Impact of the Coronavirus Pandemic Crisis on the Financial System in the Eurozone

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Abstract

The stress in the financial system in five Eurozone countries (Germany, France, Italy, Portugal and Spain) was not connected before the COVID-19 pandemic crisis. CDS premiums was priced independently, not incorporating the sovereign risk of the eurozone as a whole. However, during the period of pandemic crisis, the stress was connected in five countries. The financial market was cautious about the increased fiscal deficit caused by massive spending in the pandemic crisis, fearing that the deficit might cause increased risk in the financial system of the eurozone as a whole. The symptoms of financial crisis sprouted after the pandemic crisis started. We need to monitor whether countermeasures taken by European Central Bank (ECB) and European Union (EU) contribute to the stability of financial system in the eurozone.

Keywords: Credit Default Swap, COVID-19 Pandemic crisis, Eurozone, Financial system,

JEL Classifications: E42, F35, G15,

1.Introduction

As the Council of the European Union states, the coronavirus (COVID-19) pandemic crisis (hereafter pandemic crisis) constitutes an unprecedented challenge with very severe socio-economic consequences. The outbreak of the pandemic in the eurozone was discovered in northern Italy around the end of February, 2020, from where it quickly spread to other EU countries. This paper focuses on the stress in the financial system caused by the increased premium in sovereign credit default swaps (CDSs) of five eurozone nations (Germany, France, Italy, Portugal and Spain) during the early stage of the pandemic crisis.

Originally, CDS was introduced to serve as an insurance. It is a financial swap agreement whereby the seller will compensate the buyer if there is a credit event. As mentioned in Ito (2015),

"the buyer of the CDS makes a series of payments to the seller and, in exchange, receives a compensation payoff if there is a default, whereupon the seller retakes possession of the defaulting bond or loan". When the credit risk increases in a country, the CDS premium increases. We can see CDS premiums because they are traded every day on the financial market, and it is therefore appropriate to use the CDS premium to measure stress in the financial system.

As the pandemic crisis deepened in northern Italy around the end of February 2020, the CDS premium rose dramatically in countries such as Italy, Spain and Portugal. The financial market was cautious about the increased fiscal deficit caused by the massive spending in the pandemic crisis. This paper analyzes the co-movement of sovereign CDSs in five eurozone countries during the outbreak of the pandemic crisis. The research question is whether the stress in the countries' financial systems are connected. If so, the concern in the financial market would be that the fiscal deficit might impair financial stability in the rest of the eurozone. This paper is the first one to analyze the stress in the eurozone financial system during the pandemic crisis by using the data of CDS market, and contributes to the research by comparing samples before and after the outbreak.

So far the number of related literatures in the analysis of the impact of coronavirus on the economy and financial market is very limited because the first outbreak of coronavirus pandemic was confirmed in China around the end of January 2020. Corbet et al (2020) conclude that "the volatility relationship between the main Chinese stock markets and Bitcoin evolved significantly during this period of enormous financial stress. They provide a number of observations as to why this situation occurred". Siddiquei and Khan (2020) conduct "an in-depth analysis of how the disease is affecting transport, hospitality, food and beverage, and the stock market".

Liu et al (2020) find that "both the Chinese and Asian stock markets had significantly declined, with the cumulative abnormal returns (CAR) remaining negative in all the examined event window periods by using event study method to calculate the abnormal returns in the 10 trading days following the outbreak". Zaremba et al (2020) demonstrate that "non-pharmaceutical interventions significantly increase equity market volatility. The effect is independent from the role of the coronavirus pandemic itself and is robust to many considerations". Tokic (2020) conclude that the COVID‐19 pandemics is likely to accelerate the trends of de‐globalization and de‐dollarization and to creates an opportunity for building a new trend of more sustainable

globalization.

Recent studies analyzing CDS in the eurozone, such as Alter and Beyer (2014), Beirne and Fratzscher (2013), Calice et al. (2013), Gorea and Radev (2014), Grammatikos and Vermeulen (2012), Ito (2015), and Kalbaska and Gatkowski (2012) are cited. These studies analyze the CDS market during the period of sovereign crisis after 2010. Alter and Beyer (2014) "quantify spillovers between sovereign credit markets and banks in the euro area". "Spillovers are estimated recursively from the VAR (Vector Autoregressive) model of daily changes in CDS spreads with exogenous common factors". Beirne and Fratzscher (2013) analyze "the drivers of sovereign risk for 31 advanced and emerging economies during the European sovereign debt crisis". Zaremba et al. (2020) explore "the stringency of policy responses to the novel coronavirus pandemic in 67 countries around the world and demonstrate that non-pharmaceutical interventions significantly increase equity market volatility.

The major finding of Calice et al.'s (2013) study is that "for several countries, including Greece, Ireland and Portugal, the liquidity of the sovereign CDS market has a substantial time varying influence on sovereign bond credit spreads". Gorea and Radev (2014) examine "the determinants of the joint default risk of euro area countries during 2007 to 2011 and recover joint default probabilities from individual CDS contracts".

Grammatikos and Vermeulen (2012) show that " financials became significantly more dependent on changes in the difference between the Greek and German CDS spreads after Lehman's collapse, compared with the pre-Lehman sub period". Ito (2015) concludes that "Greece propelled the sovereign CDS market of the other four PIIGS (Portugal, Italy, Ireland, Greece and Spain) countries. On the other hand, no influence on Greece from other PIIGS countries was found. From the empirical analysis, it can be concluded that the financial contagion existed among sovereign CDS markets of PIIGS countries".

Kalbaskaa and Gatkowski (2012) confirm that "Greece and the other PIIGS countries (even Spain and Italy) had a lower capacity to trigger contagion than core European Union (EU) countries. In addition, Portugal was the most vulnerable country, whereas the UK was the most immune to shocks".

2.Data

The CDS market has liquidity only with a maturity of five years. CDS data with a maturity of five years are utilized in this analysis. The sample period runs from December 6, 2020 to May 5, 2020. Five EU countries (Germany, France, Italy, Portugal and Spain) are chosen for this study. Daily data are provided by Datastream. CDS premium, also called CDS spread, is quoted by basis point in the market. The entire sample is divided into two at the point of discovery of the outbreak of the pandemic crisis in northern Italy. The first period (Sample A) runs from December 6, 2020 to February 21, 2020. The second period (Sample B) runs from February 24, 2020 to May 5, 2020. The CDS premium increased in all five counties, particularly in Italy, Spain and Portugal. The movement of CDS is shown in Figure 1. The descriptive statistics of the dataset are shown in Table1.

Figure 1

Table 1

3.Methodology

3.1. Unit Root Test

As mentioned in Ito (2015), "because empirical analyses of the period from the mid-1980's to the mid-1990's show that data such as interest rates, foreign exchange and stocks are non-stationary, it is firstly necessary to check whether the data used in this paper contain unit roots". "ADF (Augmented Dickey/Fuller)" and "KPSS (Kwiatowski/Phillips/Schmidt-Shin)" tests are conducted[1]. Fuller (1976) provides the tables for the ADF test. Firstly, the original data are checked to see whether they contain a unit root. Then the data with first differences are analyzed to see whether they have a unit root in order to confirm that the data represent I (1) variables.

3.2 Cointegration Test

The cointegration test proposed by Johansen (1988) is applied as described below to investigate the co-movement of the CDS premium after it is confirmed that the data are non-stationary I (1) variables. Johansen suggests starting an analysis with the k order Vector AutoRegression (VAR) model as in equation (1).

$$X_t = \Pi_1 X_{t-1} + \ldots + \Pi_k X_{t-k} + u_t \quad (1)$$

[1] For details of unit root test, see Dickey and Fuller (1979,1981) and Kwiatkowski et al. (1992).

The CDSs in the five countries are analyzed by the Johansen cointegration test. Maximal eigenvalue and trace tests are conducted to investigate the cointegration relationship. When a cointegration relationship is found, it can be concluded that the CDS markets in the five countries move in a long-run equilibrium. In other words, the stress in the financial systems of the five countries are connected.

4.Result

4.1 Unit Root Test

The results cannot exclude the doubt that the original data have unit roots, because the results of both tests show non-stationarity with some exceptions in the ADF test in Samples A and B. The results are shown in Table 2 and Table 3.

Table 2

Table 3

Next, ADF and KPSS tests are conducted for data with a first difference. The results show that all data with a first difference are stationary, with some exceptions in the ADF test in Samples A and B. However it is possible that all of the variables used for the analysis are non-stationary I (1) variables, taking into account the results of both the ADF and KPSS tests, and therefore a non-stationary time series can be used. The results are shown in Tables 4 and 5.

Table 4

Table 5

4.2 Cointegration Test

No cointegration relationship is found in Sample A by both maximal eigenvalue and trace tests. This means that the stress in the financial system was not connected before the pandemic crisis. On the other hand, two cointegration relationships are found in Sample B by both maximal eigenvalue and trace tests. This means that the stress in the financial market was connected during the pandemic crisis. The results are shown in Table 6.

Table 6

5.Conclusion

This paper analyzes the co-movement of sovereign CDSs in five eurozone countries (Germany, France, Italy, Portugal and Spain) during the pandemic crisis. The stress in the financial system was not connected before the pandemic crisis. CDS premiums were priced independently and did not incorporate the sovereign risk of the eurozone as a whole. However, during the pandemic crisis, the stress was connected in the five countries. The financial market was cautious about the increased fiscal deficit caused by the massive spending in the pandemic crisis, fearing that the deficit could cause increased stress in the financial system of the eurozone as a whole. It can be concluded that the symptoms of financial crisis sprouted after the start of the pandemic.

As Tokic (2020) concludes that "the COVID‐19 pandemic will accelerate the trends of de‐globalization and de‐dollarization, producing a highly uncertain geopolitical and economic future", it is expected that the importance of euro will grow as a world key currency after US dollar. The strengthened monetary policy decided by European Central Bank (ECB) on June 4, 2020 is a welcome sign for the financial stability. But concerted fiscal policy is important to stabilize financial system. In May 2020, the European Commission, the executive arm of EU, suggested raising 750 billion euros in pubic markets to invest in the hardest-hit sectors and countries. Eventually agreements were reached as for how to distribute that money and how to oversee its application on July 21, 2020. We need to monitor whether countermeasures taken by ECB and EU contribute to the stability of financial system in the eurozone.

The sample period of this paper ends on May 5, 2020. Further study could analyze the impact of countermeasures by eurozone countries on financial stress after May 6, 2020.

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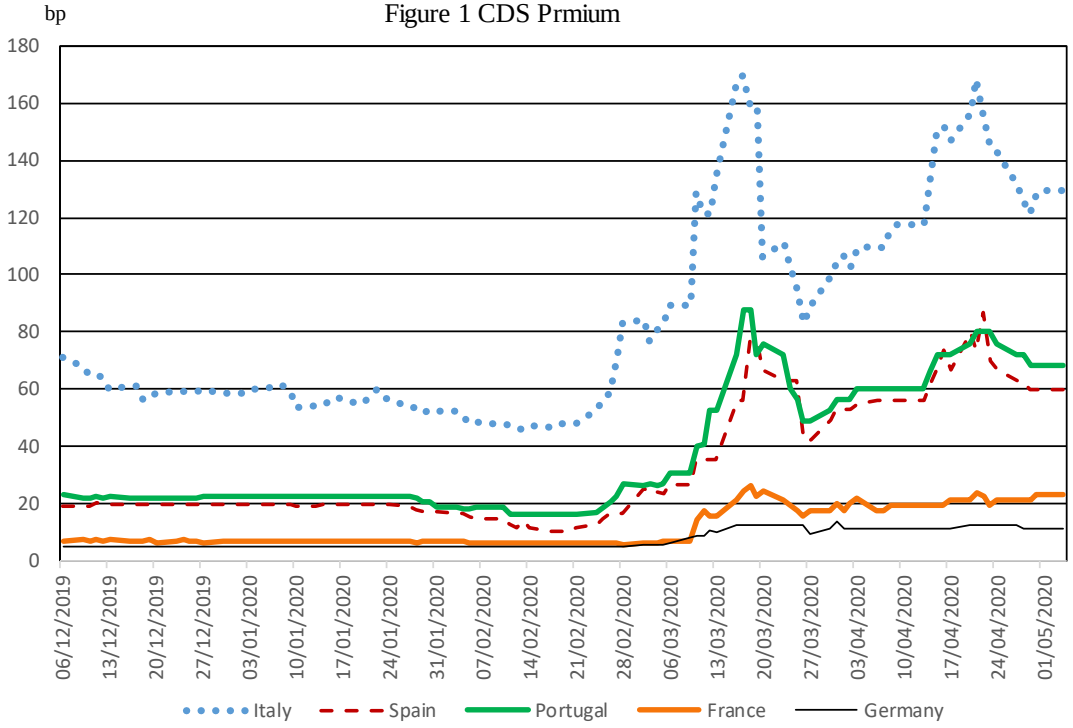
Figure 1 CDS Prmium



Notes: Data source is Datastream.
Sample A is from December 6, 2020 to February 21, 2020.
Sample B is from February 24, 2020 to May 5, 2020.

Table 1 Descriptive statistics

Variable	Average	SD	Min	Max	Median
Sample A					
Italy	55.37	6.09	45.98	70.89	55.90
Spain	17.43	3.21	10.44	19.98	19.34
Portugal	20.68	2.42	16.33	22.85	22.09
France	6.57	0.35	6.07	7.09	6.58
Germany	5.07	0.00	5.07	5.08	5.07
Sample B					
Italy	115.65	30.17	53.02	169.35	117.59
Spain	50.67	19.35	12.45	86.72	56.20
Portugal	56.36	19.75	16.54	87.92	60.28
France	17.04	6.16	5.59	26.14	19.22
Germany	10.16	2.69	5.07	13.78	10.99

Notes: Sample A is from December 6, 2020 to February 21, 2020.
Sample B is from February 24, 2020 to May 5, 2020.

Table 2 ADF test - original series

Variable	Without Trend	With Trend
Sample A		
Italy	-1.990	-2.831
Spain	-1.103	-2.719
Portugal	1.899	-2.045
France	-2.234	-2.735
Germany	-0.145	-3.794*
Sample B		
Italy	0.261	-3.354
Spain	0.162	-2.642
Portugal	0.215	-4.294*
France	0.491	-4.462*
Germany	0.674	-3.663*

Notes : * indicates significance at the 5 % level.
5% critical values are -2.86(Without Trend) and -3.41(With Trend）.
Sample A is from December 6, 2020 to February 21, 2020.
Sample B is from February 24, 2020 to May 5, 2020.

Table 3 KPSS test - original series

	Lag=0		Lag=12	
Variable	η_μ	η_τ	η_μ	η_τ
Sample A				
Italy	4.256*	0.171*	0.795*	0.065
Spain	3.826*	1.153*	0.732*	0.209*
Portugal	3.856*	1.109*	0.640*	0.196*
France	3.464*	0.152*	0.755*	0.090
Germany	0.733*	0.156*	0.259	0.059
Sample B				
Italy	9.320*	0.310*	0.410*	0.075
Spain	3.321*	0.519*	0.616*	0.128
Portugal	3.032*	0.505*	0.565*	0.113
France	2.995*	0.664*	0.557*	0.139
Germany	2.775*	0.857*	0.498*	0.168*

Notes: * indicates significance at the 5 % level.
5% critical values are 0.463(level stationary), 0.146 (trend stationary).
$\eta_\mu$indicates level stationarity. η_τ indicates trend stationarity.
Sample A is from December 6, 2020 to February 21, 2020.
Sample B is from February 24, 2020 to May 5, 2020.

Table 4 ADF test - first differenced series

Variable	Without Trend	With Trend
Sample A		
⊿Italy	-7.046*	-6.299*
⊿Spain	-1.426	-1.640
⊿Portugal	-6.397*	-5.978*
⊿France	-19.679*	-27.525*
⊿Germany	-2.717	-2.652
Sample B		
⊿Italy	-6.417*	-5.831*
⊿Spain	-8.018*	-7.377*
⊿Portugal	-5.184*	-4.821*
⊿France	-6.611*	-6.163*
⊿Germany	-6.148*	-6.533*

Notes : * indicates significance at the 5 % level.
5% critical values are -2.86(Without Trend) and -3.41(With Trend）.
Sample A is from December 6, 2020 to February 21, 2020.
Sample B is from February 24, 2020 to May 5, 2020.

Table 5 KPSS test - first differenced series

	Lag=3		Lag=12	
Variable	η_μ	η_τ	η_μ	η_τ
Sample A				
⊿Italy	0.148	0.065	0.189	0.092
⊿Spain	0.356	0.061	0.384	0.092
⊿Portugal	0.273	0.097	0.225	0.098
⊿France	0.085	0.009	0.061	0.069
⊿Germany	0.094	0.056	0.116	0.069
Sample B				
⊿Italy	0.149	0.071	0.123	0.064
⊿Spain	0.146	0.039	0.166	0.051
⊿Portugal	0.233	0.079	0.139	0.052
⊿France	0.105	0.057	0.110	0.063
⊿Germany	0.178	0.041	0.223	0.065

Notes: * indicates significance at the 5 % level.
5% critical values are 0.463(level stationary), 0.146 (trend stationary).
$\eta_\mu$indicates level stationarity. η_τ indicates trend stationarity.
Sample A is from December 6, 2020 to February 21, 2020.
Sample B is from February 24, 2020 to May 5, 2020.

Table 6 Johansen cointegration test

Null	Alternative	Test Statistics	5% Critical Value	Test Statistics	5% Critical Value
Sample A		Maximal Eigenvalue Test		Trace Test	
r = 0	r = 1	29.368	34.40	70.766	76.07
r ≦1	r = 2	17.965	28.14	41.099	53.12
r ≦2	r = 3	14.741	22.00	23.473	34.91
r ≦3	r = 4	6.554	15.67	8.693	19.96
r ≦4	r = 5	2.139	9.24	2.139	9.24
Sample B					
r = 0	r = 1	34.754*	34.40	92.084*	76.07
r ≦1	r = 2	29.395*	28.14	57.330*	53.12
r ≦2	r = 3	14.449	22.00	27.935	34.91
r ≦3	r = 4	8.974	15.67	1.349	19.96
r ≦4	r = 5	4.513	9.24	4.513	9.24

Notes: *,** indicates significance at 5 % and 10% level.
Critical values are cited from Osterwald-Lenum (1992).
Sample A is from December 6, 2020 to February 21, 2020.
Sample B is from February 24, 2020 to May 5, 2020.