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The Determinants of Sovereign Credit Default Swaps (CDS) Spreads

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ABSTRACT

The paper examines the determinants of sovereign CDS spreads for 19 different primary sovereigns from January 2009 to December 2018, using several macroeconomics variables. We apply a panel vector autoregressive (PVAR) model using a system-generalized method of moment (System-GMM) methodology, to analyse the relationship between the CDS spreads and its macroeconomic determinants. Our model combines both local factors such as GDP growth rate, import, export, inflation rate, the balance of payment, and government external debt with global factors such as S&P 500 Index (SP500) returns, CBOE Market Volatility Index (VIX), and 10-year U.S. Treasury. We find that both local (such as inflation and government external debt), and global (e.g., VIX) determinants of sovereign CDS spreads are statistically significant through various periods for most maturities.

Keywords: Sovereign CDS pricing, Panel vector autoregressive model, Generalized method of moment.

1. INTRODUCTION:

The CDS market has experienced tremendous growth in the last decade, resulting in increased popularity in financial markets. Yet, the valuation of CDS is intrinsically complex given the confounding effects of the default probability, loss amount, recovery rate, and timing of default. Nevertheless, sovereigns, companies, and banks found CDS the most crucial instrument to assess the financial market constancy (Annaert, De Ceuster, Van Roy, & Vespro, 2013). Moreover, according to Das, Hanouna, and Sarin (2009), CDS offer alternative tools to assess credit risk rather than bonds. In terms of practical methods applied to analyze the CDS market, Doshi et al. (2014) show two separate strands in the current research. Firstly, several studies use reduced-form latent approaches to model credit risk (e.g., Pan and Singleton, 2008; Longstaff et al., 2011). Secondly, other studies regress CDS spreads on variables that carry critical macroeconomic spread determinants (e.g., Dieckmann and Plank, 2012). The main objective of this research is to identify and analyse the key factors that influence sovereign CDS spreads in different countries within the Eurozone and Latin America using the Panel Vector Autoregressive (PVAR) model. Specifically, we aim to determine how various global and local macroeconomic variables impact sovereign CDS spreads and how these impacts vary across different maturities of CDS contracts. This paper contributes to the literature by revealing the most significant factors that explain the sovereign CDS spreads for different countries across the Eurozone and Latin America, using the Panel Vector autoregressive (PVAR) model that applies the standard VAR model on panel data. A sovereign credit default swap is a financial contract where the reference entity is a government. This contract is developed to compensate international investors upon sovereign default (Ismailes-

cu & Kazemi, 2010). In this regard, the research employs various global and local macroeconomic factors, including the CBOE Market Volatility Index (VIX), GDP growth rate, IMPORT, EXPORT, Consumer Price Index (CPI), The balance of payment (BOP), U.S. 10-year treasury, S&P 500 Index (SP500) and Government External debt (GEXD). Additionally, the study adds to the existing literature by testing different sovereign CDS contracts ranging from a 6-month maturity to 30 years.

Our research contributes to the existing body of literature on several fronts. First, we use local and global macroeconomics variables to examine the determinants of sovereign CDS of 19 different countries. In addition, we consider ten different maturities for sovereign CDS, while most of the papers focused on five-year CDS contracts. The primary point is that most earlier studies employed the five-year CDS as assumed to be the most liquid in the market. Nevertheless, our research tests various maturities to review the most critical factors influencing the CDS spread across different maturity and countries. Our findings show that global and local factors have a high impact on the sovereign CDS spreads and are considered determinants. Finally, the results of a panel vector autoregressive (PVAR) model confirm that, the sovereign CDS across the 19 studied countries are significantly affected by the local variables GEXD, CPI, and global variables VIX. Our result confirms also by the granger-causality test, variance decomposition analysis, and the impulse response analysis.

The remainder of the study is organized as follows. Section 2 reviews the literature. Section 3 describes the data and methodology. The results and discussions are presented in Section 4. Finally, the policy implication and conclusion of the study are presented in Section 5.

2 Literature review

Numerous studies have explored the relationship between CDS spreads and other financial metrics. Research by Blanco et al. (2005) and Zhu (2006) examines the link between CDS spreads and bond credit spreads, while Galil and Soffer (2011), Hull et al. (2004), and Norden and Weber (2004) investigate the nexus between credit ratings and CDS spreads. Hull et al. (2004) demonstrate a close relation between bond price-derived credit spreads and CDS spreads, suggesting CDS spreads' superiority due to fewer uncertainties and direct observation.

Studies by Collin-Dufresne et al. (2001) and Campbell and Taksler (2003) delve into bond credit spreads and firm equity volatility, respectively, with mixed results. While Collin-Dufresne et al. (2001) highlight limited explanatory power of market dynamics for sovereign CDS, Campbell and Taksler (2003) suggest equity volatility as a key determinant, contested by Norden and Weber (2004) who emphasize the anticipatory nature of credit ratings in CDS markets.

Another significant body of work examines CDS spread determinants during financial crises (Naifar, 2012; Pereira et al., 2014; Galil et al., 2014) and the influence of macroeconomic and firm-specific variables (Mellios & Paget-Blanc, 2006; Baek et al., 2005; Ramos-Francia & Rangel, 2012; Annaert et al., 2013; Ericsson et al., 2009; Corò et al., 2013; Pires et al., 2015). These studies predominantly adopt a microeconomic perspective, which may not fully apply to sovereign CDS pricing.

Longstaff et al. (2011) and Pan and Singleton (2008) analyze sovereign CDS markets, revealing that global factors like U.S. bond market premia and equity significantly influence sovereign CDS spreads, whereas domestic macroeconomic factors have a lesser impact.

Various econometric methods have been employed to study CDS spreads. For instance, Basazinew and Vashkevich (2013) and Norden and Weber (2009) use VAR and Granger causality tests, finding complex causality relationships between stock markets and CDS spreads. Ericsson, Jacobs, and Oviedo (2009) use linear regression to identify leverage, equity volatility, and risk-free interest rates as significant CDS spread determinants. Heinz and Sun (2014) confirm the influence of macroeconomic variables and market sentiment using a panel GLS error correction framework.

The Eurozone sovereign debt crisis has attracted extensive research. Studies by Blommestein et al. (2016) and Kalbaska and Gątkowski (2012) highlight the role of European Monetary Union factors and cross-country contagion effects. Makrichoriti et al. (2016) employ the PVAR model to reveal the unstable nature of CDS determinants across periods and countries, em-

phasizing the importance of investor sentiment.

Research on macroeconomic variables impacting CDS spreads includes Cantor and Packer (1996), who find inflation, economic growth, and external debt as key factors. Similarly, studies by Georgievska et al. (2008) and Can and Paskaleva (2017) identify solvency, liquidity, and local capital market indices as significant influences.

Recent studies, such as Guesmi et al. (2018) and Srivastava et al. (2016), examine CDS index spreads and global risk spillover, respectively, underscoring the asymmetric influences of economic variables and the importance of global shocks on CDS markets.

The financial crisis has led to increased focus on sovereign CDS determinants during specific periods. Corò Dufour and Varotto (2013) and Di Cedare and Guazzaro (2010) find liquidity and leverage as significant factors during the crisis. Eyssell, Gay Fung, and Zhang (2013) note the shifting relevance of global and local factors in China's CDS market, particularly during financial crises. Overall, the literature highlights varying factors affecting sovereign CDS spreads, with few studies analysing cross-country perspectives comprehensively. Our study aims to fill this gap by examining macroeconomic determinants of sovereign CDS spreads across various countries and maturities, providing insights for investors and policymakers on the influence of these factors over time.

3 Data and Methodology

Simplified Summary of PVAR Methodology

Data Collection

- Sample: CDS spreads from 19 sovereigns with various maturities (6 months to 30 years) from January 2009 to December 2018.
- Source: Refinitiv Eikon (mid-closing prices on Wednesdays).
- Countries: Belgium, Brazil, Chile, Colombia, France, Indonesia, Ireland, Italy, Malaysia, Peru, Philippines, Poland, Portugal, Romania, Russia, South Africa, Spain, Sweden, Turkey.

Variables:

- Domestic: GDP, CPI, Export (EXP), Import (IMP), Government External Debt (GEXD), Balance of Payments (BOP), CDS prices.
- Global: S&P 500 Index (SP500), CBOE Market Volatility Index (VIX), 10-year U.S. Treasury.

Panel Vector Autoregression (PVAR)

- Objective: To analyse the causal relationships and dynamic interactions among the variables.
- Method:
- All variables are treated as endogenous.
- Includes unobserved heterogeneity across countries.
- Determines the optimal lag order using criteria like AIC and BIC.

Steps in PVAR Analysis

1. Lag Order Selection:
- Based on the overall coefficient of determination and Moment and Model Selection Criteria (MMSC).
2. Estimation:
- Conducted using Stata with specific commands (pvarsoc for lag selection, pvar for estimation).
3. Model Stability:
- Assessed by plotting eigenvalues.
4. Variance Decomposition (FEVD):
- Cholesky decomposition used to understand the contribution of each variable to the forecast error variance.
5. Granger Causality Tests:
- To determine causal relationships between variables.
6. Impulse Response Functions (IRFs):
- Show the reaction of one variable to a shock in another over time.

Model Structure:

- All variables are considered endogenous.
- Lag structure is determined using AIC, BIC, HQIC criteria.
- Impulse response functions and dynamic multipliers are analysed post-estimation.

Panel Vector Autoregression (PVAR) Model:

- Each variable is influenced by its own past values and the past values of other variables.
- The model accounts for unobserved individual heterogeneity.

Equation:

$$Z(i,t) = \gamma 0 + \gamma 1 * Z(i,t-1) + \gamma 2 * Z(i,t-2) + \ldots + \gamma p * Z(i,t-p) + fi + \varepsilon t$$

Where:
- Z(i,t): Vector of the variables at time t for country i
- γ: Coefficients
- fi: Time-invariant fixed effects
- εt: Error terms

3.1 Data:

Data Collection Process:

The CDS spreads of 19 sovereigns with various maturities were collected weekly from January 2009 to December 2018. The mid-closing prices were retrieved from Refinitiv Eikon, ensuring consistency and reliability in the data source.

Our sample consists of CDS spreads of 19 diverse sovereigns, with maturities of 6 months, 1, 2, 3, 4, 5, 7, 10, 20, and 30 years. The CDS prices are mid-closing prices retrieved from Refinitiv Eikon on each available Wednesday from January 2009 to December 2018. All data pertain to euro denominated CDS contracts for 19 different primary sovereigns, namely, Belgium, Brazil, Chile, Colombia, France, Indonesia, Ireland, Italy, Malaysia, Peru, Philippines, Poland, Portugal, Romania, Russia, South Africa, Spain, Sweden, and Turkey.

Other variables employed in our analysis are defined below. These variables include both domestic and global variables. The domestic variables comprise the Gross Domestic Product (GDP), the Consumer Price Index (CPI), the value of export and import in local currency/U.S. dollars, Government External debt (GEXD), the Balance of Payment (BOP) and the CDS prices. In contrast, the international or global variables are S&P 500 Index (SP500), CBOE Market Volatility Index (VIX), and the 10-year U.S. Treasury.

i. Gross domestic product (GDP) denotes the total commercial or business advantage of full goods and services generated inside a country's boundaries in a particular time interval. A rising percentage of economic growth leads to reducing the related debt load. Furthermore, this may assist in avoiding liquidation difficulties (Mellios and Paget-Blanc, 2006).

ii. Consumer Price Index (CPI); A lowering inflation valuation shows the sustainability of the monetary and exchange rate systems. It also can be viewed as a proxy of the state of economic control.

iii. Export (EXP): According to the World Bank definition, Export is defined as "the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments".

iv. Import (IMP): The World bank defines import as "the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, licence fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments".

v. Government External debt (GEXD) is the part of a country's debt extended by foreign donors, including commercial banks, governments, or international financial institutions. These loans, including interest payments, are usually paid in the original currency the loan was extended.

vi. The balance of payments (BOP) is a record of all activities conducted among entities in one country and the rest of the world over a determined time, a quarter or a year.

vii. Sovereign CDS prices (6month, 1year, 2year, 3year, 4year, 5year, 7year, 10-year, 20-year, and 30-year).

viii. S&P 500 Index (SP500) is a market-capitalization-weighted index of the 500 biggest publicly traded businesses in the U.S.

ix. CBOE Market Volatility Index (VIX) measures the market's expectation of future volatility of S&P500 stock index option prices. It is based on the weighted average of the proposed volatilities over a wide range of strikes. Furthermore, it is recognized as a market measure of growing volatility. Implied volatility holds a significant potential to generate data that a model-based prediction cannot offer. For example, this VIX index shows features linked to previous and expected jumps in volatility (Becker et al., 2009).

x. The 10-year U.S. Treasury is a liability debt declared by the U.S. Treasury Department with a

10-year maturity. It pays interest to the holder of the bond every six months at a fixed interest rate predetermined at the beginning. In addition, the U.S. Government pays the par value of the note to the bondholder in fine or at the expiry of the maturity term. The issuer uses the proceedings received from selling bonds to meet its obligations and continuing costs, for instance, employee salaries.

3.2. Modelling:

Following Love & Zicchino (2006), we apply a Panel Vector Autoregression (PVAR) methodology. Each variable in this approach is considered endogenous (VAR), while unobserved specific heterogeneity remains. The version of the panel VAR model employed here allows us to select optimal lag order in both the panel VAR specification and the moment conditions. To perform a complete analysis, the impulse response functions are also analyzed post estimation. The panel VAR method is distinctly attractive since it overcomes general econometric weaknesses and addresses attractive policy issues linked to transmitting shocks across borders (Canova & Ciccarelli, 2013). We employ a panel vector autoregressive (PVAR) model to classify the potential causal association among the variables.

To choose the lag structure, we apply the overall coefficient of determination (CD) and the Moment and Model Selection Criteria (MMSC) stated by Andrews and Lu (2001), and the MMSC-Akaike's information criterion (MMSC-AIC). Andrews and Lu's MMSC is based on Hansen's J(1982) statistic, which requires the number of moment conditions to be higher than endogenous variables. Their suggested MMSC is like many commonly used maximum likelihood-based model determination criteria, particularly the Akaike criteria (AIC) (Akaike, 1969), the Bayesian information criteria (BIC) (Schwarz, 1978), and the Hannan-Quinn information criteria (HQIC) (Hannan and Quinn, 1979).

To determine these measures, namely the AIC, BIC, and HQIC, we apply Love and Zicchino (2006) system on Stata using the pvarsoc command. Then, following the lag order selection, Panel vector autoregressions were conducted (pvar). PVAR system stability was also ascertained by plotting the eigenvalues of the companion matrix. Moreover, the (pvarfevd) calculations include Cholesky forecast-error variance decomposition (FEVD) subsequently to the evaluation of the (pvar). Also, we run the (pvargranger), which presents a set of Granger causality Wald analyses for each equation of the underlying panel vector autoregression model. Finally, we measure and plot the impulse-response functions (IRFs) and dynamic multipliers (D.M.s).

All variables in the method are treated as endogenous, as in a standard VAR measure, and unobserved individual heterogeneity is permitted. The PVAR does not allow for dynamic interdependencies because the lags of the endogenous variables of the same unit only occur. Furthermore, it does not enable cross-sectional heterogeneities since y0 and y1 are the same across all units. Panel VAR model can be defined as follows with a first-order nine-variable PVAR model:

$$Z_{i,t} = \gamma_0 + \gamma_1 Z_{i,t-1} + \gamma_2 Z_{i,t-2} \ldots + \gamma_p Z_{i,t-p} + f_i + \varepsilon_t \quad (1)$$

$$i \in \{1, 2,...,N\}, \quad (2)$$

$$t \in \{1,2,...,Ti\} \quad (3)$$

where $Z_{i,t}$ is the vector for the nineteen factors used in our study, namely, (6m CDS, 1year CDS, 2year CDS, 3year CDS, 4year CDS, 5year CDS, 7year CDS, 10year CDS, 20year CDS, 30year CDS , GDP, CPI, EXP, IMP, GEXD, SP500, VIX, BOP and The 10-year U.S. Treasury).γ_0 represents the vector of constants, γ_1 $Z_{i,t-1}$indicates a matrix polynomial in the lag operator. f_i represents the time-invariant fixed effects, and the error terms are represented by ε_t.

4 Empirical results:

Assumptions of the Panel VAR Model:

Endogeneity of Variables: The panel VAR model assumes that all variables included in the analysis are endogenous, meaning they are jointly determined within the model. This assumption allows for the investigation of causal relationships among variables.

Time-Invariant Fixed Effects:

The model assumes the presence of time-invariant fixed effects, denoted as: f, i, f, i, which capture unobserved heterogeneity across individual units in the panel. These fixed ef-

fects account for any individual-specific characteristics that may influence the variables of interest.

Homogeneity of Lag Structures:
The panel VAR model imposes homogeneity of lag structures across individual units in the panel. This means that the lag lengths and coefficients of the endogenous variables are assumed to be the same for all units.

Potential Limitations and Implications:
Homogeneity Assumption:
While assuming homogeneity simplifies the model, it may not capture potential differences in the dynamic relationships among variables across individual units. This could lead to misspecification if there are significant variations in the lag structures across units.

Fixed Effects Interpretation:
The inclusion of time-invariant fixed effects helps control for unobserved heterogeneity, but it also restricts the interpretation of coefficients. Specifically, the coefficients of the endogenous variables may be biased if the fixed effects are correlated with the explanatory variables.

Endogeneity Concerns:
Despite treating all variables as endogenous, the panel VAR model does not address potential endogeneity issues arising from omitted variables or simultaneity bias. Failure to account for these factors could lead to biased estimates of causal relationships.

Data Requirements:
The panel VAR model requires a relatively large panel dataset to estimate the model parameters accurately. If the sample size is small or if there are missing observations, it may affect the precision and reliability of the estimates.

4.1 Descriptive Statistics

4.2 Panel unit root test

Table 2 shows results for the panel unit root test of Im-Pesaran-Shin (2003; IPS test). As shown

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP	760	1.456	4.711	-22.31	16.59
CPI	760	.275	.331	-.93	2.49
EXPORT	760	.921	3.392	-14.74	19.58
IMPORT	760	.79	3.535	-30.4	25.8
VIX	760	1.149	.141	.91	1.52
SP500	760	3.13	.176	2.78	3.4
BOP	760	.029	2.837	-30.188	36.798
US10T	760	2.509	.603	1.45	3.837
GEXD	760	1.57	7.673	-19.43	62.305
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
6-Month CDS	760	1.515	.52	.21	3.05
1-Year CDS	760	1.59	.522	.23	3.18
2-Year CDS	760	1.751	.485	.29	3.2
3-Year CDS	760	1.864	.448	.44	3.16
4-Year CDS	760	1.953	.407	.62	3.1
5-Year CDS	760	2.025	.379	.79	3.07
7-Year CDS	760	2.105	.337	1.01	3.01
10-Year CDS	760	2.156	.306	1.17	2.95
20-Year CDS	760	2.175	.287	1.23	2.89
30-Year CDS	760	2.18	.282	1.22	2.88

The Table shows descriptive statistics for the following variables to Gross domestic product (GDP), Consumer Price Index (CPI), Export (EXP), Import (IMP),Government external debt (GEXD), Sovereign CDS prices (6month,1year,2year,3year,4year,5year,7year,10-year,20 years and 30 years, S&P 500 Index (SP500), Balance of Payment (BOP), The 10-year U.S. Treasury (US10T) and CBOE Market Volatility Index (VIX). All data are weekly and obtained from Thompson Reuters Eikon DataStream. The sample covers the period between January 2009 to December 2018.

Table 1
Descriptive Statistics.

we cannot reject the null hypothesis of a unit root for all sample variables except US10T, for all 19 countries. We deal with the non-stationarity of the US10T by changing this variable to be stationarity by taking the first difference in the PVAR model. The results for the updated US10T.D1 are similar to the main US10T.L and are shown in the appendix Table 5A.

Variables	Statistic	p-value
GDP	-3.6262	0.0001
CPI	-8.429	0.0000
EXPORT	-4.772	0.0000
IMPORT	-4.2564	0.0000
VIX	-6.8147	0.0000
SP500	-6.9161	0.0000
BOP	-12.7441	0.0000
US10T	-0.7191	0.2360
GEXD	-11.0953	0.0000

The Table presents the Im et al. (2003) test (IPS test). The null hypothesis is that Gross domestic product (GDP), Consumer Price Index (CPI), Export (EXP), Import (IMP), Government external debt (GEXD), S&P 500 Index (SP500), Balance of Payment (BOP), The 10-year U.S. Treasury (US10T) and CBOE Market Volatility Index (VIX). All data are weekly and obtained from Thompson Reuters Eikon DataStream. The sample covers the period between January 2009 to December 2018.

Table 2
Panel unit root test

4.3 Lag selection order

To choose the number of lags for our PVAR, we apply the Moment and Model Selection Criteria (MMSC) explained by Andrews and Lu (2001), the MMSC-Akaike's information criterion (MMSC-AIC), and the overall coefficient of determination (CD). Andrews and Lu's MMSC is based on Hansen's J statistic, which needs the number of moment conditions to be higher than the number of endogenous variables. The identification of the optimal number of lags established on the Bayesian (BIC), Hanan-Quinn (QIC) and Akaike (AIC) information criteria adjusted to the multivariate modelling requirements and noted here as MBIC, MAIC and MQIC. The results are shown in Table 3. The optimal lag structure is one lag. These results are similar for all 10 CDS maturities for all 19 countries.

Selection order criteria	lag	CD	J	J pvalue	MBIC	MAI	MQIC
6 months CDS	1	9998492	551.5899	7.02e-07	-2036.73	-248.4101	-942.2498
	2	9991056	470.0946	1.17e-09	-1471.145	-129.9054	-650.2852
	3	.9994252	304.4789	2.67e-06	-989.681	-95.52113	-442.441
	4	.9994252	304.4789	2.67e-06	-989.681	-95.52113	-442.441
1-year CDS	1	.9998804	553.4615	5.36e-07	-2034.858	-246.5385	-940.3782
	2	.9992194	472.8486	7.01e-10	-1468.391	-127.1514	-647.5312
	3	.999569	293.4484	.0000183	-1000.712	-106.5516	-453.4715
	4	.9999404	195.5883	3.66e-08	-451.4917	-4.411721	-177.8717

Tabil no. 3 Continue...

2- year CDS	1	.9999041	555.8585	3.78e-07	-2032.461	-244.1415	-937.9812
	2	.9994537	470.8173	1.03e-09	-1470.423	-129.1827	-649.5625
	3	.9996747	288.2828	.0000433	-1005.877	-111.7172	-458.6371
	4	.9999536	183.8963	6.56e-07	-463.1836	-16.10366	-189.5636
3- year CDS	1	.9999138	554.7038	4.48e-07	-2033.616	-245.2962	-939.1359
	2	.999503	469.2109	1.38e-09	-1472.029	-130.7891	-651.1689
	3	.9996827	288.4074	.0000424	-1005.752	-111.5926	-458.5125
	4	.999953	183.8807	6.59e-07	-463.1992	-16.11929	-189.5792
4-year CDS	1	.999923	552.9535	5.77e-07	-2035.366	-247.0465	-940.8862
	2	.9995876	470.3747	1.11e-09	-1470.865	-129.6253	-650.0051
	3	.9996893	291.698	.0000246	-1002.462	-108.302	-455.2218
	4	.9999523	188.5614	2.12e-07	-458.5186	-11.43862	-184.8986
5-year CDS	1	.999934	553.2807	5.50e-07	-2035.039	-246.7193	-940.559
	2	.9996467	472.7959	7.08e-10	-1468.444	-127.2041	-647.5839
	3	.9997431	295.4815	.000013	-998.6784	-104.5185	-451.4384
	4	.999954	189.8283	1.55e-07	-457.2517	-10.17175	-183.6317
7-year CDS	1	.9999421	554.1322	4.87e-07	-2034.188	-245.8678	-939.7075
	2	.9996674	472.492	7.50e-10	-1468.748	-127.508	-647.8878
	3	.9996771	292.563	.0000213	-1001.597	-107.437	-454.3568
	4	.9999565	182.7606	8.60e-07	-464.3193	-17.23935	-190.6993
10-year CDS	1	.9999467	551.6434	6.97e-07	-2036.676	-248.3566	-942.1963
	2	.9997004	472.4629	7.54e-10	-1468.777	-127.5371	-647.9169
	3	.9996868	288.7216	.0000403	-1005.438	-111.2784	-458.1982
	4	.9999562	182.8955	8.33e-07	-464.1845	-17.10451	-190.5644
20-year CDS	1	.9999443	548.5587	1.08e-06	-2039.761	-251.4413	-945.2811
	2	.9996882	475.1654	4.52e-10	-1466.074	-124.8346	-645.2144
	3	.9995613	290.232	.0000314	-1003.928	-109.768	-456.6879
	4	.9999569	177.8878	2.69e-06	-469.1922	-22.11221	-195.5721
30-year CDS	1	.9999427	547.9173	1.18e-06	-2040.402	-252.0827	-945.9224

Tabil no. 3 Continue...

	2	.9996472	474.0375	5.60e-10	-1467.202	-125.9625	-646.3424
	3	.9995291	284.5624	.0000788	-1009.597	-115.4376	-462.3574
	4	.9999555	176.0176	4.14e-06	-471.0624	-23.98243	-197.4424

Table 3 shows the test results for the optimal lag structure. We apply the Moment, and Model Selection Criteria (MMSC) explained by Andrews and Lu (2001) and the MMSC-Akaike's information criterion (MMSC-AIC). Andrews and Lu's MMSC is based on Hansen's J statistic, which requires the number of moment conditions to be higher than the number of endogenous variables.

Table 3
Lag selection order

Therefore, one should pay attention to the VAR model's underlying moving average (M.A.) description. Mainly the impulse response functions (IRFs) and the associated variance decompositions (DVDs). These links convey how every variable reacts to a shock from another variable, as in Table 6. For suggestive views, we show the results of the measured parameters in Table 4 to reveal the result from our model estimation when applying the Sovereign CDS as an endogenous variable in the method.

From Table 4 and the figures (1.1 to 1.10) below the most valuable determinants of the sovereign CDS are CPI, VIX, and GEXD for all studied countries, including all maturities, which are statistically significant at a 1% confidence level. S&P 500 returns do not seem to have any statistically significant effect on the spreads of CDS contracts with maturity from 6 months up to 30 years. However, for 4-year maturity, the results show substantial significance at 1% level and similarly for the rest of the maturity up to 30 years. Likewise, IMPORT renders insignificant impact from 6 months up to 6 years of sovereign CDS. For 7-year CDS contracts, IMPORT starts to show significance at a 1% level up to 30-year maturity. The CPI coefficients are significant and negative, suggesting that an increase in CPI decreases the sovereign credit spread. These results are similar to, Izadi and Hassan (2018).

4.4 Coefficients of the Panel VAR with Sovereign CDS as an endogenous variable.

Table 4A in the appendix summarizes data on the stability qualities of the measured PVAR model. The stability of the PVAR needs the modulus of the

6M CDS	*Coef.*	*Std. Err.*	*Z*	*P>|z|*		*1year CDS*	*Coef.*	*Std. Err.*	*Z*	*P>|z|*
GDP.L1	0.003	0.001	2.420	0.016		*GDP.L1*	0.001	0.001	1.280	0.201
CPI.L1	-0.345	0.020	-17.220	0.000 ***		*CPI.L1*	-0.301	0.018	-16.610	0.000 ***
EXPORT.L1	0.000	0.001	-0.090	0.924		*EXPORT.L1*	0.000	0.001	0.000	0.998
IMPORT.L1	-0.001	0.002	-0.440	0.659		*IMPORT.L1*	0.000	0.002	-0.150	0.879
VIX.L1	0.660	0.038	17.430	0.000 ***		*VIX.L1*	0.600	0.034	17.470	0.000 ***
SP500.L1	0.077	0.043	1.810	0.071		*SP500.L1*	0.028	0.041	0.690	0.49
BOP.L1	-0.001	0.001	-0.990	0.322		*BOP.L1*	-0.001	0.001	-1.170	0.241
US10T.L1	0.006	0.010	0.620	0.537		*US10T.L1*	0.003	0.010	0.320	0.751
GEXD.L1	-0.003	0.001	-4.510	0.000 ***		*GEXD.L1*	-0.002	0.001	-4.840	0.000 ***
6M CDS.L1	0.773	0.020	38.100	0.000		*6M CDS.L1*	0.767	0.021	36.960	0.000
2year CDS	*Coef.*	*Std. Err.*	*Z*	*P>|z|*		*3year CDS*	*Coef.*	*Std. Err.*	*Z*	*P>|z|*
GDP.L1	0.000	0.001	0.420	0.676		*GDP.L1*	0.000	0.001	0.190	0.849
CPI.L1	-0.234	0.015	-15.810	0.000 ***		*CPI.L1*	-0.214	0.014	-15.530	0.000 ***

Tabil no. 4 Continue...

EXPORT.L1	0.000	0.001	-0.390	0.699		*EXPORT.L1*	0.000	0.001	-0.430	0.664
IMPORT.L1	0.000	0.001	0.320	0.751		*IMPORT.L1*	0.001	0.001	0.520	0.603
VIX.L1	0.450	0.026	17.150	0.000 ***		*VIX.L1*	0.380	0.022	17.090	0.000 ***
SP500.L1	0.027	0.033	0.810	0.42		*SP500.L1*	0.058	0.028	2.090	0.037
BOP.L1	0.000	0.001	-0.060	0.95		*BOP.L1*	0.000	0.001	0.400	0.689
US10T.L1	-0.008	0.008	-1.040	0.3		*US10T.L1*	-0.007	0.007	-1.080	0.28
GEXD.L1	-0.002	0.000	-5.940	0.000 ***		*GEXD.L1*	-0.002	0.000	-5.780	0.000 ***
6M CDS.L1	0.830	0.019	44.810	0.000		*6M CDS.L1*	0.879	0.018	47.920	0.000
4year CDS	***Coef.***	***Std. Err.***	***Z***	***P>|z|***		***5year CDS***	***Coef.***	***Std. Err.***	***Z***	***P>|z|***
GDP.L1	0.001	0.001	1.470	0.141		*GDP.L1*	0.001	0.000	1.390	0.164
CPI.L1	-0.183	0.012	-14.820	0.000 ***		*CPI.L1*	-0.171	0.012	-14.850	0.000 ***
EXPORT.L1	-0.001	0.001	-1.040	0.298		*EXPORT.L1*	-0.001	0.001	-0.760	0.447
IMPORT.L1	0.001	0.001	1.160	0.244		*IMPORT.L1*	0.001	0.001	1.520	0.128
VIX.L1	0.364	0.020	18.590	0.000 ***		*VIX.L1*	0.338	0.018	19.050	0.000 ***
SP500.L1	0.096	0.024	4.070	0.000 ***		*SP500.L1*	0.108	0.021	5.080	0.000 ***
BOP.L1	0.000	0.001	0.780	0.435		*BOP.L1*	0.000	0.000	0.520	0.603
US10T.L1	-0.010	0.006	-1.650	0.100		*US10T.L1*	-0.011	0.005	-2.050	0.041
GEXD.L1	-0.002	0.000	-6.110	0.000 ***		*GEXD.L1*	-0.002	0.000	-6.650	0.000 ***
6M CDS.L1	0.933	0.018	51.850	0.000		*6M CDS.L1*	0.971	0.018	52.930	0.000
7year CDS	***Coef.***	***Std. Err.***	***Z***	***P>|z|***		***`10year CDS***	***Coef.***	***Std. Err.***	***Z***	***P>|z|***
GDP.L1	0.001	0.000	1.570	0.117		*GDP.L1*	0.000	0.000	1.230	0.219
CPI.L1	-0.144	0.010	-14.720	0.000 ***		*CPI.L1*	-0.139	0.009	-15.390	0.000 ***
EXPORT.L1	-0.001	0.001	-1.250	0.21		*EXPORT.L1*	0.000	0.001	-0.760	0.449
IMPORT.L1	0.002	0.001	2.840	0.000 ***		*IMPORT.L1*	0.002	0.001	2.620	0.000 ***
VIX.L1	0.256	0.015	16.750	0.000 ***		*VIX.L1*	0.240	0.014	17.510	0.000 ***
SP500.L1	0.091	0.016	5.630	0.000 ***		*SP500.L1*	0.065	0.014	4.580	0.000 ***
BOP.L1	0.000	0.000	-0.630	0.53		*BOP.L1*	0.000	0.000	-0.470	0.637
US10T.L1	-0.009	0.005	-2.070	0.038		*US10T.L1*	-0.005	0.004	-1.100	0.273
GEXD.L1	-0.002	0.000	-6.520	0.000 ***		*GEXD.L1*	-0.001	0.000	-5.870	0.000 ***
6M CDS.L1	1.014	0.017	58.170	0.000		*6M CDS.L1*	1.005	0.018	56.140	0.000
20year CDS	***Coef.***	***Std. Err.***	***Z***	***P>|z|***		***30year CDS***	***Coef.***	***Std. Err.***	***Z***	***P>|z|***
GDP.L1	0.001	0.000	1.370	0.172		*GDP.L1*	0.000	0.000	0.800	0.424
CPI.L1	-0.131	0.009	-15.090	0.000 ***		*CPI.L1*	-0.125	0.008	-14.870	0.000 ***
EXPORT.L1	0.000	0.001	-0.820	0.414		*EXPORT.L1*	0.000	0.000	-0.970	0.330
IMPORT.L1	0.001	0.001	2.620	0.009		*IMPORT.L1*	0.002	0.001	3.070	0.000 ***
VIX.L1	0.185	0.013	14.680	0.000 ***		*VIX.L1*	0.164	0.012	13.340	0.000 ***
SP500.L1	0.046	0.013	3.650	0.000 ***		*SP500.L1*	0.036	0.012	2.960	0.000 ***

Tabil no. 4 Continue...

BOP.L1	0.000	0.000	-1.050	0.295		*BOP.L1*	0.000	0.000	-0.150	0.884
US10T.L1	-0.004	0.004	-1.000	0.316		*US10T.L1*	-0.004	0.004	-0.970	0.334
GEXD.L1	-0.001	0.000	-5.490	0.000 ***		*GEXD.L1*	-0.001	0.000	-5.430	0.000 ***
6M CDS.L1	1.005	0.019	53.900	0.000		*6M CDS.L1*	0.980	0.019	51.430	0.000

Table 4 outlines coefficients of regressing the dependent variables on lags of the independent variables. ***, **, *, indicate significance at the 1%, 5%, and 10% respectively.

Table 4
Panel VAR

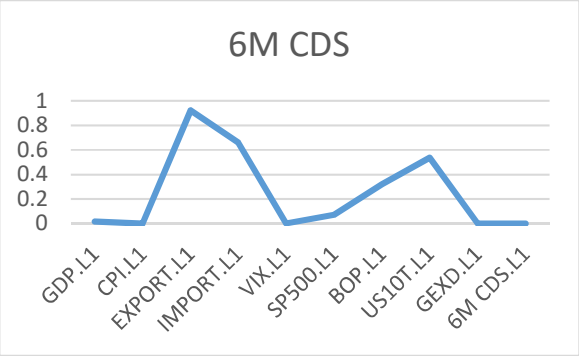

Fig (1.1) 6-month sovereign CDS Panel VAR.

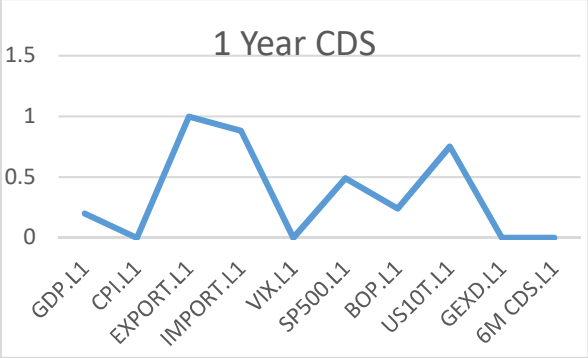

Fig (1.2) 1-year sovereign CDS Panel VAR.

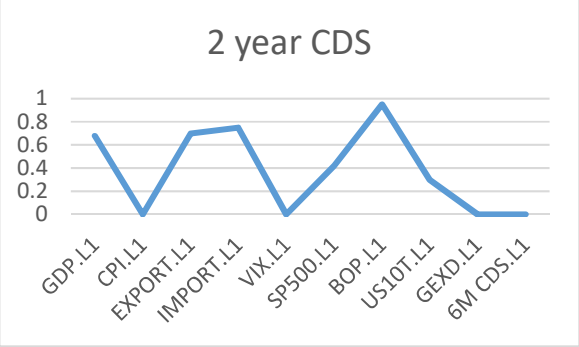

Fig (1.3) 2-year sovereign CDS Panel VAR.

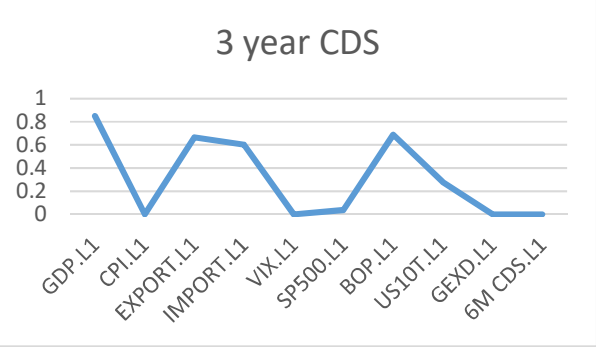

Fig (1.4) 3- year sovereign CDS Panel VAR.

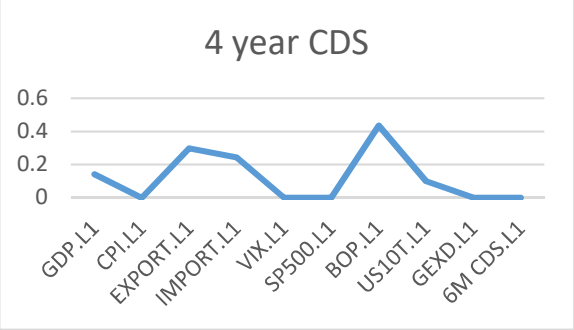

Fig (1.5) 4- year sovereign CDS Panel VAR.

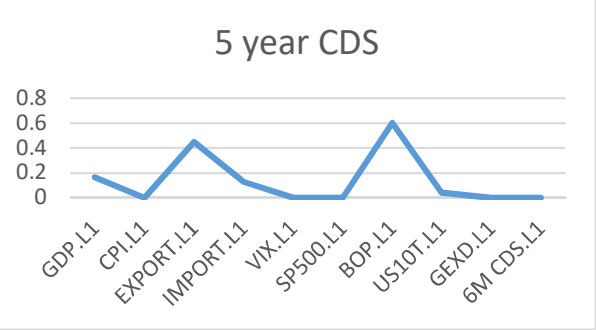

Fig (1.6) 5- year sovereign CDS Panel VAR.

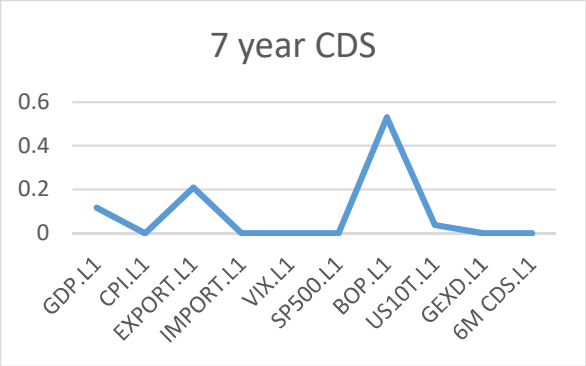

Fig (1.7) 7- year sovereign CDS Panel VAR.

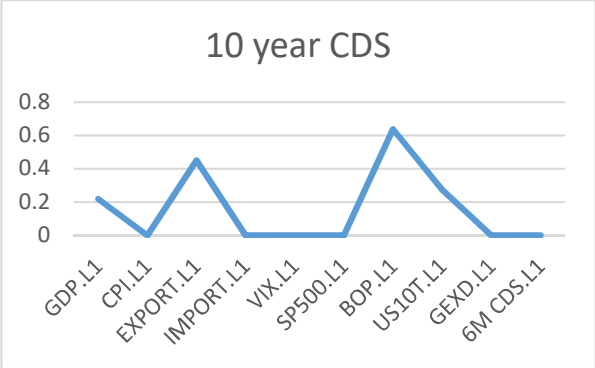

Fig (1.8) 10- year sovereign CDS Panel VAR.

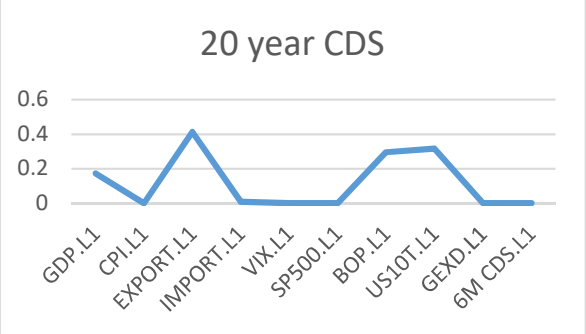

Fig (1.9) 20- year sovereign CDS Panel VAR.

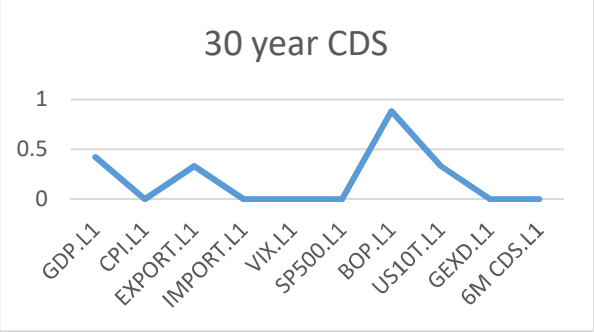

Fig (1.10) 30- year sovereign CDS Panel VAR.

eigenvalues of the dynamic matrix to lie within the unit circle, which is the position in our considered model (see Fig. 1A to Fig 10A). We perform the stability test as a robustness check exercise for the PVAR. We use the eigenvalue stability condition test. As in these figures, the eigenvalue stability condition graph shows that all the eigenvalues are within the unit circle, confirming that the estimate PVAR is stable (Hamilton, 1994; Lutkephol, 2005; Love & Zicchino, 2006; Galariotis et al., 2016).

4.5 Panel VAR-Granger causality Wald test

Table 5 shows the Panel, VAR-Granger causality Wald test that determines the behaviour of bi-directional causality among ten different maturities of sovereign CDS and the other variables, namely GDP, CPI, EXPORT, IMPORT, VIX, SP500, BOP, US10T, and GEXD. For short-term sovereign CDS contracts, there is a unidirectional causality between sovereign CDS and the variables CPI, VIX, and GEXD, when the chi-square probability is almost zero. However, for long maturities of sovereign CDS starting from 5 years, CDS shows that IMPORT and SP500 also Granger cause sovereign CDS.

4.6 Forecast-error variance decomposition

Table 6 describes the forecast-error variance decomposition, representing how a variable responds to specific shocks stemming from other variables (Marques et al., 2013). The principal contributors to sovereign CDS variance decomposition are the GDP (20%), CPI (25%), and VIX (25%). The three variables (GDP, CPI, VIX) altogether have a combined effect of around 70 % on the total sovereign CDS variance in both the short- and long-term except for the own effect, which is 30% of the total variance. However, in the first period, for sovereign CDS contracts whose maturities range from 6 months up to 30 years, the main determinants contributing the most to the variance of CDS are the GDP (30%) and VIX (15%), while the sovereign CDS contributes to 55% of the total forecast error variance decomposition.

In addition, starting with a 6-month sovereign CDS, the GDP alone explains about 22% of the total variance, on average, for the first five periods but declines to about 16% of total variance for the last five periods. The CPI in the first five periods contributes on average 16% of the total variance when in the last five periods con-

	Equation \ Excluded	chi2	df	Prob > chi2		Equation \ Excluded	chi2	df	Prob > chi2
6 months CDS	*GDP*	5.858	1	0.016	*1-year CDS*	*GDP*	1.636	1	0.201
	CPI	296.698	1	0.000		*CPI*	275.94	1	0.000
	EXPORT	0.009	1	0.924		*EXPORT*	0.000	1	0.998
	IMPORT	0.195	1	0.659		*IMPORT*	0.023	1	0.879
	VIX	303.798	1	0.000		*VIX*	305.16	1	0.000
	SP500	3.269	1	0.071		*SP500*	0.475	1	0.490
	BOP	0.98	1	0.322		*BOP*	1.376	1	0.241
	US10T	0.381	1	0.537		*US10T*	0.101	1	0.751
	GEXD	20.364	1	0.000		*GEXD*	23.403	1	0.000
	ALL	595.705	1	0.000		*ALL*	571.19	1	0.000

	Equation \ Excluded	chi2	df	Prob > chi2		Equation \ Excluded	chi2	df	Prob > chi2
2-year CDS	*GDP*	0.174	1	0.676	*3-year CDS*	*GDP*	0.036	1	0.849
	CPI	249.848	1	0.000		*CPI*	241.15	1	0.000
	EXPORT	0.150	1	0.699		*EXPORT*	0.189	1	0.664
	IMPORT	0.100	1	0.751		*IMPORT*	0.270	1	0.603
	VIX	294.203	1	0.000		*VIX*	292.12	1	0.000
	SP500	0.650	1	0.420		*SP500*	4.369	1	0.037
	BOP	0.004	1	0.950		*BOP*	0.160	1	0.689
	US10T	1.074	1	0.300		*US10T*	1.166	1	0.280
	GEXD	35.283	1	0.000		*GEXD*	33.437	1	0.000
	ALL	571.287	1	0.000		*ALL*	556.69	1	0.000

	Equation \ Excluded	chi2	df	Prob > chi2		Equation \ Excluded	chi2	df	Prob > chi2
4-year CDS	*GDP*	2.167	1	0.141	*5-year CDS*	*GDP*	1.937	1	0.164
	CPI	219.561	1	0.000		*CPI*	220.65	1	0.000
	EXPORT	1.083	1	0.298		*EXPORT*	0.578	1	0.447
	IMPORT	1.355	1	0.244		*IMPORT*	2.321	1	0.128
	VIX	345.403	1	0.000		*VIX*	362.72	1	0.000
	SP500	16.592	1	0.000		*SP500*	25.764	1	0.000
	BOP	0.608	1	0.435		*BOP*	0.271	1	0.603
	US10T	2.711	1	0.100		*US10T*	4.190	1	0.041
	GEXD	37.329	1	0.000		*GEXD*	44.285	1	0.000
	ALL	617.768	1	0.000		*ALL*	647.89	1	0.000

Table 5. Continue...

	Equation \ Excluded	chi2	df	Prob > chi2		Equation \ Excluded	chi2	df	Prob > chi2
7-year CDS	GDP	2.456	1	0.117	10-year CDS	GDP	1.511	1	0.219
	CPI	216.682	1	0.000		CPI	236.75	1	0.000
	EXPORT	1.575	1	0.210		EXPORT	0.572	1	0.449
	IMPORT	8.048	1	0.005		IMPORT	6.861	1	0.009
	VIX	280.582	1	0.000		VIX	306.74	1	0.000
	SP500	31.709	1	0.000		SP500	20.962	1	0.000
	BOP	0.395	1	0.530		BOP	0.223	1	0.637
	US10T	4.295	1	0.038		US10T	1.202	1	0.273
	GEXD	42.528	1	0.000		GEXD	34.503	1	0.000
	ALL	584.05	1	0.000		ALL	587.3	1	0.000
	Equation \ Excluded	chi2	df	Prob > chi2		Equation \ Excluded	chi2	df	Prob > chi2
20-year CDS	GDP	1.865	1	0.172	30-year CDS	GDP	0.639	1	0.424
	CPI	227.557	1	0.000		CPI	221.13	1	0.000
	EXPORT	0.669	1	0.414		EXPORT	0.949	1	0.330
	IMPORT	6.841	1	0.009		IMPORT	9.445	1	0.002
	VIX	215.367	1	0.000		VIX	177.91	1	0.000
	SP500	13.306	1	0.000		SP500	8.737	1	0.003
	BOP	1.096	1	0.295		BOP	0.021	1	0.884
	US10T	1.007	1	0.316		US10T	0.932	1	0.334
	GEXD	30.170	1	0.000		GEXD	29.498	1	0.000
	ALL	469.456	1	0.000		ALL	438.56	1	0.000

Table5 shows Panel VAR-Granger causality Wald test for the 19 factors : Gross domestic product (GDP), Consumer Price Index (CPI), Export (EXP), Import (IMP), Government external debt (GEXD), S&P 500 Index (SP500), Balance of Payment (BOP), The 10-year U.S. Treasury (US10T) and CBOE Market Volatility Index (VIX).

Table 5
Panel VAR-Granger causality Wald test.

tributes to 27% of the total variance. The VIX in the first five periods has a slightly lesser contribution (22%) than the rest (25%). A total of 10% is related to the first one and about 25% to the second period up to the tenth period. On the other hand, for the same CDS contract (6-month CDS), the outcomes indicate that the most significant contributor is the CDS own influence (about 38% on average) within the first five periods, which is higher than in the last five periods, where it reaches about 29%. Similar results are obtained for all other maturities of the sovereign CDS, except the 20, and 30-year sovereign CDS contracts.

The analysis indicates that the determinants of sovereign CDS variance are stable during the periods of our analysis and sample countries. The number of CDS contracts used in the analysis are also crucial contributors to about 50% variation in forecast error variance decomposition. The EXPORT, IMPORT, SP500, BOP, US10T, and GEXD indices are not very important for the studied countries during the periods covered in our sample and seem less critical to explain the forecast error variance decomposition.

6m CDS	*GDP*	*CPI*	*EXPORT*	*IMPORT*	*VIX*	*SP500*	*BOP*	*US10T*	*GEXD*	*6M CDS*
1	0.323	0.000	0.002	0.001	0.102	0.005	0.002	0.004	0.006	0.555
2	0.235	0.096	0.001	0.000	0.254	0.005	0.001	0.003	0.013	0.392
3	0.197	0.190	0.002	0.000	0.256	0.004	0.001	0.002	0.016	0.331
4	0.178	0.235	0.003	0.001	0.255	0.004	0.001	0.002	0.017	0.306
5	0.169	0.255	0.003	0.001	0.253	0.004	0.001	0.002	0.017	0.296
6	0.165	0.264	0.004	0.001	0.252	0.004	0.001	0.002	0.017	0.292
7	0.163	0.267	0.004	0.001	0.252	0.004	0.001	0.002	0.017	0.290
8	0.163	0.268	0.004	0.001	0.252	0.004	0.001	0.002	0.017	0.290
9	0.162	0.269	0.004	0.001	0.252	0.004	0.001	0.002	0.017	0.289
10	0.162	0.269	0.004	0.001	0.252	0.004	0.001	0.002	0.016	0.289
1year CDS	*GDP*	*CPI*	*EXPORT*	*IMPORT*	*VIX*	*SP500*	*BOP*	*US10T*	*GEXD*	*1y-CDS*
1	0.311	0.001	0.001	0.001	0.111	0.005	0.003	0.004	0.005	0.557
2	0.230	0.093	0.001	0.001	0.264	0.004	0.002	0.003	0.012	0.391
3	0.198	0.181	0.002	0.001	0.268	0.004	0.001	0.002	0.015	0.327
4	0.181	0.225	0.002	0.001	0.268	0.003	0.001	0.002	0.016	0.300
5	0.173	0.244	0.003	0.001	0.267	0.003	0.001	0.002	0.016	0.290
6	0.170	0.251	0.003	0.001	0.267	0.003	0.001	0.002	0.016	0.286
7	0.169	0.254	0.003	0.001	0.267	0.003	0.001	0.002	0.016	0.285
8	0.168	0.254	0.004	0.001	0.267	0.004	0.001	0.002	0.016	0.284
9	0.168	0.255	0.004	0.001	0.267	0.004	0.001	0.002	0.016	0.284
10	0.167	0.255	0.004	0.001	0.267	0.004	0.001	0.002	0.016	0.283
2year CDS	*GDP*	*CPI*	*EXPORT*	*IMPORT*	*VIX*	*SP500*	*BOP*	*US10T*	*GEXD*	*2y- CDS*
1	0.288	0.000	0.000	0.003	0.112	0.008	0.003	0.003	0.004	0.578
2	0.227	0.084	0.000	0.003	0.248	0.007	0.002	0.003	0.013	0.412
3	0.198	0.169	0.000	0.002	0.257	0.007	0.002	0.003	0.017	0.345
4	0.180	0.215	0.001	0.002	0.259	0.006	0.001	0.003	0.018	0.315
5	0.170	0.239	0.001	0.002	0.258	0.005	0.001	0.003	0.019	0.301
6	0.165	0.250	0.001	0.002	0.258	0.005	0.001	0.003	0.019	0.295
7	0.162	0.256	0.002	0.001	0.258	0.005	0.001	0.004	0.019	0.293
8	0.161	0.258	0.002	0.001	0.258	0.005	0.001	0.004	0.018	0.291
9	0.160	0.259	0.002	0.001	0.258	0.005	0.001	0.005	0.018	0.290
10	0.159	0.260	0.002	0.001	0.258	0.005	0.001	0.005	0.018	0.290
3year CDS	*GDP*	*CPI*	*EXPORT*	*IMPORT*	*VIX*	*SP500*	*BOP*	*US10T*	*GEXD*	*3y - CDS*
1	0.299	0.000	0.000	0.003	0.114	0.008	0.003	0.002	0.004	0.567
2	0.244	0.084	0.000	0.003	0.239	0.008	0.003	0.002	0.013	0.404
3	0.211	0.173	0.000	0.002	0.249	0.008	0.002	0.002	0.017	0.337
4	0.190	0.223	0.001	0.002	0.249	0.007	0.002	0.002	0.018	0.306

Table no. 6 Continue...

5	0.178	0.250	0.001	0.001	0.247	0.007	0.001	0.003	0.018	0.293
6	0.171	0.265	0.001	0.001	0.246	0.007	0.001	0.003	0.018	0.286
8	0.165	0.277	0.001	0.001	0.245	0.007	0.001	0.004	0.018	0.280
9	0.163	0.280	0.001	0.001	0.245	0.007	0.001	0.004	0.018	0.279
10	0.162	0.282	0.001	0.001	0.244	0.007	0.001	0.005	0.018	0.278
4 year CDS	*GDP*	*CPI*	*EXPORT*	*IMPORT*	*VIX*	*SP500*	*BOP*	*US10T*	*GEXD*	*4y- CDS*
1	0.331	0.000	0.000	0.001	0.108	0.005	0.003	0.001	0.004	0.547
2	0.261	0.077	0.000	0.002	0.249	0.006	0.002	0.001	0.015	0.386
3	0.224	0.164	0.000	0.002	0.257	0.007	0.002	0.002	0.019	0.322
4	0.200	0.216	0.000	0.001	0.257	0.007	0.001	0.003	0.020	0.294
5	0.186	0.244	0.001	0.001	0.254	0.008	0.001	0.004	0.021	0.281
6	0.178	0.260	0.001	0.001	0.252	0.008	0.001	0.004	0.021	0.274
7	0.172	0.270	0.001	0.001	0.250	0.008	0.001	0.005	0.021	0.270
8	0.169	0.277	0.001	0.001	0.249	0.009	0.001	0.006	0.021	0.268
9	0.166	0.281	0.001	0.001	0.248	0.009	0.001	0.007	0.021	0.266
10	0.164	0.284	0.001	0.001	0.247	0.009	0.001	0.007	0.021	0.264
5year CDS	*GDP*	*CPI*	*EXPORT*	*IMPORT*	*VIX*	*SP500*	*BOP*	*US10T*	*GEXD*	*5y- CDS*
1	0.353	0.000	0.000	0.000	0.112	0.004	0.002	0.001	0.006	0.522
2	0.276	0.078	0.000	0.001	0.255	0.006	0.002	0.002	0.018	0.362
3	0.234	0.167	0.000	0.001	0.263	0.007	0.001	0.003	0.023	0.301
4	0.207	0.218	0.000	0.001	0.262	0.008	0.001	0.004	0.024	0.275
5	0.192	0.247	0.001	0.000	0.258	0.009	0.001	0.005	0.024	0.263
6	0.182	0.264	0.001	0.000	0.255	0.010	0.001	0.006	0.025	0.257
7	0.176	0.274	0.001	0.000	0.253	0.010	0.001	0.007	0.025	0.253
8	0.172	0.282	0.001	0.000	0.250	0.011	0.001	0.008	0.025	0.250
9	0.168	0.287	0.001	0.000	0.249	0.012	0.000	0.009	0.025	0.248
10	0.166	0.291	0.001	0.000	0.247	0.013	0.000	0.010	0.025	0.247
7year CDS	*GDP*	*CPI*	*EXPORT*	*IMPORT*	*VIX*	*SP500*	*BOP*	*US10T*	*GEXD*	*7y- CDS*
1	0.348	0.000	0.000	0.000	0.112	0.003	0.001	0.003	0.009	0.525
2	0.271	0.074	0.000	0.001	0.237	0.005	0.001	0.003	0.023	0.385
3	0.232	0.155	0.000	0.001	0.244	0.006	0.000	0.004	0.027	0.331
4	0.206	0.202	0.000	0.001	0.244	0.007	0.000	0.005	0.029	0.307
5	0.191	0.228	0.000	0.000	0.241	0.007	0.000	0.006	0.029	0.297
6	0.181	0.243	0.001	0.000	0.238	0.008	0.000	0.007	0.029	0.292
7	0.175	0.252	0.001	0.000	0.236	0.009	0.000	0.008	0.029	0.289
8	0.171	0.258	0.001	0.000	0.235	0.009	0.000	0.009	0.029	0.287
9	0.167	0.264	0.001	0.000	0.233	0.010	0.000	0.010	0.030	0.285

Table no. 6 Continue...

10	0.165	0.268	0.001	0.000	0.232	0.010	0.000	0.011	0.030	0.284
10year CDS	*GDP*	*CPI*	*EXPORT*	*IMPORT*	*VIX*	*SP500*	*BOP*	*US10T*	*GEXD*	*10y-CDS*
1	0.359	0.000	0.000	0.001	0.097	0.002	0.000	0.004	0.012	0.524
2	0.267	0.084	0.000	0.001	0.227	0.003	0.000	0.004	0.024	0.389
3	0.227	0.167	0.001	0.001	0.232	0.004	0.000	0.004	0.029	0.336
4	0.201	0.213	0.001	0.000	0.233	0.004	0.000	0.003	0.031	0.313
5	0.188	0.237	0.001	0.000	0.232	0.004	0.000	0.003	0.031	0.303
6	0.180	0.250	0.001	0.000	0.231	0.004	0.000	0.003	0.031	0.299
7	0.175	0.257	0.001	0.000	0.231	0.004	0.000	0.003	0.031	0.297
8	0.172	0.262	0.002	0.000	0.231	0.004	0.000	0.003	0.031	0.295
9	0.170	0.266	0.002	0.000	0.231	0.004	0.000	0.003	0.031	0.294
10	0.168	0.268	0.002	0.000	0.231	0.004	0.000	0.002	0.031	0.293
20 year CDS	*GDP*	*CPI*	*EXPORT*	*IMPORT*	*VIX*	*SP500*	*BOP*	*US10T*	*GEXD*	*20y-CDS*
1	0.337	0.000	0.000	0.002	0.096	0.003	0.000	0.003	0.015	0.543
2	0.254	0.083	0.000	0.001	0.197	0.004	0.000	0.003	0.029	0.430
3	0.217	0.155	0.000	0.001	0.201	0.004	0.000	0.003	0.034	0.385
4	0.194	0.194	0.001	0.001	0.202	0.004	0.000	0.003	0.035	0.367
5	0.182	0.213	0.001	0.001	0.201	0.004	0.000	0.003	0.035	0.360
6	0.174	0.223	0.001	0.000	0.201	0.004	0.000	0.003	0.035	0.358
7	0.170	0.229	0.001	0.000	0.201	0.004	0.000	0.002	0.035	0.357
8	0.167	0.232	0.001	0.000	0.201	0.004	0.000	0.002	0.035	0.356
9	0.165	0.235	0.001	0.000	0.202	0.004	0.000	0.002	0.035	0.355
10	0.163	0.237	0.001	0.000	0.202	0.004	0.000	0.002	0.035	0.355
30year CDS	*GDP*	*CPI*	*EXPORT*	*IMPORT*	*VIX*	*SP500*	*BOP*	*US10T*	*GEXD*	*30y-CDS*
1	0.309	0.000	0.000	0.001	0.097	0.003	0.000	0.004	0.015	0.571
2	0.240	0.083	0.000	0.001	0.184	0.004	0.000	0.004	0.028	0.455
3	0.206	0.154	0.000	0.001	0.190	0.004	0.000	0.004	0.033	0.408
4	0.185	0.192	0.001	0.000	0.191	0.004	0.000	0.004	0.034	0.389
5	0.173	0.211	0.001	0.000	0.190	0.004	0.000	0.004	0.035	0.382
6	0.167	0.220	0.001	0.000	0.190	0.004	0.000	0.004	0.035	0.380
7	0.163	0.226	0.001	0.000	0.190	0.004	0.000	0.003	0.035	0.379
8	0.160	0.229	0.001	0.000	0.190	0.004	0.000	0.003	0.035	0.378
9	0.158	0.232	0.001	0.000	0.190	0.004	0.000	0.003	0.035	0.377
10	0.156	0.233	0.001	0.000	0.190	0.003	0.000	0.003	0.035	0.377

----------The Table summarizes the ten quarter ahead forecast error variance of each variable attributable to Gross domestic product (GDP), Consumer Price Index (CPI), Export, Import, Government external debt (GEXD), Sovereign CDS prices which are (6m-CDS, 1y-CDS, 2y-CDS, 3y-CDS, 4y-CDS, 5y-CDS,7y-CDS,10-y-CDS, 20y-CDS and 30y-CDS), S&P 500 Index (SP500), The 10-year U.S. Treasury (US10T), (BOP) Balance of Payment and CBOE Market Volatility Index (VIX).

Table 6
Forecast-error variance decomposition

4.7 Fig. 2.1 to 2.10 Orthogonalized Impulse Response Functions: (January 2009 - December 2018).

Figs. 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9 and 3.10 display Orthogonalized Impulse Response Functions (IRFs) and the 5% and 95% error lines produced by Monte Carlo simulations (200 repetitions). We show that the pattern significantly cross-correlated the local and the global factors for all 19 countries for the first period (6-month up to 5-year CDS). In addition, these responses are predictable ones. For illustration, there is a negative response to a shock in GEXD and CPI for the six months sovereign CDS. Nevertheless, the sovereign CDS has a positive reaction to the shock of VIX and SP500 Additionally, for the 1-year, 2-year, and 3- year sovereign CDS, there is a negative response to a shock in the external government debt, EXPORT, and consumer price index, while there is a positive response to the shock SP500, VIX, and IMPORT.

Within 4-year and 5-year sovereign CDS, there is a positive response to SP500, IMPORT, VIX, and BOP. As market risk increases, spreads also increase. This implies that the growth in the global financial uncertainty embedded in the VIX index causes CDS spread changes to increase. This finding corroborates with Merton's structural model. It offers results similar to Pan and Singleton (2008) and Longstaff et al. (2011), who find that the VIX is statistically significant in explaining CDS spreads of Mexico, Turkey, and Ko-

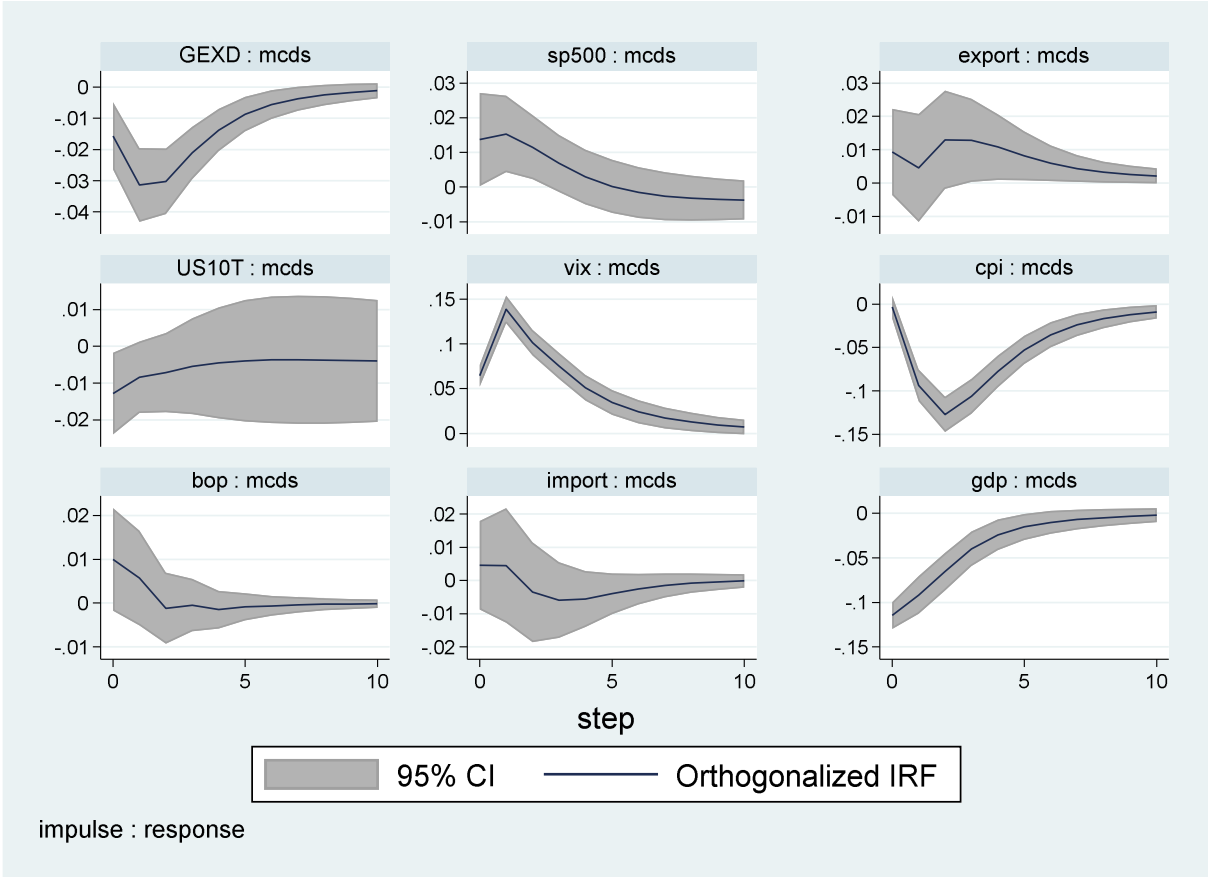

Fig (2.1)
6-month sovereign CDS impulse response function.

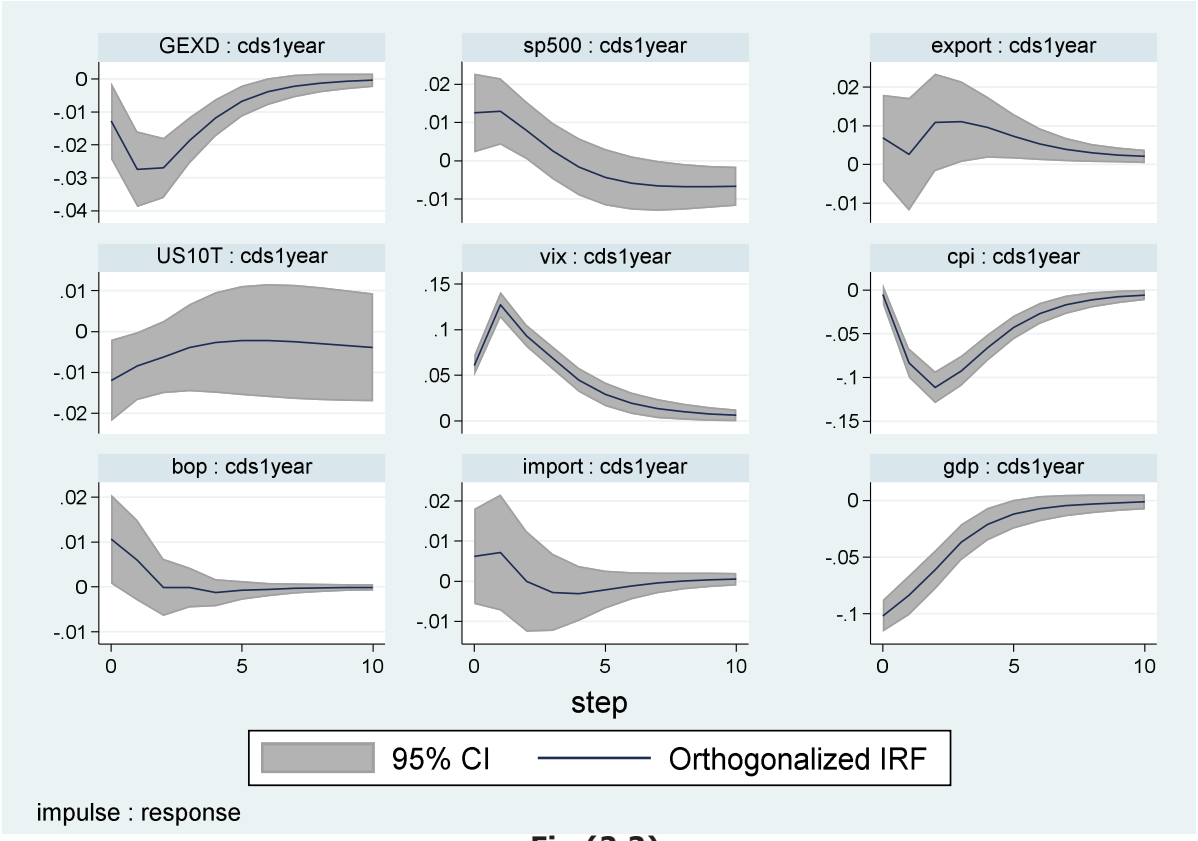

Fig (2.2)
1-year sovereign CDS impulse response function.

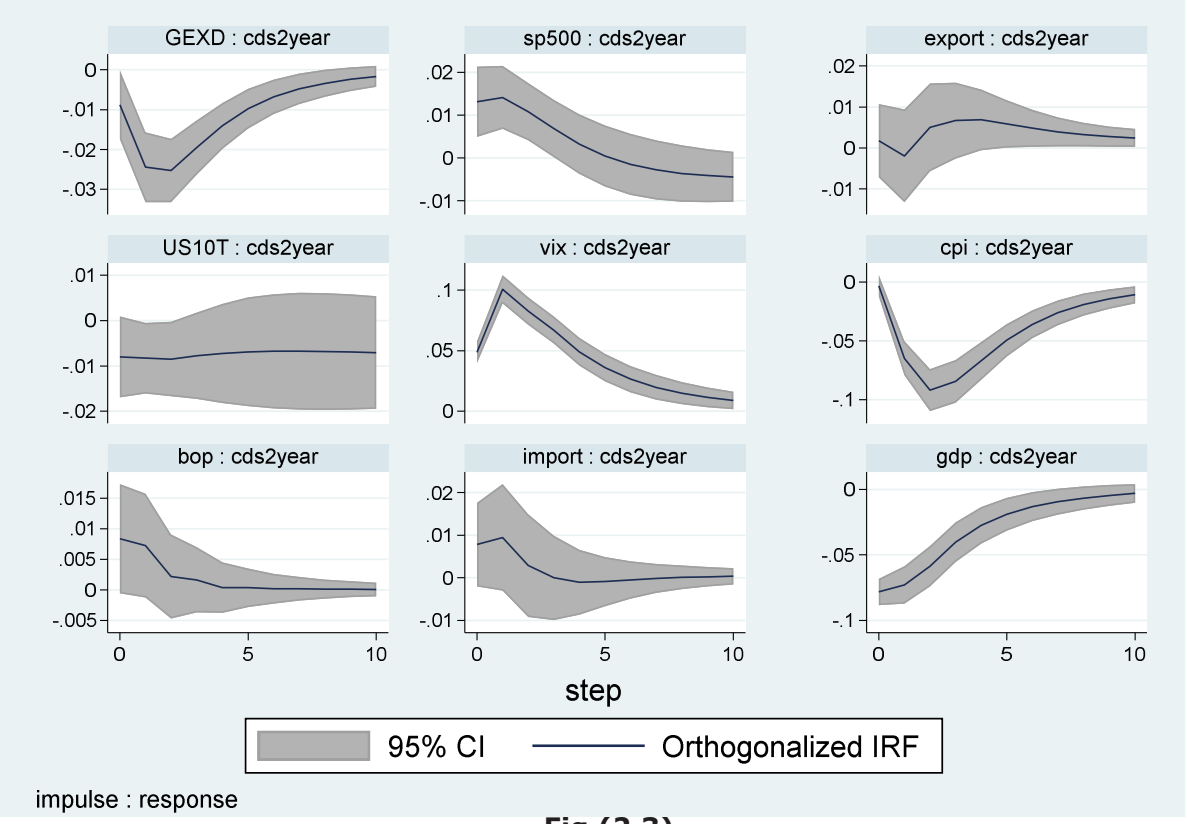

Fig (2.3)
2-year sovereign CDS impulse response function.

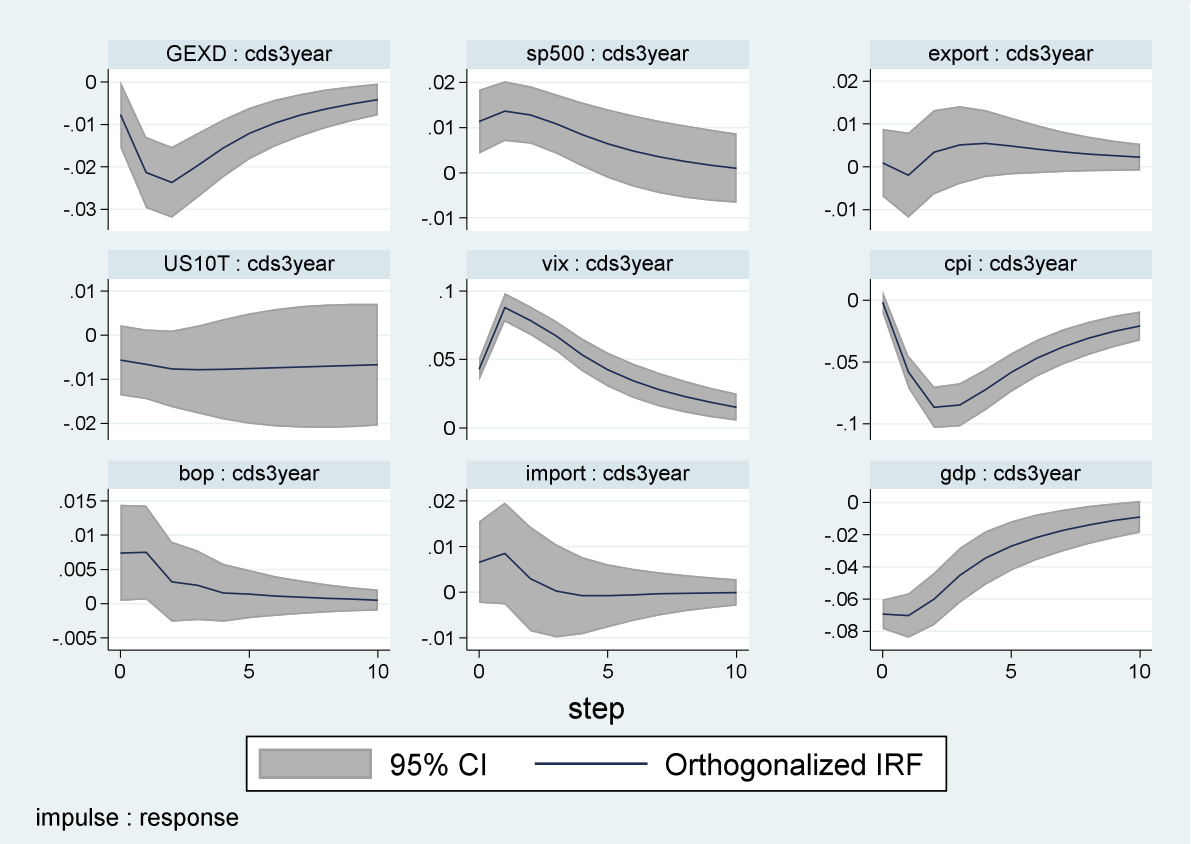

Fig (2.4)
3-year sovereign CDS impulse response function.

rea. In addition, Hilscher and Nosbusch (2010) identify global factors as important determinants of emerging economies' sovereign risk. The 10-year U.S. Treasury bills negatively influence CDS spread changes, particularly for 4- and 5-year CDS contracts. This suggests that a rise in the world interest rates can push up CDS spreads. This result is in line with Chan and Marsden (2014), who observed that a rise in interest rates indicates a positive economic shock and reduces credit spreads. However, there is a negative response to the GEXD, EXPORT, and CPI, implying that the increase in country-specific fundamental factors and economic growth leads to reduced spread. This may change the risk perception over countries.

The response of 7-year, 10-year, 20-year, and 30-year sovereign CDS contracts to VIX, IMPORT and SP500 shock is positive. The adverse reaction is in GEXD, BOP, CPI, US10T , EXPORT, and GDP. The results from the Impulse Response Functions for all 19 countries indicate that the most significant variables are GEXD, VIX, US10T, and CPI on the short-term sovereign CDS contract for maturities up to 3 years. Additionally, VIX and CPI are the most significant variables in response to the shock positively and negatively for extended term contracts that are the most liquid in the market.

5. Conclusion

In this study, we investigated the macroeconomic determinants of sovereign CDS spreads for 19 countries, including Belgium, Brazil, Chile, Colombia, France, Indonesia, Ireland, Italy, Malaysia, Peru, Philippines, Poland, Portugal, Romania, Russia, South Africa, Spain, Sweden, and Turkey, covering the period from January 2009 to December 2018. Using a Panel Vector Autoregressive (PVAR) methodology, our research extends the existing literature by including ten different maturities of CDS spreads and a broader set of countries. This approach allows for a more comprehensive analysis than previous studies, which often focus solely on 5-year maturities and a limited number of countries.

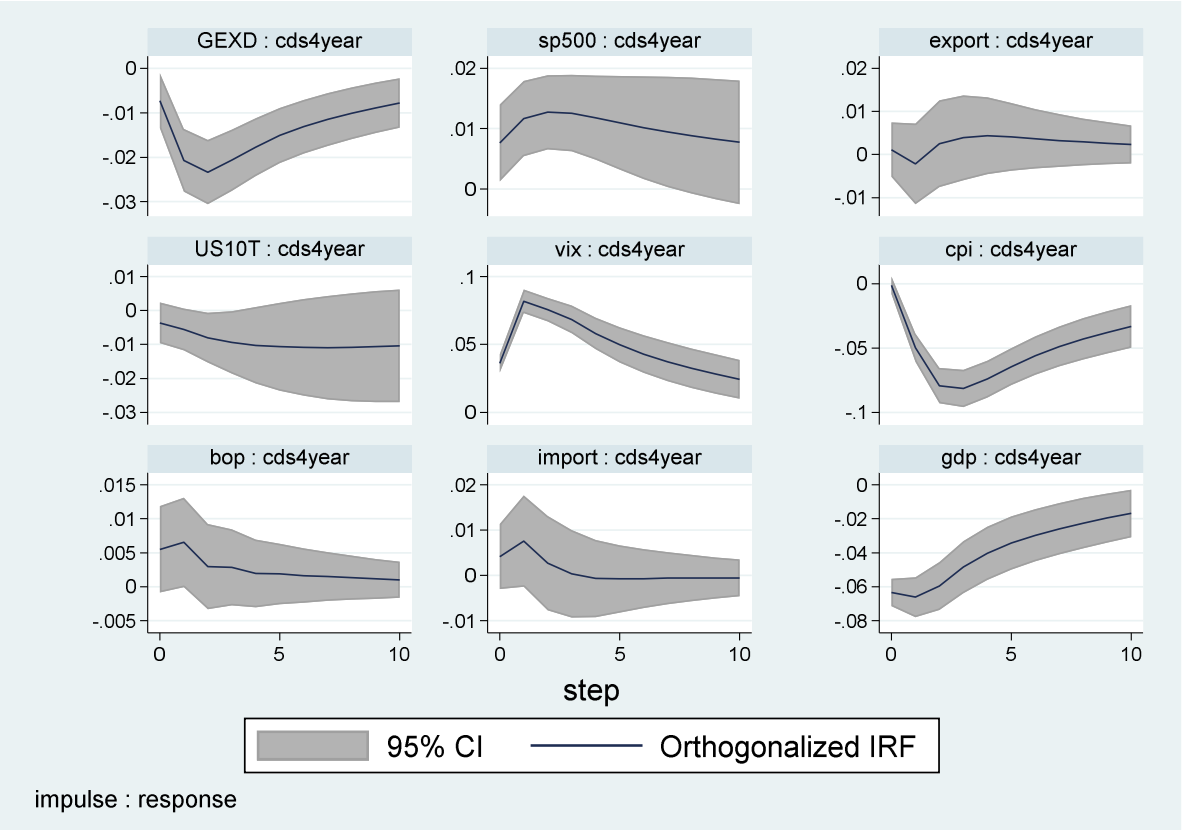

Fig (2.5)
4-year sovereign CDS impulse response function.

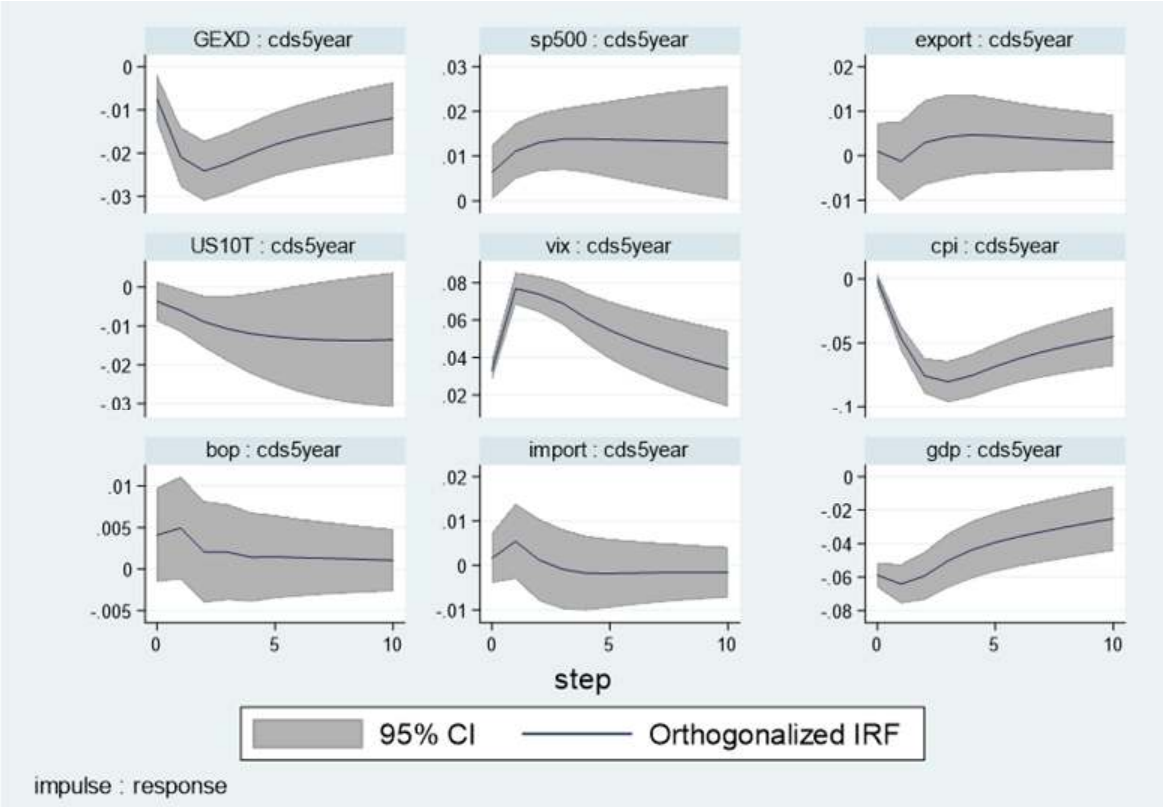

Fig (2.6)
5-year sovereign CDS impulse response function.

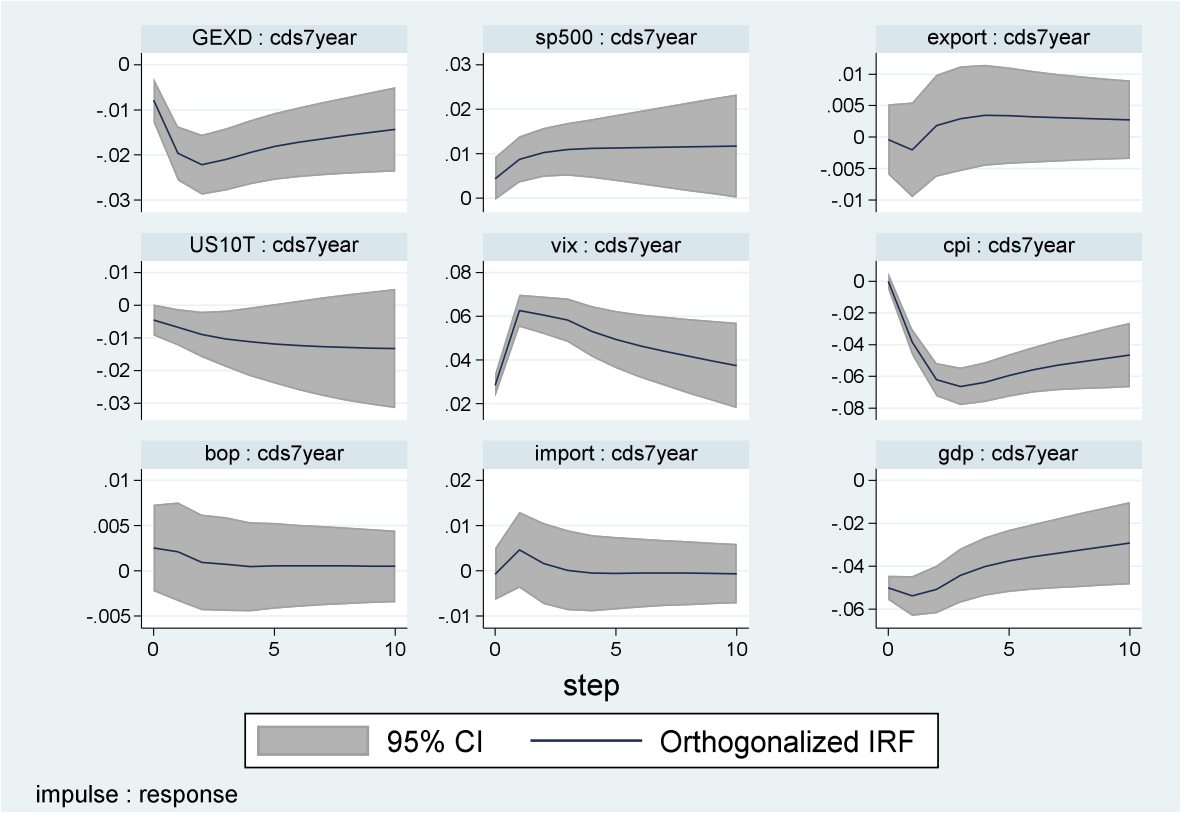

Fig (2.7)
7-year sovereign CDS impulse response function.

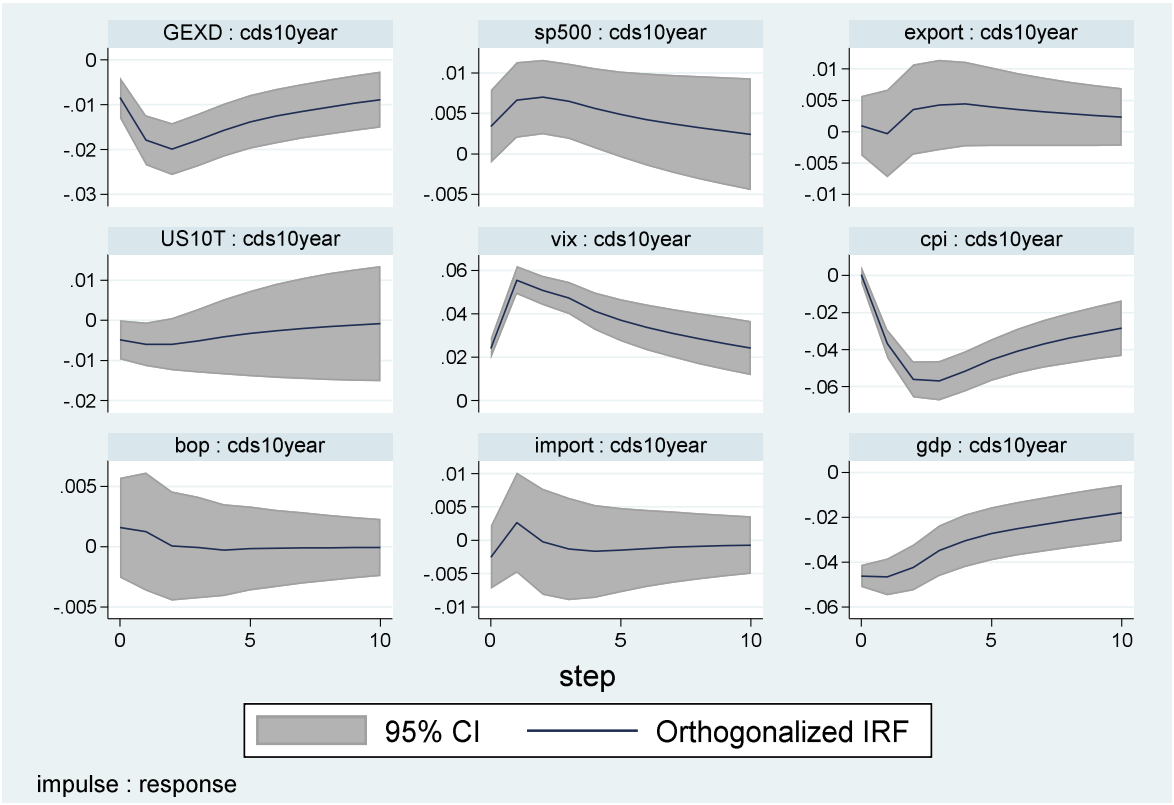

Fig (2.8)
10-year sovereign CDS impulse response function.

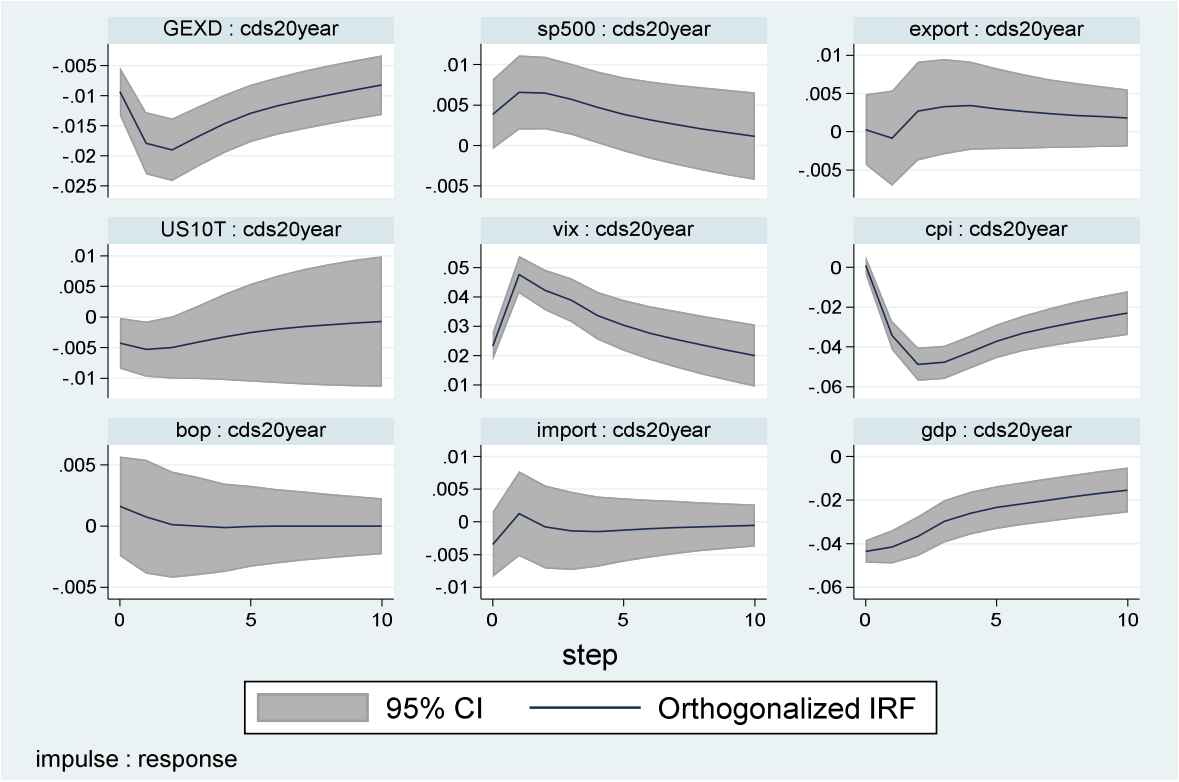

Fig (2.9)
20-year sovereign CDS impulse response function.

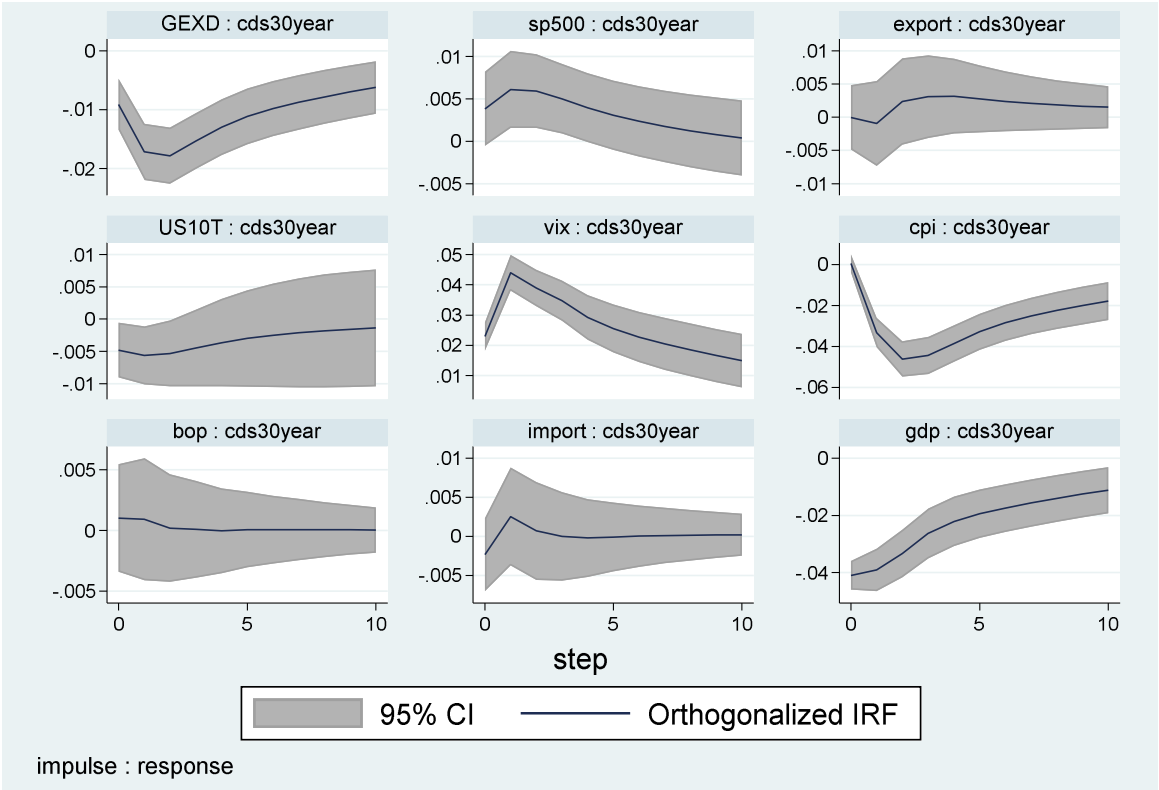

Fig (2.10)
30-year sovereign CDS impulse response function.

Our primary objective was to identify the most significant determinants of sovereign CDS spreads, both local and global. Our findings reveal that local variables such as Government External Debt (GEXD) and Consumer Price Index (CPI), along with the global variable CBOE Market Volatility Index (VIX), are significant determinants of sovereign CDS spreads. Specifically, the S&P 500 Index (SP500) and import values also show significant impacts on CDS spreads for maturities from 4 to 30 years and 7 to 30 years, respectively. These results underscore the importance of both domestic economic conditions and global market dynamics in influencing sovereign credit risk.

The study highlights the utility of sovereign CDS spreads as leading economic indicators, useful for cross-market trading, hedging, and economic policy analysis. The significance of variables such as GDP, CPI, and VIX in variance decomposition analysis further supports the predictive power of sovereign CDS spreads across different maturities.

However, the study also points out limitations, particularly in the indirect effects of variables like external government debt, which calls for future research. Future studies should explore these indirect effects and extend the analysis to other emerging and developed markets to validate and expand upon these findings.

The study's findings have significant implications for both policymakers and investors. For policymakers, understanding the impact of macroeconomic factors on sovereign CDS spreads can guide measures to enhance macroeconomic stability and manage risk. For instance, if the study indicates that rising inflation leads to higher CDS spreads, central banks might tighten monetary policy to stabilize inflation and reduce associated risks. Additionally, the insight into the influence of GDP growth on CDS spreads can help investors develop more informed investment strategies; they might favor bonds from countries with robust economic growth, as these are likely to have lower risk premiums.

Furthermore, the study highlights the importance of global factors, suggesting that international policy coordination, such as synchronized fiscal measures, could effectively mitigate sovereign risk. Policymakers could also develop monitoring and early warning systems based on key determinants of CDS spreads to detect financial distress early and take preventive actions. These applications of the study's findings can help both policymakers and investors manage economic stability, devise optimal investment strategies, and implement coordinated measures to enhance overall economic resilience.

In conclusion, our research contributes to a deeper understanding of the determinants of sovereign CDS spreads, providing valuable insights for investors, policymakers, and researchers. The results emphasise the need for continuous monitoring of both local and global economic factors to better manage sovereign credit risk and inform policy decisions.

References

Aizenman, J., Hutchison, M., & Jinjarak, Y., 2013. What is the risk of European sovereign debt defaults? Fiscal space, CDS spreads, and market pricing of risk. Journal of International Money and Finance, 34, 37-59. https://doi.org/10.1016/j.jimonfin.2012.11.011

Akaike, H., 1969. Fitting autoregressive models for prediction. Annals of the Institute of Statistical Mathematics, 21(1), 243-247. https://doi.org/10.1007/BF02532251

Andrews, D. W. K., & Lu, B., 2001. Consistent model and moment selection procedures for GMM estimation with application to dynamic panel data models. Journal of Econometrics, 101(1), 123-164. https://doi.org/10.1016/S0304-4076(00)00077-4

Annaert, J. M, De Ceuster, M., Van Roy, P., & Vespro, C., 2013. What determines Euro area bank CDS spreads. Journal of International Money and Finance, 32, 444-461. https://doi.org/10.1016/j.jimonfin.2012.05.029

Apergis, N., 2015. Forecasting Credit Default Swaps (CDS) spreads with newswire messages: Evidence from European countries under financial distress. Economics Letters ,136, 92-94. https://doi.org/10.1016/j.econlet.2015.08.032

Apergis, N., Lau, M. C. K., & Yarovaya, L., 2016. Media sentiment and CDS spread spillovers: Evidence from the GIIPS countries. International Review of Financial Analysis, 47, 50-59. https://doi.org/10.1016/j.irfa.2016.06.010

Avramov, D., Jostova, G., & Philipov, A., 2007. Understanding changes in corporate credit spreads. Financial Analysts Journal, 63(2), 90-105. https://doi.org/10.2469/faj.v63.n2.4525

Baek, I. M., Bandopadhyaya, A., & Du, C., 2005. Determinants of market-assessed sovereign risk: Economic fundamentals or market risk appetite? Journal of International Money and Finance, 24(4), 533-548. https://doi.org/10.1016/j.jimonfin.2005.03.007

Baldacci, E., Gupta, S., & Mati, A., 2011. Political and fiscal risk determinants of sovereign spreads in emerging markets. Review of Development Economics, 15(2), 251-263. https://doi.org/10.1111/j.1467-9361.2011.00606.x

Basazinew, S. T., & Vashkevich, A., 2013. Relationship between sovereign credit default swap and stock markets-The Case of East Asia. Business AdministrationUmeå School of Business and Economics (USBE), p. 87.

Baum, C. F., & Wan, C., 2010. Macroeconomic uncertainty and credit default swap spreads. Applied Financial Economics, 20,1163-1171. https://doi.org/10.1080/09603101003781455

Beirne, J., & Fratzscher, M., 2013. The pricing of sovereign risk and contagion during the European sovereign debt crisis. Journal of International Money and Finance, 34, 60-82. https://doi.org/10.1016/j.jimonfin.2012.11.004

Blanco, R., Brennan, S. & Marsh, I.W., 2005. An empirical analysis of the dynamic relation between investment-grade bonds and credit default swaps. Journal of Finance, 60(5), 2255-2281. https://doi.org/10.1111/j.1540-6261.2005.00798.x

Blommestein, H., Eijffinger, S., & Qian, Z., 2016. Regime-dependent determinants of Euro area sovereign CDS spreads. Journal of Financial Stability, 22, 10-21. https://doi.org/10.1016/j.jfs.2015.11.004

Campbell, J. Y., & Taksler, G. B., 2003. Equity volatility and corporate bond yields. The Journal of Finance, 58(6), 2321-2350. https://doi.org/10.1046/j.1540-6261.2003.00607.x

Can, H., & Paskaleva, M., 2017. Macroeconomic Determinants of CDS: The Case of Europe. (Online) Academic Publishing House "Talent "University of Agribusiness and Rural Development - Bulgaria. New Knowledge Journal of Science, ISSN 2367-4598.

Cantor, R., & Packer, F., 1996. Determinants and impact of sovereign credit ratings. Economic policy review, 2(2). https://doi.org/10.1111/j.1468-036X.1996.tb00040.x

Chan-Lau, J. A., & Kim, Y. S., 2004. Equity pric-

es, credit default swaps, and bond spreads in emerging markets. Working paper. Washington, DC: International Monetary Fund. https://doi.org/10.2139/ssrn.564241

Chan, K. C., Fung, H. G., & Zhang, G., 2009. On the relationship between Asian credit default swap and equity markets. Journal of Asian Business Studies, 4(1), 2-11. https://doi.org/10.1108/15587890980000414

Chen, L., Lesmond, D. A., & Wei, J., 2007. Corporate yield spreads and bond liquidity. The Journal of Finance, 62(1), 119-149. https://doi.org/10.1111/j.1540-6261.2007.01203.x

Chiaramonte, L., & Casu, B., 2013. The determinants of bank CDS spread: Evidence from the financial crisis. European Journal of Finance, 19, 861-887. https://doi.org/10.1080/1351847X.2011.636832

Cimadomo, J., Claeys, P., & Ribeiro, M., 2016. How do experts forecast sovereign spreads?. European EconomicReview, 87, 216-235. https://doi.org/10.1016/j.euroecorev.2016.03.002

Collin-Dufresn, P., Goldstein, R. S., & Martin, J. S., 2001. The determinants of credit spread changes. The Journal of Finance, 56(6), 2177-2207. https://doi.org/10.1111/0022-1082.00402

Corò, F., Dufour, A., & Varotto, S., 2013. Credit and liquidity components of corporate CDS spreads. Journal of Banking and Finance, 37, 5511-5525. https://doi.org/10.1016/j.jbankfin.2013.07.010

Das, S. R., Hanouna, P., & Sarin, A., 2009. Accounting-based versus market-based cross-sectional models of CDS spreads. Journal of Banking and Finance, 33, 719-730. https://doi.org/10.1016/j.jbankfin.2008.11.003

Delatte, A.L., Gex, M., & LA˜3pez-Villavicencio, A., 2012. Has the CDS market influenced the borrowing cost of European countries during the sovereign crisis? Journal of International Money and Finance, 31(3), 481-497. https://doi.org/10.1016/j.jimonfin.2011.10.008

Di Cesare, A., & Guazzarotti, G., 2010. An analysis of the determinants of credit default swap spread changes before and during the subprime financial turmoil. Bank of Italy Temi di Discussione (Working Paper) No, 749. https://doi.org/10.2139/ssrn.1670045

Dieckmann, S., & Plank, T., 2012. Default risk of advanced economies: an empirical analysis of credit default swaps during the financial crisis. Review of Finance, 16 (4),903-934. https://doi.org/10.1093/rof/rfr015

Elton, E. J., Gruber, M. J., Agrawal, D., & Mann, C., 2001. Explaining the rate spread on corporate bonds. Journal of finance, 56(1), 247-277. https://doi.org/10.1111/0022-1082.00324

Ericsson, J., Jacobs, K., & Oviedo, R., 2009. The determinants of credit default swaps premia. Journal of Financial and Quantitative Analysis, 44, 109-132. https://doi.org/10.1017/S0022109009090061

Eyssell, T., Fung, H. G., & Zhang, G., 2013. Determinants and price discovery of China

sovereign credit default swaps. China Economic Review, 24, 1-15. https://doi.org/10.1016/j.chieco.2012.09.003

Fabozzi, F. J., Cheng, X., & Chen, R.-R., 2007. Exploring the components of credit risk in credit default swaps. Finance Research Letters, 4, 10-18. https://doi.org/10.1016/j.frl.2006.10.002

Fender, I., Hayo, B., & Neuenkirch, M., 2012. Daily pricing of emerging market sovereign CDS before and during the global financial crisis. Journal of Banking & Finance, 36(10), 2786-2794. https://doi.org/10.1016/j.jbankfin.2012.06.017

Forte, S., & Pe˜na, J. I., 2009. Credit spreads: An empirical analysis on the informational content of stocks, bonds, and CDS. Journal of Banking and Finance, 33, 2013-2025. https://doi.org/10.1016/j.jbankfin.2009.04.015

Fung, H. G., Sierra, G. E., Yau, J., & Zhang, G., 2008. Are the stock market and credit default swap market related? Evidence from the CDX indices. Journal of Alternative Investments, 11(1), 43-61. https://doi.org/10.3905/jai.2008.708849

Galariotis, E. C., Makrichoriti, P., & Spyrou, S., 2016. Sovereign CDS spread determinants and spillover effects during financial crisis: A panel VAR approach. Journal of Financial Stability, 26, 62-77. https://doi.org/10.1016/j.jfs.2016.08.005

Galil, K., & Soffer, G., 2011. Good news, bad news and rating announcements: An empirical investigation. Journal of Banking & Finance, 35(11), 3101-3119. https://doi.org/10.1016/j.jbankfin.2011.04.010

Galil, K., Shapir, O. M., Amiram, D., & Ben-Zion, U., 2014. The determinants of CDS spreads. Journal of Banking and Finance, 41,271-282. https://doi.org/10.1016/j.jbankfin.2013.12.005

Georgievska, A., Georgievska, L., Stojanovic, A., & Todorovic, N., 2008. Sovereign rescheduling probabilities in emerging markets: a comparison with credit rating agencies' ratings. Journal of Applied Statistics, 35(9), 1031-1051. https://doi.org/10.1080/02664760802193112

Guesmi, K., Dhaoui, A., Goutte, S., & Abid, I., 2018. On the determinants of industry-CDS index spreads: Evidence from a nonlinear setting. Journal of International Financial Markets, Institutions and Money, 56, 233-254. https://doi.org/10.1016/j.intfin.2018.01.005

Hamilton, J. D., 1994. Time Series Analysis. Prentice Hall New Jersey 1994. SFB 373(Chapter 5), 837-900.

Hannan, E. J., & Quinn, B. G., 1979. The Determination of the Order of an Autoregression. Journal of the Royal Statistical Society. Series B (Methodological). WileyRoyal Statistical Society. https://doi.org/10.1111/j.2517-6161.1979.tb01072.x

Hansen, L. P., 1982. Large Sample Properties of Generalized Method of Moments Estimators Author (s): Lars Peter Hansen Reviewed work (s): Published by: The Econometric Society. Econometrica, 50(4), 1029-1054. https://doi.org/10.2307/1912775

Hilscher, J., & Nosbusch, Y., 2010. Determinants of Sovereign Risk: Macroeconomic Fundamentals and the Pricing of Sovereign Debt. Review of Finance,14, 235-262. https://doi.org/10.1093/rof/rfq005

Ho, S. H., 2016. Long and short-runs determinants of the sovereign CDS spread in emerging countries. Research in International Business and Finance, 36, 579-590. https://doi.org/10.1080/14697688.2020.1865558. https://doi.org/10.1080/14697688.2020.1865558

Hull, J. C., Predescu, M., & White, A., 2004. The relationship between credit default swaps spreads, yields bonds and credit rating announcements. Journal of Banking and Finance, 28, 2789-2811. https://doi.org/10.1016/j.jbankfin.2004.06.010

Kalbaska, A., & Gątkowski, M., 2012. Eurozone sovereign contagion: Evidence from the CDS market (2005-2010). Journal of Economic Behavior & Organization, 83(3), 657-673. https://doi.org/10.1016/j.jebo.2012.05.010

Longstaff, F. A., Pan, J., Pedersen, L. H., & Singleton, K. J., 2011. How sovereign is sovereign credit risk? American Economic Journal: Macroeconomics, 3(2), 75-103. https://doi.org/10.1257/mac.3.2.75

Love, I., & Zicchino, L., 2006. Financial development and dynamic investment behavior: Evidence from panel VAR. Quarterly Review of Economics and Finance, 46(2), 190-210 https://doi.org/10.1016/j.qref.2005.11.007

Lutkephol, H., 2005. New Introduction to Multiple Time Series Analysis. Available at: 10.1007/978-3-540-27752-1.

Markose, S. M., Giansante, S., Gatkowski, M., & Shaghaghi, A. R., 2010. Too interconnected to fail: Financial contagion and systemic risk in network model of CDS and other credit enhancement obligations of us banks. University of Essex, Department of Economics, Discussion Paper Series 683.

Medina, R. S, Ponce, A. A, Martinez, P. P, & Pietro, F. D., 2016. Determinants of bank CDS spreads in Europe. Journal of Economics and Business, 86, 1-15. https://doi.org/10.1016/j.jeconbus.2016.03.001

Mellios, C., & Paget-Blanc, E., 2006. Which factors determine sovereign credit ratings?, The European Journal of Finance, 12(4), 361-377. https://doi.org/10.1080/13518470500377406

Naifar, N., 2012. Modeling the dependence structure between default risk premium, equity return volatility and the jump risk: Evidence from a financial crisis. Economic modelling, 29(2), 119-131. https://doi.org/10.1016/j.econmod.2011.08.026

Narayan, P. K., 2015. An analysis of sectoral equity and CDS spreads. Journal of International Financial Markets, Institutions and Money, 34, 80-93. https://doi.org/10.1016/j.intfin.2014.10.004

Narayan, P. K., Sharma, S. S., & Thuraisamy, K. S., 2014. An analysis of price discovery from panel data models of CDS and equity returns. Journal of Banking and Finance, 41, 167-177. https://doi.org/10.1016/j.jbankfin.2014.01.008

Norden, L., & Weber, M., 2004. Informational efficiency of credit default swap and stock markets: The impact of credit rating announcements. Journal of Banking & Finance, 28(11), 2813-2843. https://doi.org/10.1016/j.jbankfin.2004.06.011

Norden, L., & Weber, M., 2009. The co-movement of credit default swap, bond and stock markets: An empirical analysis. European financial management, 15(3), 529-562. https://doi.org/10.1111/j.1468-036X.2007.00427.x

Pan, J., & Singleton, K. J., 2008. Default and Recovery Implicit in the Term Structure of Sovereign CDS Spreads. Journal of Finance, 63(5), 2345-2384. https://doi.org/10.1111/j.1540-6261.2008.01399.x

Pereira, J., Sorwar, G., & Nurullah, M., 2014. What drives corporate CDS spreads? Comparison across U.S., U.K. and Euro-zone markets. In Proceedings of the 2014 annual meeting of the European financial management association (EFMA).

Pires, P., Pereira, J. P., & Martins, L. F., 2015. The empirical determinants of credit default swap spreads: A quantile regression approach. European Financial Management, 21, 556-589. https://doi.org/10.1111/j.1468-036X.2013.12029.x

Ramos-Francia, M., & Rangel, J. G., 2012. Revisiting the effects of country specific fundamentals on sovereign default risk. Economics Bulletin, 32(4), 3008-3016.

Rapach, D. E., Strauss, J. K., & Zhou, G., 2013. International stock return predictability: what is the role of the United States? The Journal of Finance, 68(4), 1633-1662. https://doi.org/10.1111/jofi.12041

Schwarz, G., 1978. Estimating the Dimension of a Model. The Annals of Statistics, 6(2), 461-464. https://doi.org/10.1214/aos/1176344136

Srivastava, S., Lin, H., Premachandra, I. M., & Roberts, H., 2016. Global risk spillover and the predictability of sovereign CDS spread: International evidence. International Review of Economics & Finance, 41, 371-390. https://doi.org/10.1016/j.iref.2015.10.047

Zhu, H., 2006. An empirical comparison of credit spreads between the bond market and the credit default swap market. Journal of Financial Services Research, 29(3), 211-235. https://doi.org/10.1007/s10693-006-7626-x