

The European Sovereign Debt Crisis and the Role of Credit Swaps



Professor Eleftherios (El) Thalassinos
University of Piraeus, Greece
Director of MSc Program in Maritime Studies
Post-Doc in Economics, U of California at Berkley,
USA
Ph.D. in Quantitative Methods & International
Economics, UIC, Chicago, USA
M.B.A. in International Business & Finance
De-Paul U, Chicago, USA
B.A in Economics, U of Athens, Greece
Email : thalassi@unipi.gr, thalassinos@ersj.eu
Tel: (+30) 210-4142543
Secretariat: (+30) 210-4142542



NEW CHALLENGES OF ECONOMIC AND BUSINESS DEVELOPMENT – 2016

May 12–14, 2016, Riga, University of Latvia

The European Sovereign Debt Crisis and the Role of Credit Swaps

□ Eleftherios (El) Thalassinos

□ Professor, Chair Jean Monnet

□ University of Piraeus, Greece

□ Editor ERSJ, IJEBA and IJMTEI

□ www.ersj.eu www.ijeiba.com www.ijmtei.com
www.icabe.gr www.jeanmonnet-emu.eu



NEW CHALLENGES OF ECONOMIC AND BUSINESS DEVELOPMENT – 2016

May 12–14, 2016, Riga, University of Latvia

This paper has been included as Chapter 20 in a
collective volume titled:

“The European Sovereign Debt Crisis and the Role
of Credit Swaps”

in the World Scientific Handbooks in Financial
Economics Series

edited by The World Scientific Publishing, New
York, London, Frankfurt, Singapore

dedicated to the memory of the late **Merton H.
Miller (Nobel Laureate in Economics 1990)** and
Leo Melamed, great academic and practitioner
pioneers, respectively, of financial futures.

General Econometric Limitations I

New thoughts regarding the use of econometrics in empirical research:

- ❑ Structural changes in datasets;
- ❑ Significant symmetric shocks in datasets;
- ❑ Multicollinearity;
- ❑ **Endogeneity** and **heterogeneity**.

General Econometric Limitations II

- ❑ Brilliant use of econometrics but absence of **theoretical foundation**;
- ❑ Pure knowledge of the technical background (distribution of software provided automated analysis);
- ❑ Simple or complete models;
- ❑ Ability/capability to interpret the results.

Abstract I

The **main objectives** of this research are:

- ❑ To **determine** the factors responsible for the market pricing of sovereign default risk;
- ❑ To **analyze** the causalities of Credit Default Swaps (CDSs) spreads;
- ❑ To **examine** possible **pricing discrimination** and **asymmetries** between South West Euro Area Periphery (SWEAP) and non-SWEAP countries;
- ❑ To **detect for structural changes** in the pattern of the CDS spreads throughout and after the crisis;
- ❑ To **detect for possible speculation** against the SWEAP group of countries.

Abstract II

Significant variables:

- ❑ The **grading rate** forward one period;
- ❑ The current governments' **bond yield**;
- ❑ The **inflation rate**;
- ❑ The variable related to the **public debt** lagged one period;
- ❑ All variables, amongst others robust predictors of the CDS spreads, have been proven statistically and economically significant, except for the fiscal space of one quarter forward of the fiscal balance proven to be only weakly significant.

Introduction I

- The flows of funds in the international financial markets worldwide have been **extremely unstable** since the eruption of the global financial crisis.
- The pressure imposed on the financial markets in 2008 signified a **diminution of liquidity** among insolvent financial institutions, compelling at the same time many banks and investors to send capital back to their countries in order to finance investments and pay for restructuring.

Introduction II

- Governments, public or private financial institutions and international organizations involved in the regulatory framework of the world economy **have been accused** for failing to control the current financial crisis whilst most of them have been censured as **inadequate**.
- The size of the crisis is associated with the **degree of openness** and especially that of the financial sector as well as the **macroeconomic stability** of each country, i.e. the consistence between fiscal and monetary policies and the adoption of a fixed exchange rate regime.

Introduction III

- Eurozone crisis erupted in most of the member countries, raising questions about whether the **common currency introduced in 2001 would survive** and whether the European banks, financial institutions and sovereign governments were in a position to **fulfill their responsibilities** and honor their obligations regarding the criteria set out in the Maastricht Treaty in 1992 and the ensuing straitjacket of the Stability and Growth Pact (SGP) in 1997.

Introduction IV

- Eurozone is **still undergoing** many hardships, five years after the financial crisis has erupted.
- The matter identified as the most crucial one is the **sovereign debt**, particularly for member-countries like Greece (bankrupt de facto, in May 2010), on the long history of bad governance of which should one add European Monetary Union's membership in 2001.

The main aims of this research I

- “Sovereign risk” refers to the risk that a government will fail to fulfil its debt obligations.
- “Sovereign risk” may also be used when a country **imposes regulations** confining the capability of issuers in the country to fulfil their obligations, amongst others foreign currency restrictions.
- The topic has been **extensively analyzed** during the recent credit crisis.

The main aims of this research II

- The development of various theories was based on the **effect of macroeconomic and financial variables** on the determination of the CDS spreads, as in the works of Jamal (2011), Arghyrou and Kontonikas (2011) and Grammatikos and Vermeulen (2012).
- Various theories based on the works of Beirne and Fratzscher (2013), Calice, Chen and Williams (2013) and Aizenman, Hutchison and Jinjarak (2013) have emphasized on the **financial discrimination** against “high-risk” countries.

The main aims of this research III

- In the present research study an attempt to analyze the **mechanism determining** the market pricing of sovereign default risk is made;
- The determinants used are of **macroeconomic and financial** nature;
- Focus is given on the **fiscal space** as defined in Aizenman et al. (2013) either as the public debt to tax base or the fiscal balance to tax base.

The main aims of this research IV

Other control variables:

- ❑ **Current account** as a ratio to Gross Domestic Product (GDP);
- ❑ The growth of the consumer price index (**inflation rate**);
- ❑ The **yield for the five-year** maturity government bond rate (mainly for comparison with relative studies);
- ❑ The respective **rating grade** (downgrade rating) as announced by the big 3 Credit Rating Agencies (CRAs, Moody's, Standard and Poor's, and Fitch).

The groups of countries

- **SWEAP** (Greece, Italy, Spain, Portugal, Ireland) and **non-SWEAP** (Austria, Belgium, Cyprus, Estonia, Finland, France, Deutschland, Luxembourg, Malta, The Netherlands, Slovakia, Slovenia), using **quarterly data**, during the **2008q1-2013q2** full sample period, as well as during the global financial crisis, **2008q1-2010q4**, and the period following it, **2011q1-2013q2**.

Objectives

- (1) What are the **causalities** of the CDS spreads taken as a proxy for market pricing of sovereign default risk?
- (2) Are there any **pricing discrimination** and asymmetries of CDS spreads between SWEAP and the non-SWEAP countries?
- (3) Is there any identifiable **structural change** in the pattern of CDS spreads during and after the global financial and European debt crisis in 2008-2010?
- (4) What do our data reveal about the research hypothesis of **"speculation of the market against sovereign countries"**?

Literature review I

- **Aizenman, Hutchison and Jinjarak (2013)**, who address the remarkable volatility in the macroeconomic environment of a number of European countries that, after a period of moderation in their economies, faced strong turbulence in their risk profiles. The methodology applied is the estimation mainly of the impact of the “fiscal space”, a variable defined as government debt or government’s budget deficits relative to the tax base and measured by the total general government revenues as a ratio to GDP averaged for several past years.

Literature review II

- **Arghyrou and Kontonikas (2011)**, have rejected the hypothesis that there was evidence of speculation in the CDS market against the weak economies leading them at higher levels. Their finding implies that, in the long run and taking into consideration other variables on a model using monthly data, spreads in some European countries are mainly driven by accumulated interrelated macroeconomic imbalances and international risk conditions in the Euro area; thus, the researchers covered half of the road in order to detect first generation crisis model's behavior.

Literature review III

- **Beirne and Fitzcsher (2013)** found evidence of market discrimination against the “poor European periphery”, which is in full conformity with our findings. The authors indicate that there is a great possibility of contagion every time the financial markets appear to be more sensitive to economic fundamentals, as in the case of the SWEAP countries. Their findings support the hypothesis of different effects on each country based on their different characteristics.

Literature review IV

- **Puig and Rivero (2011)** used daily data for 10-year bond yields for the period 1990-2010 for the SWEAP countries, applied the Granger causality test and found a strong causality relation among peripheral European Monetary Union (EMU) bond yields. Their findings also indicate that the contagion of the crisis through macroeconomic imbalances and the banking system could have been a fundamental issue.

Literature review V

- *Oliveira et al. (2012)* analyzed the influence of the macroeconomic and financial variables from 2000 to 2010 in sovereign CDS spreads within the EMU. The sample is split into two sub-samples: the pre-crisis period, 2000 to 2007, and the crisis period, 2007 to 2010. The findings show that, during the pre-crisis period, the macroeconomic fundamentals of each country had limited explanatory power.

Literature review VI

- Calice, Chen, and Williams (2013), in response to the European banking or public debt crisis in 2009–2010 and the regional economic problems that emerged, addressed the correlation between liquidity and credit spreads in the sovereign CDS and bond markets of nine Eurozone countries. By developing an empirical model of time-varying vector autoregressive methodology via a time-varying coefficient specification, the authors are led to considerable implications.

Research Grounds

The present research has been conducted on the following grounds:

- Use of **dynamic panel data** for separate groups of countries with similar characteristics;
- Inclusion of **macroeconomic and financial** variables as the main determinants in the models;
- Use of **dummy variables** in an attempt to examine certain effects associated with the specific groups;
- Use of the **fiscal space** not just as a predictor, but rather to analyze whether the real capabilities of the economy to pay off its debt have been taken into account by investors or speculators.

Methodology and statistical data I

□ **Panel dataset** can be presented as:

$$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it}$$

Where i refers to cross-sectional observations 1 through N and t to periods 1 through t .

Methodology and statistical data II

- The use of panel data in economic research increases the number of observations giving a **certain advantage** to the researcher in connection with the degrees of freedom while **collinearity** between the independent variables is eliminating improving the effect of the estimates.

- The researcher is able, using this type of data, to **analyze a number of hypotheses** that cannot be evaluated in the case of cross-sections of time series datasets (Hsiao, 2003).

Methodology and statistical data III

- The main difference between the FE and the RE models lies in the assumption they encompass regarding how **heterogeneity** is captured in addition to the estimation techniques.
- The FE model assumes that individual heterogeneity is captured by the **intercept term**. This means that every individual gets its own intercept α_i , while the slope coefficients are the same.

Methodology and statistical data IV

- This also means that the **heterogeneity** is associated with the regressors on the right-hand side of the equation.
- The FE model is also known as the **Least Square Dummy Variable (LSDV) estimator** because a dummy variable is assigned to each individual (Kennedy, 2008).

Methodology and statistical data V

- The RE model assumes, that the **individual effects are identified by the intercept, and the random component u_i** . This random component is associated neither with the regressors (independent variables) nor with the error term.

- Although the assumption in the RE model that individual effects are not associated with explanatory variables is very important, it allows estimation of the **effect of time-invariant variables** cancelled out in fixed effects estimation.

Methodology and statistical data VI

- The **regression equation** for the FE model is given in equation:

$$Y_{it} = \alpha_i + X'_{it}\beta_1 + u_{it}$$

- and for the **RE model** in equation:

$$Y_{it} = \alpha + X'_{it}\beta_1 + u_{it} + \varepsilon_{it}$$

Methodology and statistical data VII

- An important difference between Generalized Least Squares (GLS) and Feasible Generalized Least Squares (FGLS) methodology is that the latter has been accepted as a reliable methodology to calculate the variance covariance matrix of the series even when the **off-diagonal elements in the matrix are not known**. FGLS estimators, also known as Estimated Generalized Least Squares (EGLS) estimators, can be obtained by using a number of different methodologies, among which the **maximum likelihood method**, described by Baltagi and Chang (1994).

Methodology and statistical data VIII

- **FGLS, also known as EGLS**, in addition to the aforementioned FE and RE models, is used giving estimators the same desirable **asymptotic properties** as in the case of the GLS methodology used in most of the studies conducted after the European banking or debt crisis.
- FGLS (or EGLS) is more preferable than the GLS when the off-diagonal elements in the variance covariance matrix are not known, in other words when the phenomenon of **heteroskedasticity** appears.

Methodology and statistical data IX

- The dataset has been used as panel data applying the **FE model (fiscal balance)**, the **RE model (public debt)** or the FGLS model in an attempt to model the two different groups (SWEAP and non-SWEAP), to discover possible **asymmetries** or **financial discrimination** between the groups or **structural changes** in market pricing of Euro Area's official debts as well as some kind of **speculation** against the SWEAP group from the financial intermediaries based on self-fulfilling expectations or herding behavior suggested by fiscal space or downgrade ratings indications.

Methodology and statistical data X

- The panel regression model used in the estimations (with STATA 12.1 v.) is given in equation:

$$Y_{it} = \alpha_i + \lambda_t + \theta Y_{it-1} + X'_{it} \beta + \varepsilon_{it}$$

Where the dependent variable Y is the sovereign CDS spreads of five-year tenor in basis points, $t = 2008Q1, \dots, 2013Q2$ and $i = 13$ member countries out of 17 of the Eurozone because of lack of data for Cyprus, Estonia, Greece, and Luxembourg.

3. Findings and Discussion

Table 1. Dynamics of CDS spreads

	(1) RE_Model_1 (2008-13)	(2) FGLS_Model_2 (2008-13)	(3) FE_Model_3 (2008-13)	(4) FGLS_Model_4 (2008-13)
t2008 x nonSWEAP	-40.18 (28.39)	-8.444 (13.87)	-38.26 (29.40)	-5.645 (14.49)
t2009 x nonSWEAP	-43.10*** (10.73)	-25.93** (9.338)	-29.03* (10.24)	-23.99** (9.168)
t2010 x nonSWEAP	-8.721 (9.692)			
t2008 x SWEAP	-15.18 (30.68)			6.240 (34.58)
t2009 x SWEAP	-29.00** (10.48)	-11.13 (19.83)	-12.52 (20.75)	
t2010 x SWEAP	42.28* (18.95)	42.93* (18.65)	53.43# (26.99)	50.16** (19.22)

3. Findings and Discussion

Table 1. Dynamics of CDS spreads

	(1) RE_Model_1 (2008-13)	(2) FGLS_Model_2 (2008-13)	(3) FE_Model_3 (2008-13)	(4) FGLS_Model_4 (2008-13)
CDS_5y (t-1)	0.501*** (0.078)	0.569*** (0.038)	0.514*** (0.092)	0.638*** (0.037)
yield_5y	35.30*** (6.439)	26.40*** (2.857)	35.30*** (8.063)	23.91*** (3.234)
CurrAcc/GDP	1.232*** (0.361)	0.825 (0.617)	2.011** (0.502)	1.484* (0.673)
Inflation	6.623* (2.986)	9.140** (3.094)	12.73 (6.161)	9.430** (3.052)
Public Debt/Tax Base (t-1)	3.443* (1.436)	4.989** (1.707)		
Downgrade Rating (t+1)	49.69*** (7.006)	54.78*** (10.34)	50.93** (12.16)	58.10*** (11.41)
Fiscal Balance / Tax Base (t+1)			-9.890 (41.97)	-41.17# (25.12)
Constant term	-56.05*** (13.35)	-61.03*** 13.71	-54.26* (17.97)	-42.09*** (10.01)

3. Findings and Discussion

Table 1. Dynamics of CDS spreads

	(1) RE_Model_1 (2008-13)	(2) FGLS_Model_2 (2008-13)	(3) FE_Model_3 (2008-13)	(4) FGLS_Model_4 (2008-13)
Observations	224	224	199	199
R^2	0.9357		0.890	
Adj. R^2			0.884	
Countries (i)	13	13	13	13
Fixed (or Random) Effects (i)	(Yes)	(No)	Yes [0.3168]	No
[corr(u_i , Xb)]				
Serial Correlation	y(t-1)	y(t-1)	y(t-1)	y(t-1)
Clustered s.e. (i)	No	Yes	No	Yes

Notes: Standard errors in parentheses. # $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. R^2 for RE (FE) model stands for the overall (within) one. FGLS feasible generalized least squares allowing estimation in the presence of AR(1) autocorrelation within panels and cross-sectional correlation and heteroskedasticity across panels. Similar results to FGLS models we have had from Prais-Winsten or Newey-West estimators often used for panel corrected standard errors, robust in our case of heteroskedastic and contemporaneously correlated across panel disturbances or possibly autocorrelated up to some lag. Lack of data for *Yield_5y* variable for the Euro zone's 4 members, namely, Cyprus, Estonia, Greece and Luxembourg (plus for the *CDS_5y* variable) causes their exclusion from the sample which after all includes 13 out of 17 Euro Area countries (i).

3. Findings and Discussion

Table 2. CDS spreads, fundamentals and structural change

	(1) RE_Model_5 (2008-13)	(2) FGLS_Model_6 (2008-13)	(3) FGLS_Model_7 (2008-10)	(4) FGLS_Model_8 (2011-13)
CDS_5y (t-1)	0.536*** (0.0699)	0.561*** (0.038)	0.661*** (0.0678)	0.562*** (0.0547)
yield_5y	31.54*** (5.713)	25.20*** (2.750)	20.82*** (4.421)	27.50*** (3.805)
CurrAcc/GDP	0.987* (0.410)	0.636 (0.629)	0.281 (0.660)	0.954 (0.973)
Inflation	10.05* (4.079)	13.32*** (2.602)	16.56*** (2.772)	12.57 (7.134)
Public Debt/Tax Base (t-1)	5.832*** (1.155)	7.068*** (1.759)	8.922*** (1.582)	4.122 (3.028)
Public Debt/Tax Base				
Downgrade Rating (t+1)	64.26*** (5.682)	61.03*** (10.46)	63.43*** (14.12)	55.49*** (14.22)
Downgrade Rating Constant term	-83.44*** (16.25)	-81.81*** 12.92	-90.39*** (15.14)	-67.48* (28.85)

4. Findings and Discussion

Table 2. CDS spreads, fundamentals and structural change

	(1) RE_Model_5 (2008-13)	(2) FGLS_Model_6 (2008-13)	(3) FGLS_Model_7 (2008-10)	(4) FGLS_Model_8 (2011-13)
Observations	224	224	111	113
R^2	0.9270			
Countries (i)	13	13	13	13
Fixed (Random) Effects (i)	(Yes)	(No)	(No)	(No)
Serial Correlation [common AR(1) coeff.for all panels]	y(t-1)	y(t-1) [0.1127]	y(t-1) [0.2080]	y(t-1) [0.0406]
Clustered s.e. (i)	No	Yes	Yes	Yes

Notes: Main fiscal space measure: public debt/tax base. Standard errors are in parentheses.

p<0.10, * p<0.05, ** p<0.01, *** p<0.001. See notes of the previous Table here also applied.

4. Findings and Discussion

Table 3. CDS spreads, fundamentals and structural change

	(1) FE_Model_9 (2008-13)	(2) FGLS_Model_10 (2008-13)	(3) FGLS_Model_11 (2008-10)	(4) FGLS_Model_12 (2011-13)
CDS_5y (t-1)	0.528*** (0.0972)	0.657*** (0.0349)	0.782*** (0.0683)	0.617*** (0.0505)
yield_5y	30.77*** (7.072)	21.28*** (3.065)	15.30** (4.974)	27.08*** (4.543)
CurrAcc/GDP	2.218** (0.562)	1.277 (0.693)	0.830 (0.696)	2.660* (1.113)
Inflation	16.33* (6.066)	12.25*** (2.8)	15.55*** (2.934)	14.19 (7.924)
Fiscal Balance/Tax Base (t+1)	-17.32 (44.73)	-61.59* (25.97)	-71.06** (22.14)	2.019 (62.54)
Fiscal Balance/Tax Base				
Downgrade Rating (t+1)	59.84*** (11.97)	66.63*** (11.22)	62.98*** (15.85)	72.35*** (15.54)
Downgrade Rating Constant term	-53.81*** (12.22)	-49.14*** 9.542	-42.77*** (12.64)	-62.56* (26.16)

4. Findings and Discussion

Table 3. CDS spreads, fundamentals and structural change

	(1) FE_Model_9 (2008-13)	(2) FGLS_Model_10 (2008-13)	(3) FGLS_Model_11 (2008-10)	(4) FGLS_Model_12 (2011-13)
Observations	199	199	111	88
R^2	0.877			
Adj. R^2	0.873			
Countries (i)	13	13	13	13
Fixed (Random) Effects (i)	Yes [0.4940]	No	No	No
[corr(u _i , Xb)]				
Serial Correlation [common AR(1) coeff.for all panels]	y(t-1)	y(t-1) [0.0916]	y(t-1) [0.2105]	y(t-1) [0.0181]
Clustered s.e. (i)	No	Yes	Yes	Yes

Notes: Main fiscal space measure: fiscal balance/tax base. Standard errors are in parentheses.
p<0.10, * p<0.05, ** p<0.01, *** p<0.001. See notes of the previous Table here also applied.

4. Findings and Discussion

Table 3. CDS spreads, fundamentals and structural change

	(5) FGLS_Model_10a (2008-13)	(6) FGLS_Model_11a (2008-10)	(7) FGLS_Model_12a (2011-13)
CDS_5y (t-1)	0.607*** (0.0408)	0.788*** (0.0786)	0.556*** (0.0506)
yield_5y	26.51*** (3.192)	21.28*** (5.573)	30.48*** (4.175)
CurrAcc/GDP	0.744 (0.741)	0.0972 (0.761)	1.453 (1.014)
Inflation	11.84*** (3.221)	14.65*** (3.425)	9.069 (7.711)
Fiscal Balance/Tax Base (t+1)			
Fiscal Balance/Tax Base	-30.32 (27.99)	-30.47 (27.70)	-2.753 (59.18)
Downgrade Rating (t+1)			
Downgrade Rating	38.53*** (12.99)	29.31 (19.20)	50.82*** (15.89)
Constant term	-49.43*** (10.88)	-49.12*** (14.17)	-42.38 (25.75)

Detecting the dynamics of market pricing discrimination I

- **Four different** models have been approved. Two of them consider the **fiscal space by using the “public debt/tax base”** lagged one period (RE Model 1 and FGLS Model 2) and the other two consider the fiscal space by using the **“fiscal balance/tax base”** forward one period (FE Model 3 and FGLS Model 4) as the main determinants in the explanatory X matrix.

Detecting the dynamics of market pricing discrimination II

- The main conclusion is that we have detected strong evidence for market **pricing discrimination and asymmetries** between non-SWEAP and SWEAP groups. During the global financial crisis, especially in 2009, the market was pricing non-SWEAP's CDS spreads approximately 23–43 basis points below the Eurozone average (interaction term $t_{2009} \times \text{non-SWEAP}$). From 2009 and on, but on the turmoil of the Eurozone debt crisis in 2010, the market had been pricing SWEAP's CDS spreads approximately 42–53 basis points above the Eurozone average (interaction term $t_{2010} \times \text{SWEAP}$).

Detecting the dynamics of self-fulfilling expectations I

- We have detected the dynamics of the dependent variable caused by the determinants used given the conditions described above. The estimations present very strong evidence ($p < 0.001$) **of self-fulfilling expectations** based on the big 3 CRAs' valuations, as it is expressed by one quarter lead of the variable downgrade rating ($t+1$) detected for the CDSs of the Eurozone, increasing the appropriate coefficient approximately 49–58 basis points above the region's average throughout the period 2008–2013. That can be considered a **significant speculation** against Euro Area member-countries.

Detecting the dynamics of self-fulfilling expectations II

- We have also detected very strong evidence ($p < 0.001$) regarding the **interconnection of the CDS derivative market and the government bond market of the respective five-year maturity yield**, pushing CDS spreads 24–35 basis points above the Eurozone average for the sample period. **The result is in opposite direction to the results by Arghyrou and Kontonikas (2011).**

Detecting the dynamics of fiscal space determinants I

- The fiscal space, as defined hereinabove, has been proven to be among the main determinants in causing CDS spreads, as described in the models of Table 1. We found strong evidence ($p < 0.01$) that historical values of **“public debt/tax base” have small positive influence** on the sovereign risk of the Eurozone, increasing their CDS spreads approximately 3–5 basis points above the Eurozone’ average in the period 2008–2013, i.e., almost 11 times lower influence of fiscal space than of downgrade ratings of the CRAs, given the different units of measurement.

Detecting the dynamics of fiscal space determinants II

- The latter seems to justify the **presence of speculation** and herding behavior or, in the opposite that investors took into account official statistics of fundamentals much less than statements of markets participants, as may be seen in the case of CRAs. However, **fiscal balance/tax base forward one period has been proven weakly statistically significant** ($p < 0.10$), with a 1% amelioration of the relative deficit government budget causing a decline in CDS spreads approximately 41 basis points above the Eurozone' average for the period 2008–2013. **The results for fiscal space are in accordance with the results of Aizenman, Hutchison, and Jinjarak (2013).**

Detecting the dynamics of other determinants I

- We have also detected **significant conclusions** for the other fundamentals used in the estimated models. We have found strong evidence ($p < 0.01$) that inflation has a positive influence on the sovereign default risk of the Eurozone, increasing their CDS spreads approximately 9 basis points above the average throughout the period 2008–2013, while weaker evidence has been found ($p < 0.01$ or $p < 0.05$) for the international competitiveness, as accounted for by the current account/GDP.

Detecting the dynamics of other determinants II

- All other statistics of the estimated models in Table 1 are considered as well. The R squared statistic is high (from 0.884 to 0.935), 13 countries pertain to the sample (after the exclusion of Cyprus, Estonia, Greece, and Luxembourg) and by using the dependent variable lagged one period the **serial correlation has been moderated.**

Detecting “pure” dynamics of fiscal space expressed as the relative public debt I

- To compare the estimations from models 1–4 in Table 1 (including time and sub-groups interaction dummies) and to examine structural changes in market pricing CDS spreads for the official sector during the sample period, we **present seven more estimated models in Tables 2 and 2a**. Table 2 presents four dynamic models (RE Model 5 for the whole sample period, FGLS Model 6 also for the period 2008-2013, FGLS Model 7 during the global financial crisis 2008–2010 and FGLS Model 8 after that, i.e. for the period 2011–2013 during which the Eurozone kept creeping) **considering the fiscal space in the version of “public debt/tax base”**, lagged one period, and the variable **downgrading rating** forward one period.

Detecting “pure” dynamics of fiscal space expressed as the relative public debt II

- We aim to detect the **causalities** of sovereign risk for the Eurozone as a whole (without dummies and interaction terms added) over the sample period 2008–2013 and possible **structural change** between the crisis period (2008–2010) and the following one (2011–2013).

Detecting “pure” dynamics of fiscal space expressed as the relative fiscal balance I

- **Fiscal balance/tax base has been proven insignificant**, while for downgrade rating, yield, inflation rate and current account/GDP we have had statistical verification on their inference. Once again, similar results have been taken when **FGLS estimators** were used with or without interaction terms (Model 4 – Table 1 and Model 10 – Table 3 respectively). This time, strong evidence on statistical significance of CRAs valuations, relative fiscal balance, respective yield and inflation was verified from Models 4 and 10.

Detecting “pure” dynamics of fiscal space expressed as the relative fiscal balance II

- Thus, forward looking (a quarter lead) either of fiscal balance or even more of downgrade rating by the big 3 CRAs may be interpreted as evidence on **self-fulfilling expectations channel in market pricing** of sovereign default risk, here expressed by the respective CDS spreads. **Therefore, speculators who believe that fiscal balance (downgrade rating) of a Eurozone’s country is going to be reduced by 1% (a rank) take short (long) positions in the market and pushing down (up) CDS spreads almost 62 (67) basis points.**

Conclusions I

- Our findings on market pricing of Euro Area member-countries' default risk **reveal a major role in the downgrade valuations of CRAs forward one quarter**, the current yield on five-year governments' bonds, a period lead of a fiscal space variable if expressed with the fiscal balance as a percentage of the tax base and lag if expressed by the public debt as a ratio to the tax base.

Conclusions II

- **Self-fulfilling expectations** and herding behavior may be detected from the forward looking predictors, such as either the CRAs valuations or the relevant fiscal space, justifying the call for second generation crisis models for ensuing the crisis in Eurozone. **With a view to the fiscal space, our findings are generally in accordance with those of Aizenman, Hutchison, and Jinjarak (2013).**

Conclusions III

- **Market pricing discrimination** between SWEAP and non-SWEAP countries has been statistically and economically confirmed. Specifically, we estimated asymmetric market pricing on average 30 basis points less than the mean-Eurozone's for the non-SWEAP country-members in 2009 (at the "end" of the global financial crisis) and also on average 47 basis points more for SWEAP in 2010 (at the peak of the Eurozone's crisis). **This finding for the discrimination is consistent with the result by Beirne and Fratzscher (2013) and Thalassinos (2014).**

Conclusions IV

- We found strong evidence supporting the hypothesis of **structural change** between two sub-periods, period 2008-2010 of global financial crisis and period 2011-2013 after that.
- Traders seem to take into account fundamentals, like **fiscal space** (relative public debt or state's budget) or bonds' yield or inflation rates or even in some cases international competitiveness (current account/GDP) during the crisis (2008-2010), while the period following (2011-2013), they seem not to trust European leaders, but rather look for CRAs and relevant bond markets' valuations. **The latter evidence is in accordance with those of Grammatikos and Vermeulen (2012).**

Conclusions V

- Market pricing discrimination and asymmetries detected by way of our estimated Models in combination with strong evidence in favor of structural change in sovereign default risk pricing after the crisis, may economically be identified as speculation against SWEAP countries fiscally distressed in 2010 (Arezki, Candelon and Sy, 2011).

Conclusions VI

- **Self-fulfilling credit rating expectations** detected mainly from the downgrade rating forward one period always matter, but the current credit rating seems to be statistically significant only after the crisis (2011-2013). The effect is the opposite for the fiscal space.
- **The fiscal balance variable forward one period is triggering speculative waves** by interpreting the CDS market pricing of sovereign default risk on the basis that this derivative and Over-the-Counter (OTC) market primary look on future fundamentals.

Conclusions VII

- Greece's decision to default in early 2012 is consistent with the multiple equilibrium model proposed by Calvo (1988) or even with the Eurozone's structural deficiencies (De Grauwe and Ji, 2012).
- In this respect, CDS market is pricing sovereign default risk by following contagion waves, over-reacting and mis-pricing it, passing through from "optimistic", good, expectational equilibrium to a "pessimistic" bad one. The statistically and economically robust predictor of the current yield is strong evidence in favor of this interpretation.

Conclusions VIII

- The main **structural breaks** and the **speculation** detected from the estimations presented call for immediate European Central Bank (ECB) regulation, supervision and control of Eurozone sovereign CDS spreads accepted by the Eurozone banking system and European rating agencies; e.g.: **(1)** No one should have the right to buy “naked” CDS, by definition without owning the underlying government bond; **(2)** These CDS should be traded in organized Eurozone exchanges subject to European authorities’ control.

Conclusions IX

- **The restructuring of the Eurozone's fiscal architecture** is also necessary to compile with the Optimum Currency Areas (OCA) theoretical conclusions, e.g., the ECB lender of last resort, e-bonds and the “modest proposal for overcoming the Euro crisis” (Varoufakis and Holland, 2011; Eichengreen, 2011) proposals for reforming either the Eurozone's or international financial architecture (Obstfeld, Shambaugh and Taylor, 2009; Cartapanis and Herald, 2007).

Conclusions X

- **The main limitation** of the study pertains to the fact that it does not take explicitly into account the **endogeneity** between CDS and bond markets (Calice, Chen and Williams, 2013; Thalassinos, 2014).
- The self-fulfilling speculation mechanism determining the current CDS spreads feeds bond markets with “news”, influencing their prices and yields as well as the interest rates on newly issued government bonds, forcing some governments to default (e.g. the Euro crisis). **This limitation shall be addressed and constrained by way of using a Generalized Method of Moments (GMM) estimator.**

Limitations: A new approach I

- **In a new paper** (still on progress) we provide evidence on the pricing of sovereign risk for the Eurozone countries, using credit default swaps (CDS) as proxy variable, and taking into account the endogenous relation among CDS, the respective government bond yield and the fiscal space (debt/tax base or deficit/tax base). On the sample of the Euro area countries' data used covering the period 2008Q1 - 2013Q2 we apply dynamic panel data econometric methods. **We actually compare the fixed or random effects (FE or RE) or feasible generalized least squares (FGLS) estimations with those of the system generalized method of moments (system-GMM) more appropriate for our dataset.**

Limitations: A new approach II

- **Dynamic endogeneity** is always present verified from the statistically and economically significant lagged CDS in the set of regressors no matter what was the period of estimation, i.e., the whole period 2008-'13 or the crisis one 2008-'10 or even the post-crisis 2011-'13. **Simultaneity also detected in most of the cases among CDS, yield and debt to tax base, while rarely for deficit to tax base and during the sub-periods too.**

Limitations: A new approach III

- **Forward looking expectations** represented by a dummy expressing the downgrade rating of the credit rating agencies was also proved statistically and economically significant especially when in the system was present the debt to tax base variable and not the deficit one. **Discrimination's evidence** between South-West Euro Area Periphery (SWEAP, Greece, Italy, Spain, Portugal and Ireland) and non-SWEAP member countries **was found mainly in the non-system GMM estimations**. Main findings of our work are consistent with other similar studies. Finally we discuss the philosophical issue of the meaning of the CDS.
-

Questions, Comments...



NEW CHALLENGES OF ECONOMIC AND BUSINESS DEVELOPMENT – 2016

May 12–14, 2016, Riga, University of Latvia
