

Louvain School of Management

Political Risk and the Eurozone Sovereign Bond Market

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Abstract

Drivers of spreads on the Sovereign Bond Market have been a particular concern of economic agents as well as for modelling purposes, spreads being most often used as fiscal discipline devices. However, the recent rise in non-default components have posed an important challenge to traditional theories relying heavily on credit and liquidity risk to justify yield differentials across the Eurozone. Despite an important diminution of Euro-area breakup fear following the intervention of Mario Draghi in 2012, new threats developed on the market following the distress caused by the recovery period experience by the Eurozone countries following the crisis. Political risk, as measured by the Economic Policy Uncertainty index, has greatly gained in attention over the past years given the tensions within national governments but also with Brussels. Given the potential impact a shift in factors influencing spreads on the Eurozone bond market could have on monetary policy transmission, our aim was to assess whether the EPU index can be considered as a significant pricing factor when included in models emphasising yields spreads for Eurozone's main economies. We found that political risk as measured by the index only showed significance when considered in its national form rather than European average especially for France and Italy, providing the insight that such risk perhaps matters locally in those countries, rather than being more broadly significant to the wider Eurozone.

Interestingly, we found an important behaviour of co-movement between redenomination risk and political risk, following the lines of the suggested correlation between these two components underlined by De Santis. Nevertheless, this correlation hypothesis was rejected through our analysis, suggesting that while both variables may be intertwined, they are not complementary, suggesting that the EPU index focuses on the attention markets give to political matter while the Quanto CDS focuses rather on a solely financial perspective.

Introduction

I. The integration of financial markets and its implication

Integration of financial markets has been a particular concern of economic agents throughout time. Indeed, *“both economic theory and empirical findings suggest that the integration and development of financial markets are likely to contribute to economic growth by removing frictions and barriers to exchange”* (Baele, Ferrando et al, 2004). Favero and Missale even underline the potential of highly integrated financial markets in boosting *“the role of the euro as a reserve currency”* (Favero, Missale, 2016).

As explained by Berendberg-Gossler and Ederlein, despite the fact that some heterogeneity of countries' financial features can be desirable to a certain extent, a fragmented financial market has strong implications on many different aspects, including the efficiency of monetary policy transmission, balance of credit flows and equality between countries (Berenberg-Gossler, Ederlein, 2016). This is especially important in the context of the European Monetary Union, established in 1999, through which a common monetary policy was applied by the European Central Bank to all eurozone members.

II. The Eurozone sovereign bond market

Integration has greatly varied throughout time but also across markets. The Eurozone sovereign bond market has been one of the markets which almost immediately showed signs of higher integration after the implementation of the single currency (Japelli, Pagano, 2008). An extensive portion of the literature studies the extent to which fragmentation on this specific market is over, and more specifically what dimensions have affected such fluctuation of fragmentation over time. Indeed, drivers of sovereign yield differentials have varied both in nature and intensity, spanning from traditional components to newer variables only considered since after the financial crisis, such as redenomination risk. Moreover, a more recent focus has been attributed to political risk as a result of the several crises that evolved in the Eurozone throughout the years. Altogether, this had a direct implication on models and their ability to accurately forecast sovereign bond spreads in the Eurozone.

III. Structure of our research

Our research will be divided in the following manner: firstly, a literature review will be carried out. This will allow grasp an understanding of the patterns of agreements and their evolution in the literature on the sovereign bond market during the period analysed.

Given the specific tendencies characterising the Eurozone sovereign bond market, the literature review will be chronologically separated into three specific episodes, as illustrated by Graph [1]. The first episode considered will start with the implementation of the single currency in 1999, and end at the eve of the 2008 financial crisis. The second episode will concern the period spanning from the 2008 financial crisis up until mid-July 2012 and Mario Draghi's "*whatever it takes*" speech. The third episode will treat the period going from August 2012 up until March 2019. Such division will provide more clarity to the analysis of the literature on the subject given the shifts which materialised throughout this period.

The analysis of the literature will be paralleled by various graphs and exploratory data analysis in order to assess the coherence between the prevailing economic theories present in the literature and the actual patterns forming on the markets. To enhance the clarity of this research, all graphs will be referenced and found in the Graphs Appendices.

Thanks to the establishment of such theoretical framework, we will transition into our quantitative analysis in which we will assess the significance of the Economic Policy Uncertainty Index after 2012 through the introduction of the latter into models with selected specifications.

Such investigation finds its interest in the strong policy transmission implications a shift in spread drivers on the Eurozone sovereign bond market could cause. Indeed, as pointed out by Favero, if traditional models do not have the desired predictive power to determine the drivers of spreads on the sovereign bond market, the power of spreads as a fiscal discipline device is greatly weakened (Favero, 2013).

Part I: Literature Review

Although the efficient market theory stipulates that a surge in sovereign spreads can be mainly explained by a worsening of countries' fundamentals, the literature shows that events that took place on the market over the past decade have not been consistent with this theory (Dewachter, Iana et al, 2015) (Favero, 2013). Nevertheless, until the financial crisis, a common agreement exists over the determinants of spreads on the market, which shifted with the establishment of the Economic Monetary Union.

Determinants of spreads prior to the implementation of the Economic Monetary Union

As agreed by the vast majority of studies of the sovereign bond market, spreads, up until the introduction of the euro currency in 1999, could be explained by three main sources of risks, namely: **default risk, exchange rate risk, and liquidity risk**. As classified by Favero and Missale, credit risk accounts for the default component of spreads, while exchange rate risk and liquidity risk belong to what they refer to the non-default component of yield spreads (Favero, Missale, 2016). Dewachter also classified default risk under the “fundamentals” category, given the reliance of credit risk on a country's macroeconomic situation, especially its fiscal position and repayment abilities (Dewachter, Iania et al, 2014).

Attention will be through more specifically in this research to the Eurozone 10-year maturity sovereign bond market. Being amongst the most traded maturity of sovereign bonds, such maturity should allow a more accurate reflection of fundamentals while capturing a more forward-looking perspective and a long-term vision of the risk.

Moreover, the German sovereign yield, also known as the Bund, is considered as the closest sovereign yield that would prevail in a perfectly integrated bond market, gaining the status of “safe haven” investment after the default of Lehman Brothers in 2008 (Schucknecht, von Hagen et al, 2011). For these reasons is the German yield commonly used as a benchmark on the sovereign

market in order to assess the level of integration achieved (Baele, Ferrando et al, 2004). Such benchmark will be employed in our analysis¹.

I. Default risk

Default risk, or credit risk, prices a government's likelihood of going into default (Favero, Missale, 2016). As mentioned above, default risk is heavily reliant on a country's fiscal position (De Grauwe, Ji, Macchiarelli, 2017), and a nation will have to reward investors with a premium as a counterparty for incurring the risk that the latter might face default. This is especially visible in times of distress on financial markets (Monfort, Renne, 2014).

In the circumstances of the single euro currency, Credit Default Swap (CDS) spreads relative to the Bund have been commonly used to assess countries' respective credit risk on the Eurozone sovereign bond market. CDS contracts are swap contracts through which the buyer will pay a series of premium to the seller of the contract. The seller of the contract will, in exchange, provide a payoff to the buyer if the bond for which the agent bought the CDS contract happens to go into default (Favero, 2013). It is, as a result, a protection against the eventual default of a sovereign bond (Favero, Missale, 2016), also referred as a "*credit event*" (Minnena, 2017).

By taking the difference between the CDS spread of a eurozone member bond and the CDS spread of the German bond of the same maturity², we are able to measure the premium investors demand to protect themselves against the default of a member's bond, in comparison to the bond considered to be the safest on the Eurozone market. Such surges in premium demanded are particularly present at the onset and during both the financial and sovereign debt crisis, as observed on Graph [2]. This reflects the deterioration of fiscal positions countries across the EMU experienced. As we will analyse further on, a distinction between high and low debt countries also developed.

¹ Such choice of benchmark was also made in accordance with the work of Favero, Missale (2016) as well as Bernoth et al (2004) who used the German Bund yield as the reference risk-free rate for their Eurozone analysis. We do however acknowledge the fact that such choice will lead to the exclusion of the German sovereign yield spread from our model.

² 10-year maturity government bonds in the context of our analysis

But although default components, dominated by credit risk, have proven to explain the majority of spreads on the sovereign bond market throughout time, non-default components also account for a non-negligible portion of spreads, while they have had a rather fluctuating presence (Favero, Missale, 2010, 2012).

II. Liquidity risk

Following a higher perceived risk of default, liquidity risk might arise from what Monfort and Renne describe as *“the potential difficulty that one may have in selling the asset before its redemption, which is typically the case in distressed market conditions, where it is difficult to find a counterpart for trade relatively quickly”* (Monfort, Renne, 2013).

Liquidity risk is defined by Favero and Missale as the risk of having to sell or buy a bond on a thin market (Favero, Missale, 2012), defined as an inactive or illiquid market, following a liquidity shock and at a fractional cost³ (Monfort, Renne, 2013). As a result, it prices the possibility that a bond becomes illiquid when investors wish to exit their position (Beber, Brandt et al, 2006). This is related to Favero and Missale who noted that the lack of participants on illiquid markets will lead to unfair pricing, where higher transaction costs will be incurred (Favero, Missale, 2016). As a result, illiquidity will be priced by the market as it will not only create additional trading costs, but it also has the potential of creating additional risk given that it *“changes unpredictably over time”* as emphasised by Favero and Pagano (Favero, Pagano et al, 2010).

The KfW⁴-Bund spread has been widely used to appropriately measure flight-to-liquidity within the EMU. Indeed, the KfW-Bund spread will reflect what Beber refers to international investors’

³ Monfort and Renne noted that such fractional cost will depend on the ease with which the bond can be traded. Source: (Monfort, Renne, 2013)

⁴ KfW bonds are bonds of varying maturities that are issued by the *Kreditanstalt für Wiederaufbau*, a German bank owned by the Federal Republic of Germany and the German federal states. These bonds are guaranteed under the law by the Federal Republic of Germany (*“The Federal Republic guarantees all obligations of KfW in respect of loans extended to and debt securities issued by KfW, fixed forward transactions or options entered into by KfW, and other credits extended to KfW as well as credits extended to third parties inasmuch as they are expressly guaranteed by KfW”*). As a result, their safety is equal as the one from German Bunds, being issued by the Federal Republic of Germany itself and used as benchmark. KfW bonds have been assigned the highest credit rating AAA by major rating agencies S&P, Moody’s and Scope Ratings. Both bonds are as a result perceived to have the same credit risk. Source: Bank aus Verantwortung (n.d.).

tendency to prefer assets with the lowest liquidity risk in times of higher uncertainty (Beber, Brandt et al, 2006). The choice of emphasis on flight-to-liquidity in this research is justified by our desire to capture the dynamics prevailing in the circumstances of liquidity shocks before bonds necessarily reach maturity.

De Santis and Stein emphasised that the difference between the Agency's and the Government's bond yields effectively reflect such preferences from investors (De Santis, Stein, 2014). Indeed, while Bunds are considered to be the most liquid bonds within the Eurozone, KfW bonds are less liquid in the sense that the outstanding volume and issuances of those bonds are smaller, in addition to the average size of a KfW bond being about four times smaller than the one of a Bund. As a result, the yield spread between the KfW bond and the Bund is agreed to reflect the excess yield-to-maturity demanded by investors to hold a KfW bond, instead of the more liquid Bund (Monfort, Renne, 2013). This is also justified by the fact that both bonds are perceived to have the same credit risk, meaning that the yield differential fully captures a liquidity premium.

This specific spread is also considered as an appropriate Euro-area variable to assess flight-to-liquidity, as pointed out by the analysis carried out by Monfort and Renne. Indeed they found, when comparing sovereign spreads of other countries of the Eurozone with their corresponding government-guaranteed bonds, a high correlation between the latter and the KfW-Bund spread. As a result, they concluded that the KfW-Bund spread was a fitting representative of flight-to-liquidity for the Eurozone as a whole, where *"countries' illiquidity intensities are driven by a single European liquidity-related factor"* (Monfort, Renne, 2014). This led to the perception of the KfW-Bund spread to be a euro area common risk factor, capturing *"the portfolio shifts due to a higher appetite for the German Bund, thereby affecting all euro area sovereign yields"* (De Stantis, Stein, 2014).

As highlighted by Graph [3], flight-to-liquidity episodes have greatly varied over time with distinctive peaks during both the financial and sovereign debt crisis, where Monfort and Renne analysed its particular significance in explaining spreads (Monfort, Renne, 2013). This is consistent with a literature-wide agreement according to which liquidity factors will particularly prevail in times of shocks and high uncertainty (De Grauwe, Ji, Macchiarelli, 2017). For instance, De Santis and Stein characterised the peak the KfW-Bund spread reached in August 2007 as the

materialisation of the shift to what they called a “*crisis regime*”, especially for countries such as Spain and Italy (De Santis, Stein, 2014).

III. Exchange rate risk

A third component that characterised spreads prior to the implementation of the single currency is **exchange rate risk**, representing the risk of exchange rate fluctuations. As pointed by Favero, exchange rate risk accounted for one of the main risk pricing yields on the sovereign bond market next to credit risk before the implementation of the EMU, given the less systematic presence of liquidity risk (Favero, 2013). In fact, investors will demand compensation to face the risk that the bonds they hold in a certain currency loses value against a neighbour currency, such fluctuations therefore representing a risk. As we will be able to assess, the presence of this particular nature of risk has not been consistent throughout time, as it temporarily vanished with the introduction of the Euro.

IV. Risk aversion and global uncertainty

As we will assess further on, countries’ yield differentials are also subject to the influence of aggregate risk components such as global uncertainty and risk aversion. In fact, De Grauwe and Ji assessed the ability of such components in driving spreads away from countries’ fundamentals as a result of fear or even panic. Contagion risk also gained in significance later (De Santis, 2012) in the context of a monetary union as noted by Dewachter et al (Dewachter et al, 2015).

First episode: The introduction of the Economic Monetary Union (EMU) and until the 2008 Lehman Brothers default in 2008

An important argument used in favour of the implementation of the Economic and Monetary Union was that “*higher degrees of financial integration enhance potential output and risk sharing among its participants member states*” (De Santis, Gérard, 2006). Implementing a single currency was seen as reflecting “*a desire to defend and strengthen the degree of economic integration achieved thus far and can be interpreted as an insurance against symmetric shocks that may emerge in the future*”, therefore deepening the European Single Market⁵ (Issing, 2001).

I. Convergence of yields on the Eurozone Sovereign bond market

With the introduction of the Monetary Union and the single currency area on January 1st, 1999, an important convergence of sovereign yields spreads in the Eurozone and integration on financial markets overall took place. Favero noted that Eurozone spreads accounted for about 30 basis points by the year 2000, compared to the 300 basis points achieved prior to the implementation of the EMU (Favero, 2013). This was partly the result of exchange rate risk not being a concern within the eurozone any longer. In fact, the 1992 crisis, where important swings in nominal and real exchange rates across countries of the future Eurozone area were experienced, truly affected trade, as well as the potential of the Single Market project. This led to the Maastricht Treaty of 1992, solidifying a conviction that “*nominal exchange rates must be irrevocably fixed to achieve and maintain a truly unified single European Market*” (Issing, 2001).

As a result, Japelli and Pagano claimed that such shift greatly contributed to the elimination of an important obstacle to the integration of the Eurozone sovereign bond market (Japelli, Pagano, 2008). The introduction of the EMU also more broadly triggered a euro bias, where “*a shift in the composition of financial portfolios in favour of other euro area countries’ assets*” materialised (Lane, 2006). Such bias tremendously increased holdings across the Eurozone (Hobza, Zeugner,

⁵ The European Single Market : “*The single market refers to the EU as one territory without any internal borders or other regulatory obstacles to the free movement of goods and services. A functioning single market stimulates competition and trade, improves efficiency, raises quality, and helps cut prices. The European single market is one of the EU’s greatest achievements. It has fuelled economic growth and made the everyday life of European businesses and consumers easier*”. Source: The European Commission, n.d.

2014) as Lane and Miles-Ferretti found that “*there was substantially more cross-border asset trade between members of the euro-area than among other parings*” after the introduction of the EMU (Lane 2006).

This step towards integration led sovereign yields to progressively adopt a synchronous co-movement at a low level overall until 2008 (Favero, 2013), as emphasised by Graph [4]. Favero pointed that such co-movement of yields, despite the heterogeneous liquidity levels across Eurozone countries, confirmed the dominance of credit risk in explaining spreads during this period, or at least a strong co-movement between credit and liquidity risk to explain spreads (Favero, 2013). Indeed, Dewachter et al showed that government bonds were still never really seen as perfect substitutes by the market, due to the different levels of credit and liquidity risk characterising respective Eurozone countries (Dewachter, Iania et al, 2014). As a result, interest rates differentials remained, despite being significantly lower than prior to 1999.

These persisting differences can also be linked to Beirne and Fratzcher’s work in which they assessed that members of a Monetary Union are inevitably more sensitive to the health of the financial system than non-EMU members are, due to their high inter-connectedness as well as lower monetary policy independence (Monfort, Renne, 2013). Indeed, it is agreed that union members will become increasingly nervous as the fiscal position of their peers worsens and liquidity concerns surface, given their proximity to the latter. The fragility of the monetary union can also be explained by the possibility of contagion episodes, which will be analysed further on (De Grauwe, Ji, 2012).

Moreover, Japelli and Pagano also found that “*yield spread risk could not be fully hedged by holding a diversified portfolio of euro-area bonds, so that their risk is to be taken into account and priced by investors*”, justifying yield differentials despite their strong co-movement (Japelli, Pagano, 2008).

II. *The implementation of a common monetary policy in a heterogeneous environment*

The EMU was in fact implemented in the context of important heterogeneity between countries of the Eurozone. A single monetary policy was applied despite the important divergences in terms of macroeconomic but also microeconomic aspects countries faced, including levels of output per capita, demography and specialisation (Lane, 2006).

However, the Maastricht Treaty of 1992 imposed important measures to future Eurozone countries to set the foundations of the single currency, known as “*convergence criteria*” or “*Maastricht criteria*”⁶. Although some differentials in terms of public finances remained between countries after the application of these measures, the criteria imposed were achieved by a majority of nations by 1997, with the exception of Greece who joined the EMU in 2001.

By imposing these requirements, an overall decrease in inflation rates was observed across all countries of the future EMU. Nevertheless, some differentials remained with for example Frieden and Walter who showed that the average inflation in Spain between 1997 and 2007 was of 3.2%, or twice the average German inflation of 1.5% during the same period (Cesaroni, De Santis, 2013).

Moreover, a dualism progressively developed between core countries and periphery countries⁷. Indeed, given the higher levels of inflation periphery countries experienced at the eve of the EMU, the latter saw a greater decline in interest rates as they entered the Union, which pushed borrowing and credit growth significantly. This resulted in the formation of important growth but also developing deficits in periphery countries, financed mainly by core countries as analysed by Hobza and Zeugner, what they referred to a “*downhill capital flow*” (Hobza, Zeugner, 2014). Graph [5] and Graph [6] reflect such developing dualism.

These divergences in terms of current accounts are important to address in the context of the European Sovereign bond market, given that as analysed by De Grauwe, Ji and Macchiarelli, the

⁶ The Maastricht criteria required not only required “*an inflation rate that could not be higher than 1.5 percentage points above the three best performing member states and a nominal long-term interest rate of more than 2 percentage points above the three best-performing member states*”, but also sound public finances with “*annual budget deficits could not be more than 3 % of the country’s GDP and accumulated debt could not be greater than 60% of GDP*”. Source : Lane (2006), De Santis (2015)

⁷ Core countries, or low yielders, include among others Germany, France, Belgium, Luxembourg and the Netherlands while the periphery countries, or high yielders, include among others Spain, Greece, Portugal, Italy and Ireland. Source: Favero, Missale (2016)

latter have a comparable impact as debt-to-GDP ratios have on spreads through the credit risk channel, influencing the pricing of sovereign risk. They did in fact point out that deficits grown through increased net foreign private debt will impact the probability of default of the private sector, and in turn affect governments and their respective budgets, revenues, as well as their own probability of default (De Grauwe, Ji, Machiarelli, 2017). This had severe implication later on in the lead up to the financial and sovereign debt crisis.

III. Fiscal perspective of the EMU

Despite the implementation of a common monetary policy for all EMU members, the Economic and Monetary Union member countries are still accountable for their own national fiscal policies. These are used as a tool to minimise the impact of a country-specific shock, national monetary policies and exchange rate policies being unavailable to member countries. The need for healthy fiscal positions within the EMU is also justified by the objective of the European Central Bank, whose role is to anchor the medium-term inflation expectations across the Eurozone at 2%, indeed achieved partly through fiscal soundness of each member (Lane 2006).

As previously mentioned, the 1992 Maastricht treaty had imposed fiscal conditions to countries in order to integrate the EMU. This brought all members to carry out efforts in order to stabilise their fiscal fundamentals, also justifying the decrease of spreads observed on the sovereign bond market in the first half of the 2000s. In the continuity of the Maastricht Treaty, the Growth and Stability Pact⁸ was introduced in 1998. Such pact allowed the accumulation of larger deficits in comparison to the Maastricht Treaty in case of economic hardship. The latter still required from member countries to implement corrective policies should their deficits become “excessive” (Lane, 2006). Nevertheless, the Stability and Growth Pact was not respected, as analysis have shown that a majority of members of the eurozone had reached above-ceiling debt levels even before the outbreak of the financial crisis.

⁸ *The Growth and Stability Pact defines the procedures for multilateral budgetary surveillance (preventive arm) as well as the conditions under which to apply the excessive deficit procedure (corrective arm). The Pact is an essential part of the macroeconomic framework of the Economic and Monetary Union. By requesting Member States to coordinate their budgetary policies and to avoid excessive deficits, it contributes to achieving macroeconomic stability in the EU and plays a key role in securing low inflation and low interest rates, which are essential contributions for delivering sustainable economic growth and job creation.* Source : The European Central Bank, n.d.

Second episode: The outbreak of the 2008 financial crisis until Draghi's “Whatever it takes” announcement

In these circumstances, members such as Greece carried on their excessive borrowings at rates equivalent to the ones of Germany, when their credit worthiness was in reality much lower. Accordingly, despite the high debt-to-GDP ratios forming, governments did not emphasise a need for fiscal policy shift, and fiscal disparities remained across the Eurozone (De Grauwe, Ji, 2012).

I. The outbreak of the 2008 financial crisis

a. “Fundamentals contagion” and panic

The surge in previously neglected debt-to-GDP ratios became a true concern in pricing sovereign risk at the outbreak of the financial crisis, sometimes referred as a “*wake up call contagion*” or “*fundamentals contagion*” by the literature (De Santis, Stein, 2016). Gosh et al noted that “*bond investors rediscovered the role of fiscal fundamentals*” (Cimadomo et al, 2014), transmitting itself into panic and overreaction on the markets while De Grauwe, Ji and Macchiarelli showed that investors went from “*modes of risk-denial to excessive risk perception*” (De Grauwe, Ji, Macchiarelli, 2017). In fact, De Sanctis claimed that only since the crisis, moment at which De Grauwe and Ji point out the structural break that formed on the sovereign market (De Grauwe, Ji, 2012), investors truly considered countries’ fiscal positions and their ability to repay their debt. Their analysis also emphasised that financial markets disregarded fundamentals prior to the crisis, as well as the risk implied in holding periphery countries’ debt (De Grauwe, Ji, Macchiarelli, 2017).

De Grauwe et al refer such behaviour as “*mispricing*” of risk on the Eurozone sovereign bond market. Indeed, they analysed that, contrarily to the market-based fiscal discipline hypothesis according to which “*financial markets ask a higher default premium to countries that borrow excessively*” (Attinasi, Checherita, Nickel, 2009), spreads were particularly flat during this period despite countries’ diverging fiscal fundamentals (De Grauwe, Ji, 2012). This perspective was shared by Beirne and Fratzscher as well as Dewaechter et al who, through their respective analysis, found that more distinctive unrest in both sovereign yields and CDS spreads would have been observed prior to the outbreak of the financial crisis if greater attention had been brought to countries’ fundamentals (Beirne, Fratzscher, 2013) (Dewaechter et al, 2013). This goes in hand with Favero and Missale who highlighted that countries’ fiscal fundamentals have a significant

power in pricing the default risk of a country, but “*only as they interact with the global risk that the market perceives*”, which was underestimated prior to the crisis (Favero, 2013).

As a result, such mispricing assessed by De Grauwe is in line with Favero and Missale who made the point that “*fiscal fundamentals have a greater role to play in driving the price of sovereign risk in periods of high global risk aversion*” (Favero, Missale, 2012). Beirne and Fratzscher highlighted through their empirical analysis this heightened risk aversion that developed during the financial crisis, in comparison to prior to 2008 (Beirne, Fratzscher, 2013). Arghyrou and Kontonikas characterised such movement as a shift from a behaviour of “*convergence-trade*” prior to 2007 to a behaviour driven by macro-fundamentals and international risk aversion starting in 2008 (Afonso, Arghyrou et al, 2015).

b. Surge in spreads and progressive emergence of non-default factors

Subsequently as the financial crisis unfolded, the extent of surge in spreads on the sovereign bond market was not explainable solely by countries’ fiscal fundamentals. Contrarily to the standard approach of modelling government bond spreads, the extent with which spreads surged was too significant in size to be solely justified by credit and eventually liquidity motives, as pointed by De Grauwe and Favero (De Grauwe, Ji, 2012) (Favero, 2013). As confirmed by Checherita et al, a large portion of surge in spreads was also caused by such added higher international risk aversion (Checherita, Attinasi, Nickel, 2010).

The point made by Favero was that components other than default indicators were influencing and justifying spreads starting from the financial crisis, as the movements of sovereign spreads observed were much greater than the movements of countries’ fundamentals since 2008 (Favero, 2013). As confirmed by Dewachter, Iana et al, despite the fact that economic fundamentals remain a crucial component determining the levels of spreads on the sovereign market, non-fundamental components have been playing an increasingly important role since 2008 (Dewachter, Iana et al, 2014).

This argument can be supported though the analysis of Graph [7] and Graph [8]. The latter illustrate Credit Default Swap contracts spreads for Eurozone countries, emphasising credit risk,

and are compared to the yield spreads of the corresponding nations. Such analysis was similarly carried out by Favero and Missale in their paper and allows to visualise the extent to which credit risk accounts for yield spreads. It also highlights the evolution of the distinction between default and non-default components within spreads, with a marked difference between high and low yield countries⁹ (Favero, Missale, 2016). We do observe that as of the financial crisis, the CDS spreads do not in fact account for the integrality of yield spreads in such ways it did prior to 2008. A growing gap between the two components is observed, to different extents depending on the country analysed. Indeed, credit risk seems to originally account for the entire yield spreads in low yield countries, while an important gap already existed for high yield countries. Progressively as the crisis unfolds, the gap between CDS spreads and yield spreads for both subset of countries took in magnitude, confirming Favero's point, i.e. the dissociation from traditional models who focused mainly on default components to explain spreads.

Another important aspect grasped from the pattern of the spreads is that starting from the financial crisis, the synchronous moves of sovereign yields previously observed ceased to exist. Indeed, important heterogeneity in terms of yield movements appeared, with a marked distinction between high and low debt countries (Favero, Missale, 2016). Subsequently, the first signs of severe fragmentation appeared on the market by 2010 (Berenberg-Gossler, Enderlein, 2016). This shift goes back to Favero's analysis which showed that the termination of yields co-movement was in accordance with the end of credit risk being a main driver of spreads (Favero, 2013).

II. The European Sovereign Debt crisis

Following 2008, a large portion of the literature has studied the elements which influenced spreads in the lead to the Eurozone sovereign debt crisis. Common agreement exists on the impact government's bank bailout programs had on sovereign spreads. As highlighted in the analysis of Checherita et al, governments' commitment to financial institutions through their rescue packages led to what they referred as a "*reassessment of sovereign credit risk*". This was the result of such transfer of risk from the banking sector to governments, inevitably impacting the sovereign bond market (Checherita, Attinasi, Nickel, 2010) (De Grauwe, Ji, Machiarelli, 2017) (Pagano, 2010)

⁹ High yield countries refer to Spain, Italy, Portugal and Ireland, while low yield countries refer to the Netherlands, Austria, Belgium, France and Finland.

(Afonso, Arghyrou et al, 2015). Such reassessment was clearly visible on the Credit Default Swap market as spreads reached a peak by 2010.

a. Spillover and Contagion within the EMU

Distress aggravated further with Greece's announcement that it had lied over the extent of its deficits during the financial crisis¹⁰. This caused aggressive downgrades of the country's debt, along with surging premiums demanded by investors to face this even greater risk (Barber, 2010). De Santis showed that such downgrade from credit rating agencies highly influenced the yield spreads of countries with weaker fundamentals such as Spain, Portugal and Ireland, but also affected countries with stronger fundamentals, such as France and Belgium. This goes back to Gande's analysis on spill-over effects¹¹ in the Eurozone, given the significant effect changes on credit ratings have had on yield spreads in the wider EMU (Gande, Parsley, 2005). The crisis occurring in Greece also fed increasing risks of contagion in the broader Eurozone, what De Santis characterised as "*situations whereby instability in a specific market is transmitted to one or several other markets*" (De Santis, 2012).

Indeed, the eurozone being in a monetary union, the single currency implies that individual governments cannot control the currency themselves, which also concerns governments' debts and its servicing (De Grauwe, Ji, Machiarelli, 2017). Pagano showed that this shapes the possibility for multiple equilibria, being highly dependent on investors' level of confidence. As pointed by De Grauwe, a country facing a fiscal crisis may create further doubts on the market over the repayment ability of other fellow governments. Should the market fear the fiscal conditions a country, a large-scale sale of bonds can as a result take place, pushing interest rates up, to the extent where a country is brought into a bad equilibrium which has been self-fulfilled (De Grauwe, 2011).

Attinasi et al assessed the contagion effect that developed in fellow Eurozone countries as a result of the crisis occurring in Greece (Attinasi et al, 2011). More broadly, Favero and Missale found

¹⁰ Greece was condemned by the European Commission in 2010 for "*falsifying data about its public finances and allowing political pressures to obstruct the collection of accurate statistics*". Source: Barber (2010)

¹¹ Diebold and Yilmaz define spillovers as "*the proportion of the (conditional) variance of the returns to an asset that is explained by the (conditional) variance of returns to other assets*". Source: Favero (2013)

clear evidence of such tendencies of contagion on the Eurozone sovereign bond market during the Eurozone sovereign debt crisis, where the pricing of credit risk in a certain country could influence market sentiment and subsequently other countries through what they referred in their model as the global spreads link¹². In fact, they showed that countries within the EMU are interdependent from each other, interdependence being rooted in the risk of break-up of the Euro area. This implies a global risk faced by all Eurozone countries (Favero, 2013). They therefore determined that the distance characterising countries' respective fiscal fundamentals, being time-varying, determines the degree of exposure to such global risk, and more particularly the extent with which surges in spreads related to credit risk will affect other nations, being the mechanism through which a debt crisis will propagate¹³ (Favero, Missale, 2016). As a result, such risk increases with fiscal proximity.

As emphasised by De Grauwe and Ji, this represents a fragile point of the Union. Additionally, Ang and Longstaff also highlighted through their analysis that such systemic risk impacts Eurozone members to a greater extent in comparison to individual US states, which Battistini et al attributed to this imminent possibility of a currency union break-up (Dewachter, Iania et al, 2015).

b. The reappearance of re-denomination risk and the possibility of a Euro area break-up

Indeed, Monfort and Renne noted that since the establishment of the EMU and before 2009, investors were essentially demanding compensations for two main nature of risks: credit and liquidity risk (Monfort, Renne, 2013) (Dewachter et al, 2011). But the different crisis, deterioration of market confidence as well as countries' fundamentals, as shown in Table [1], greatly contributed to the appearance of redenomination risk later in 2011 (De Santis, 2015). This occurred after

¹² Global spreads are what Favero and Missale determined as “global risk factor”, representing the interaction of spreads from fellow members of the EMU with the local fiscal fundamentals of an EMU member. It highlights the fiscal proximity between countries and as a result the exposure of countries to the risk of contagion of surging spreads in neighboring countries in the EMU. Global spreads for each country are computed in their analysis through a weighted average of all other eurozone countries considered in their analysis, the weight utilized being proportional of respective countries' distance in terms of fiscal fundamentals. Source : Favero, Missale (2016).

exchange rate concerns ceased to explain yield spreads when euro was first introduced in 1999 (Favero, Missale, 2016).

Redenomination is what De Santis refers to “*the process whereby a country’s currency is recalibrated either due to significant inflation and currency devaluation, when a currency union is formed or when a currency union breaks up*” (De Santis, 2015). In the circumstances of the Eurozone sovereign debt crisis, redenomination risk was perceived, as defined by Dewachter et al, as “*the fear by investors that at least one country would abandon the euro area*” (Dewachter et al, 2015). In fact, the conditions core and periphery countries were in, with the probability of certain countries’ default, led to the significant doubts over the possible cohesion of eurozone countries as a union (Fiedler et al, 2016). This implied a possible exit of certain countries from the Eurozone, and even a break-up of the euro-area itself, resulting in the end of the Euro as a common currency and a Euro-wide crisis. The formation of important heterogeneity in terms of yield movements by 2011 on the Eurozone sovereign bond market, as observed in Graph [9], coincided with such uprising fears as shown by Favero. Indeed, Favero noted that the common fluctuation across Eurozone countries of non-default related factors strongly implied that those fluctuations were more related to redenomination rather than liquidity factors (Favero, 2013).

Progressively, the markets started to reconsider an exit of countries from the Eurozone, with scenarios of events such as “Grexit” emerging, following the reasoning that stronger countries would push weaker nations out of the union in order to avoid the cost incurred from bailing those countries out through a monetisation of their debt (Pagano, 2010). This had severe implications since countries such as Portugal, Ireland and Spain accounted similar debt levels, meaning that their exit could also be potentially justified (Koutsoukis, Roukanas, 2014).

More broadly, Seitan showed that a withdrawal of a member of the Eurozone from the Union implied severe repercussions such as the depreciation of the Euro “*as a result of the economic instability perception at the Eurozone level*” (Seitan, 2013), the establishment of important political risk as well as macroeconomic difficulties on a broader level. Moreover, redenomination risk was considered as a real threat in the sense that a Euro-area break-up scenario would not only imply the exit of a certain country from the eurozone, but also its conversion to another currency which would be necessary in order to recapitalise its banks. Such events of exit would be

anticipated by investors on the market, leading to a depreciation and appreciation of the new currency eventually implemented in periphery and core countries respectively (Frieden, Walter, 2017).

c. Predictive failure of standard models

According to Favero, this non-default related factor was heavily priced on the sovereign bond market, as the emergence of a possible exit of countries from the EMU caused what he referred to “*a generalised predictive failure*” of standard models of sovereign bond spreads. Indeed, standard models, where credit-factors are considered to be dominant, view spreads as “*persistent processes reverting to a time-varying mean*”¹⁴ (Favero, 2013) which is heavily reliant on fiscal fundamentals as well as the market’s risk aversion. Nevertheless, the re-emergence of exchange rate fluctuation risk, being omitted from standard specifications, could then gain explain according to Favero a large portion of the difference between actual spreads and the ones being forecasted through the standard approach. Subsequently, the surge in spreads resulting from this new pricing factor considered by Favero showed have impeded the standard approach of modelling spreads as well as its accuracy in the lead up to 2012.

Favero further pointed the important implication of such deviation of spreads in terms of policy transmission (Favero, 2013). Indeed, Bernoth et al argued the importance of yields as a fiscal discipline instrument through an increase of borrowing cost that a surge of default-related components may cause, being an important mechanism especially in the context of a monetary union, where policy independence is restrained (Bernoth et al, 2004). However, in the words of Favero and Missale, “*if markets can stay irrational longer than a country can stay solvent, then the role of yield spreads on national bonds as a fiscal discipline device is considerably weakened, and some form of ECB intervention or the issuance of Eurobonds can be economically justified*” (Favero, Missale, 2012).

¹⁴ Berg showed, through his analysis of the 2008 financial crisis, that risk aversion is mean-reverting in the long term, implying that risk premia increases significantly more in the short-term than in the long-term. This led Favero to underline that such mean-reversion of credit risk lead to predictability in the patterns of spreads. Source : Berg (2010)

Mario Draghi, in his July 2012 speech¹⁵ confirmed this rise in non-default components, more precisely redenomination risk. When speaking about the surging spreads across the Eurozone, Draghi cited that *“these premia have to [do], as I said, with default, with liquidity, but they also have to do more and more with convertibility, with the risk of convertibility”* (European Central Bank, 2012). The problematic lied in the fact that growing suspicions over a euro-breakup implied the possibility of self-fulfilling debt run across the entire Eurozone market, shaping a critical outlook for the Eurozone (Favero, Missale, 2016).

In fact, the interdependence between countries of the Eurozone leading to possible events of contagion mentioned above is traditionally determined by the proximity of countries’ respective fiscal fundamentals. This directly impacts the pricing of countries’ credit risk due to the perception of global risk from the market. As discussed earlier, countries detaining weak fiscal fundamentals are generally more exposed to such nature of debt run given the reduced fiscal distance from fellow countries facing weak fundamentals. This implies that fiscally sound countries detain a higher immunity to the propagation of surging credit risk in troubled countries. Nevertheless, in the case of a risk of euro-area break-up, Favero and Missale showed that the wider nature of such risk, potentially leading to the break-up of the Union, implies that debt default could propagate even to safe member states, despite their sound fiscal fundamentals (Favero, Missale, 2016). This brought De Santis to characterise redenomination risk as systemic to the Eurozone.

d. Measure of redenomination risk

To emphasise the extent of this redenomination risk, Favero and Missale used the Quanto CDS spreads variable, first introduced by De Santis in 2015 and referred to a “euro risk” factor. Redenomination risk was characterised by De Santis as the main driver of spreads for low yielder countries, given their lower credit risk in comparison to periphery countries, until 2012 (De Santis, 2015).

The Quanto CDS variable is defined as the difference between the Credit Default Swaps spreads in US dollars and Credit Default Swap spreads in Euro (Favero, Missale, 2016). Subsequently, it

¹⁵ Mario Draghi’s “Whatever it takes” speech given on the 23rd of July 2012, addressed the deterioration of financial and economic conditions in 2011 and 2012. This speech will be analysed further in this research.

measures the risk of a potential depreciation of the Euro against the Dollar as perceived by the market (De Santis, 2017). In other words, such spreads differential represents “*the premium that market participants are willing to pay to receive protection in US dollars so as to avoid the risk that the euro depreciates against the dollar after the default of a member state*” (Favero, Missale, 2016). This is directly linked to the decreased value a protection denominated in Euro would provide in case of a credit event from a Eurozone member state (De Santis, 2015). By following the methodology used by Favero and Missale, we computed the average Quanto CDS for Eurozone economies included in our analysis. This allows to grasp a euro-wide variable measuring the fluctuation of redenomination risk between 2010 and 2019.

The increasing gap between US and Euro denominated protections until 2012, as emphasised by Graph [10], highlights the growing expectations of loss incurred from euro-denominated protections in comparison dollar-denominated protections expected during this period (Favero, Missale, 2016). This lead spreads on the sovereign bond market to reach their highest levels between 2011 and 2012 (Favero, 2013).

Third episode: Draghi's announcement up until now

I. *Outright Monetary Transaction announcement*

a. “Whatever it takes” speech

To address this situation of high doubts over the survival of EMU and to save countries from having to exit the Eurozone due to the inability of rolling their debt over, the ECB intervened. This was in accordance with Pagano who showed that market confidence had to be imperatively restored in these circumstances (Pagano, 2010). Mario Draghi, the former president of the European Central Bank, gave a memorable speech on the 23rd of July 2012. Draghi announced that he would do “*whatever it takes to save the euro*” (Bayer, Kim, Kriwoluzky, 2018).

Here again, the movement of sovereign spreads observed during that period, illustrated on Graph [11], were disconnected from countries' fundamentals, as no concrete measures had been yet taken to improve the fiscal positions of troubled countries. Given the slower adjustment required for a stabilisation of fiscal fundamentals, the literature commonly agrees that the dramatic decrease in spreads after Draghi's announcement was triggered by a decrease in non-default components influencing spreads, especially redenomination risk (De Santis, 2015), also referred as the “fear factor” by De Grauwe (De Grauwe, Ji, Macchiarelli, 2017).

In fact, Draghi's announcement, by ruling out an external adjustment (Frieden, Walter, 2017) and impacting the broad market sentiment, greatly dampened fears of a break-up of the eurozone (Favero, Missale, 2016), eliminating a large portion of the risk premium associated with such risk. This was due to the outright monetary transactions from the ECB on the secondary sovereign bond market it implied, representing an important support (Horvath, 2016). Indeed, due to the severe fragmentation the bond market had reached, such intervention's purpose was to “*“safeguard an appropriate monetary policy transmission and the singleness of the monetary policy” with the underlying aim of maintaining the integrity of the euro area*” (European Stability Mechanism, n.d.).

Outright Monetary Transactions are to a certain extent Lender of Last Resort transactions, as the ECB commits itself to the unlimited purchase of troubled government's bonds of countries “*subject to speculation that they might leave the eurozone*” (Steen, 2013) after receiving financial

assistance from the European Stability Mechanism¹⁶ (Favero, Missale, 2016). More broadly, OMTs are considered as a large-scale insurance policy thanks to which “*investors no longer fear they will be unable to sell their bonds if markets turn against that eurozone country*” (Financial Times, 2013). Without a single bond that had yet been bought by the Central Bank by 2013, Draghi’s sole verbal intervention shifted investors’ perception (Favero, Missale, 2016) and encouraged the flow of capital back to periphery countries such as Italy and Spain (Financial Times, 2013).

Altogether, the announcement allowed a progressive pacification of the sovereign bond market (Berenberg-Gossler, Enderlein, 2016) with spreads subsequently lowering down in the following months (De Grauwe, Ji, 2014). This was especially the case for countries with sound fiscal fundamentals now being mostly immune from redenomination risk (Favero, Missale, 2016). Indeed, we do observe a significant decrease of the Quanto CDS spread after 2012, confirming De Santis’s claim that redenomination risk has remained contained since Mario Draghi’s intervention (De Santis, 2015).

By September 2012, the Italian and Spanish sovereign spread, both being countries under debt-financing stress (Favero, Missale, 2016), decreased drastically as emphasised on Graph [12], also highlighting the importance non-default risk components had as driver of spreads (De Santis, 2017). Simultaneously, such prompt spread drop also underlined the non-fundamental nature of the crisis and role of self-fulfilling expectations in debt-runs, as pointed out by Favero and Missale (Favero, Missale, 2016).

¹⁶ Indeed, OMTs could only take place under specific conditions, as countries first had to apply to the European Stability Mechanism (ESM) which would impose an austerity program for the troubled country. As a result, the ECB would intervene only if the applicant country was filling the eligibility criteria (including for instance a sustainable debt, a sustainable external position and a sound financial system of this preliminary assistance program. These conditions took away a large portion of moral hazard that could arise from those types of transactions, as countries may be incentivised to borrow excessively should they know that at the ECB will automatically intervene in times of distress. Source : Favero and Missale (2016), De Grauwe (2013), European Stability Mechanism (n.d.)

b. Calmer and supported market

By February 2013, no country had applied for an OMT program, yet the markets returned to a somewhat calmer state (Financial Times, n.d.). Favero and Missale concluded from their analysis that non-default components, including the "euro risk", were unlikely to explain spreads after 2013. Moreover, they claimed that "*the component of the spread likely due to liquidity problems becomes very small*" given the support provided to the sovereign market since 2012 (Favero, Missale, 2016). This was further confirmed by De Santis and Stein in their KfW-Bund spread analysis, emphasising an improvement of the sovereign bond market on that aspect since then (De Santis, Stein, 2014).

After the OMT announcement, the ECB introduced additional programs concretising the promise made by Draghi in July 2012. For instance, the Long-Term Refinancing Operations¹⁷ (LTRO) as well as the Securities Markets Program¹⁸ (SMP) were implemented (Bayer, Kim, Kriwolusky, 2018). Greece also faced important bailout programs executed by the ECB along with other institutions such as the International Monetary Fund (Koutsoukis, Roukanas, 2016). Altogether, the aim of these programs was to pull the eurozone out of the sovereign debt crisis through active intervention.

Later in 2015, Quantitative Easing¹⁹ (QE) or Expanded Asset Purchase Programme (EAPP) was also introduced. Contrarily to the OMT program which was rather used as a calming instrument for fears over specific countries, quantitative easing is not restrained to troubled countries. As a result, the European Central Bank, under QE, targets financial assets independently of their nationality (Münchau, 2013) with a limit of 1/3 of the country's total debt issuance²⁰ (Delivorias, 2015).

¹⁷ The LTRO program had the main objective of providing European banks holding illiquid assets a liquidity cushion preventing the ceasing of interbank lending. Source : European Central Bank (n.d.)

¹⁸ The SMP program was focused on the interventions of the ECB to "*ensure depth and liquidity in malfunctioning segments of the debt securities markets and to restore an appropriate functioning of the monetary policy transmission mechanism*". Source: European Central Bank (2010)

¹⁹ Quantitative easing is an asset-purchase program through which the ECB commits itself to keep interest rates low and boost growth within the eurozone by purchasing government bonds issued by Eurozone countries (Stubbington, 2019). Moreover, the aim of such operations is partly for bond sellers to reinvest their money into foreign assets offering higher interest rates, as a result lowering the value of the domestic currency and subsequently boosting the exports of the country concerned. Source: Delivorias (2015)

²⁰ It was estimated that between March 2015 and December 2019, the QE programme allowed to take in charge more than 2.6 trillion euros worth of debt. Source: Stubbington (2019)

II. *The rise of political and social concerns and unrest on the sovereign market*

a. Post crisis adjustment and a suggested shift of risk on the sovereign market

Following several years of recovery, positive impacts were observed on economies, especially for periphery countries. Real GDP growth progressively regained stamina, along with current balance accounts going back towards surpluses and an overall stabilisation of debt-to-GDP ratios within the Eurozone (De Grauwe, Ji, Machiavelli, 2017). But contrarily to the neo-classical theory of inter-temporal utility maximisation according to which “*diverging current account among countries is the natural consequence of a future convergence of economies with different levels of capital endowment*”, there has not so far been a true rebalancing between core and periphery countries, despite the various interventions after the crisis (Cesaroni, De Santis, 2015).

Moreover, important yield movements have been observed on the sovereign bond market again as of 2015, despite the financial support the latter now benefits from.

In fact, although some argue that the eurozone sovereign bond market has now gone back to “normal” i.e. back to pre-crisis level of spreads, important yield movements have been observed on the market again since 2015, as emphasised by Graph [13]. Greece being in a specific situation following its bail-out, we do observe spreads that are becoming more prominent in the remaining Eurozone countries since that year. The levels observed are generally higher than those observed in the pre-financial crisis period.

A tendency highlighted by De Grauwe and Münchau in the context of the post-OMT period is that the euro is now supported. As a result, both claimed that “*the only conceivable threat to the cohesion of the eurozone can be political*” (Münchau, 2019), as well as social, turning away from traditional financial threats previously experienced on the market. De Grauwe characterises this tendency as a shift from “*the risk of financial implosion*” to “*the risk of implosion due to uncontrollable social and political disturbances in the South of Europe*” (De Grauwe, 2012).

Indeed, following the Eurozone sovereign debt crisis, countries' leaders were forced to "*patch together emergency institutional reforms*" (Sandbu, 2019), the possibility of external adjustment²¹ having been clearly ruled out by the European Central Bank in 2012.

A true political dimension has developed (De Grauwe, Ji, 2014) as a result of the critical recessions Southern Europe countries found themselves in for years (De Grauwe, 2012). During the recovery, debtor and creditor countries had to determine a way of addressing severe deficits, causing what Petropoulos and Tsobanogou referred as a true "*ideological rift*" (Petropoulos, Tsobanogou, 2014). Additionally, Frieden and Walter underlined that the cost of the crisis was distributed very unequally between countries of the Eurozone (Frieden, Walter, 2017).

Opposition to austerity programs was rooted in the fear that by cutting budgets and raising taxes, the aggregate demand of highly indebted countries would deteriorate further and increase fiscal deficits even more (Petropoulos, Tsobanogou, 2014). Subsequently, several countries were still supporting an exit of the Eurozone even after 2012, considering it as a more viable solution compared to austerity programs. More broadly, Kraemer showed that a trend towards what he referred to "protest votes" has been observable across countries even beyond Europe, fed by groups of the population's desire to go back to times somewhat seen as the "golden era", in comparison to the post-crisis times characterised by recession (Kraemer, 2016).

Inevitably, the combination of a common union monetary policy with national fiscal policies and budget became an inherent problem within the Eurozone (Petropoulos, Tsobanogou, 2014).

²¹ What Frieden and Walter refer as external adjustment to the crisis is a scenario of exit of a country from the Eurozone, followed by depreciation (for a deficit country) or an appreciation (for a surplus country) of its currency. Source: Frieden and Walter (2017)

b. Rise of populism and the migration crisis

A rise of interest towards new uprising political parties such as populist parties has been taking place across Europe, and have shown to be partly generated from this distress. Although populism has had long lasting roots in Europe, the conventional explanation for this particular rise since 2015 stipulates that the past decade of economic crisis and globalisation have had an important responsibility in triggering diverging ideologies.

Additionally, the literature considers the migration crisis that took place in Europe in 2015 as a contributing factor in this change of political perspective. Indeed, Hatton assessed that “*in severe recessions, public opinion becomes more negative towards immigration*”, therefore claiming that austerity has had an important role in reviving the political debate over immigration (Hatton, 2014). Indeed, European countries showed a lack of cohesion in managing the important inflow of people within their borders. For instance, while Germany enforced its “*Willkommenskultur*”²² (Mudde, 2016), other countries in Europe have shared their unwillingness to welcome migrants on their territory, such as France and Hungary. The uncontrolled migration that took place created anxiety in most European countries as the important and fast-paced inflows were perceived as a threat to national security, with fears that it might cause consequences on a broader social and economic level (Economic Policy Uncertainty, n.d.). This was highlighted by the migration fear index²³ represented on Graph [14], which peaked in 2015, after lowering down again following the EU-Turkey statement²⁴.

Several parties leveraged those fears in order to gain in popularity in their respective countries (Zerka, 2018). The argument used to promote nationalism was often followed the belief that such

²² ‘*Willkommenskultur*’ i.e. “*Culture of Welcoming*”, was the response taken both by Austria and Germany facing the inflow of migrants in Europe. There was indeed a high support of welcoming and supporting the waves of migrants coming in and passing through their country. Source: Trauner, Turton (2017).

²³ The European migration fear index is a news-based measure capturing anxiety over migration on the basis of the analysis the number of newspaper articles containing at least one term defined as related to migration (*border control, migrant, migration, asylum, refugee, immigrant, immigration, assimilation, human trafficking, open borders, Schengen*), and one term defined as related to fear (*anxiety, panic, bomb, fear, crime, terror, worry, concern, violent*), for each Germany, France and UK’s two respective main newspapers. This value is then divided by the total amount of newspaper article for the same period. Source: Economic Policy Uncertainty (n.d.)

²⁴ The EU-Turkey Statement was introduced in March 2016 with the aim of ceasing uncontrolled migration into Europe, also implying that all incomers had to apply for asylum. Migrants would as a result be sent back to Turkey if they did not apply for asylum or if their application happened to be rejected. Refugee camps were also set up in strategic locations such as Italy and Greece in order to help authorities manage the inflow more efficiently, which dramatically decreased since the implementation of this statement. Source: European Council (2016).

inflows of migrants would not only increase crime and terrorism in Europe, but that it would also affect employment (Stearns, 2020). Although not all claims were perceived as credible by the market, many did nevertheless raise concerns of investors and nations on a broader perspective.

c. Increasing spreads and the promotion of an exit of the Euro

Later on, several countries saw some of their political parties gain in importance in the public eye through their promotion of an exit of their country from the Eurozone, or even the dissolution of the Eurozone itself.

As highlighted by Kaya in his research, the 2016 Brexit referendum has had a significant impact on the policy consensus within Europe (Kaya, 2018).

Additionally, the 2017 French presidential elections created non-negligible uncertainty in the Eurozone's political sphere. The plan of Marine le Pen, if she happened to win, was to “*dedicate the first six months of her term to lead the country out of the single currency*” (Minnella, 2017) along with a shift to a country controlling its own borders and “*an identity unchanged by migration*” (Stothard, 2017). Such promises²⁵ led to her win of the first election round in April, before being defeated by Emmanuel Macron in May. Nevertheless, the imminent possibility of Le Pen arriving in the Champs Élysées was priced by the market as the French 10-year sovereign bond yield rose significantly, as illustrated on Graph [15] (Stothard, 2017). The Yellow Vest movement²⁶ which broke out in 2018 also truly emphasised the unrest existing within the country (Viscusi, 2019).

In Italy, the Five Star Movement was promising a “better life” outside of the Eurozone. On the other hand, Forza Italia, led by Silvio Berlusconi, was encouraging the adoption of a parallel

²⁵ Marine Le Pen strongly promoted lower taxes and increased welfare payments, on top of enforced protectionism in response of slow growth and unemployment in France at that point in time. Source: Stothard (2017)

²⁶ France Yellow Vest movement which started in October 2018 was characterized by an opposition between “*the ruling elite in Paris and workers who face rising costs of living, shrinking public services and an unfair tax burden*” and seen as a “*people's resistance to sacrificing any social benefits to help create more jobs and make France competitive again*” Source : Viscusi (2019)

currency, seen as a first step towards an exit of the Eurozone²⁷. For instance, only 41% of Italians considered the Euro as a “good thing” in comparison to the 47% who considered it as a “bad thing” according to European Commission Eurobarometer²⁸ in 2017.

The possibility of an Italian exit was also strongly considered by investors as a result of the budget-related conflicts the Italian government developed with Brussels (Minnena, 2017). Indeed, Politi underlined that the argument used in favour of Italy’s exit of the Eurozone was also greatly motivated by the budgetary and regulatory constraints set by the European Commission and the European Central Bank (Politi, 2017). This was also heavily motivated by beliefs that austerity had strongly damaged the country (Politi, 2018). This point was confirmed by Minnena who highlighted that Italy’s exit risk was “*a phenomenon deeply connected to the presence of a new, conflict-ridden government unwilling to comply with EU-budget rules*” (Minnena, 2019). Moreover, Blanchard and Zettelmeyer claimed that “*as it is, the confluence of rigid rules and the political populism has rendered fiscal policy impotent*” in Italy (Sandbu, 2019). As a result, the perceived risk of an exit from the euro was still very much present, despite the absence of upcoming elections in Italy.

Subsequently and as pointed out by Minnena, “*the European Central Bank’s commitment to defend the irreversibility of the euro is based as much on threats as on positive pledges*” (Minenna, 2017) and this rising trend towards populist and anti-euro parties has been sustained within Europe. As Greenhill pointed out, the events that occurred within the Eurozone have “*(re-)kindled national divisions in ways that redounded strikingly to the benefit of right-wing, nationalist political parties*” (Greenhill, 2016). Politics across the Eurozone have been truly disrupted, with anti-establishment parties beyond Italy and France such as Syriza in Greece as well as Podemos and Ciudadanos in Spain and the Netherlands’s Party for Freedom (PVV) all gaining in popularity

²⁷ Such solution was motivated on the grounds of “*the broad public disappointment with the economic damage inflicted by a long recession and sluggish recovery*” where “*only a return to monetary sovereignty will allow Italy to free itself from the budgetary and regulatory constraints set by the EU and the ECB*”. Source: Politi (2017)

²⁸ The Eurobarometer highlights the overall support for more policy coordination in the euro area. The latter is established by year and country. It takes the form of surveys which “*cover a wide range of issues, focusing on citizens’ perceptions and expectations towards EU action, and the main challenges the Union is facing. The surveys also measure in detail citizens’ attitudes towards the EU and the European Parliament, while also keeping a close eye on the public’s views on the European elections*”. Source: European Parliament (n.d.)

(Frieden, Walter, 2017) (John, 2017). Between 2010 and 2016, at least one populist party has earned more than 10% of votes during elections in general, as showed by Mudde (Mudde, 2016).

d. The development economic policy uncertainty and political risk

Kaya has strongly underlined that growing scrutiny has been brought to economic policies and their future in the Eurozone, partly as a result of the growing political risk that developed in Europe. He stated that *“recently, with macroeconomic uncertainty still being in focus, policymakers’ decisions on economic policies have taken centre stage as well. Their statements and actions with regard to fiscal policies, as well as structural and regulatory reforms, are affecting financial markets as seldom before. As a result, uncertainties surrounding these policies have received growing attention”* (Kaya, 2018). Azqueta-Gavaldon et al related such growing attention to *“global trade disputes, the economic challenges stemming from climate change and geopolitical factors”* (Azqueta-Gavaldon et al, 2019) which have unfolded over the past years, in addition to the recent election tendencies in Europe (Kaya, 2018).

The opposition to austerity measures and increasingly fragmented discourses on the national levels, along with diverging interests (Lehne, 2016), have in fact been considered to significantly increase the levels of political risk and uncertainty as perceived by the market. Kraemer characterises such movement as a convergence of political and institutional risk, rooted in the diminished *“predictability of policies and democratic choices in the Western World”* (Kraemer, 2016).

e. Definition of uncertainty

Jurado, Ludvigson and Ng define the broad concept of uncertainty as *“the conditional volatility of a disturbance that is unforecastable from the perspective of economic agents”* (Jurado, Ludvigson, Ng, 2015). On the other hand, the literature most often refers to political uncertainty as *“the possibility of relatively abrupt discontinuity in public governance due to, and expressed as shifts, interruptions or inconsistencies in the implementation and long-term coherency of public policy and assorted regulatory environment”* (Koutsoukis and Roukhanas, 2016). Subsequently, De Santis links political risk to *“the compensation demanded by market participants for the risk that*

investments' returns could suffer as a result of political change or instability in a country" (De Santis, 2017).

De Santis also highlighted the possibility of positive correlation between redenomination risk and political risk in the Eurozone, should the winning government pledge an exit of the Euro (De Santis, 2017). Such correlation was observed in Italy for instance, illustrated by Graph [16], as the high uncertainty emerging from the political sphere with the rise of the Five Star Party was linked to the promotion of Italy's exit from the Eurozone. Subsequently, the Italian Quanto CDS measure rose significantly again as of 2017.

III. The Economic Policy Uncertainty (EPU) index

Although no exact measure of uncertainty exists given its abstract nature, adequate proxies have been used in the literature so far in order to quantify uncertainty, such as the realised volatility of the stock market or dispersion of forecasts (Jurado, Ludvigson, Ng, 2015). As pointed by Kaya, the traditional measures of uncertainty and overall volatility have lowered significantly recently, being, according to him, partly the reflection of "*benign global economic conditions and rock bottom benchmark rates*" (Kaya, 2018). The Economic Policy Uncertainty index, on the other hand, has been reaching some of its highest levels ever observed (Kaya, 2018).

a. Construction of the index

This is also the reason why the EPU index, build by Baker, Bloom and Davis, has gained significant attention in the literature more recently as a variable used to measure political uncertainty within the Eurozone (Al-Thaqeb et al, 2019). Such index was defined by Kaya as reflecting "*economic agents being unable to foresee the outcomes of fiscal, regulatory, monetary and trade policies*" (Kaya, 2018). The EPU bases itself on the identification of articles related to policy uncertainty for Europe's main economies. To do so, the number of articles for each newspaper containing at least one of the terms *uncertain, uncertainty, economic or economy*, and as well as one of the terms *policy, tax, spending, regulation, central bank, budget and deficit* are recalled in the native language of the country analysed for Europe's five largest economies : Germany (Frankfurter Allgemeine Zeitung and Handelsblatt), Spain (El Pais and El Mundo), Italy (Corriere della Sera and la Repubblica), France (Le Monde and le Figaro) and the United-Kingdom (The Times of London and the Financial Times).

As specified by Baker, Bloom and Davis, they scale the raw EPU count by a measure of the number of articles in the same newspaper and month. Then, “*we standardize each newspaper-level monthly series to unit standard deviation prior to 2011 and average across newspapers by month to obtain country-level and European EPU indexes, which we normalize to a mean of 100 prior to 2011. For country-level indexes, we average across each country's two newspapers. For the European-wide EPU index, we average equally across all 10 European newspapers*” (Baker, Bloom, Davis, 2012). Given the specific methodology used to aggregate the county-level data, we have decided to retain the data concerning the United-Kingdom and which is included in the European-level index.

Graph [18] emphasises the important level the EPU has attained since 2008, confirming Baker, Bloom and Davis’s assessment that economic policy uncertainty is more prominent since then. They have also highlighted the role of such growing uncertainty and its impact on recovery (Baker, Bloom, Davis, 2013). Indeed, the high levels EPU have sustained, while Kaya also pointed an important mechanism of negative spill-overs of such policy uncertainty, what he referred as “*cross-country EPU transmissions*” (Kaya, 2018). Such spill-over took place for instance with the Brexit referendum where the UK’s EPU particularly transmitted itself to the one of France and Germany who in turn spiked as well, as shown by the analysis carried out by Kaya. He highlighted such contagion as being the result of the important interconnectedness of policymaking within the European Union, uncertainty being most often transferred from larger EU members to other members (Kaya, 2018). For all the reasons above have Dewachter et al included the EPU as a measure of political risk in the euro area in their model.

To challenge the accuracy of such news-based method, Baker, Bloom and Davis applied the same methodology in identifying specific words related to the financial market for US newspaper in order to assess the closeness of their index to the VIX index. By identifying articles containing terms such as *stock price*, *equity price* and *stock market*, they highlighted the high correlation of their index with the VIX despite its noisier tendency, being coherent with the movements of the financial markets. Moreover, they established an alternative EPU index for the United-States where a division between republican and democrat newspapers was carried out. They showed that both indexes moved together synchronously and homogeneously, confirming the lack of distortion

political slant may incur with such methodology when constructing the EPU index, therefore ruling out such eventual shortcoming of the method used (Baker et al, 2013).

IV. Implication on the sovereign bond market

The literature widely studies the impact of such high levels of policy uncertainty on the real economy, with for example disturbed financing conditions, higher premiums demanded (Kaya, 2018), investment choices made by corporations as well as consumer spending (Azqueta-Gavaldon et al, 2019) (Al-Thaqeb et al, 2019) “*given that the future path of economic policies is essential to economic agents’ decision-making*” (Haya, 2018). However, high economic policy uncertainty can also have strong implications in terms of efficiency on the sovereign bond market particularly. An important example can be the episode of quantitative easing undertaken in the beginning of 2019 by the ECB. Although we should see such programs effectively lower the government bond yields by providing liquidity to the bond market, this did not happen in Italy due to the important political uncertainty that prevailed in the country. This maintained the Italian yield significantly higher than the one of the Bund during the first half of the year (Minnena, 2019), perhaps confirming De Grauwe’s point that the European Central bank is necessary, but not sufficient in these circumstances (De Grauwe, 2012).

More generally, the reappearance of signs of fragmentation on the market and deviation from standard models along with countries’ fundamentals have strong policy implications, as underlined by Favero (Favero, 2013). Indeed, this can severely impede the transmission of the Eurozone single monetary policy (De Santis, Stein, 2016) hence the attention given by central banks to the state of integration of the bond market, as well as the factors influencing the latter.

Part II: Econometric Analysis

In this context, we would like to assess whether there has in fact been a shift in terms of nature of risks defining spreads on the Eurozone sovereign bond market. More precisely, we would like to analyse whether what we consider as an appropriate measure of political risk has gained relevance in explaining spreads on the Eurozone Sovereign bond market. As a result, our line of investigation will determine whether such market has “turned” political.

I. A financial versus a macroeconomic approach

Our analysis will evolve in two specific directions. Indeed, two models, focusing on macroeconomic variables as well as financial variables respectively, will allow us to assess the significance of the EPU when considered as a financial risk, in comparison to when considered as a macroeconomic risk. Comparability between models and their structure will subsequently be enhanced through divisions into subsamples and spreads will be modelled through a specification comprising of selected variables. Such choice of parallel specifications is rooted in the potential lower variance a variable such as Economic Policy Uncertainty (EPU) index could have, in comparison to the greater variance financial variables present.

Therefore, we will assess whether the EPU shows signs of significance when emphasising a perspective not only on financial variables but also on countries’ respective fiscal fundamentals when decomposing yield spreads. Our macroeconomic decomposition will follow the main lines of the standard specification employed by Favero, while our financial specification will take reference from Dewaechter et al. Additionally, the EPU in both its European average and national form will be studied in order to assess further the specific nature of risk, i.e. Euro-wide or country-specific, the EPU index potentially represents.

All of our results, in order to enhance the clarity of the analysis for the reader, will be gathered in various tables found in the output appendices.

II. Methodology and data collection

The seemingly unrelated regression method will be used for our models. The error terms produced within a set of unrelated equation being likely to be correlated due to unconsidered factors still playing an influential role on the latter, the SUR method allows an inter-equation dependence through the correlation of errors. Such dimension would not have been obtained through the use of an ordinary least square (OLS) method.

Following the methodology used by Favero as well as the one of Dewachter et al, both models established will comprise of global euro-area as well as country-specific variables. Factors common to the wider subset of Eurozone countries will allow us to capture the time varying interdependence that exists between spreads (Favero, 2013) as well as the perceived risk of collapse of the Eurozone, through the Quanto CDS variable for example, available as of 2010 (Dewachter et al, 2015). Country-specific variables, on the other hand, will capture the varying characteristics prevailing across countries considered in our analysis. The sample, running from 1999 up until 2019, gathers monthly observations.

The countries considered in our analysis are Italy, Spain, Portugal, and Ireland for the periphery countries, as well as the Netherlands, Finland, France, Austria and Belgium for the core countries. As mentioned earlier, Germany is used as our benchmark on the 10-year sovereign bond market in order to obtain respective yield spreads for the countries analysed. Yield spreads are therefore computed as the following:

$$YS_t^i = Y_t^i - Y_t^{\text{bund}}$$

Where Y_t^i represents the 10-year maturity yield for country i in period t , and Y_t^{bund} represents the 10-year maturity yield for Germany in period t (Favero, 2013). Sovereign yield data was retrieved with a daily frequency from the Bloomberg Terminal. We converted the daily data onto a monthly frequency by averaging the daily yield spread data for the period considered in order to stay consistent with the method used to establish the EPU index where monthly averages are employed.

Our choice of benchmark also implies that the German yield spread will not be included in our analysis. Such decision was made in accordance with Favero and Missale, as well as Monfort and Renne, who base themselves on the German yield as the risk-free rate on the Eurozone sovereign

bond market. Despite the exclusion of the German yield from our analysis as a result of this choice, we believe in the appropriateness of using the Bund yield as risk-free rate given our focus on Economic Policy Uncertainty in this research. Moreover, the closeness of the OIS rate²⁹ to the German Bund of the same maturity confirms the limited difference in results an analysis using the OIS as benchmark would provide.

Additionally, we have made the choice to exclude Greece from our analysis due to the specific circumstances through which the country evolved during the period analysed. In fact, Greece can be considered as an exceptional case when compared to the Eurozone's remaining countries. Its exclusion therefore allows to us to circumvent the potential inaccuracy produced by the measures included in our model regarding Greece such as default risk, due to the additional counterparty risk that characterised the country during the second half of the period studied.

III. Economic policy uncertainty in our model

For both models, the Economic Policy Uncertainty index will be used as a measure of political risk in the Euro area, as done by Dewachter et al (Dewachter et al, 2015). As previously mentioned, such index is constructed on the basis of a news-paper method and released monthly. More particularly, the EPU will be studied in both its European average and country-specific form. These two alternatives measures will allow us to investigate such risk not only when considering it as a European factor but also as a national factor when decomposing yield spreads. This will therefore enable a narrowing down towards the specificity of the nature of the political risk itself, should the latter show significance when included in our models.

a. Economic Policy Uncertainty as a common risk

We will assess the EPU as a common risk to the wider subset of countries considered in the analysis through the inclusion of the average European EPU index in our regression. The monthly index is retrieved from Baker, Bloom and Davis and represents a monthly average of the EPU indexes for

²⁹ A vast portion of the literature uses the Overnight Index Swap as the Eurozone reference risk-free rate.

France, Italy, Germany, Spain and the United-Kingdom. Given the consequential EPU spillover effects discussed earlier in this research, we consider the European EPU as an adequate representative of political risk for the Eurozone as a whole. We should however note that the specificity of the averaging method used by Baker, Bloom and Davis for the European EPU refrains us from excluding the United-Kingdom specifically from the European index.

b. Economic policy uncertainty as a country-specific risk

In parallel, we will investigate the significance of the EPU index as a risk factor that is specific to the countries in our analysis through the inclusion of the country-level versions of the index. To do so, we collect the EPU indexes at national level available, being the ones for France, Belgium, Spain, Ireland, Italy and the Netherlands. As a result, a limit has to be set to this aspect of our analysis given the restricted availability of national indexes. Moreover, it is important to note that although these variables are retrieved from Baker, Bloom and Davis, as for the European EPU, the national EPU indexes computed for Ireland as well as for the Netherlands are established by authors other than Baker, Bloom and Davis³⁰. Nevertheless, the authors for both indexes still base themselves on the methodology used by the latter.

IV. *Migration fear index*

We should also note that despite shedding a light on migration fear in our literature review, we have decided to exclude the migration fear or migration policy uncertainty index from our analysis given its close relationship with the EPU index. In fact, Baker, Bloom and Davis highlighted an important causality given that *“large unforeseen shocks can present policymakers with extraordinary challenges. Questions about how policymakers will respond and what the consequences will be then become an important source of economic uncertainty”* with as a result what they consider as a large reflection of migration concerns in the *“broader pattern that we see in our measures of overall economic policy uncertainty for a dozen countries”* (Baker et al, 2015).

³⁰ The Irish EPU is established by Zalla while the Dutch EPU is established by Kok, Kroese and Parlevliet.

As a result, such close relationship the EPU index holds with the migration fear index, also illustrated by Graph [18], could cause a potential overlapping between the variables in the case both variables are included in our models.

V. Redenomination risk

The average Quanto CDS with equal weights across countries considered in our analysis will be used in our model as a representative of redenomination risk. Such choice was made following the analysis made by Favero and Missale who showed that individual countries' Quanto CDS factor were characterised by a strong co-movement, with a common trend and variance contained within a 50-basis points band, with the exception of Spain and Portugal. The common trend present relates back to the fact that *“a credit event in one country will display its effect on the Quanto CDS of other country through expected depreciation, currency risk and default probabilities”* (Favero, Missale, 2016). Moreover, the importance of including such component in our model was underlined in our literature review, in addition to Favero who assessed the significance of the variable in explaining *“a sizeable part of the difference between actual spreads and those predicted by the standard specification”* as emphasised earlier in this research (Favero, 2013).

Given the limited availability of the variable, the Quanto CDS will be included in our samples spanning from 2010 on. Moreover, to stay consistent with our approach for the EPU index, we will investigate both the national and European average form of the variable. The national Quanto CDS will as a result represent the country-specific depreciation risk of euro-denominated assets. This choice is also justified by the potential correlation highlighted by De Santis between redenomination and political risk. This will allow us to highlight eventual interesting co-movement of the Quanto CDS with the ones of the national EPU indexes on the national level as well which will be assessed further on in our analysis.

Our financial model

Our first line of investigation will rely on a model specification focused on financial markets. Regressing countries' yield spreads on selected variables being widely used in the literature as representative of the financial markets will allow us to assess whether, in this perspective, political risk can be considered as a pricing factor of financial nature. As mentioned above, we will challenge the EPU index in both its European and national form, in order to narrow down the nature of its potential influence on yield spreads when focusing their decomposition on a financial perspective.

a. Country-specific variables

Countries' respective CDS spreads³¹ relative to the Bund will be included in our model. As mentioned earlier, CDS spreads relative to the Bund have been commonly used to assess countries' respective credit risk on the Eurozone sovereign bond market. The great disparities in terms of default risk faced by the countries considered in our analysis also justify our choice of including such variable in its country-specific form. The data, retrieved from Bloomberg, is monthly and runs from 2010 to 2019. As a result, our investigations concerning the EPU as a financial risk will be carried out for this time period.

b. Global euro-area variables

As mentioned above, we use the average Quanto CDS across the Eurozone as a representative of redenomination risk in our model. Moreover, we follow Dewaechter et al who, in their model, included the VIX³² volatility component in order to emphasise financial volatility and subsequently uncertainty on financial markets in their computations (Dewaecher et al, 2015). We

³¹ It is important to note that CDS spreads, as emphasized by Favero and based on Sturzenegger and Zettelmeyer's work, represent the default risk of a country, but do not capture the probability of default of a country. This relates to the fact that the price of a CDS contract "*depends both on the probability of default and on the expected recovery value of the defaulted bond*". Moreover, Fontana and Scheicher, despite using the variable in his model as a representative of credit risk, did point out the potential imperfection of CDS spreads due to the heterogeneity of liquidity on the CDS market Source : Favero (2013)

³² "*The VIX index is a calculation designed to produce a measure of constant, 30-day expected volatility of the U.S. stock market, derived from real-time, mid-quote prices of S&P 500® index call and put options. On a global basis, it is one of the most recognized measures of volatility – widely reported by financial media and closely followed by a variety of market participants as a daily market indicator*". Source : Chicago Board Options Exchange, n.d.

integrate such perspective in our model through the introduction of the VIX index's European equivalent, the Euro VSTOXX50 index, which measures “*the implied variance across all options of a given time to expiry*”. Moreover, “*the option contracts on the EURO STOXX 50 are among the Eurex products with highest trading volume*” (Qontigo, 2020).

Additionally, the KfW-Bund spread is included in our model in order to integrate a flight-to-liquidity perspective within the Eurozone in our model, given its appropriateness to represent such aspect for the Union as a whole as argued earlier in the literature review. The KfW-Bund spread was averaged across maturities³³, here again following the methodology used by Dewachter et al, in order to rule out the eventual maturity-specific risk that could be captured by relying solely on one specific maturity, as argued by Monfort and Renne (Monfort, Renne, 2013). Finally as mentioned earlier, the average Quanto CDS variable is introduced in our financial model as of 2010 to include redenomination risk in our computation.

Our financial model therefore consists of:

$$(Y_t^i - Y_t^{bd}) = B_{i0} + B_{i1} (Y_{t-1}^i - Y_{t-1}^{bd}) + B_{i2} (CDS_{sp_t}^i - CDS_{sp_t}^{bd}) + B_{i3} (EU_QuantoCDS) \\ + B_{i4} (KfW_Bundsp_t^{bd}) + B_{i5} (VSTOXX_t) + B_{i6} (EU_EPU_t)$$

Where $(Y_t^i - Y_t^{bd})$ represents the yield spread over the Bund for country i in period t ;

$(CDS_{sp_t}^i - CDS_{sp_t}^{bd})$ represents the CDS spread relative to the Bund for country i in period t ;

$(KfW_Bundsp_t^{bd})$ represents the KfW-Bund spread averaged across maturities in period t ;

$(VSTOXX_t)$ represents the VSTOXX index for period t ;

$(EU_QuantoCDS_t)$ represents the European Quanto CDS variable for period t , being an equally weighted average across the countries considered in our analysis and;

(EU_EPU_t) represents the European EPU index for period t .

As we are able to see, here yield spreads are modelled so as to catch their entire variance over the period studied. This allows us to gain a perspective where we can understand the entire dynamic of the latter. It is however important to note that the monthly yield spreads gathered in our analysis

³³ Our KfW-Bund component was obtained through an equally weighted average of the variable for 6 months, 1 year, 3 year, 7year and 10-year maturity bonds

are highly persistent and considered for an extensive time-period, meaning that they can be characterized by stationarity. As a result, the lag of yield spreads provides to our regression a very strong explanatory power. For this reason should the high $\overline{R^2}$ obtained not be interpreted as a sign of more appropriate model in comparison to others.

Taking the data to the model: financial model

a. Measure of the EPU as a common risk factor

As mentioned earlier, the restricted availability of the data concerning the Credit Default Swap spreads as well as for the Quanto CDS refrain us from computing our model for a period prior to 2010, hence our first trial which will be executed for the subsample 2010-2019. We begin with the investigation of the Economic Policy Uncertainty Index as a common risk factor by including in our model the European index as well as the average Quanto CDS for the Eurozone. As emphasised by our results illustrated in Table [2], the EPU index performs poorly with only a limited significance when considering the Dutch and French yield spreads respectively for this subsample.

Nevertheless, as argued by Favero and Missale, our entire sample considered, i.e. 1999-2019, is a period characterized by important shifts following the Eurozone crisis, resulting in what can be considered as a new regime that developed on the Eurozone sovereign bond market. As a result, we should underline a potential inaccuracy of selecting such length of sample to assess the significance of the EPU (Favero, Missale, 2016). Additionally, we discussed in our literature review the structural breaks that affected spreads and factors influencing the latter on the sovereign market, with for instance the important surge in non-default related components such as the Euro-risk later in 2010. Finally, our attention being shifted especially towards political risk in the Eurozone as measured by the Economic Policy Uncertainty index, the relevance of political risk being noticeable only truly since 2015 also encourages a focus towards a more restrained time period.

For these reasons have we decided to center ourselves specifically on the subsample 2012-2019 for our analysis, being the period for which redenomination risk started to significantly lower down

following Mario Draghi's "*Whatever it takes*" speech earlier in the summer, in addition to the first noticeable movements on the side of the European EPU index.

Subsequently, we compute our model more specifically for the subsample 2012-2019, with Table [3] gathering the results of such computation. As we are able to see here again, the significance of the EPU index shows to be extremely limited. A mild significance is performed by the European EPU index for the yield spreads of Netherlands, Belgium and Spain, which interestingly does not meet our initial expectations given the important events that took place for instance in France and Italy, as highlighted in our literature review.

We do however have to note the high significance of redenomination risk in our model, as measured by the Quanto CDS, that plays an important role for the majority of the countries included in our regression.

Given the results covered above, we cannot draw conclusions over the significance of the EPU index when considered as a common risk factor on the Eurozone sovereign bond market.

b. Measure of the EPU as a local risk factor

We pursue our investigations by focusing on the EPU index in its national form. Indeed, we have to acknowledge the fact that the method with which the European EPU index is constructed also implies that the factor in its average form not only includes the United-Kingdom but may also inaccurately represent a certain country specifically, as a result of the averaging method employed. In fact, given the important disparities in terms of political circumstances observed across the Eurozone during the period analysed, including the EPU index in its national form may allow us to emphasize whether political risk, as measured through a local component, could be considered as a significant pricing factor as an alternative to the European index. Such line of investigation is also justified by the poor performance from EPU index seen above when taken in its European average form.

Subsequently, we substitute both the European EPU, as well as the Quanto CDS factor to stay consisted with such substitution, with their local equivalent and integrate them in our financial

model. Such analysis is carried out for the countries for which a national EPU index is available, i.e. France, Belgium, Ireland, Italy, the Netherlands and Spain³⁴.

Our model with national redenomination and political risk components therefore consist of:

$$(Y_t^i - Y_t^{bd}) = B_{i0} + B_{i1}(Y_{t-1}^i - Y_{t-1}^{bd}) + B_{i2}(CDS_{sp,t}^i - CDS_{sp,t}^{bd}) + B_{i3}(\text{QuantoCDS}_t^i) \\ + B_{i4}(\text{KfW_Bundsp}_t^{bd}) + B_{i5}(VSTOXX_t) + B_{i6}(EPU_t^i)$$

Where (QuantoCDS_t^i) represents the Quanto CDS measure for country i in period t and; (EPU_t^i) represents the national EPU index constructed on the basis of Baker, Bloom and Davis's method for country i in period t .

As illustrated by Table [4], the inclusion of both factors in their national form, along with the narrowing down of our sample, only brought a slight improvement of performance to our model. However, we should note the high significance from the French EPU index, leading us to the potential conclusion that such factor does rather matter on a local perspective in France when considering a financial perspective, a conclusion that can nevertheless not be taken for the remaining countries of our analysis. Moreover, we again observe a very significant Quanto CDS measure when taken in its national form for the six countries considered in this analysis.

c. Variance differential

Having obtained these results where we assessed a lack of significance of the European EPU and a significance of the National EPU index limited to France, it is however important to underline the variance differential that exists between the variables selected in our financial specification. Indeed, the EPU index is constructed through a news-paper analysis method, which may be an obstacle to the inclusion of the index in a model comprising of variables drawn from financial markets characterised by much more abrupt and frequent movements.

³⁴ We again here acknowledge the limit to our analysis given the restricted number of countries for which a national EPU index is available.

Our macroeconomic model

For this particular reason, we have decided to investigate a second model focused rather on macroeconomic variables, perhaps allowing to avoid such variance inequality between the EPU index and the remaining variables of the model. For this model, we base ourselves on the standard specification established by Favero, where spreads are modelled as “*persistent processes reverting to a time-varying mean*”. Such mean, as highlighted by Favero, is determined by two factors, being a local factor representing countries’ fiscal fundamentals and growth, and an exogenous world factor, representing risk aversion. Such specification was used by Favero for his monthly sample running from 2000 to 2009. However, we saw that the re-emergence of redenomination risk, and an overall non-linear relationship between yield spreads and fiscal fundamentals after 2009, caused an important predictive failure of models using such specification after this period. Our aim is therefore to potentially improve this traditional model through the inclusion of not only redenomination risk but more specifically our focus variable, i.e. political risk.

a. Country-specific data

Following the methodology used by Favero, we established a model where focus is attributed to fiscal fundamentals through the debt-to-GDP as well as deficit-to-GDP ratios of the respective countries considered in the analysis. The spreads of these variables relative to the one of Germany for each country are computed in order to capture the macroeconomic distance of the countries considered in comparison to our chosen benchmark, i.e. Germany. Moreover, such fundamentals are rescaled according to the Maastricht treaty criteria in order to allow a measure of the distance with Germany “*in the same metric of percentage deviation from the Maastricht reference point*” as underlined by Favero³⁵ (Favero, 2013). As a result, respective countries’ yield spreads are regressed on their corresponding harmonised debt-to-GDP and deficit-to-GDP ratios. The data is collected from the European Commission’s forecasts where components are computed as the equally weighted average of the current and following year’s figures for both the spring and autumn forecasts.

³⁵ Our Debt-to-GDP ratios and Deficit-to-GDP ratios are as a result divided by 60 and 3 respectively, reflecting the budgetary discipline measures of 60% debt-to-GDP and 3% deficit-to-GDP levels first set as limits by the Treaty in order to join the Eurozone. Source : Favero (2013), European Central Bank (n.d.).

b. Global Euro-Area Factors

Additionally, the Baa-Aaa spread variable is specifically used as a representative of the market's risk appetite in our macroeconomic model, allowing a relationship of dependence between country-specific factors, i.e. sovereign spreads, and what Favero refers to a common exogenous variable, i.e. the Baa-Aaa spread (Favero, 2013). Indeed, such spread corresponds to the yield differential between the highest and lowest ranked class of corporate bonds detaining the investment grade category as determined by Moody's³⁶. As a result, an observed increase of the Baa-Aaa spread indicates additional unpredictability in bonds' behavior including their default rates, overall providing an appropriate insight into the state of the economy. Such monthly component is retrieved from the Federal Reserve Bank of Saint Louis.

Moreover, we begin by including both the European EPU index and the Average Quanto CDS variable in our regression in order to, in accordance with the financial model, integrate redenomination and political risk into our macroeconomic model.

Given the tendency of convergence of spreads towards a time-varying mean as mentioned above and as highlighted by Favero, the lagged component of both the Baa-Aaa spread as well as yield spreads are included in our set of independent variables in order to reflect such pattern. Additionally, the inclusion of the differentials of those variables in our regression allows us to catch the eventual fluctuations around the expected long-term equilibrium represented in our regression.

Our macroeconomic model therefore consists of:

$$\begin{aligned} \Delta(Y_t^i - Y_t^{bd}) = & B_{i0} + B_{i1} (Y_{t-1}^i - Y_{t-1}^{bd}) + B_{i2} (Baa_{t-1} - Aaa_{t-1}) + B_{i3} (Debt_t^i - Debt_t^{bd}) \\ & + B_{i4} (Balance_t^i - Balance_t^{bd}) + B_{i5} \Delta(Baa_t - Aaa_t) + B_{i6} (EU_EPU_t^i) + (EU_QuantoCDS) \end{aligned}$$

³⁶ Aaa-rated obligations are “judged to be of the highest quality, subject to the lowest level of credit risk” while Baa-rated obligations are “judged to be medium-grade and subject to moderate credit risk and as such may possess certain speculative characteristics”. Source: Moody's Investors Services (2020)

Where $(Y_t^i - Y_t^{bd})$ represents the yield spread over the Bund for country i in period t ;
 $(Baa_t - Aaa_t)$ represents the Baa-Aaa spread as a measure of panic in period t ;
 $(Debt_t^i - Debt_t^{bd})$ represents the harmonized debt-to-GDP ratio spread relative to the Bund for country i in period t ;
 $(Balance_t^i - Balance_t^{bd})$ represents the harmonized deficit-to-GDP ratio spread relative to the Bund for country i in period t ;
 $(EU_QuantoCDS)$ represents the European Quanto CDS variable for period t , being an equally weighted average across the countries considered in our analysis and ;
 (EU_EPU_t) represents the European EPU index in period t .

As a result, we can observe the reliance of Favero on a Vector Autoregression (VAR) where, through this specification, we capture the extent of the variance of spreads around the long-term level the latter theoretically reach. Subsequently, our two models provide us with two different approaches and explanation levels, given that the specification for our financial model captures the entire variance of spreads instead.

Testing Favero's macroeconomic model

In order to test the reliance of the method used by Favero as well as the coherence of the results obtained by the latter with our own model, we begin by replicating such model established for the corresponding sample, i.e. 2000 to 2009. Favero's traditional model consist of the following:

$$\begin{aligned} \Delta(Y_t^i - Y_t^{bd}) = & B_{i0} + B_{i1} (Y_{t-1}^i - Y_{t-1}^{bd}) + B_{i2} (Baa_{t-1} - Aaa_{t-1}) + B_{i3} (Debt_t^i - Debt_t^{bd}) \\ & + B_{i4} (Balance_t^i - Balance_t^{bd}) + B_{i5} \Delta(Baa_t - Aaa_t) \end{aligned}$$

The results obtained, as illustrated by Table [5], confirms the reliance of the model and the data gathered due to the correspondence of the results obtained with the ones of Favero.

Additionally, we bring our testing phase further by computing Favero's model for the subsample 2001-2009, allowing us to integrate the European Economic Policy Uncertainty Index onto the latter³⁷. Such test allows us to investigate the significance of the index for the period prior to the financial crisis, and therefore see whether the latter had a potential impact prior to the crisis period.

Table [6] highlights the lack of impact the EPU had on sovereign spreads before 2009. Indeed, the index shows no signs of significance while its inclusion does not bring any additional explanatory power to Favero's model for this subsample. Given the low political uncertainty that prevailed during this specific period, a tendency strongly confirmed by the index, the results obtained for such sample are coherent with our expectations.

³⁷ The European EPU index produced by Baker, Bloom and Davis first starts in 2001

Taking the data to the model: macroeconomic model

a. Measure of the EPU as a common risk factor

Then, we pursue our investigation by assessing the significance of the Economic Policy Uncertainty Index as a common factor by including the European index in our model for the full period for which the index is available, i.e. 2001-2019.

Table [7], illustrates the results of our computations, showing some high significance from the European EPU index when considering the yield spreads of Belgium, Spain, Austria, Italy, France as well as the Netherlands. In this sole perspective, it as a result looks like the European Policy Uncertainty Index does matter. However, the extremely low $\overline{R^2}$ produced by the model for this period brings suspicions over the appropriateness of the model despite the significance shown by the index.

Indeed using the same argument as the one above in our financial model, the several regimes and important shifts which materialized over the period considered justify a reduction of the size of our sample and therefore focus on a shorter time-frame characterized by more homogeneity in terms of circumstances on the sovereign bond market.

Despite our interest on specifically the subsample 2012-2019 for the EPU index as mentioned above, we first compute our model for the subsample 2010-2019. This allows us to assess the behavior of our model from the inclusion of the average Quanto CDS variable, 2010 being the point at which the Quanto CDS started to gain in importance in the Eurozone as a measure of redenomination risk, until the end of our sample. The results, gathered in Table [8], illustrate an improved performance of the model with simultaneously some significance from the European EPU index and the Quanto CDS depending in the country considered. However, their respective significance remains relatively low, which refrains us from confirming their pricing power. Additionally, we suspect a potential competition from the Quanto CDS variable towards other variables included in the regression, especially the EPU index, given the loss of significance experienced by the latter when the Quanto CDS is included in our regression.

Table [9], on the other hand, emphasizes the results obtained when computing our macroeconomic-focused model for the period 2012-2019. As we are able to assess, only when considering the yield spread of Portugal is the European EPU index visibly significant, on the contrary of the Quanto CDS index which only shows explanatory power when looking at yield spreads of Belgium, Spain, Ireland and France respectively.

As observed, the narrowing down of the subsample and the inclusion of both the average Quanto CDS and the European EPU index maintain a restricted significance level for of the latter. As a result, we cannot draw affirmative conclusions over the significance of the EPU index when considered as a common risk factor on the Eurozone sovereign bond market.

b. Measure of the EPU as a national risk factor

However here again do we have to highlight the potential inaccuracy of using a European-averaged index such as the European EPU index. As a result, we follow our methodology implemented for our financial model in order to maintain consistency and comparability between the models, and substitute, in our macroeconomic model, the European EPU and average Quanto CDS with their national equivalents for Belgium, France, Ireland, Italy, the Netherlands and Spain.

Table [10] illustrates the result of such computation where each countries' yield spread is regressed on the macroeconomic variables mentioned above, in addition to their national EPU indexes and respective redenomination risk as measured by their national Quanto CDS variable.

As we are able to see, we find important significance for the EPU index in its national form for Italy and France respectively, significance levels which were not observable when focusing on the broader European index.

c. Political and redenomination risk as measured by the EPU index and Quanto CDS

We should also highlight the dual significance obtained from the political and redenomination risk measures. Indeed, we see that both variables show strong significance in France and in Italy respectively, while we overall observe significance from either the EPU index, the Quanto CDS variable or neither in the remaining countries considered. This is consistent with the events discussed in our literature review, where we saw for the example the important political concerns raised in Italy along with the persisting inadequacy of the country's public finances, even after Draghi's intervention in 2012. Similarly in France, the potential "Frexit" was priced by the market with the political tensions that greatly contributed to the spike of the French EPU index after 2012. Moreover, the high significance produced by the Quanto CDS variable in Ireland gives evidence of the doubts that prevailed over this periphery country and the lack of improvement of its public finances.

However, going back to the point of De Santis, light should be brought to this eventual correlation between political and redenomination risk given the result obtained above. In fact, De Santis claimed the potential correlation between redenomination risk and political risk, should a government of a certain Eurozone nation obtain the exit of their country from the Union. As a result, we question whether one variable could eventually capture the information provided by the other.

As illustrated by Graph [19], we observe important co-movements between the two variables, specifically in the case of Italy and France. Nevertheless, we computed a correlation test between the national Quanto CDS and national EPU index for the sample 2012- 2019 for Italy and France respectively. As shown in Table [11], the low correlation factors obtained reject such hypothetical correlation suggested by De Santis for our sample between political and redenomination risk.

This perhaps confirms that the two variables do indeed catch different risks given the lack of correlation between the two despite their joint significance. This perhaps allow us to confirm that the Quanto CDS does catch financial information over the single asset depreciation risk, while the EPU index focuses rather on the attention given by markets overall to political risk.

d. Improvement of Favero's traditional model

Finally, although our analysis concerned a different time period as the one analysed by Favero, we do nevertheless find interesting to see that through the inclusion of the national EPU index and national Quanto CDS variables for Spain, France, Ireland, the Netherlands, Italy and Belgium, our additions seem to have improved the performance of Favero's traditional model as measured by the given the improved R^2 obtained, summarized in Table [12] . Nevertheless, we do still have to be cautious with such conclusions given the different time period Favero worked on.

Limitations and concluding remarks

After having assessed the drivers of spreads on the Eurozone Sovereign Bond market and their evolution between 1999 and 2019 in our literature review, we found clear evidence of not only important shifts on such market, but also a non-negligible rise of non-default related components, contrarily to the traditional theories. Redenomination risk having significantly lowered again for a large majority of Eurozone countries after 2012, we emphasised a new uprising fear that seemed to develop within the European economy, being political risk. As a result of the unprecedented events that took place since 2015 with significant challenges and tensions threatening the currency union again, the Economic Policy Uncertainty index, used as a measure political risk in our research, has been reaching levels never witnessed before. This drew our attention over this particular risk and its eventual impact on the longer term on the Eurozone Sovereign bond market, also justified by the predictive failure of standard specifications modelling spreads in the Eurozone, as pointed by Favero.

Subsequently, our investigations carried out through the use of both a financial and a macroeconomic model together highlighted the visible lack of significant impact the European EPU index had on sovereign yield spreads in the Eurozone after 2012. Nevertheless, having ruled out the hypothesis of the EPU as risk factor common to the Eurozone, we brought our analysis further by studying the EPU index in its national form. This shed light on an alternative perspective, where the significance of the index obtained for countries such as Italy and France particularly, in both macroeconomic and financial models, underlined the significant influence of political risk on spreads when considered as a local matter rather than a risk common to a wider subset of countries. Overall, the narrowing down of our sample size and the inclusion of both redenomination risk and political risk measures in Favero's traditional model allowed to obtain the most improvement in terms of results. This was relative to our financial model where we assessed that the nature of the EPU index itself, detaining a significantly lower variance, produced non-conclusive results with the exception of France where the national EPU index showed to be very significant in explaining the yield spread between 2012 and 2019. As a result, going back to De Grauwe and Münchau, their claim that "*the only conceivable threat to the cohesion of the eurozone can be political*" may be validated in these circumstances. However, the pricing of political risk as a Eurozone-wide threat cannot be confirmed here.

A limit we have to set to this macroeconomic approach is the low $\overline{R^2}$ obtained throughout our computations, meaning that despite its performance, Favero's model may not be taken as a reference. Simultaneously, we should also point out the lack of significance produced by other factors within our regressions, such as the Baa-Aaa spread and fiscal ratios. This can be justified by our time frame focus, i.e. after 2012, where we saw an important but progressive improvement of fiscal ratios, along with the Baa-Aaa spread which gradually met pre-crisis levels again, as illustrated on Graph [20]. This is the reflection of its somewhat immunity to the Eurozone crisis, given its close relation with US corporate bonds.

Moreover, a point to eventually investigate in further researches over the Economic Policy Uncertainty index would be the extent with which the Quanto CDS variable catches political risk information provided through the EPU index. Indeed, despite the very low correlation factor obtained between the redenomination and political risk measures in our analysis, we do observe a co-movement of the two variables for specific countries. Additionally, the significance levels obtained when including the Quanto CDS in our regression do raise suspicions over the ability of the Quanto CDS to explain certain dimensions of the EPU index given the competing power it imposed on the latter when introduced in the regression.

Bibliography

Al-Thaqeb, A.A., Algharabali, B.G. (2019). *Economic policy uncertainty: a literature review*. The Journal of Economic Asymmetries, 20, <https://doi.org/10.1016/j.jeca.2019.e00133>

Asgari, N. (2019). *Italian five-year yield rises above Greek equivalent for first time since 2008*. The Financial Times. Online <https://www.ft.com/content/64cf32f2-838d-11e9-9935-ad75bb96c849>, consulted on 8 June 2020

Atkins, R. (2013). *Spanish banks up sovereign bond holdings*. The Financial Times. Online <https://www.ft.com/content/df6fd016-c949-11e2-bb56-00144feab7de>, consulted on 8 June 2020

Attinasi, M.G., Checherita, C., Nickel, C. (2011). *What explains the surge in Euro Area sovereign spreads surging the financial crisis of 2007-09?*. European Central Bank working paper series, 1131, pp1-49, http://ssrn.com/abstract_id=1520351.

Azqueta-Gavaldon, A., Hirschbühl, D., Onorante, L., Saiz, L. (2019). *Sources of economic policy uncertainty in the euro area : a machine learning approach*. ECB Economic Bulletin, 5, online :https://www.ecb.europa.eu/pub/economicbulletin/focus/2019/html/ecb.ebbox201905_04~6b149ccb66.en.html

Baele, L., Ferrando, A., Hördahl, P. et al (2004). *Measuring financial integration in the Euro area*. European Central Bank Occasional Paper Series, 14, pp1-98, http://ssrn.com/abstract_id=749045.

Baker, S.R., Bloom, N., Davis, S.J. (2013). *Measuring economic policy uncertainty*. Chicago Booth Research Paper, pp13-02, 1-57, doi :<http://dx.doi.org/10.2139/ssrn.2198490>

Baker, S.R., Bloom, N., Davis, S.J. (2015). *Immigration fears and policy uncertainty*. VOX CEPR Policy Portal. Online <https://voxeu.org/article/immigration-fears-and-policy-uncertainty>, consulted on 8 June 2020

Bank aus Verantwortung (n.d.). *Frequently asked questions*. KfW Group. Online <https://www.kfw.de/KfW-Group/Investor-Relations/KfW-Anleihen/Kapitalmarkt/Private-Anleger/Häufig-gestellte-Fragen/index.html>, consulted on 8 June 2020

Barber, T. (2010). *Greece condemned for falsifying data*. The Financial Times. Online : <https://www.ft.com/content/33b0a48c-ff7e-11de-8f53-00144feabdc0>, consulted on 8 June 2020

Barber, T. (2019). *Eurozone reform deadlock reflects deep malaise over integration*. The Financial Times. Online <https://www.ft.com/content/8ffa04c6-1815-11ea-8d73-6303645ac406>, consulted on 8 June 2020

Bayer, C., Kim, C.H., Kriwoluzky, A. (2018). *Measuring the risk of a euro area breakup*. VOX CEPR Policy Portal. Online <https://voxeu.org/article/measuring-risk-euro-area-breakup>, consulted on 8 June 2020

Beber, A., Brandt, M. W., Kavajecz, K. A. (2006). *Flight-to-quality or flight-to-liquidity? Evidence from the Euro-area market*. NBER Working Paper Series, 12376, pp1-38

Berenberg-Gossler, P., Enderlein, H. (2016). *Financial market fragmentation in the euro area: state of play*. Directorate General for Internal Policies, Policy Department: Economic and Scientific Policy, Monetary Dialogue, pp7-24, doi: 10.2861/188671

Berg, T. (2010). *The term structure of risk premia: new evidence from the financial crisis*. ECB Working Paper Series, 1165, ISSN: 1725-2806

Bernoth, K., von Hagen, J., Schuknecht, L. (2004). *Sovereign risk premia in the European Government bond market*. ECB Working Paper Series, 369, SSRN: <https://ssrn.com/abstract=533129>

Campos, N., Macchiarelli, C. (2018). *A history of the European core and its periphery : how an optimal currency area forms*. VOX CEPR Policy Portal. Online <https://voxeu.org/article/history-european-core-and-its-periphery>, consulted on 8 June 2020

Checherita, C., Attinasi, M., Nickel, C. (2010). *What explains the surge in euro-area foreign spreads during the financial crisis of 2007-09?*. *VOX CEPR Policy Portal*. Online <https://voxeu.org/article/how-financial-crisis-raised-eurozone-bond-spreads>, consulted on 8 June 2020

Chicago Board Options Exchange (n.d.). *VIX index*. Online : <http://www.cboe.com/vix/>, consulted on 3 August 2020

Cimadomo, J., Clays, P., Poplawski-Ribeiro, M. (2014). *How do financial institutions forecast sovereign spreads?*. ECB Working Paper Series, 1750, doi : 10.2866/36724

De Grauwe, P. (2012). *From financial to social and political risks in the Eurozone*. Social developments in the European Union, 14, pp31-42

De Grauwe, P. (2013). *The European Central Bank as Lender of Last Resort in the government bond markets*. CESifo Economic Studies, 59, pp1-16, doi:10.1093/cesifo/ift012

De Grauwe, P., Ji, Y. (2012). *Mispricing of sovereign risk and multiple equilibria in the Eurozone*. CEPS working document, 361, <http://dx.doi.org/10.2139/ssrn.1996484>

De Grauwe, P., Ji, Y. (2014). *Disappearing government bond spreads in the eurozone: back to normal?*. CEPS Working Document, 396, pp1-12, <https://ssrn.com/abstract=2438610>

De Santis, R. (2015). *A measure of redenomination risk*. European Central Bank Working Paper Series, 1785, pp1-48, doi: 10.2866/619277

De Santis, R., Stein, M. (2016). *Correlation changes between the risk-free rate and sovereign yields of euro area countries*. European Central Bank Working Paper Series, 1979, pp1-45, doi: 10.2866/850460

Delivorias, A. (2015). *ECB's Expanded Asset Purchase Programme: Will quantitative easing revive the euro area economy?*. European Parliament Briefing. EPRS.

Dewachter, H., Iania, L., Lyrio, M., de Sola Perea, M. (2014). *A macro-financial analysis of the euro area sovereign bond market*. Journal of Banking & Finance, 50, pp308-325, <http://dx.doi.org/10.1016/j.jbankfin.2014.03.011>

Economic Policy Uncertainty (2012). *Migration Fears and EPU*. Online https://www.policyuncertainty.com/immigration_fear.html, consulted on 8 June 2020

European Central Bank (2010). *Euro Area Money Growth and the "Securities Markets Programme"*. ECB Monthly Bulletin, pp24-26, ISSN 1725-2822

European Central Bank (n.d.). *Convergence criteria*. Online : <https://www.ecb.europa.eu/ecb/orga/escb/html/convergence-criteria.en.html>, consulted on 8 June 2020

European Central Bank (n.d.). *Fiscal Policies*. Online <https://www.ecb.europa.eu/mopo/eaec/fiscal/html/index.en.html>, consulted on 8 June 2020

European Central Bank (n.d.). *Open Market Operations*. Online : <https://www.ecb.europa.eu/mopo/implement/omo/html/index.en.html>, consulted on 8 June 2020

European Commission (2016). *Eurobarometer: Overall support for more euro area economic policy coordination*. Economic and Financial affairs. Online https://ec.europa.eu/economy_finance/articles/euro/2016-12-09-eurobarometer_en.htm, consulted on 8 June 2020

European Commission (2017). *The Migration Crisis*. Online <https://op.europa.eu/webpub/com/factsheets/migration-crisis/en/>, consulted on 8 June 2020

European Commission (n.d.). *The European single market*. Online https://ec.europa.eu/growth/single-market_en, consulted on 8 June 2020

European Council (2016). *EU-Turkey statement, 18 March 2016*. Council of the European Union Press Release. Online : <https://www.consilium.europa.eu/en/press/press-releases/2016/03/18/eu-turkey-statement/>, consulted on 8 June 2020

European Parliament (n.d). *What is Eurobarometer?* Online <https://www.europarl.europa.eu/at-your-service/en/be-heard/eurobarometer>, consulted on 8 June 2020

Favero A.C., Pagano, M., Von Thadden, E-L. (2010). *How does liquidity affect government bond yields?*. Journal of financial and quantitative analysis, 45(1), pp107-134, doi:10.1017/S0022109009990494

Favero, A.C. (2013). *Modelling and forecasting government bond spreads in the euro area: a GVAR model*. Journal of Econometrics, 177(2), pp343-356, <https://doi.org/10.1016/j.jeconom.2013.04.004>

Favero, A.C., Missale, A. (2016). *Contagion in the EMU-The role of Eurobonds with OMTs*. Review of Law & Economics, 12(3), pp555–584, doi: <https://doi.org/10.1515/rle-2016-0043>

Fiedler, S., Gern, K-J., Raddant, M., Stolzenburg, U. (2016). *Financial market fragmentation in the euro area: state of play*. Directorate General for Internal Policies, Policy Department A: Economic and Scientific Policy, Monetary Dialogue, pp25-48, doi : 10.2861/188671

Fleming, S., Khan, M., Hopkins, V. (2020). *Europe shows a harder face on migration as political mood shifts*. The Financial Times. Online <https://www.ft.com/content/13fe6554-5ee9-11ea-b0ab-339c2307bcd4>, consulted on 8 June 2020

Fletcher, L. (2019) *Bond yields across the eurozone look vulnerable to policy setback*. The Financial Times. Online <https://www.ft.com/content/aa412246-c8d4-11e9-af46-b09e8bfe60c0>, consulted on 8 June 2020

Frieden, J., Walter, S. (2017). *Understanding the political economy of the Eurozone crisis*. Annual review of political science, 20, pp371-390, <https://doi.org/10.1146/annurev-polisci-051215-023101>

Gande, A., Parsley, D. (2005). *News spillovers in the sovereign debt market*. Journal of Financial Economics, 75(3), pp691-734, <https://doi.org/10.1016/j.jfineco.2003.11.003>

Greenhill, K.M. (2016). *Open arms behind barred doors: fear, hypocrisy and policy schizophrenia in the European migration crisis*. European Law Journal, 22(3), pp317-332

Hatton, T. (2014). *Public opinion on immigration: has the recession changed minds?*. VOX CEPR Policy Portal. Online : <https://voxeu.org/article/public-opinion-immigration-and-recession>, consulted on 8 June 2020

Hobza, A., Zeugner, S. (2013). *Current-account surpluses in the Eurozone: should they be reduced?*. VOX CEPR Policy Portal. Online <https://voxeu.org/article/should-eurozone-current-account-surpluses-be-reduced>, consulted on 8 June 2020

Hortvath, R. (2016). *Financial market fragmentation and monetary transmission in the Euro Area*. Directorate General for Internal Policies, Policy Department A : Economic and Scientific Policy, Monetary Dialogue, pp69-88, doi : 10.2861/188671

Jappeli, T., Pagano, M. (2008). *Financial market integration under EMU*. European Economy Economic Papers, 312, pp1-41, doi: 10.2765/50937

John, T. (2017). *What to know about Geert Wilders*. Time. Online <https://time.com/4696459/geert-wilders-the-dutch-trump/>, consulted on 8 June 2020

Jones, C. (2018). *FT poll: political risk set to cut eurozone growth*. The Financial Times. Online <https://www.ft.com/content/62785158-0478-11e9-99df-6183d3002ee1>, consulted on 8 June 2020

Jurado, K., Ludvigson, S., Ng, S. (2015). *Measuring uncertainty*. American Economic Review, 105(3), pp1177-1216, <http://dx.doi.org/10.1257/aer.20131193>

Kaminska, I. (2017). *Parallel currency talk gains ground in Italy*. The Financial Times. Online <https://ftalphaville.ft.com/2017/08/21/2192571/parallel-currency-talk-gains-ground-in-italy/>, consulted on 8 June 2020

Kaya, O. (2018). *Economic policy uncertainty in Europe*. EU Monitor: Global financial markets. Deutsche Bank Research. Online : https://www.dbresearch.com/PROD/RPS_EN-PROD/PROD0000000000460235/Economic_policy_uncertainty_in_Europe%3A_Detrimental.pdf, consulted on 8 June 2020

Khan, M. (2018). *In or out? Italy's populist have to choose on euro membership*. The Financial Times. Online <https://www.ft.com/content/a43986f6-62e9-11e8-a39d-4df188287fff>, consulted on 8 June 2020

Khan, M., Samson, A. (2017). *French bonds enjoy best run since Brexit vote*. The Financial Times. Online <https://www.ft.com/content/d37b6d90-fdd1-11e6-8d8e-a5e3738f9ae4>, consulted on 8 June 2020

Koutsoukis, N-S., Rouakanas, S. (2016). *'Compulsory' economic deflation turned political risk: effects of austere decision-making on Greece's 'true' economy (2008-2015) and the 'Eurozone or Default' Dilemma*. Economic crisis, development and competitiveness in Southeastern Europe : theoretical foundations and policy issues, pp41-55, doi: 10.1007/978-3-319-40322-9_3

Kraemer, M. (2016). *Sovereign ratings 2017: a spotlight on rising political risk*. S&P Global. Online <https://www.spglobal.com/en/research-insights/articles/sovereign-ratings-2017-a-spotlight-on-rising-political-risks>, consulted on 8 June 2020

Lane, P.R. (2006). *The real effects of European Monetary Union*. Journal of economic perspectives, 20(1), pp47-66, DOI: 10.1257

Minenna, M. (2017). *CDS markets signal rising fear of euro breakup*. The Financial Times Alphaville. Online <https://ftalphaville.ft.com/2017/03/06/2185614/guest-post-cds-markets-signal-rising-fear-of-euro-breakup/>, consulted on 8 June 2020

Minenna, M. (2019). *Debt markets are pricing in a real risk of "Quitaly"*. The Financial Times. Online <https://www.ft.com/content/b3e56724-8c36-11e9-a1c1-51bf8f989972>, consulted on 8 June 2020

Monfort, A., Renne, J-P. (2014). *Decomposing Euro-Area sovereign spreads : credit and liquidity risk*. Review of Finance, 12, pp2103-2151, doi:10.1093/rof/rft049

Moody's Investors Services (2020). *Rating Symbols and Definitions*. Online : <https://www.moodys.com/sites/products/AboutMoodysRatingsAttachments/MoodysRatingSymbolsandDefinitions.pdf>, consulted on 8 June 2020

Münchau, W. (2013). *Why Europe needs to try unconventional policy*. The Financial Times. Online <https://www.ft.com/content/34e2106a-4df5-11e3-8fa5-00144feabdc0>, consulted on 8 June 2020

Münchau, W. (2019). *Complacency could yet threaten the eurozone*. The Financial Times. Online: <https://www.ft.com/content/8bc97768-0d4a-11ea-b2d6-9bf4d1957a67>, consulted on 8 June 2020

Pagano, M. (2010). *Fiscal crisis, contagion, and the future of euro*. VOX CEPR Policy Portal. Online <https://voxeu.org/article/understanding-eurozone-crisis>, consulted on 8 June 2020

Politi, J. (2017). *Italian debate on merits of ditching euro grows louder*. The Financial Times. Online <https://www.ft.com/content/6d67cf26-08b2-11e7-97d1-5e720a26771b>, consulted on 8 June 2020

Politi, J. (2018). *Populist beliefs: where Italy's League and Five Star stand*. The Financial Times. Online: <https://www.ft.com/content/8ca9a840-543e-11e8-b3ee-41e0209208ec>, consulted on 8 June 2020

Qontigo (2020). *STOXX Strategy Index Guide*. Online : https://www.stoxx.com/document/Indices/Common/Indexguide/stoxx_strategy_guide.pdf, consulted on 3 August 2020

Sandbu, M. (2019). *Italy can no longer afford to play games with Brussels*. The Financial Times. Online: <https://www.ft.com/content/38e4235e-892e-11e9-97ea-05ac2431f453>, consulted on 8 June 2020

Sandbu, M. (2019). *The Eurozone's tectonic plates are shifting*. The Financial times. Online <https://www.ft.com/content/b130a2c8-2af1-11ea-a126-99756bd8f45e>, consulted on 8 June 2020

Schuknecht, L., von Hagen, J., Wolswijk, G. (2010). *Government bond risk premiums in the EU revisited : the impact of the financial crisis*. European Journal of Political Economy, 27(1), pp36-43, <https://doi.org/10.1016/j.ejpoleco.2010.07.002>

Seitan, S-M. (2013). *Possible risks of the withdrawal of a member state from the Eurozone*. Cross-Cutlural Management Journal, 15(1), pp51-57

Stearns, J. (2020). *Europe's refugees*. Bloomberg. Online <https://www.bloomberg.com/quicktake/europe-refugees?sref=dtbBxbnP>, consulted on 8 June 2020

Steen, M. (2013). *Bundesbank takes aim at Mario Draghi's ECB rescue plan*. The Financial Times. Online <https://www.ft.com/content/116fe5b6-adf1-11e2-a2c7-00144feabdc0>, consulted on 8 June 2020

Steen, M. (2013). *Hearing pits German monetary heavyweights against each other*. The Financial Times. Online <https://www.ft.com/content/a46a8402-cf7f-11e2-a050-00144feab7de>, consulted on 8 June 2020

Stothard, M. (2017). *Could France's Marine Le Pen deliver Frexit?*. The Financial Times. Online <https://www.ft.com/content/d37b6d90-fdd1-11e6-8d8e-a5e3738f9ae4>, consulted on 8 June 2020

Stothard, M. (2017). *Marine Le Pen launches presidential campaign*. The Financial Times. Online <https://www.ft.com/content/a5519f64-eaeb-11e6-930f-061b01e23655>, consulted on 8 June 2020

Stubbingon, T. (2019). *How 2019's mammoth bond rally buoyed the entire eurozone*. The Financial Times. Online <https://www.ft.com/content/8097ceca-1b60-11ea-97df-cc63de1d73f4>, consulted on 8 June 2020

Stubbingon, T. (2019). *Italian bonds under pressure in wake of political volatility*. The Financial Times. Online <https://www.ft.com/content/4e910176-ba8a-11e9-8a88-aa6628ac896c>, consulted on 8 June 2020

The Financial Times (2013). *In defence of OMT and Draghi's ECB*. Opinion the FT View. Online <https://www.ft.com/content/34e2106a-4df5-11e3-8fa5-00144feabdc0>, consulted on 8 June 2020

Trauner, F., Turton, J. (2017). *"Welcome culture": the emergence and the transformation of a public debate on migration*. Austrian Journal of Political Science, 46(1), pp34-40, DOI 10.15203

Viscusi, G. (2019). *Why the Yellow Vest remain a thorn in Macron's presidency*. Bloomberg. Online <https://www.bloomberg.com/news/articles/2019-04-30/why-yellow-vests-remain-thorn-in-macron-presidency-quicktake?sref=dtbBxbnP>, consulted on 8 June 2020

Zerka, P. (2018). *Destination unknown: the EU's many-faceted migration fears*. European Council on Foreign Relations. Online: https://www.ecfr.eu/article/commentary_destination_unknown_eu_many_faceted_migration_fears, consulted on 8 June 2020

