0.00)	0.0000
Hong Kong	-127.48 (-114.32)	1.66 (140.54)	0.16 (4.07)	0.60 (4.88)	0.46 (6.61)	0.0000
Japan	792.13 (453.53)	-8.28 (-427.30)	3.69 (9.60)	1.06 (8.02)	-0.00 (-0.00)	0.0000
Korea	321.35 (630.10)	-3.14 (-559.04)	0.27 (7.89)	1.01 (16.09)	0.03 (0.77)	0.0000
Singapore	475.01 (514.36)	-4.84 (-472.52)	1.50 (7.23)	1.04 (10.99)	0.00 (0.00)	0.0000
Switzerland	419.29 (58.15)	-4.17 (-53.57)	3.02 (2.25)	0.45 (2.40)	0.54 (3.35)	0.0000
UK	248.08 (141.29)	-2.24 (-116.71)	0.14 (4.40)	0.58 (7.40)	0.42 (11.50)	0.0000
US	-173.13 (-2.62)	3.01 (4.28)	17561 (19.36)	0.54 (4.02)	-0.00 (0.00)	0.0100

$$CDS\ Spread_{avg} = \alpha + \beta_5 Stock\ Market\ Index$$

Country	Intercept	Stock Mkt Index	$\alpha_0$	$\alpha_1$	$\beta_1$	R <sup>2</sup>
Australia	38.21 (637.81)	-0.00 (-166.39)	0.03 (6.64)	0.99 (13.72)	0.06 (2.83)	0.0000
Canada	266.30 (14.04)	-0.01 (-7.40)	10687 (17.20)	0.58 (3.00)	-0.00 (-0.00)	0.1099
Hong Kong	68.76 (433.43)	-0.00 (-277.37)	0.09 (5.67)	0.98 (8.85)	0.06 (1.40)	0.0000
Japan	58.82 (444.60)	-0.00 (-255.11)	0.11 (4.83)	0.80 (6.56)	0.21 (3.72)	0.0000
Korea	80.87 (4.76)	-0.02 (-1.57)	9971 (20.29)	0.59 (3.26)	0.00 (0.00)	0.0000
Singapore	52.81 (438.45)	-0.01 (-247.26)	0.13 (7.35)	0.94 (8.48)	0.07 (1.49)	0.0000
Switzerland	53.97 (397.24)	-0.00 (-195.46)	0.20 (7.21)	0.83 (8.81)	0.17 (3.43)	0.0000
UK	61.78 (164.75)	-0.00 (-51.35)	1.22 (9.22)	0.91 (6.06)	0.00 (0.00)	0.0000
US	215.93 (5.27)	-0.01 (-2.87)	17511 (19.61)	0.59 (3.20)	-0.00 (0.00)	0.0000

$$CDS\ Spread_{avg} = \alpha + \beta_1 Dollar\ Index + \beta_2 FFR + \beta_3 CDS\ Index + \beta_4 Euro\ Index + \beta_5 Stock\ Market\ Index$$

Country	Intercept	Dollar Index	FFR	CDS Index	Euro Index	Stock Mkt Index	$\alpha_0$	$\alpha_1$	$\beta_1$	R <sup>2</sup>
Australia	-153.56 (-42.65)	-0.01 (-0.72)	-0.17 (-8.27)	1.19 (1311.96)	1.40 (54.94)	0.01 (96.34)	0.26 (11.48)	1.01 (17.13)	0.12 (7.70)	0.9676
Canada	809.16 (82.26)	-3.06 (-77.49)	-2.53 (-39.58)	1.90 (870.28)	-4.75 (-61.40)	-0.00 (-41.29)	4.80 (12.10)	1.05 (16.01)	0.07 (2.83)	0.6849
Hong Kong	760.23 (89.80)	-3.95 (-93.11)	-1.53 (-41.69)	1.06 (638.24)	-4.35 (-79.49)	-0.00 (-9.53)	1.28 (10.35)	0.96 (15.20)	0.06 (3.37)	0.8992
Japan	511.97 (46.84)	-3.02 (-55.42)	-2.10 (-24.75)	1.50 (458.13)	-3.03 (-41.80)	0.00 (32.50)	0.77 (9.16)	0.84 (11.39)	0.26 (9.83)	0.9405
Korea	849.49 (88.54)	-3.98 (-98.79)	-0.47 (-8.39)	1.41 (594.29)	-5.72 (-78.19)	0.02 (46.71)	1.31 (8.72)	0.93 (11.32)	0.14 (3.78)	0.8904
Singapore	409.31 (36.37)	-3.32 (-56.22)	-0.47 (-6.30)	1.13 (368.87)	-1.34 (-18.71)	0.00 (5.78)	2.59 (15.53)	1.15 (21.41)	-0.00 (-0.00)	0.9563
Switzerland	583.42 (80.35)	-2.75 (-73.47)	-0.62 (-11.14)	0.97 (510.34)	-3.97 (-85.90)	0.00 (58.78)	0.51 (7.33)	0.71 (19.97)	0.41 (23.47)	0.9197
UK	760.53 (73.93)	-3.74 (-77.69)	-0.22 (-2.15)	1.12 (375.94)	-5.12 (-68.06)	0.01 (34.86)	0.65 (9.89)	0.76 (13.88)	0.34 (14.68)	0.9161
US	-928.54 (-58.56)	2.21 (26.97)	0.10 (1.23)	1.99 (457.37)	8.03 (83.71)	0.00 (15.79)	1.15 (6.29)	0.78 (12.88)	0.30 (17.33)	0.9709

$$CDS\ Spread_{avg} = \alpha + \beta_1 Dollar\ Index + \beta_2 FFR + \beta_4 Euro\ Index + \beta_5 Stock\ Market\ Index$$

Country	Intercept	Dollar Index	FFR	Euro Index	Stock Mkt Index	$\alpha_0$	$\alpha_1$	$\beta_1$	R <sup>2</sup>
Australia	-3053 (-134.43)	9.93 (104.58)	4.86 (21.69)	25.35 (143.95)	-0.03 (-61.76)	11.26 (9.11)	0.87 (13.29)	0.11 (4.19)	0.7914
Canada	-2779 (-133.80)	12.05 (101.93)	-4.36 (-13.56)	22.88 (166.85)	-0.02 (-71.63)	42.35 (12.87)	0.85 (9.75)	-0.00 (-0.00)	0.5813
Hong Kong	-2265 (-145.99)	8.00 (112.53)	-3.35 (-30.75)	18.07 (163.38)	-0.00 (-59.09)	7.25 (9.11)	0.95 (11.00)	0.04 (1.07)	0.6962
Japan	-2599 (-141.09)	11.65 (132.33)	4.78 (18.45)	18.84 (150.01)	-0.01 (-58.72)	16.51 (9.34)	1.01 (9.88)	0.04 (1.37)	0.6523
Korea	-3192 (-135.02)	12.18 (136.24)	1.95 (8.62)	24.74 (136.07)	-0.11 (-72.18)	14.03 (8.79)	0.85 (10.87)	0.11 (0.37)	0.5896
Singapore	-2896 (-301.92)	11.06 (285.63)	-2.30 (-16.04)	22.62 (316.80)	-0.05 (-101.64)	9.05 (8.84)	0.80 (11.57)	0.20 (6.87)	0.7663
Switzerland	-2183 (-176.05)	9.54 (153.85)	3.46 (18.68)	16.03 (194.79)	-0.01 (-61.48)	8.34 (8.48)	0.93 (11.69)	0.07 (2.30)	0.6483
UK	-1957 (-203.21)	7.36 (156.77)	4.44 (28.93)	16.09 (266.04)	-0.03 (-77.33)	3.09 (10.31)	0.66 (10.78)	0.33 (14.67)	0.6559
US	-2598 (-162.99)	9.47 (155.80)	-2.94 (-25.00)	20.98 (164.68)	-0.01 (-35.69)	5.48 (8.10)	0.79 (10.77)	0.23 (11.55)	0.4685