



Examination of the Relationship between Turkey's Credit Default Swap (CDS) Points and Unemployment

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ABSTRACT

In this study, the relationship between Turkey's credit default swap points and the unemployment figures were examined. Within the scope of this investigation, the aim of the study is to reveal whether Turkey's credit default swap points is a leading indicator describing the changes in the unemployment figures. The study discussing 2005M01 - 2015 M 07 periods was conducted in four stages. In the first stage, the stability of the series was tested by Carrion-i-Silvestre (2009) multiple structural break unit root method. In the second stage, the cointegration relationship between variables were tested by Maki (2012) multiple structural break cointegration method. For the variables defined to have cointegration correlation, long-term cointegration coefficients were estimated by dynamic least squares method in the third stage of the study. In the last stage of the analysis, short-term correlation analysis was performed between variables by error correction model. According to the findings, it was concluded that Turkey's credit default swap points could be taken as a leading indicator describing the changes in unemployment figures in Turkey.

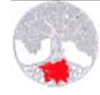
Key Words: Unemployment, Credit Default Swap, Multiple Structural Breaks Cointegration, Credit Risk, Credit Rating

JEL Classification: F30, E24, G15

Türkiye'nin Kredi Temerrüt Takas (CDS) Puanları İle İşsizlik Arasındaki İlişkinin İncelenmesi

ÖZET

Bu çalışmada, Türkiye'nin kredi temerrüt takası puanlarıyla işsizlik rakamları arasındaki ilişki incelenmiştir. Bu inceleme kapsamında çalışmanın amacı Türkiye'nin kredi temerrüt takası puanlarının işsizlik rakamlarındaki değişimleri açıklayan öncü bir gösterge olup olmadığını ortaya koyabilmektir. 2005M01 – 2015M07 döneminin ele alındığı çalışma dört aşamalı olarak gerçekleştirilmiştir. İlk aşamada serilerin durağanlıkları Carrion-i-Silvestre (2009) çoklu yapısal kırılmalı birim kök yöntemiyle test edilmiştir. İkinci aşamada değişkenler arasındaki eşbütünleşme ilişkisi Maki (2012) çoklu yapısal kırılmalı eşbütünleşme yöntemiyle test



edilmiştir. Eşbütünleşme ilişkisine sahip oldukları belirlenen değişkenler için çalışmanın üçüncü aşamasında Dinamik en küçük kareler yöntemiyle uzun dönem Eşbütünleşme katsayıları tahminlenmiştir. Analizin son aşamasında ise hata düzeltme modeliyle değişkenler arasındaki kısa dönemli ilişki analizi yapılmıştır. Elde edilen bulgulara göre de Türkiye'nin kredi temerrüt takası puanlarının Türkiye'deki işsizlik rakamlarındaki değişimleri açıklayan bir öncü gösterge olarak ele alınabileceği sonucuna ulaşılmıştır.

Anahtar Kelimeler: İşsizlik, Kredi Temerrüt Takası, Çoklu Yapısal Kırılmalı Eşbütünleşme, Kredi Riski, Kredi Derecelendirme

1. INTRODUCTION

Credit risk is the risk that the borrower's inability to perform financial transactions therefore the payments to be required to pay. The most common of practice to reduce the credit risk is in particular the transactions so-called as credit derivatives that have been showing a rapid development since the 1990s. Credit derivatives are financial contracts that guarantee losses arising from loans. These contracts offer new benefits to lenders of the banks and investors to the credit risk management.

Credit derivatives are divided into four main groups including credit default swaps, credit-based bonds, credit spreads options and total return swaps (Dufey Rehm, 2000, 3). Credit default swaps is a contract that transfers a party's risk to go into default of the defined reference assets exported by a particular reference entity to the other party in exchange for periodic payment of premiums (Brandon and Fernandez, 2004: 7).

Credit default swap (*Credit Default Swap - CDS*), with the narrower definition, is a kind of financial insurance contract with the aim to manage the credit risk efficiently and with the broader definition, it is a name given credit derivative instrument that takes the creditor side's money under protection against the risk of repayment of any financial loan and that performs this against remuneration (*insurance premium*). The financial derived from the movement of another financial product and that serves to transfer the mentioned risk to another person/group without being touched that asset against the risk of falling below a certain level agreed in advance is called as credit derivative (Kunt and Taş, 2008: 78-89).

The state credit default swaps are financial contracts working as an insurance against the losses in credit events that may occur when state legal entities could not pay off the debts. The party that bought protection pays a premium over a base point for per amount specified in the contract for possible credit event. The party selling protection pays the amount specified in the contract to the other party when the possible credit event takes place. In both the government and corporate credit default swap, there are five prominent features. These are; 1) Borrower side 2) A number of obligations 3) Contract term (eg 5 years) 4) The principal amount and 5) a list of event triggering the payment protection (Markit, 2008). By the end of 2013 CDS volume in the world reached about \$21.0 trillion (http://www.bis.org/publ/otc_hy1405.pdf).

As seen, the concept of risk in the financial field holds an extremely important place. In determining credit grades as an indicator of financial risk level of the countries, the notes of the various credit ratings agencies have been decisive for many years. However, particularly with mortgage oriented global crisis in 2008, credit ratings agencies have suffered a loss of reputation because the idea that credit notes used to reflect the credit risk expressed by the rating



agencies has become widespread. Therefore, as an indicator of credit risk, another instrument to be used instead of another instrument of credit notes was needed. At this stage, in filling the mentined gap, the Credit Default Swap (CDS) has started to come to the prominence and gain importance. In the following stage of the study, the studies discussing Credit Default Swaps (CDS) were examined in order to demonstrate this importance.

2. LITERATURE REVIEW

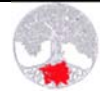
The relationships between macroeconomic variables and the risk of going into default attracted the attention of many researchers all along. In this context, especially the studies conducted by Black and Scholes (1973), Merton (1974), Black and Cox (1976), Brennan and Schwartz (1980), Chen et al (1986), Officer (1973), Schwert (1989), Longstaff and Schwartz (1995), Hamilton and Lin (1996), Lando (1998), Duffie and Singleton (1999), Duffie and others (2003), Giesecke and Weber (2004), Pan and Singleton (2008), Diebold and Yilmaz (2008) Genberg and Sulstarova (2008), Beber and Brandt (2009) and Azad and others (2011) and many researches are in question. It is noteworthy that the studies discussing the relationships between macroeconomic variables and CDS points started to increase.

The data analysis period is the period between June 1997 and November 2006 period. When the data were analyzed, it has been concluded that there is a significant and negative correlation between CDS point and GSMH growth rate and industrial production and there is a significant and positive correlation between CDS point and GSMH growth volatility.

In their study about the determinants of China State CDS's and price discovery, Eyssell et al. (2013) examined the correlations between CDS points and macroeconomic and global variables in the period of January 2001 to December 2010. It has been determined that there is a significant and negative correlation between stock index and CDS points from macroeconomic variables and there is a significant and positive correlation between real interest rate and CDS points; there is a significant and positive correlation between stock market volatility and CDS points, and there is significant and positive correlation between the ratio of the debts to national income and CDS points.

In their study related to the determinants of CDS ratios, Naifar and Abed (2006) examined 73 contracts in Belgium, Germany, Italy, France, the Netherlands, Poland, Portugal, Spain, Sweden, Switzerland and the United Kingdom. The analysis period is the period from March 15, 2001 to May 15, 2000. In conclusion of the analysis, it has been seen that there is a significant and negative correlation between CDS point and the benchmark interest rate, and there is a significant and positive correlation between CDS point and stock market volatility.

Aizenman et al. (2013) examined the correlation between the variables CDS points and some macroeconomic variables for the period before and after 2008 global crisis in Spain, Italy, Greece, Portugal and Ireland in their study about CDS points, financial opportunities and market risk ratings. Dependent variable is 5-year CDS point, and the independent variables are the ratio of the foreign debt to the tax revenue, the ratio of budget deficit to tax revenues, the ratio of external debt to GNP, trade openness (the ratio of exports and imports total to GNP) and the inflation rate. Inspection period is the period from 2005 to 2011 period. When the data were analyzed, it has been seen that there is a significant and positive correlation between all



macroeconomic variables and CDS points and this correlation is much higher during the crisis than the post-crisis period.

Norden and Webber (2009) made use of VAR method in their study examining the correlation between CDS premiums and bond and stock markets. The analysis period is the period of 2000–2002. These researchers find that CDS premiums are more sensitive to stock markets compared to bond markets, besides it has been found that this sensitivity increased for low credit degree. Besides, this sensitivity is higher than European companies in the companies of the USA.

Arouri et al. (2014) conducted a study investigating the dynamic relationships of 5-year financial CDS points of the USA covering banking, financial services and insurance sector. Inspection period is 13 July 2011 to 1 January 2004. In their study, it has been detected that there is not any significant correlation between federal funds interest rate, crude oil price, Treasury bill interest rate and CDS points whereas a significant and positive correlation between VIX index value and CDS points.

Ericsson et al. (2009) discussed the correlations between CDS points and leverage, bond yields and stock market of the firms in their study about the determinants of CDS points. The period of data analysis is weekly value for the period from 1999 to 2002. In data analysis, linear regression method was used. When the data was analyzed, a significant and positive correlation was found between leverage degree and stock volatility and a significant and negative correlation between CDS points and bond yields. It has been seen that the sensitivity of CDS points of the firms having low credit-worthiness to interest rates is higher compared to the firms having high credit value.

Bruneau et al. (2012) evaluated the country's CDS points over some macroeconomic variables in their study examining the economic crisis in Spain, Italy, Greece, Portugal and Ireland over market sentiment. Macroeconomic variables discussed are the ratio of debt to national income, unemployment levels, unit labor costs and the level of liquidity. The review period is the period from January 2006 to September 2011. When the data were analyzed, a positive correlation between the ratio of the debts to the national income and CDS point, a significant and negative correlation between unemployment level and CDS point, a positive correlation between unit labor costs and CDS score, a significant and negative correlation between CDS liquidity was revealed.

The data are monthly values for January 2001 to December 2006 period. CDS values belonging to 523 companies were discussed. When the data were analyzed; it has been concluded that there is significant and negative correlation between GNP and CDS point; there is a significant and negative and 10-year government bond; there is a significant and positive correlation between GNP growth rate volatility and CDS point, whereas there is no correlation between inflation ratio and VIX indeks exchange and CDS point.

Pu and Zhao (2012) examined the effect of a series of macro-economic variables on CDS points in the study about the correlation in credit risk variables. The independent variables addressed by the researchers, the GNP growth rate are the volatility of GNP, industrial production growth, industrial production volatility, government bond interest rate, VIX index exchange and inflation. The data are monthly values for the period of January 2001 to December 2006. 523 companies belonging to the CDS values are discussed. When the data were analyzed; GDP



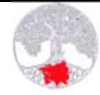
significantly between CDS points to the growth rate and negatively significantly between CDS score of return on 10-year government bonds and negatively, the GDP growth rate volatility between CDS score that is statistically significant and positive relationship, while the inflation rate and VIX exchange between CDS score was concluded that there is a relationship

Remolona et. al. (2008) examined the correlations between CDS points in emerging market countries including 24 countries in Latin America, Central and Eastern Europe, Asia, the Middle East and Africa and country-specific risk factors assumed to affect this point and the global risk factors in the study about dynamic pricing of country risk in emerging markets. The data in this study were related to the period of January 2002 to May 2006. 5-year CDS points accessible by Markit database accessible were used as dependant variable. As the country-specific explanatory variables, inflation, industrial production, GNP growth rate, export growth and foreign exchange reserves were used. When the data were analyzed, there is a significant and positive correlation between inflation and CDS point; a significant and negative correlation exchange reserves and CDS points, whereas there is no correlation between the other explanatory variables and CDS point.

Diaz et al. (2013) examined CDS values of 85 companies that operate in 15 Western European countries as of 2006-2010 in their study examining economic factors default risk premium in CDS market of the companies. Dependent variable in this study is 5-year CDS points, and as the independent variables are the European stock market indices, volatility indices, exchange rates, interest rates and the overnight interest rate and the slope of interest rates term structures were used. When the data were analyzed, it has been concluded that there is a significant and negative correlation between CDS points and the European stock market index and interest rate term structure slope and there is a significant and positive correlation between CDS point and volatility index and, exchange rate and the overnight interest rate.

Fender et al. (2012) examined the correlations between CDS premiums of 12 countries in Eastern Europe, Latin America, Southern Africa, and Asia and some macro-economic, financial and global variables in their study examining the determinants of credit default swap in a number of emerging market countries. This study consists of two parts. The first section covers the pre-crisis period from April 2002 to July 2007 and the second part covers the post-crisis period from August 2007 to December 2011. The ratio of budget deficit discussed as macro-economic variable to the national income is the ratio of external debt to the national income and the benchmark interest rate. As a result of the analysis, it has been proved that there is a significant and positive correlation between CDS premium and macroeconomic variables in pre-crisis period and there is no correlation between CDS premiums and macroeconomic variables in the post-crisis period, whereas the global variables are determinants in both periods.

Longstaff et al. (2011) examined the correlation between the comprehensive CDS points in a number of countries and global and financial variables peculiar to the country that is thought to affect these points in their study on the risk premium component of the state. In this study, the data on monthly variables in the period of October 2000 to January 2010 were evaluated. As a conclusion of the analysis, although the local stock market returns, foreign exchange rate and foreign reserves are effective on CDS point, it has been observed that US stock markets and US bond interest rates have much higher impact on CDS points.



In their study examining the European CDS points reaction to the lowering of credit rating of the US, Blau and Roseman (2014) investigated the countries being the member of European Union within 61-day period after the lowering of US credit rating on 5 August 2011 and the countries within the region of Europe despite not being the member of European Union. The dependent variable is CDS points of the countries and the independent variables are national income per capita, the ratio of debts to GNP, the population of the countries, exchange rates and unemployment rates. When the data were analyzed, it has been concluded that there is a significant and negative correlation between CDS points and the national income per capita, a significant and positive correlation between CDS points and the ratio of debts to GNP, a significant and positive correlation between CDS points and the exchange rates, a significant and positive correlation again between CDS points and unemployment rates whereas there is no correlation between CDS points and country's population.

In their study examining the stock market volatility and splash risks of individual companies and CDS points, Zhang et al. (2009) examined the correlation between the variables peculiar to the company that is thought to be affected of 5-year CDS points of 307 companies in the USA within the period of January 2001 to December 2003 and the macro financial variables. In this context, the variables discussed are stock market returns, volatility of market returns, 3-month treasury bill interest rate and yield curve. When the data were analyzed, it has been observed that there is a significant and negative correlation between CDS points and the market returns, a significant and positive correlation between CDS points and volatility of market returns, whereas there is no significant correlation between CDS points and treasury bill interest rate and yield curve slope.

In their study about macro risk factors of CDS indices, Chan and Marsden (2014) examined the correlations between CDS values of 125 companies in the North America and some macroeconomic risk factors. This study covers the period between November 3, 2003 and July 8, 2011. When the data were analyzed, it has been detected that there is a significant and positive correlation between CDS points and the ratio of the US national debt to the equities, a significant and positive correlation between CDS points and VIX index, a significant and positive between CDS points and yield slope and a significant and negative correlation between CDS points and long-term bond interest rate.

When the review of the literature were examined as a whole, it is seen that the studies generally focused on what the macroeconomic factors explaining the changes in CDS points might appear to be. Inflation, real interest rates, foreign exchange reserves, exchange rates, external debt, budget deficit, industrial production, exports and most importantly the negation in GNP growth rate of the countries leads to increase in the country's CDS points. In other words, CDS points are in the quality of an aggregated indicator reflecting the trend of the country's macroeconomic variables.

Increase in a country's CDS points will have an improver effect on borrowing costs of the companies in that country from the foreign markets in order to show that the general macroeconomic status in that country. Both the negations in macroeconomic developments of the country and increase in the borrowing cost of the companies from foreign markets will lead to negative results on production and employment. Moving of these facts, this study has been conducted to examine the presence of a relationship between CDS points in Turkey and unemployment figures and looking from broader perspective, it is seen that it has been



conducted to determine whether the changes in CDS points of Turkey will be an indicator or not in explaining the changes in unemployment points.

3. EMPIRICAL ANALYSIS

3.1. Data Sets and Model

In this study, it is aimed to investigate whether CDS points of Turkey have an explanatory feature for the unemployment, in other words CDS points are a leading factor explaining the unemployment figures in Turkey. Moving from this target, two variables consisting of unemployment figures purified from CDS points and seasonal effects were used in the research. The research consists of monthly data and covers the period of 2005M01 - 2015M07. CDS data were supplied from Bloomberg, and unemployment figures adjusted from seasonal effects were supplied from TSI (Turkey Statistical Institute). Whether the changes in Turkey's CDS points are a leading indicator in explaining unemployment figures was tried to be estimated:

$$UEM_t = \beta_0 + \beta_1 CDS_t + u_t \quad (1)$$

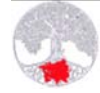
UEM shows the number of unemployed (a thousand people) purified from the seasonal effects in Turkey and CDS shows CDS points in Turkey. The data of both variables were included in the model by taking their logarithm.

3.2. Method

Econometric analysis part of the study was carried out in four stages. In the first stage, the stability of CDS and UEM series in the equation no (1) was investigated by multiple structural breaks unit root test developed by Carrion-i-Silvestre et al. (2009). In the second stage of the analysis, the presence of the long-term co-integration structure between the related series was conducted with cointegration analysis under the presence of multiple structural breaks developed by Daiki Maki (2012). In the other stage, with Dynamic Least Squares (DOLS) method for the series where the presence of cointegration relationship was detected between them, long-term relationship and coefficients belonging to this relationship were estimated. In the last stage of the study, the presence of short-term relationship between the related series and short-term coefficients were estimated by using error correction method.

3.3. Unit Root Test under the Multiple Structure Breaks

Traditional unit root tests such as ADF, PP and KPSS, where the presence of unit root belonging to the series is examined do not consider the structural breaks in the series. In these traditional methods that do not take into account the period of structural break, it can be reached to the faulty results showing that the series that are actually stable are not stable (Perron, 1989, 1361). Traditional methods are based on the assumption that the series do not include the structural breaks. But in real life the changes such as wars, natural disasters and economic crises may cause structural breaks



The first unit root analysis taking into account the structural breaks into started With the leadership of Perron (1989). Afterwards, Zivot - Andrews (1992), Lumsdaine – Papell (1997), Perron (1997), Bai – Perron (1998), Ng – Perron (2001), Lee – Strazicich (2003 - 2004), Kapetanios (2005) and Carrion-i-Silvestre et al. (2009) developed alternative tests that can make unit root analysis in the presence of structural breaks. These tests called as new generation unit root tests are also divided into two groups, while Bai - Perron (1998), Kapetanios (2005) and Carrion-i-Silvestre et al. (2009) was making unit root analysis under multiple structural breaks in the series, it can be performed unit root analysis up to one or two structural break at most in the other test methods.

In this research, the test method developed by Carrion-i-Silvestre et al. (2009) and that can make unit root analysis in the presence of up to five structural breaks was used. Carrion-i-Silvestre et al. (2009) who suggested that a structural break dates in this test method can be determined endogenously and at the same time it can be applied successfully explained stochastic data production process they used in the test as follows:

$$y_t = d_t + u_t \quad (2)$$

$$u_t = \alpha u_{t-1} + v_t \quad t=0,1,2,\dots,T \quad (3)$$

Carrion-i-Silvestre et al. (2009) developed the following five different test methods to test null hypothesis which implies the existence of a unit root in the series:

$$P_T(\lambda^0) = \frac{[S(\bar{\alpha}, \lambda^0) - \bar{\alpha}S(1, \lambda^0)]}{S^2(\lambda^0)} \quad (4)$$

$$MP_T(\lambda^0) = \frac{[c^{-2}T^{-2} \sum_{t=1}^T \tilde{y}_{t-1}^2 + (1-\bar{c})T^{-1}\tilde{y}_T^2]}{S(\lambda^0)^2} \quad (5)$$

$$MZ_\alpha(\lambda^0) = \left(T^{-1}\tilde{y}_T^2 - S(\lambda^0)^2\right) \left(2T^{-2} \sum_{t=1}^T \tilde{y}_{t-1}^2\right)^{-1} \quad (6)$$

$$MSB(\lambda^0) = \left(S(\lambda^0)^{-2} T^{-2} \sum_{t=1}^T \tilde{y}_t^2\right)^{1/2} \quad (7)$$

$$MZ_t(\lambda^0) = \left(T^{-1}\tilde{y}_T^2 - S(\lambda^0)^2\right) \left(4s(\lambda^0)^2 T^{-2} \sum_{t=1}^T \tilde{y}_{t-1}^2\right)^{1/2} \quad (8)$$

The hypothesis of this test is as follows:



H_0 : There is a unit root in the presence of multiple structural breaks.

H_1 : There is no unit root in the presence of multiple structural breaks.

When the calculated test statistics is smaller than the critical values produced with bootstrap, it is decided to be rejected of null hypothesis. The rejection of null hypothesis means that the relevant series do not include unit root under structural breaks, in the other words, it means the series is stable. In the study, unit root results made for the relevant series are shown in Table 1.

Table 1: Carrion-i-Silvestre et al. (2009) Unit Root Test Results

	Level Values					At most 3 breaks
	P_T	MP_T	MZ_α	MSB	MZ_t	
UEM	17.08 [8.40]	15.98 [8.40]	-18.40 [-35.42]	0.16 [0.11]	-3.03 [-4.18]	2008M04 – 2009M05 – 2011M09
CDS	11.01 [6.93]	10.07 [6.93]	-22.63 [-32.73]	0.14 [0.12]	-3.32 [-4.01]	2006M03 – 2007M06 – 2009M02
The Preliminary Differences						
ΔUEM	7.40* [8.12]	6.67* [8.12]	-43.73* [-36.14]	0.10* [0.11]	-4.67* [-4.23]	
ΔCDS	4.02* [7.09]	3.93* [7.09]	-57.06* [-32.61]	0.09* [0.12]	-5.34* [-4.00]	

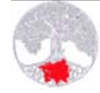
Not: Values in brackets are the critical values obtained with 1000 bootstrap cycle. *; It describes the stability of the series at 5% significance level. The model showing the structural breaks in fixed and trend was chosen. Since the data set used in this study was short, it was permitted a maximum of 3 breaking. By three different structural date of break test methods were identified as internally.

When the results in the Table 1 were analyzed, it was concluded that test statistics belonging to level values of the series is bigger than the critical values, so the level values of the series were not stable. In the unit root test carried out by discussing the preliminary differences of the series, it has been seen that calculated test statistics values are smaller than the critical values according to five test method, in other words with taking the preliminary differences, the series became stable I (1). When the preliminary differences were taken, in the second phase of the analysis, cointegration analysis has been made under the presence of multiple structural breaks between the series since the presence of cointegration relationship is required to be searched between stable I(1) series.

3.4. Cointegration Analysis under Multiple Structural Breaks

In traditional cointegration tests that do not take into account the structural breaks in the series as in unit root tests, it can be reached to the faulty results. So, the tests developed by Gregory and Hansen (1996), Westerlund and Edgerton (2006), Hatemi – J (2008) and Maki (2012) can be given as an example for new generation cointegration tests that are made by taking into account the structural breaks.

Unlike other tests in the study, cointegration test developed by Maki (2012) that can be test the presence of the cointegration relationship between the series up to five different structural break



was used. The working algorithm of this test that can determine the number and dates of the structural break terms in the series is based on the calculation of t statistics depending on discussing each period belonging to the series as a break point and the logic of being evaluated of the points where it is as a break point.

Maki (2012) tests the presence of cointegration under multiple structural breaks in the series by developing four different models:

Model 0: there is a break in the stable models, model without trend;

$$y_t = \mu + \sum_{i=1}^k \mu_i D_{i,t} + \beta' x_t + u_t \quad (9)$$

Model 1: there is a break in stable term an slope, the model without trend;

$$y_t = \mu + \sum_{i=1}^k \mu_i D_{i,t} + \beta' x_t + \sum_{i=1}^k \beta'_i x_i D_{i,t} + u_t \quad (10)$$

Model 2: there is a break in stable term an slope, the model with trend;

$$y_t = \mu + \sum_{i=1}^k \mu_i D_{i,t} + \gamma x + \beta' x_t + \sum_{i=1}^k \beta'_i x_i D_{i,t} + u_t \quad (11)$$

Model 3: the model with break in stable term, slope and trend;

$$y_t = \mu + \sum_{i=1}^k \mu_i D_{i,t} + \gamma x + \sum_{i=1}^k \gamma_i t D_{i,t} + \beta' x_t + \sum_{i=1}^k \beta'_i x_i D_{i,t} + u_t \quad (12)$$

The hypothesis of this test is as follows:

H₀: There is no cointegration in the presence of multiple structural breaks.

H₁: There is a cointegration in the presence of multiple structural breaks.

Since calculated test statistics is smaller than the critical value calculated using Monte Carlo simulations decided to reject the null hypothesis. The rejection of null hypothesis means the presence of cointegration relationship between the relevant series under structural breaks. In the study, cointegration test results made for the relevant series are shown in Table 2.

**Table 2: Maki (2012) Cointegration Test Results**

Model	Test Statistics	Critical Values			At most 3 breaks
		%1	%5	%10	
Model 0	-3.22	-5.56	-5.08	-4.78	2005M07 – 2011M02 – 2011M09
Model 1	-3.96	-5.83	-5.37	-5.10	2009M10 – 2013M03 – 2013M09
Model 2	-3.23	-6.25	-5.70	-5.40	2005M07 – 2006M03 – 2011M12
Model 3	-6.56***	-7.08	-6.52	-6.26	2011M02 – 2011M12 – 2012M12

Note: Critical values in brackets are obtained from Table 1 in Makin (2012). *; It shows the presence of the cointegration relationship between the series at 5% significance level.

When the results in Table 2 are examined, that the test statistics calculated according to Model 3 (model with breaks in fixed term, slope and trend) is smaller than the critical values at 5% significance level proves that there is a cointegration relationship between the series. After this part of the analysis, it was passed to the stage to be estimated of the cointegration coefficients between the series proved to move together.

3.5. Estimating the Long-term Cointegration Coefficients

It can be made long-term coefficient estimation with the level values of the series proved to be cointegrated and move together in the long term without falling to the spurious regression problem. But the first differences, for the series which are static and the presence of cointegration relationship was proved between, the application of classical LSM (Least Squares Method) in estimating the cointegration coefficients will lead to lose the validity of hypothesis tests due to the elimination of consistent, unbiased and efficiency properties of LSM. For the elimination of these handicaps in classical LSM, Saikkonen (1992) and Stock and Watson (1993) suggested “Dynamic Least Squares” (DLSM) Method.

In this method, it is suggested to be included of the differences, lags and leads of the independent variables besides level values in the model in the estimation of cointegration coefficients between the series. This approach is assumed to eliminate all long-term correlation between the error terms. Therefore, the method can produce strong and consistent estimations in the presence of interiority and autocorrelation problems in the independent variables (Esteve and Requena, 2006, 118). For the estimation of DLSM, the model no (1) is converted as follows. In addition, the structural break dates obtained from the cointegration analysis (*Model 3*) were also included in the model with dummy variables.

$$UEM_t = \alpha_0 + \alpha_1 t + \alpha_2 CDS + \sum_{i=-q}^q \beta_i \Delta CDS_{t-i} + \varepsilon_t \quad (13)$$

In the model, q represents the optimum lead and lag numbers. The estimation results of long-term cointegration coefficients estimation results determined by using DLSM method are presented in Table 3.

**Table 3: Long-term Cointegration Coefficients**

Dependent Variable: UEM	Coefficient	t- Statistics
Stable Term	5.18***	54.52
CDS	0.45***	10.97
D1	-0.05***	-4.35
D2	-0.11***	-8.90
D3	0.06***	5.94
R ² : 0.94	J-B: 0.18	

Note: The autocorrelation and changing variant problems were tried to be estimated with Newey - West the method. ***It expresses the significance at the 1% level. That the probability values belonging to Jarque-Bera (J-B) normality test were found to be bigger than 0.05 shows the reliability of the calculated R² value and the t statistics. The dummy variables included in the model are D1: 2011M02 D2: 2011M12 D3: 2012M12.

When long-term cointegration coefficients in Table 3 were examined, there is a positive and significant correlation between CDS points and unemployment figures in Turkey. In other words, the change in unemployment figures of Turkey describes the changes in unemployment figures of Turkey. As Turkey's CDS points are getting increased by 10%, unemployment figures increases by 4.5%. This result reached within the scope of long-term analysis can be interpreted to be a leading indicator describing the changes in unemployment figures in Turkey's CDS points. In addition, being significant of the coefficients belonging to dummy variables shows that significant changes occurred in economy in terms of CDS and unemployment variables in structural break dates determined endogenously.

3.6. Estimation of Error Correction Model (Short Term Analysis) Coefficients

Error correction model was formed with a period of lag values of the error terms obtained by the estimation of long-term cointegration coefficients with UEM and CDS variables received notice. In this model, whether there is a deviation from the balance between the variables moving together on a certain balance in long-term and how the deviations from the averages occur for per period were analyzed. Error correction model created for short-term analysis is as follows:

$$\Delta UEM_t = \alpha_0 + \alpha_1 ECT_{t-1} + \alpha_2 \Delta CDS_t + u_t \quad (14)$$

This model has also tried to be estimated with DOLS method. Optimum lead and lag numbers belonging to the model were determined by choosing AIC (Akaike Information Criterion) method. Estimation results are listed in Table 4.

**Table 4: Error Correction Model Estimation Results**

Dependent Variable: UEM	Coefficient	t- Statistics
Fixed term	0.02**	2.21
ECT_{t-1}	-1.27***	-3.39
ΔCDS	0.27**	2.27
R^2 : 0.94	J-B: 0.79	

Note: The autocorrelation and changing variant problems were tried to be estimated with Newey - West the method.

According to the results in Table 4, first of the coefficient sign of error correction term were seen to be negative and statistically significant. This case means that by eliminating the short term deviations between UEM and CDS variables, the variables converged into long term balance values in other words, it means these two variables move together in a long period. These results strengthen the argument that explains the changes in Turkey's CDS points can be a leading indicator of changes in unemployment figures.

4. RESULT

The concept of risk is very important for the actors in the financial markets. In general, the risk is a positive or negative deviation between the expected and realized financial returns in financial sense while it is the possibility of losing that can be determined objectively. Thus, especially with the elimination of the barriers in globalization and capital flows, the international investors have begun to show more sensitivity to the deviation of the risk since 1990s. In this process, enormous growth has been seen in the number of financial instruments and technics with the impact of the extraordinary developments in the field of telecommunications. One of these financial risk instruments is the CDS (credit default swap) and an increase has been observed in the academic studies examining the relationships between basic macroeconomic variables and CDS premiums.

In this study, it was aimed to investigate Turkey's CDS points that are illustrative feature of unemployment, in other words, to whether CDS points are the leading indicator of unemployment in Turkey. Econometric analyses applied in line with this aim were carried out in four stages. In the first stage of the analysis, the stability analysis belonging to CDS and UEM variables were tested with Carrion-i-Silvestre (2009) multiple structural break unit root method. According to the results obtained, it has been seen that the variables are not stable in level values whereas when the first differences of the variables were taken, they became stable $I(1)$. In the second stage, the presence of cointegration relationship between the related variables that were stable $I(1)$ in the first differences was examined by Maki (2012) multiple structural breaks cointegration test and the presence of cointegration relationship between the variables according to Model 3 (model with break in fixed term, slope and the trend) was proved. In the third stage of the analysis for the variables proved to move together in the long term, long-term coefficient estimation was made by using Dynamic Least Squares (DOLS) method. According to the results obtained, when Turkey's CDS points increased up to 10%, unemployment figures also increase at the ratio of 4.5%. According to error correction model located at the last stage, long-term analyses give reliable results.



According to the obtained results, the changes in Turkey's CDS points explain the changes in unemployment figures in long term positively. Accordingly, it has been concluded that the changes in CDS points having the feature of explanatory to the status in the basic macroeconomic variables can be accepted as a leading indicator in explaining the changes in unemployment figures.

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