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Relationship Between Credit Default Swap Premium and Risk Appetite According to Types of Investors: Evidence From Turkish Stock Exchange

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ABSTRACT

Credit default swap(CDS) premiums are often used in determining the country risks of the investment decisions made to foreign countries by international investors. Risk appetite can be described as investors' willingness to take risks. Risk appetite can be measured with the help of an index because of its changeable form and it can be used as an indicator. The aim of the study is to determine relation between risk appetite and CDS premiums which is admitted by investors as a credit risk indicator. In the study, among all independents variables related to risk appetite, foreign investors' and domestic investors' risk appetites gave meaningful results in terms of explaining CDS premiums. Both meaningful as well as negative correlation between risk appetite index with regards to each of the three types of investors and CDS premiums. Hence, it was found that if risk appetite increases, CDS premiums will decrease.

Keywords: *Credit Default Swap Premium, Risk Appetite, Investor Risk Appetite Index for Turkey (RISE).*

Jel Classification*: G12, G15, G41.*

Kredi Temerrüt Swap Primi İle Yatırımcı Sınıflarına Göre Risk İştahı Arasındaki İlişki: Türkiye Analizi

ÖZET

Uluslararası yatırımcıların, yabancı bir ülkeye yapacakları yatırım kararının riskinin değerlendirilmesinde kredi temerrüt swap(CDS) primleri sıklıkla kullanılmaktadır. Risk iştahı, yatırımcıların riske girme eğilimi, gönüllülüğü olarak ifade edilebilir ve risk iştahının sabit olmaması değişkenlik göstermesi onun bir endeks yardımıyla takip edilip gösterge olarak kullanılmasına olanak tanımaktadır. Bu çalışmanın amacı, yatırımcılar açısından kredi risk göstergesi olarak kabul edilen CDS primleri ile risk iştahı endeksi arasında bir ilişki olup olmadığını belirlemektir. Çalışmada risk iştahına ilişkin bağımsız değişkenlerden yabancı ve yerli yatırımcı risk iştahının CDS primini açıklamada anlamlı sonuç verdiği; CDS ile her üç yatırımcı sınıfına göre risk iştahı endeksi arasında negatif yönlü ve anlamlı bir korelasyon söz konusu olduğu; dolayısıyla yatırımcıların risk iştahı arttıkça CDS primlerinin düştüğü belirlenmiştir.

Anahtar Kelimeler: *Kredi Temerrüt Swap Primleri, Risk İştahı, Türkiye Yatırımcı Risk İştahı Endeksi(RISE).*

JEL Sınıflandırması: *G12, G15, G41.*

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1. INTRODUCTION

In a broad meaning, risk is expressed as uncertainty. If quantification can't be done and future conditions can't be known exactly, obscurity will be existed. If uncertainty can be measured within probabilities, risk can be calculated. So risk generally is expressed as a possibility of negative deviation from expected values. The opposite of risk is stated as luck which includes positive deviation. In capital markets risks can be classified in three categories: (1) Systematic risk, (2) Unsystematic risk and (3) Systemic risk. Systematic risks are welded from macro-economic structure. These types of risks can't be eliminated with diversification. Volatility of exchange rates and interest rates and inflation can be given as examples for systematic risk. Unsystematic risks appear from security, firm or sector and these types of risks can be eliminated with diversification. Fire on firm, strike in the sector can be given as examples for unsystematic risk. Systemic risks are welded from components of financial system and they spread like as domino to affect economic system negatively.

There are some main differences between risk appetite and risk aversion. According to Markowitz's portfolio theory (1952: 77-91), investors try to take maximum return in minimum risk. Misina(2006) indicated that risk aversion isn't a parameter which change continuously in time for investors. Risk appetite can be change periodically which depends on economic parameters, financial shocks and macro-economic obscurities (Gai and Vause, 2004:127). Risk appetite can be described as investors' willingness to take risks. Risk appetite can be measured with the help of an index because of its changeable form and it can be used as an indicator. Table 1 below denotes some examples about risk appetite indexes:

Table 1. Some Examples about Risk Appetite Indexes

Risk Appetite Indexes	**Explanations about Indexes**
Volatility Index**(VIX)**	This is an index which was constituted by Chicago Board Option Exchange (CBOE) in 1990s. American types buy and sell options with maturity of 30 days are used for measuring volatility on S&P 100 Index (Kaya, 2015: 2). If VIX increases, risk appetite will be decreased.
Global Risk Appetite Index**(GRAI)** ; Kumar and Persaud (2002: 401-436)	Kumar and Persaud (2002:401-436) used Spearman's rank correlation for measuring this index. They assumed that all investors have the same changing risk appetite unlike Capital Asset Pricing Model.
The Credit Suisse First Boston Risk Appetite Index **(CSFB)**	The index compares risk and excess returns across assets. If the index of slope is more positive, risk appetite will be greater. The CSFB is based on daily data for 64 indexes of bonds and equities in developed and emerging markets (Illing and Aaron, 2005: 40).
Liquidity, Credit and Volatility Index **(LCVI)** constituted by JP Morgan	This index was constituted by JP Morgan Bank in 2002.
Global Financial Stress Index **(GFSI)** constituted by Merrilly Linch	GFSI consists of three sub-indices which are risk, flow and skew. Risk index measure the financial system's solvency and liquidity risk. Flow index is a measure of asset price momentum for equities, bonds and money markets. Skew index is a measure of relative demand for protection against large swings in global equities and currencies(http://www.coastlightcapital.com/global-

	financial-stress-index/, 14.02.2018)
Westpack Risk Appetite Index **(WP)**	This is an index which was constituted by Westpack surveys since 1988 in Australia. Westpack surveys are made with telephone interviews on a sample of around 1500 people. Five questions which are internationally standardised are asked to participants. To understand the present economic conditions two questions are asked to respondents and the other three questions are related with respondents' future expectations (Goh, 2003: 2-3).
Investor Risk Appetite Index for Turkey **(RISE)**	This is an index which was constituted by the cooperation between Özyeğin University and Central Registry Agency since 2005. This index is prepared for weekly according to investors' 5000 TL above stock portfolios changes. Besides RISE, other indices are calculated for six different investor classifications about Turkey (Saraç, et al., 2016: 33)

Indifference curves are used to determine investors' risk appetite. Investors' attitudes for risk can be classified in three groups: (1) Willingness to take risks (Risk appetite), (2) Unwillingness to take risks and (3) To be neutral to take risk. If indifference curve which is created according to investor's risk appetite is how higher, utility will be high too. Investors try to find the best investment composition which can provide the highest utility or greatest return to them. So the most suitable portfolio composition for an investor is the point of tangency between the efficient frontier and indifference curve (Fettahoğlu, 2016:29-34).

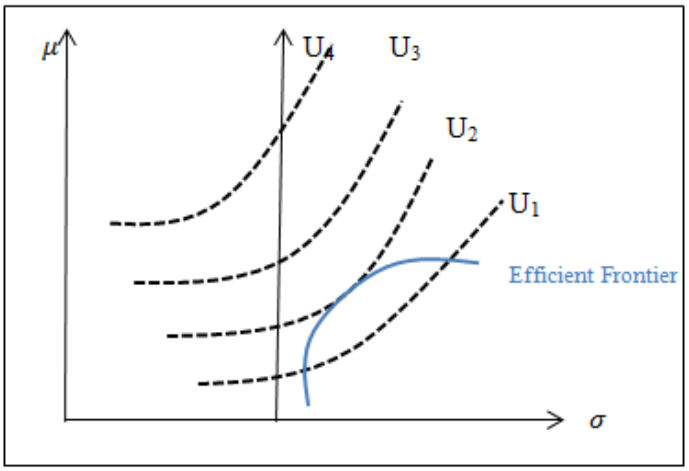
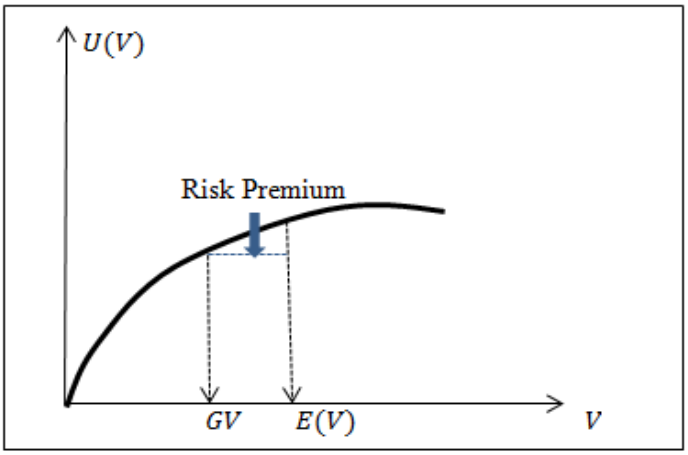


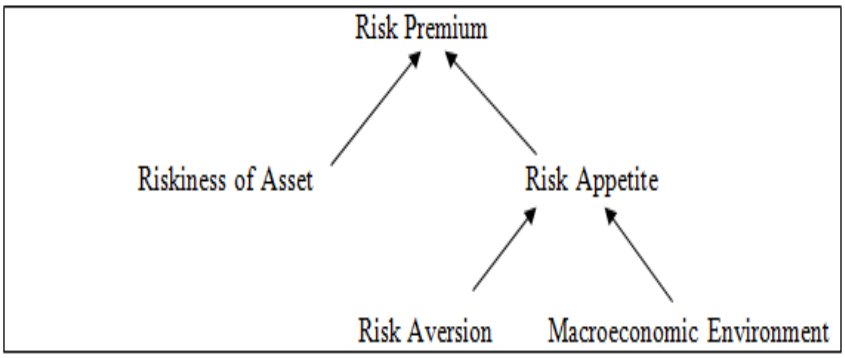
Figure 1. Indifference Curve



Source: Fettahoğlu, 2016:31.

Figure 2. Expected Return and Risk Premium for Risk Averse Investors

In Figure 2, risk premium is expressed as the difference between risk averted investors' utility expectation for an asset [E(V)] and achieved utility from guaranteed asset (GV). Rational investors expect risk premium if they take risk except guaranteed investment.



Source: Gai and Vause, 2006:169.

Figure 3. Relations between Risk Appetite, Risk Aversion and Risk Premium

Credit default swap(CDS) premiums are used often to determine country risks to make investment decisions by international investors. Changes in countries and businesses' economic and financial indicators reflect CDS premiums. Negative events increase CDS premiums (Kılcı, 2017:146-147). A CDS is an insurance contract that protects the buyer against loses from a credit event associated with an underlying reference entity (Amato, 2005:56). CDS Premiums reflect countries' or businesses' Eurobonds' or foreign bonds' credit risk or bankruptcy risk. According to Fantona and Scheicher(2010:9), investors use CDS mainly for the following purposes: (1) Speculation, (2) Hedging from country risk and (3) Arbitrage. When investors buy Eurobond, they take some risks such as credit risk, liquidity risk and interest rate risk. The credit risk can be insured against a third party by the

CDS contracts. Credit derivative markets are places where countries' and businesses' credibility can be bought and sold. In credit derivative markets repayment risks of countries' or businesses' are being traded (Kılıç, 2009). CDS premiums can be expressed as a credit risk indicator which reflects investors' opinions about foreign countries' economies and financial markets (Bursa and Tatlıdil, 2015:72). CDS contracts are standardized by the International Swaps and Derivative Association.

The importance of relation between CDS premium and risk appetite would be include valuable information for firstly foreign investors to make investment decision in a foreign country and for policymakers to implement their economic policy about liquidity conditions in a financial market. The interest rate risks and economic uncertainty are highly efficient on CDS and also risk appetite. The aim of the study is to determine relation between risk appetite and CDS premiums which is admitted by investors as a credit risk indicator. All the variables which include the period from 1st November 2013 to 9th February 2018, are only comprised of workdays.

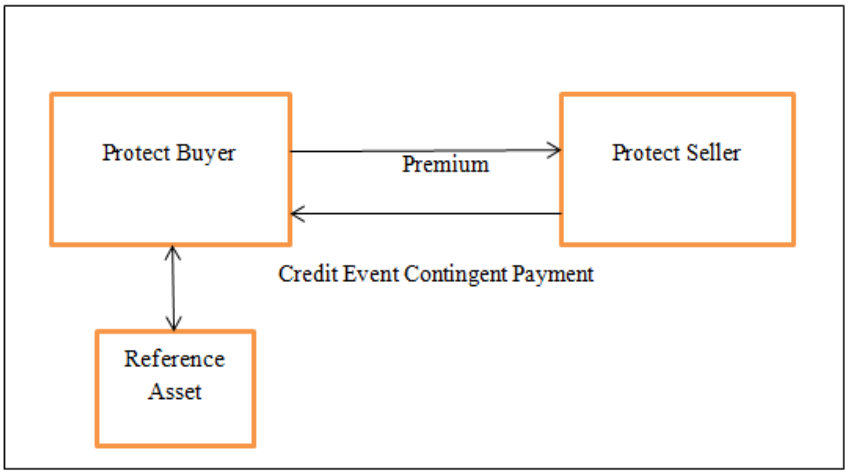


Figure 4. Credit Default Swap Process

In the literature, there are some studies investigating the relations between CDS premiums and risk appetite: Baek, Bandopathyaya and Du (2005:540-541) used RAI index to measure risk appetite. They used Brady bond stripped yield spread instead of CDS premiums as a measure of country risk premium. Brady bond stripped yield spread is then the difference between the Brady bond stripped yield and the US treasury bond yield with a similar maturity. In regression analysis dependent variable was chosen as Brady bond stripped yield spread and independent variables were determined as RAI index and the other economic variables in the study. They found significant as well as strong relations between RAI index and dependent variable.

Pan and Singleteon(2008:2381-2382) chose Mexico, Turkey and Korea as samples in order to determine the factors that impact on CDS premiums. They found in their analysis that investor's risk appetite had an impact on CDS premiums. Remolona, Scatigna and Wu(2008:20-21) decomposed sovereign debt spreads into two market-based components: the expected loss from default and the default risk premium. They found in their study that

country specific sovereign risk fundamentals, market liquidity and investors' global risk aversion affected on risk premiums. Turguttopbaş(2013: 142) indicated in her study that both financial market related variables and risk appetite in the global financial markets affect CDS spreads. She used Emerging Market Index(EMBI) which was constituted by JP Morgan Bank as risk appetite index in the study. Besides, she explored positive correlation between CDS premiums and EMBI index.

Bursa and Tatlıdil(2015: 86-87) used VIX as risk appetite index in their study. They implemented regression and correlation analysis to measure relations amoung CDS premiums, VIX index and the other independent variables. Kılcı(2017:145-154) used Toda-Yamamoto causality analysis to determine any causality between CDS premiums and growth rate, unemployment ratio, inflation, current account deficit, capital adequacy ratio, BIST-30 Index and reel effective exchange rate. As a result of the causality analysis, it is concluded that there exists causality between 5-year CDS and capital adequacy ratio as well as between BIST-30 Index and reel effective exchange rate in long period.

The study has three parts. After introduction, the design and methodology of the study were indicated. In the second part, findings and discussions were stated. And finally the last part of study includes the conclusions and future suggestions.

2. DESIGN AND METHOD

The aim of the study is to determine relation between risk appetite and CDS premiums which admitted by investors as a credit risk indicator. Regression analysis formulated in the equation (1) was implemented to achieve the purpose of determining the relations. The model was designed with the help of the studies of Pan and Singleteon(2008:2381-2382), Bursa and Tatlıdil(2015: 86-87) and Saraç, et al.(2016: 33).

$$CDS_t = \alpha_0 + \alpha_1 FIRA_t + \alpha_2 DIRA_t + \alpha_3 IIRA_t + \alpha_4 \left(EURO/TL\right)_t + \alpha_5 \left(\$/TL\right)_t + \alpha_6 BIST100_t + \alpha_7 (2040\ EUROBOND\ Price)_t + \varepsilon \quad (1)$$

The dependent variable of the model was 5-year CDS premiums for Turkey. 5-year CDS premiums data set was obtained from (https://www.haberturk.com/ekonomi/piyasa/145-turkiye-cds, 14.02.2018) web site. RISE which was constituted by the cooperation between Özyeğin University and Central Registry Agency was used as independent variable. RISE-Foreign Investor Risk Appetite(FIRA), RISE- Domestic Investor Risk Appetite (DIRA) and RISE-Institutional Investor Risk Appetite(IIRA) data set were defined as the investor types of the analyse. FIRA, DIRA and IIRA data set can be obtained from Central Registry Agency's web site (https://www.mkk.com.tr/risk-index) as daily form. RISE data set which includes the period from 1st November 2013 to 9th February 2018, is only comprised of workdays. All of the data set was started from 1st November 2013. Because RISE data set which was declared by Central Registry Agency started the date of 1st November 2013 in the web site (https://www.mkk.com.tr/risk-index). Euro/TL exchange rates, $/TL exchange rates, BIST-100 Index and 2040-Eurobond prices in the model represent the control variables. Euro/TL exchange rates, $/TL exchange rates and BIST-100 Index data set was obtained from (www.investing.com) web site. 2040-Eurobond prices in the model were obtained from (https://www.bloomberght.com/eurobond/tr-2040,14.02.2018) web site. Each of the

components of the data set was adjusted for the same period with RISE for the same date. Thus, totally 224 observations were used in the analysis.

3. FINDINGS AND DISCUSSIONS

The descriptive statistics for variables can be seen in In Table 2. Domestic investors' risk appetite averages was found higher than foreign and institutional investors' risk appetite averages. Foreign investors' expectations about risk premiums will be high due to price of taking risk. Institutional investors' risk aversion wishes may derive from two factors: (1) Regulations over the composition of their portfolio and (2) Characteristics of the institutions' management. Such examples can be given for the first factor: Banks have to perform capital adequacy ratios, mutual funds face restrictions in their access to leverage against their asset holdings, and pension funds and insurance companies face strict limits on their exposure to risk. For the second factors it can be stated that for each class of institutional investors, managers make the portfolio allocation decisions. In case of making decision about the portfolio allocation, the successes of portfolio managers and portfolio management wages are both dependent on the performance of the portfolio that they manage (Lizarazo, 2010: 5).

Table 2. Descriptive Statistics for Variables

Variable	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
CDS Point	224	224,72	40,56	159	339,59
Foreign Investors' Risk Appetite	224	43,90	11,47	16	71
Domestic Investors' Risk Appetite	224	50,23	11,28	19	75
Institutional Investors' Risk Appetite	224	45,02	10,79	14	70
Euro/TL	224	3,36	0,55	2,63	4,70
$/TL	224	2,89	0,57	2,00	3,94
BIST 100 Index	224	83699,37	12829,21	61858,21	120701,92
TR2040 Euro Bond	224	113,14	7,07	97,73	130

In the first step multiple linear regression model was used for all independent variables. In Table 3 shows that the model is valid at significance level of 5% and the independent variables explained changes in CDS premiums by 80.3%.

Table 3. Regression Model Summary for CDS and All Independent Variables

	R	R Square	Adjusted R Square	F Change	Sig.
Model Summary	,900	,809	,803	130,865	,000

Predictors : (Constant), Eurobond2040, BIST 100, FIRA, $/TL, IIRA, DIRA, Euro/TL
Dependent Variable: CDS

Table 4. Regression Coefficients for CDS and All Independent Variables

	Coefficients	Standardized Coefficients	t	Sig.	Collinearity Statistic VIF
Constant	422,076		11,673	,00	
$/TL	88,699	1,261	13,581	,00	9,764
BIST 100	-,003	-,970	-13,853	,00	5,554
Eurobond 2040	-,576	-,100	-2,026	,04	2,783
Institutional Investors' Risk Ap.	-,253	-,067	-,561	,57	16,246
Foreign Investors' Risk Ap.	,886	,251	3,184	,00	7,01
Domestic Investors' Risk Ap.	-,646	-,180	-1,516	,13	15,927
Euro/TL	-37,729	-,514	-3,731	,00	21,448

Dependent Variable: CDS

According to the results denoted in Table 4, there was statistically meaningful and same directional relation between "$/TL" exchange rates and CDS premiums. There was a statistically collinearity relation for "Euro/TL" exchange rates because of VIF parameter was higher than 10(=21,448). In regression analysis VIF parameter quantifies how much the variance inflated. So there was no meaningful result about "Euro/TL" exchange rates in the analysis. At the same time VIF parameters were found higher than 10 for DIRA and IIRA variables. In this situation correlations between independent variables must be check and high correlated variables must exclude from the model to take meaningful results.

Table 5. Correlation Summary for Independent Variables

		IIRA.	$/TL	Eurobond 2040	BIST 100	FIRA	DIRA	Euro/TL
Correlation	**IIRA**	1	,231	-,140	-,036	-,295	-,768	-,215
	$/TL	,231	1	-,458	,391	-,079	-,142	-,863
	Eurobond 2040	-,140	-,458	1	-,704	,142	,035	,724
	BIST 100	-,036	,391	-,704	1	-,020	,014	-,740
	FIRA	-,295	-,079	,142	-,020	1	-,333	,121
	DIRA	-,768	-,142	,035	,014	-,333	1	,122
	Euro/TL	-,215	-,863	,724	-,740	,121	,122	1

Dependent Variable: CDS

According to Table 5, IIRA was found high correlated with DIRA; "Euro/TL" exchange rates were found high correlated with "$/TL" exchange rates, Eurobond 2040 and BIST 100. To obtain statistically meaningful results "Euro/TL" exchange rates and IIRA variables must exclude from the model.

Table 6. Regression Model Summary for CDS and Adjusted Independent Variables

	R	R Square	Adjusted R Square	F Change	Sig.
Model Summary	,892	,795	,790	169,264	,000

Predictors : (Constant), Eurobond2040, BIST 100, FIRA, $/TL, DIRA
Dependent Variable: CDS

Table 7. Regression Coefficients for CDS and Adjusted Independent Variables

	Coefficients	Standardized Coefficients	t	Sig.	Collinearity Statistic VIF
Constant	324,062		13,160	,00	
$/TL	68,094	,968	20,074	,00	2,476
BIST 100	-,004	-1,183	-25,508	,00	2,290
Eurobond 2040	,198	,035	,980	,328	1,324
Foreign Investors' Risk Ap.	,904	,256	3,304	,00	6,384
Domestic Investors' Risk Ap.	-,904	-,251	-3,217	,00	6,505

Dependent Variable: CDS

In Table 6 and Table 7 show the results for adjusted variables. All VIF parameters were found lower than 10. So collinearity problem was solved. Akkaya(2017:142-413), Çonkar and Vergili(2017:65) indicated in their study that "$/TL" exchange rates had impacts on CDS premiums.

Difference between CDS spread and sovereign bond spread which is in the same maturity is defined as CDS-bond basis. Akdoğan and Chadwick(2012:2) determined a long-run co-integration relationship between CDS and bond yield spreads. Eurobonds are international bonds which are issued by consortiums outside the country of the currency in which it is denominated. Thus Eurobonds are important indicator for pricing Turkey's risk perception. Ersan and Günay(2009:21) found in their study that Eurobond price was the most important factor effects for CDS premiums. Kargı(2014:65) stated in his study that CDS spreads were mostly affected by the market interest rates for Turkish economy. When the interest rates increase, CDS spread also increases. Opposite relation between bond prices and market interest rate shows that if bond prices decrease, CDS premiums will increase. In this study, after adjusted results to solve collinearity problem, results showed that 2040-Eurobond prices were found insignificant relation (sig.=,328) with CDS premiums.

Hancı(2014:6), Eren(2014:97), Bursa and Tatlıdil(2015:86) determined in their study that there was a negative relation between BIST-100 indices and CDS premiums. In this study, BIST-100 Index had negative and meaningful relation with CDS premiums according to the results of the analysis.

According to the results emphasized in Table 7, FIRA and DIRA was found as significant and valid to explain CDS premiums in the analysis. Results showed that DIRA had significant but opposite relation with CDS premiums.

According to results denoted in Table 8, negative and significant correlation between was found between FIRA, DIRA and CDS premiums. This means that if investors' risk appetite rise, CDS premiums will decrease. Hence, it is expected that the relations between CDS premiums and risk appetite will be negative.

Table 8. Correlation Summary for CDS and FIRA-DIRA Variables

		Foreign Investors' Risk Ap.	Domestic Investors' Risk Ap.
CDS	Pearson Correlation	-,175	-,249
	Sig. (2-Tailed)	,00	,00
	N	224	224

Correlation is significant in %1 level (2-Tailed)

4. CONCLUSIONS

There are some factors related to investors' behaviours in financial markets. Domestic or international economic factors and risks affect risk appetite for investors. Investors' risk appetite tendency change according to risk. If a country's risk rating increases, international investors will reduce their appetite for risk. Thus, the rise and fall of CDS premiums could be an important factor in the observed change in risk appetite.

The aim of the study is to determine relation between risk appetite and CDS premiums which is admitted/ accepted by investors as a credit risk indicator. The results of the analysis can be stated as follows:

- Domestic investors' risk appetite means are higher than foreign and institutional investors' risk appetite means. Foreign investors' risk appetites and domestic investors' risk appetites gave meaningful results in terms of explaining CDS premiums. If investor sentiment increases, investors will be in higher risk aversion. Thus, higher investor sentiment conditions create higher risk price (Fettahoğlu, 2017:444-451). CDS premium is generally used as an indicator by foreign investors to make portfolio diversification. Thus, CDS premiums are used by international investors often to determine country risks while making investment decisions. Domestic investors can make savings if the economic conditions are positive for them. If domestic investors' economic views are optimistic and economic indicators are favourable for them, their risk appetite will be high and CDS premiums will be low.
- The relation between $/TL exchange rate and CDS premiums was determined as meaningful, in the same direction. If the increase on "$/TL" exchange rates is evaluated together with some factors, like current account deficit, imports with dollar, increases in inflation, stops in economic growth, investors' risk appetite will be low in financial markets. Thus CDS premiums will be high in this situation.
- For policy makers, CDS-bond basis reflects the information about liquidity condition for the financial market and risk premiums to determine asset prices. 2040-Eurobond prices were found insignificant relation with CDS premiums. There were 224

observations for making analysis. RISE data set which was declared by Central Registry Agency started the date of 1st November 2013 in the web site (https://www.mkk.com.tr/risk-index). To attain statistically significant results, more observations in long-run must be used in analysis.

- BIST-100 Index relation between CDS premiums were determined as significant but in the negative directions. BIST-100 Index reflects the risk appetite as indicated by domestic equities. Indexes show the stock prices' directions and changes as a whole. Thus, equity indexes reflect information about market. If BIST 100 Index increases, it means that investors are optimist about stock prices and CDS premiums will decrease.
- Both meaningful as well as negative correlation between risk appetite index with regards to FIRA, DIRA and CDS premiums. It was found that if risk appetite increases, CDS premiums will decrease.

For future researchers; if events, date or news which effects financial system adds into model, analysis about risk appetite will be useful for the literature.

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