THE FRAGILITY OF THE EUROZONE: HAS IT DISAPPEARED?

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Abstract:

We revisit the fragility of the Eurozone which arises because the sovereigns in the Eurozone issue debt in a currency (the euro) over which they have no control. This prevents them from giving a guarantee to bond holders that they will always be repaid at maturity. This fragility can trigger self-fulfilling liquidity crises, such as those that erupted during 2010-12. We document how this fragility has evolved over time and how it has been affected by the reforms in the governance of the Eurozone since the sovereign debt crisis of 2010-12. This will allow us to analyze the most recent episode that started with the emergence of the pandemic in 2020. The latter has, up to now, not lead to a new debt crisis in the Eurozone, despite the fact that the shock produced by the pandemic was at least as large as the financial crisis of 2007-08. We document how during the pandemic the new governance of the Eurozone prevented this shock from leading to a new sovereign debt crisis. We end with a discussion of the prospects for the future and ask the question of whether the fragility of the Eurozone is a thing of the past.

1. Introduction

The Eurozone is a fragile construction. Its fragility has to do with the fact that the governments of the member countries issue bonds in a currency over which they have no control. It is as if each of these governments issue debt in a foreign currency. As a result, they cannot give a 100% guarantee to the bondholders that they will have the necessary liquidity to pay them out at maturity. The risk that the governments can run out of cash creates the potential of self-fulfilling liquidity crises that may force the government to default (De Grauwe (2011), De Grauwe and Ji (2013)). This problem does not exist in standalone countries where governments issue debt in their own currency. Investors know that these governments will never run out of cash because they have a central bank that is ready to provide the cash to the government in times of crises. Self-fulfilling liquidity crises cannot arise in standalone countries.

The Eurozone has struggled to deal with this fragility when the sovereign debt crisis erupted in 2010. This crisis forced the Eurozone policymakers to redefine the role of the European Central Bank in times of crises, pushing that institution to provide some form of liquidity backing of the national governments. They were forced to do so to avoid an imminent collapse of the Eurozone.

In this paper we revisit the fragility problem of the Eurozone. We will document how this fragility has evolved over time and how it has been affected by the reforms in the governance of the Eurozone since the sovereign debt crisis of 2010-12. This will allow us to analyze the most recent episode that started with the emergence of the pandemic in 2020. The latter has, up to now, not lead to a new debt crisis in the Eurozone, despite the fact that the shock produced by the pandemic was at least as large as the financial crisis of 2007-08. We will document how during the pandemic the new governance of the Eurozone prevented this shock from leading to a new sovereign debt crisis. We will end with a discussion of the prospects for the future.

2. How fragile is the Eurozone? Some simple diagnostics

It is useful to start the analysis from Figure 1. This shows the yields on 10-year government bonds in member countries of the Eurozone during 1999-2021. We will distinguish three periods: the pre-financial crisis period, the crisis period, and the post-crisis period.

The *pre-financial crisis period* (1999-2007) was characterized by a situation where government bonds in the Eurozone countries were seen as (almost) perfect substitutes. As a result, the spreads (the difference between the bond rate of country x with the interest rate on German bonds) were very close to zero. Thus, investors considered the risk involved in holding, say, a Greek government bond to be the same as the risk in holding a German bond. A remarkable situation. This also implied that the movements in the yields of these different government bonds were almost perfectly correlated. We show this in Table 1. We find that in the period before the financial crisis the correlation coefficients were very close to 1.

And then the *financial crisis* erupted. From 2008 onwards this completely changed the risk perceptions in the government bond markets. In our JIMF article we analyzed the dynamics underlying these changes (De Grauwe and Ji(2013)). As the national government bond markets lacked a backstop, i.e. a central bank willing to provide liquidity in the government bond markets in times of crisis, self-fulfilling liquidity crises were set in motion. The governments of those countries hit most by the financial crises saw their budgetary and debt situation deteriorate quickly. As a result, panicky investors fearing that these governments would face difficulties in funding the rollover of their debt, sold the bonds massively, thereby creating the liquidity shortage that they were afraid of. The yields on the bonds of these governments shot up. At the same time, these same investors in search of safety moved liquidity to safe havens, such as the German and Dutch bond markets. This led to a decline in the yields of the bonds in these markets.

Put differently, the financial crisis led to a massive re-pricing of risks in government bond markets leading to sharp increases in the yields of some government bonds and declines of others. As a result, yields between the risky and safe bonds suddenly became negatively correlated as can be seen from table 2. That table shows how all the yields between core and periphery countries were negatively correlated (indicated in yellow) and the yields within the

core group of countries and within the periphery group were positively correlated (indicated in green).

Another way to put this is to introduce the notion of fragmentation. During the crises the government bond markets became fragmented creating a cluster of high-risk and high-yield countries and another cluster of low-risk and low yield countries. This fragmentation is a result of the fragility of the government bond market that lacks a lender of last resort.

The governments of the high-risk bond markets were pushed into a "bad equilibrium": the need to find liquidity forced them to raise taxes and to reduce spending. These forced austerity programmes in turn made the recession worse and intensified the debt problem. The governments of the low-risk countries had plenty of liquidity and were spared the need to install severe austerity (De Grauwe and Ji(2013)). We learned that in times of crisis, and in the absence of a lender of last resort, the government bond markets in a monetary union become highly unstable, pretty much like foreign exchange markets in fixed exchange rate regimes (De Grauwe and Ji(2014)).

It took the ECB until September 2012 to take on its responsibility. It did this by announcing that it was ready to provide unlimited liquidity support in the government bond markets. This so-called Outright Monetary Transactions (OMT) programme took out the fear factor from the government bond markets and started a process of normalization during which yields gradually converged again. This convergence was sometimes bumpy, as during the second Greek crisis in 2015. It ultimately led to an almost complete convergence of the yields at the end of 2019.

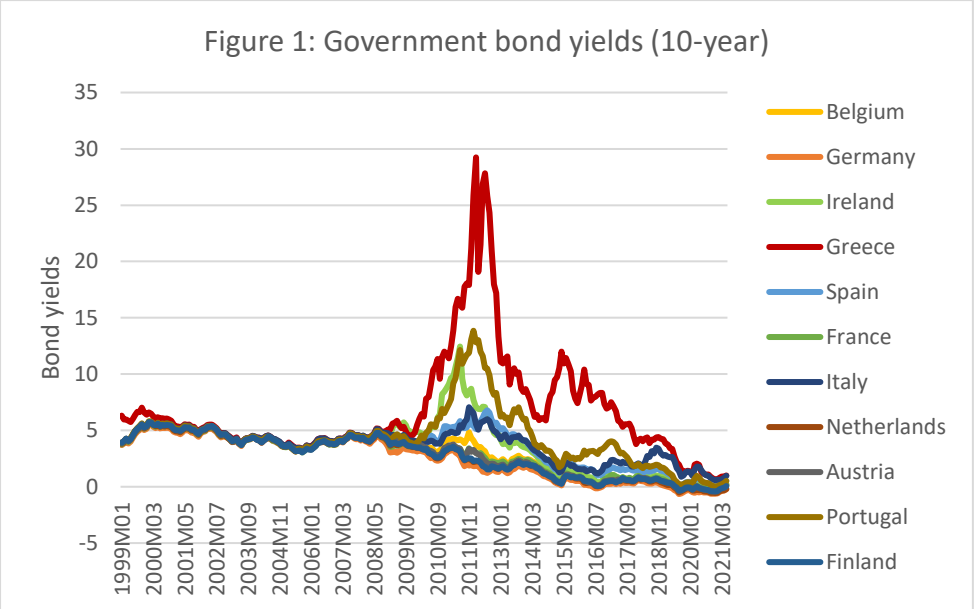
This post-crisis period of convergence also led to a situation in which yields got positively correlated again (see table 3). In fact, with the exception of Greece, the correlation coefficients tended to exceed 0.8, also between the periphery and the core countries.

Then came the pandemic in 2020. One could have expected that the huge shock that hit the Eurozone countries would trigger a new sovereign debt crisis, especially since the high-risk countries in the periphery also appeared to have suffered significantly larger negative effects on their GDP than low-risk countries, as can be seen from Figure 2. The sovereign debt crisis did not happen. In fact, apart from an early hiccup in the yields of Italy, these yields continued to converge further so that at the end of May 2021 the spreads were even smaller than before

the eruption of the pandemic. In table 4, we show that yields have remained positively correlated since the start of the pandemic. This paradoxical result raises the question of why the large pandemic shock did not destabilize the government bond markets.

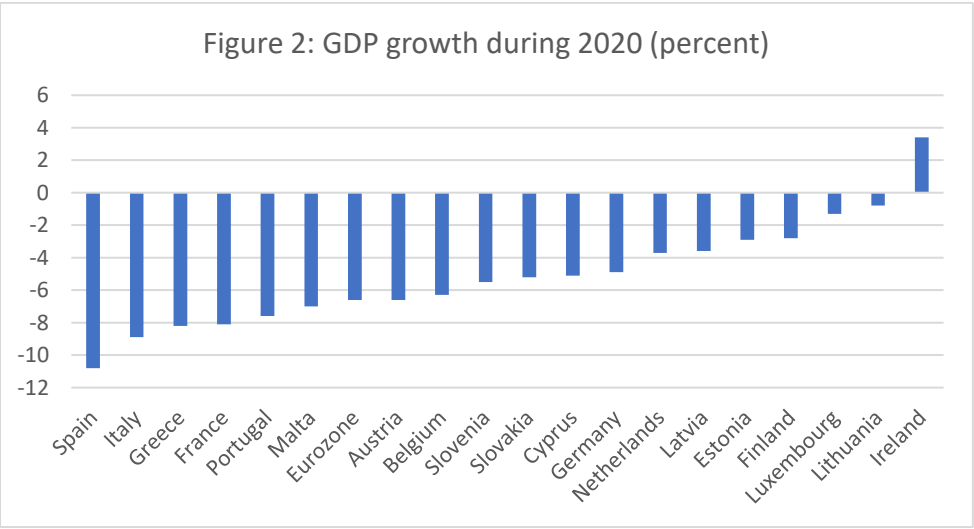
Before turning to this question, we will present a statistical analysis of how a "good cluster" and a "bad cluster" in the yields can emerge. This analysis will also allow us to study the sensitivity of the yields to fundamental variables in these two types of clusters. Put differently, we will analyze the dynamics of fragmentation in the government bond markets and how this fragmentation leads to different transmissions of fundamental variables into the yields.

Figure 1: Government bond yields (10-year)



Source: Eurostat

Figure 2: GDP growth during 2020 (percent)



Source: Eurostat

Table 1. Correlation of 10 year government bond yields before financial crisis (2000Q1-2007Q4), quarterly data.

	Greece	Italy	Portugal	Spain	Ireland	Germany	Austria	Belgium	Finland	France
Greece	1									
Italy	0.9855	1								
Portugal	0.9871	0.9983	1							
Spain	0.9864	0.9976	0.998	1						
Ireland	0.9849	0.9961	0.9964	0.9977	1					
Germany	0.9854	0.9956	0.9956	0.9965	0.9982	1				
Austria	0.9884	0.9974	0.9977	0.9992	0.998	0.9975	1			
Belgium	0.9883	0.9972	0.9972	0.9993	0.9978	0.9962	0.9995	1		
Finland	0.9883	0.9963	0.9961	0.9984	0.9985	0.9976	0.9978	0.9976	1	
France	0.9871	0.9973	0.9974	0.9986	0.9988	0.999	0.9989	0.9985	0.9984	1
Netherlands	0.9851	0.997	0.9975	0.9983	0.9987	0.9988	0.9985	0.9978	0.9987	0.9995

Table 2: Correlation of 10 year government bond yields during the financial crisis (2008Q1-2012Q3), quarterly data.

	Greece	Italy	Portugal	Spain	Ireland	Germany	Austria	Belgium	Finland	France
Greece	1									
Italy	0.7725	1								
Portugal	0.9398	0.8464	1							
Spain	0.8955	0.8322	0.8576	1						
Ireland	0.588	0.4804	0.7378	0.6258	1					
Germany	-0.8865	-0.5716	-0.7688	-0.6959	-0.4411	1				
Austria	-0.8269	-0.4177	-0.6756	-0.6727	-0.4168	0.9457	1			
Belgium	-0.4215	0.1055	-0.1373	-0.2287	0.0982	0.6723	0.7891	1		
Finland	-0.888	-0.5168	-0.7519	-0.7071	-0.4326	0.9811	0.9823	0.7285	1	
France	-0.7532	-0.3157	-0.5909	-0.5644	-0.3753	0.9427	0.9782	0.832	0.9597	1
Netherlands	-0.8841	-0.5256	-0.7594	-0.6897	-0.4367	0.9854	0.9741	0.7073	0.997	0.9577

Table 3: Correlation of 10 year government bond yields after financial crisis and before covid crisis (2012Q4-2019Q4), quarterly data.

	Greece	Italy	Portugal	Spain	Ireland	Germany	Austria	Belgium	Finland	France
Greece	1									
Italy	0.4483	1								
Portugal	0.7888	0.7959	1							
Spain	0.7319	0.8936	0.9435	1						
Ireland	0.688	0.9015	0.92	0.9897	1					
Germany	0.5934	0.8325	0.847	0.9195	0.9371	1				
Austria	0.5937	0.8648	0.8648	0.938	0.955	0.9956	1			
Belgium	0.5982	0.8925	0.879	0.9522	0.969	0.9868	0.9949	1		
Finland	0.5759	0.8523	0.8419	0.9226	0.9431	0.9957	0.997	0.9921	1	
France	0.6009	0.8715	0.8804	0.9415	0.9551	0.9922	0.9948	0.9946	0.9911	1
Netherlands	0.5858	0.8416	0.854	0.9226	0.9417	0.9971	0.9968	0.9902	0.9964	0.9917

Table 4. Correlation of 10 year government bond yields during the covid crisis (2020Q1-2021Q1), quarterly data

	Greece	Italy	Portugal	Spain	Ireland	Germany	Austria	Belgium	Finland	France
Greece	1									
Italy	0.9888	1								
Portugal	0.9775	0.9914	1							
Spain	0.9638	0.9699	0.9923	1						
Ireland	0.9032	0.8825	0.9238	0.9601	1					
Germany	0.594	0.5101	0.5445	0.6057	0.7878	1				
Austria	0.8727	0.8238	0.859	0.903	0.9803	0.8765	1			
Belgium	0.9333	0.896	0.9186	0.9462	0.9855	0.821	0.9894	1		
Finland	0.8926	0.8479	0.8722	0.9048	0.9728	0.8839	0.9917	0.9915	1	
France	0.9117	0.8774	0.9043	0.9342	0.9864	0.8489	0.9897	0.9959	0.9968	1
Netherlands	0.9036	0.8492	0.8532	0.8726	0.9305	0.8777	0.9658	0.9755	0.9869	0.9768

Source: calculations based on Eurostat data

3. Econometric analysis

In this section we develop a test of the Eurozone fragility hypothesis. As explained earlier, the Eurozone fragility arises when there is absence of a lender of last resort in the government bond markets. This then leads to fragmentation in the government bond markets during times of crisis. This fragmentation also implies that multiple equilibria can arise where some countries are pushed into a bad and others into a good equilibrium. Thus, testing for fragmentation is indirectly testing for the fragility hypothesis (De Grauwe and Ji(2013)).

Data.

To test this, we include the major Eurozone countries that joined the Eurozone in early 2000 (Austria, Belgium, Ireland, France, Finland, Italy, Netherlands, Greece, Portugal, Spain). We also select countries whose GDP per capita≥$ 20,000 and population ≥ 5 million. There are 14 "stand-alone" advanced countries[1] (Australia, Canada, Czech Republic, Denmark, Hungary, Japan, South Korea, Norway, Poland, Singapore, Sweden, Switzerland, the UK and the US) in

[1] Saudi Arabia, United Arab Emirates, Hong Kong, Israel and Taiwan are excluded. Slovakia is a special case as it joined the Eurozone in 2009 and should not be included in the stand-alone sample.

this group. In order to make the analysis comparable with our analysis of the Eurozone countries, we select the same risk-free government bond, i.e., the German government bond and compute the spreads of the 10-year government bond rates.

Spreads and fundamentals

How are spreads affected by fundamentals? Our empirical tests rely on the existing literature, see for example Aizenman and Hutchinson(2012), Beirne and Fratzscher(2012), De Grauwe and Ji (2013)[2]. The most common fundamental variables found in this literature are variables measuring the sustainability of government debt. We will use the debt to GDP ratio. In addition, we use the current account position, the real effective exchange rate and the rate of economic growth as fundamental variables affecting the spreads. The effects of these fundamental variables on the spreads can be described as follows (see De Grauwe and Ji(2013)).

- An increase in the *government debt to GDP ratio* increases the burden of the debt service and raises the probability of default, which in turn leads to an increase in the spread. We will also specify a non-linear relationship between the spread and the debt to GDP ratio. A non-linearity can come from two sources. One is based on the idea that, as the debt to GDP ratio increases, investors realize that they come closer to the default decision, making them more sensitive to a given increase in the debt to GDP ratio (Giavazzi and Pagano(1995)). The other one finds its origins in the fact that as the debt to GDP ratio increases beyond a certain point, the probability of a bailout increases significantly making it possible for investors to recuperate their investment. This should tend to lower the yield. We will let the data decide which effect prevails.

- We use the cumulative current account deficits or surpluses as our measure of the net foreign asset (debt) position of a country. Increases in the net foreign debt position of a country is the result of increases in public and/or private net foreign debt. In the former case it raises the government debt services and increases the default risk. In the latter case, the private sector is at risk of default. If private defaults occur economic activity is

[2] See others such as Attinasi, M., et al. (2009), Arghyrou and Kontonikas(2010), Gerlach, et al.(2010), Schuknecht, et al.(2010), Caceres, et al.(2010), Caporale, and Girardi (2011), Gibson, et al. (2011).

negatively affected. This then increases the government budget deficit and thus also raises the default risk of the government

- We use the *real effective exchange rate* as a measure of competitiveness. A country that experiences a real appreciation will run into problems of competitiveness. This in turn may lead to future current account deficits, and future debt problems. Investors may then demand an additional risk premium when buying government bonds .
- Through the automatic budget stabilizers, *Real economic growth* affects the budget outcome. A decline in economic growth increases budget deficits and debts. As a result, a decline in economic growth provides an incentive to default. This leads to an increase in the default risk and the spread.
- Change in exchange rate. It is important to stress that the spreads of "stand-alone" countries reflect not only default risk but also exchange rate risk. It is even likely that the latter dominates the default risk, as exchange rates exhibit large fluctuations thereby creating large risks resulting from these fluctuations. In the econometric analysis we will therefore introduce exchange rate changes as an additional explanatory variable of the spreads.

Finite Mixture Model

We use a Finite Mixture Model (FMM) to identify fragmentation in the data. In finite mixture modelling, the observed data are assumed to belong to unobserved 'classes' (in our case they are called 'good' or 'bad' clusters). Each class follows its own normal distribution with different means and standard deviations.

Good equilibrium cluster:

$$s_{it} = \alpha + a_1 CA_{it} + a_2 Debt_{it} + a_3 REE_{it} + a_4 Growth_{it} + a_5 (Debt_{it})^2 + u_{it}$$

Bad equilibrium cluster:

$$s_{it} = \beta + b_1 CA_{it} + b_2 Debt_{it} + b_3 REE_{it} + b_4 Growth_{it} + b_5 (Debt_{it})^2 + v_{it}$$

where s_{it} is the interest rate spread of country i in period t, $CA_{it}$is the accumulated current account to GDP ratio of country i in period t, and $Debt_{it}$is either the government debt to GDP

ratio or the fiscal space of country i in period t, REE_{it} is the real effective exchange rate, $Growth_{it}$ is GDP growth rate. α and β are the constant terms that are cluster-specific.

Despite the fact that the same fundamental variables determine the interest rate spread, we assume that the coefficients (A=a_1, a_2, a_3, a_4, a_5) of the good equilibrium cluster are different from those (B=b_1, b_2, b_3, b_4, b_5) of the bad equilibrium cluster. Additionally, the error terms of the two clusters u_{it} and v_{it} are assumed to follow normal distribution with differences in mean and variance.

We also assume that cluster membership (i.e. the probabilities observed data belong to one particular cluster) depends on some exogenous factors z apart from the fundamental variables discussed above.

For example, the probability of an observation belonging to the 'bad' equilibrium cluster can be written as

$$Prob(SB_{it} = 1) = \Phi(\delta z + \zeta_{it})$$

where Prob ( ) denotes probability, and Φ is the Cumulative Distribution Function (CDF) of the standard normal distribution. According to our fragility hypothesis, we also assume that class probabilities depend on exogenous factors z such as the exchange rate regime such as eurozone membership, eurozone periphery, time dummies such as debt crisis during 2010-2012, covid period starting in 2020Q1.

The parameters A, B and δ are estimated by the maximum likelihood method.

Results

Before we use the FMM to identify the fragmentation in the data, we did unit root tests and cointegration tests. The results are shown in Tables 5 and 6. The LLC, Breitung and IPS tests show that the debt sustainability variables and the accumulated current account to GDP ratio in the sample countries have unit root. However, the Kao residual panel cointegration test shows that the variables are cointegrated.

Table 5. Unit root test (H_0 hypothesis: Panel contains unit root)

Variable	LLC test: p-value	Breitung test: p-value	IPS test: p-value
Eurozone:			
Spread	0.0002	0.0024	0.0766
Debt to GDP ratio	0.9487	1.0000	1.0000
Accumulated current account to GDP ratio	0.0055	1.0000	0.8189
Real effective exchange rate	0.0001	0.0944	0.0608
Growth rate	0.0000	0.0000	0.0000
Change of exchange rate	0.0000	0.0000	--

Table 6. Kao test for cointegration (H_0 hypothesis: no cointegration)

Cointegration test	**Basic regression (all sample)**
Modified Dickey-Fuller t	Reject "no cointegration" (p-value=0.0000)
Augmented Dickey-Fuller t	Reject "no cointegration" (p-value=0.0000)
Unadjusted modified Dickey-Fuller t	Reject "no cointegration" (p-value=0.0000)
Dickey-Fuller t	Reject "no cointegration" (p-value=0.0004)
Unadjusted Dickey-Fuller t	Reject "no cointegration" (p-value=0.0067)

We fit the data using the finite model with two classes (assuming two distributions) and then a similar model with only one class (assuming one distribution). Both the Akaike information criterion (AIC) and the Bayesian information criterion (BIC) from the two models favour the two-class model. This finding supports the idea that there is more than one distribution in the data and hence it is likely that there might be fragmentation in the government bond market.

Table 7 provides detailed results on the fragmentation. Using the full sample of 24 countries, we find there are two classes. In the good equilibrium cluster, neither debt GDP ratio nor its non-linear form has a significant impact on the spreads. In the bad equilibrium cluster, debt GDP ratio has a positive impact on the spread, though its marginal impact declines when the debt GDP level increases. We also find that the accumulated current account, the real effective exchange rate, the growth rate of GDP and the changes in exchange rate all have a significant association with the spreads. There is a big contrast between the two classes: the absolute values of the coefficients of these variables are much larger in the bad equilibrium cluster than in the good equilibrium cluster, indicating that there is an amplification effect in the bad equilibrium. This feature also explains why the standard deviation of the spreads is

much smaller in the good cluster than the bad cluster (0.012 versus 3.823).

Turning to the Eurozone countries, our findings in the second column of table 7 are similar. The absolute values of the coefficients of the accumulated current account, the real exchange rate and the GDP growth rate are much larger in the bad cluster than in the good cluster. Concerning debt to GDP ratio, in the good cluster, debt is negatively associated with the spreads when the debt GDP ratio is below 45% and the association turns positive when the debt ratio is higher. In the bad cluster, the association between debt and spreads is positive when the debt ratio is below 114% and then turns negative as the debt GDP ratio further increases. This contradicts the Giavazzi and Pagano (1996) hypothesis. It is likely to be due to the fact that when the debt ratio becomes too high, the country involved obtains a bailout. The latter then leads to a decline in the spreads. Greece during the sovereign debt crisis comes to mind as an example of this effect.

Is the fragmentation we have found related to the Eurozone membership? In Table 8, we find some evidence to support this claim. The Eurozone membership reduces the probability of being in a bad equilibrium by 314%. However, we also find that being a periphery Eurozone member increases this probability by 166% and the period of 2010-2012 further increases the probability by 175%. This finding confirms that the Eurozone periphery countries were pushed in a bad equilibrium during the Eurozone debt crisis. This finding does not apply to other countries.

Do other exogenous shocks such as the Covid pandemics pull countries into a bad cluster? We do not find that the covid dummy has a significant impact. This finding is also confirmed when we run the same regression using the Eurozone sample. The covid pandemic does not seem to have led to clustering effects (fragmentation) in the government bond markets in either the advanced countries or in the Eurozone countries.

Table 7. Spreads and fundamentals in good and bad clusters

	Full sample	Eurozone sample
Good cluster		
Accumulated current account GDP ratio	-0.00119*** (0.00036)	-0.00071*** (0.00024)
Debt GDP ratio	-0.00061 (0.00139)	-0.00177*** (0.00066)
Debt GDP ratio squared	0.00001 (0.00000)	0.00002*** (0.00000)
Real effective exchange rate	-0.01053*** (0.00250)	-0.01051*** (0.00140)
Growth rate	-0.02582*** (0.00948)	-0.02937*** (0.00439)
Change in exchange rate	0.04430*** (0.01155)	----
Constant	1.34591*** (0.29497)	1.38337*** (0.14828)
Bad cluster		
Accumulated current account GDP ratio	-0.01554*** (0.00128)	-0.04141*** (0.00571)
Debt GDP ratio	0.00676* (0.00401)	0.06618*** (0.01776)
Debt GDP ratio squared	-0.00004** (0.00002)	-0.00029*** (0.00008)
Real effective exchange rate	-0.02790*** (0.00570)	0.06658* (0.04080)
Growth rate	-0.13721*** (0.04544)	-0.17559*** (0.05090)
Change in exchange rate	-0.03895** (0.01878)	----
Constant	4.44673*** (0.64083)	-8.98435* (4.91168)
Observations	2040	850

Cluster at country level and robust standard error is shown in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01

Table 8. Determinants of being in bad cluster in the FMM models

	Total sample	Eurozone sample
Eurozone	-3.14223***	----
	(0.24280)	
Periphery Eurozone	1.65788***	1.76352***
	(0.18297)	(0.18991)
Debt crisis	1.74505***	2.12975***
	(0.42988)	(0.25587)
Covid pandemic	-0.37190	-0.54906
	(0.53846)	(0.61564)
Constant	1.60821***	-1.68675
	(0.18716)	(0.13981)
Observations	2040	850

Cluster at country level and robust standard error is shown in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01

4. Why absence of fragmentation during the pandemic?

We observed in the previous sections that although the pandemic was a huge shock and affected member states very differently, it did not trigger a sovereign debt crisis. This contrasts very much with what happened after the financial crisis of 2008. Put differently, while after the financial crisis the fragility of the Eurozone led to a fragmentation of government bond yields into a good and a bad cluster, this fragmentation did not occur during the pandemic years of 2020-21.

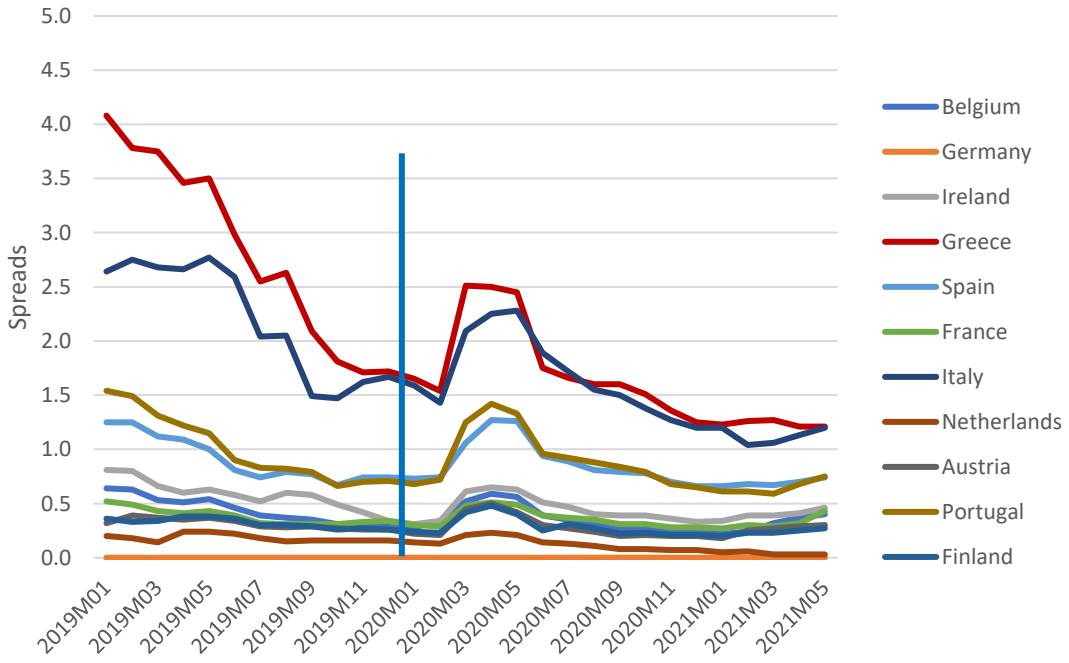
As noted earlier, there was a short-lived hiccup of the bond yield spreads during March-May 2020, but this seems to have been caused by remarks Christine Lagarde, president of the ECB, made on 12 March 2020 to the effect that the ECB was "not here to close spreads". This may have led to a perception that the ECB was not committed to provide liquidity in the government bond markets in times of crisis. When, shortly afterwards, the ECB announced its Pandemic Emergency Purchase Programme (PEPP) the spreads quickly declined again so that at end of 2020 they were lower than at the end of 2019. We maintain our conclusion that the pandemic did not lead to a renewed fragmentation in the government bond markets of the Eurozone[3].

[3] This contrasts with the conclusion of Candelona, et al. (2021) who argued that Covid-19 may have increased fragmentation risk in the Eurozone again. This conclusion may have been influenced by the short hiccup in the spreads during March-May 2021.

What are the reasons for this surprising result? We will focus on the new governance of the Eurozone that emerged after the sovereign debt crisis and that allowed the European policymakers to use new instruments of stabilization that made it possible to avoid self-fulfilling crises in the government bond markets. These new instruments are monetary and fiscal.

As argued earlier, the decision of the ECB to launch the OMT programme in 2012 is the single most important monetary instrument that stabilized the government bond markets in the Eurozone at that time. By promising unlimited purchases of government bonds during liquidity crisis, the ECB took out the fear factor from the market. Suddenly, Greek, Spanish, Italian bonds whose prices had collapsed as a result of fear of liquidity shortages, appeared to be cheap for private investors. They massively returned to theses bond markets, bought the bonds and raised their prices. The spreads collapsed quickly (see Figure 3). The nice part of this result is that the ECB did not have to buy one euro of government bonds in the context of its OMT-programme. Private investors, having rediscovered confidence, bought these bonds.

Figure 3: Government bond spreads (2019-21)



There were problems with the OMT-programme, though. One was the fact that the ECB committed itself to buying government bonds of a particular country only after that country agreed to an austerity programme. The European Stability Mechanism(ESM), an inter-governmental institution that saw the light after the sovereign debt crisis, was given the task to design these austerity programmes.

The conditionality of the OMT-programme creates a paradox. The ECB has made it clear it only wants to intervene to stem a liquidity crisis. If it is a liquidity crisis, providing the liquidity is all that should happen. The imposition of austerity prior to the provision of liquidity implies that the ECB believes the crisis originates from a solvency problem. But in that case the ECB should not intervene at all, and other approaches are required, such as debt restructuring. All this creates ambiguity about the aims of the OMT-programme: is it to solve a liquidity crisis? In that case austerity is not needed. Is it to solve a solvency crisis? In that case, liquidity support is not sufficient and debt restructuring is required.

The ambiguity of the aims of the OMT-programme undermines its credibility and leads to questions about its future use. The ECB must have understood this when, in response to the Covid-19 crisis, it created a massive bond buying programme, the PEPP, in 2020 that we discussed earlier. In contrast to the OMT-programme, the PEPP has no conditionality attached to it. The ECB must have realized that the Covid-shock produced a downward spiral in economic activity and massive liquidity problems both of private firms and governments. Attaching conditions of austerity in the activation of liquidity support in government bond markets would have been counterproductive as it would have exacerbated the recession.

The PEPP-programme, stripped as it was from any conditionality, was certainly instrumental in preventing a surge in the bond yields and a new sovereign debt crisis. It made it clear that there was a central bank ready to support the sovereigns unconditionally. Quite a step in economic thinking and policymaking in the Eurozone.

A second major policy innovation was a fiscal one. After much controversy, the European leaders decided in July 2020 to set up a recovery plan amounting to €807 billion. The NextGeneration EU (NGEU) plan as it was called was funded by the issue of common bonds. Half of the proceeds of this bond issues were to be used to transfer to those countries most hit by the pandemic.

It can now be said that this was a first step towards a budgetary union in which a central authority obtains the power to issue debt that is guaranteed jointly by all member countries. It was the first issue of Eurobonds. Not so long ago the issue of Eurobonds was considered to be politically impossible. The pressure of a common crisis, however, overcame the objections.

This common spending programme financed by the issue of Eurobonds helped to create further confidence in the future of the Eurozone. This was the second reason why the Covid-shock did not lead to a sovereign debt crisis.

5. Conclusion: Prospects for the future

Since the sovereign debt crisis of 2010-12 a new governance of the Eurozone has been developed. Key in this new governance has been the willingness of the ECB to be a lender of last resort in the government bond markets. This has made it possible for the Eurozone to overcome its fragility and to withstand the major economic disruptions brought about by the pandemic.

This leads to the question of whether the Eurozone now has matured and has permanently eliminated its fragile nature. The answer is not obvious for the following reason. There is a fundamental contrast between the Eurozone and standalone countries, i.e. countries with their own central bank. In a standalone country the central bank faces one sovereign who always prevails in times of crisis. There can be no doubt that in a standalone country the central bank will have to provide liquidity when the government faces a liquidity crisis. In the eurozone things are very different. The ECB faces 19 sovereigns none of which has authority over the ECB. None of these governments can force the ECB to provide liquidity in times of crisis. The decision to provide liquidity support is at the discretion of the central bank. This creates uncertainty about future liquidity support in a monetary union; an uncertainty that is absent in standalone countries.

Will the ECB always be ready to support sovereigns? One can have reasonable doubts about this. Who will be at the helm of the bank in the future? Will the Governing Council that consists of national central bankers always be receptive to the demand of one member country's government for support? One cannot be sure about this, in contrast with the

certainty we have that when the British government were to experience a liquidity shortage the Bank of England will always step in.

There is thus a fundamental credibility issue about the willingness of the ECB to be a lender of last resort in the government bond markets. This will continue to make the Eurozone a fragile construction.

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