EUROPEAN CENTRAL BANK
EUROSYSTEM

Working Paper Series

Andrea Zaghini

The Covid pandemic in the market: infected, immune and cured bonds

No 2563 / June 2021

Abstract

By focusing on the cost conditions at issuance, I find that not only the Covid-19 pandemic effects were different across bonds and firms at different stages, but also that the market composition was significantly affected, collapsing on investment-grade bonds, a segment in which the share of bonds eligible to the ECB corporate programmes strikingly increased from 15% to 40%. Contemporaneously, the high-yield segment shrunk to almost disappear at 4%. Another source of risk detected in the pricing mechanism is the weak resilience to pandemic: the premium requested is around 30 bp and started to be priced only after the early containment actions taken by the national authorities. On the contrary, I do not find evidence supporting an increased risk for corporations headquartered in countries with a reduced fiscal space, nor the existence of a premium in favour of green bonds, which should be the backbone of a possible "green recovery".

JEL classification: G15,G32, E52.

Keywords: ECB, Corporate quantitative easing, Covid pandemic, Green bonds.

NON-TECHNICAL SUMMARY

The Covid pandemic significantly affected all financial markets, however not all securities were hit in the same way. By focusing on the pricing mechanism at issuance, I study the effect of the pandemic in the euro-area bond market. I find that not only the effects were different across bonds and firms at different stages, but also that the market composition was significantly affected.

As happened to the stock markets around the world, also the euro-area bond market was not much affected by the news about the Corona virus diffusion up to last week of February 2020, when the first severe lockdown measures were taken in Europe. The cost at issuance suddenly increased in all market segments and regardless of the business sector of the issuing corporation. However, it is estimated that the bonds eligible to the ECB corporate programme (CSPP) benefited from a more muted impact of around 40 basis points. Somewhat surprisingly, this advantage instead disappeared in the period starting from mid-March 2020, characterized by the ECB launch of an extraordinary purchasing programme (PEEP) and policy measures of unprecedented magnitude by the domestic governments and the European Union.

The latter evidence can be explained by two circumstances: i) the change in the market composition; ii) the working of the portfolio rebalancing channel. Concerning the market composition, the flight to safety phenomenon moved financial agents away from the more risky assets (i.e., bonds with a high yield rating) and towards the safer investment grade (IG) segment. The share of high-yield bonds shrunk to almost disappear at 4%. Given that all eligible bonds have an IG rating, that made the bond market more homogeneous and reduced the price differences in the most acute phase of the crisis.

Regarding the rebalancing channel, after the starting of the new pandemic programme in the second half of March 2020, a large share of the market became unavailable because of the ECB increased demand. As a consequence, investors rebalanced their portfolio towards assets of similar characteristics: IG bonds which were non eligible to the ECB purchases. This in turn generated a surge in the demand for non-eligible bonds which, increasing the bond price, reduced the cost at issuance and offset the difference with respect to eligible bonds.

In addition to the market segmentation along the bond grade and the eligibility to the ECB programmes, another source of risk detected in the pricing mechanism is the weak resilience to pandemic crises, where resilience is defined as the reliance on business models based on technologies and organizational structures that are robust to social distancing (those, for instance, that can adapt extensively to teleworking or do not require close contact with customers). The premium requested is around 30 basis points and started to be priced only after the early containment actions taken by the national authorities. On the contrary, I do not find evidence supporting an increased risk for corporations headquartered in countries with a reduced fiscal space.

A final exercise concerns the existence of a possible price advantage for green bond, also known in the literature as "greenium". Indeed, the policy decisions taken to address the pandemic crisis are likely to have lasting effects on the global economy and the way business activities are carried on. At the same time, the commitments to a CO2 reduction and the transition to a low carbon environment taken within the 2015 Paris agreements are still to be achieved. Thus, from many sources claims were voiced that a "green recovery" through sustainable energy investments could help economies out of the crisis and give the most needed push to the transition to a sustainable economy. Given that green bonds are among the most suitable financial instruments to finance green projects, I test whether they enjoy a reduced cost of placement. It turns out that the 315 green bonds placed in the euro-area market since January 2019, do not show any additional (positive or negative) cost at issuance. This evidence is confirmed when looking at the bond issued by non-financial corporations only and when focusing on bonds with a third party green certification.

1 Introduction

In September 2019, the ECB announced a new wave of corporate asset purchases at a monthly pace of €20 billion to reinforce the accommodative impact of the policy rates and ease euro-area corporations' financing conditions. In particular, following the experience of the first Corporate Sector Purchase Programme (CSPP), the purchases of bonds of eligible quality were expected not only to have a direct impact on targeted bonds, concerning both prices and quantities (Todorov 2020), but also to trigger the portfolio rebalancing channel, the mechanism through which also bonds of lower quality, typically associated with small and medium enterprises (SMEs), are able to benefit of a reduced cost of issuance (Zaghini 2019). In addition, given a sufficient time span, other channels could kick in and involve corporations with no access to the bond market by relaxing banks' lending constraints (Grosse-Rueschkamp et al. 2019; Arce et al. 2020).

Four months into the programme the economic, financial and social outlook completely changed in the euro area and worldwide due to the outburst and spreading of the Covid-19 pandemic. The ECB promptly acted by launching on 18 March, 2020 a new temporary asset purchase programme (PEPP, Pandemic Emergency Purchase Programme) on the much larger scale of 120 billion per month to counter the serious risks to the monetary policy transmission mechanism and the economic outlook for the euro area posed by the escalating diffusion of the virus.

The Covid-19 is an infectious disease brought about by a Corona virus which causes a severe acute respiratory syndrome with a deadly rate strongly depending on the age of the infected person. The disease was first identified in December 2019 in Wuhan, China and it rapidly spread from January 2020 around the world. The first official case recorded in the US is dated 21 January, 2020, while the first case in Europe is recorded in France just three days later. The World Health Organization (WHO) declared it a "public health emergency of international concern" on January 30, 2020. Up to

that date financial market reactions were muted, almost entirely ignoring the spreading of the virus and behaving as if the diffusion would not have had any implication for the economic activities.

Market reactions started only after the first significant set of interventions against the spreading of the virus in Italy (the first strongly hit European country). On 23 February, 2020 the Italian government announced a decree imposing the quarantine of more than 50,000 people from 11 municipalities in Northern Italy. The Italian military and law enforcement agencies were instructed to secure and implement the lockdown. The quarantine zones identified as the centres of the two main clusters were called the Red zones. From then on an escalation of similar and stronger decisions were taken all over Europe and the world. In the 30 days starting from February 24, 2020 stock markets collapsed and volatility surged. The US S&P 500 Index lost one third of its value and the Euro Stoxx fell by 37%. Falls of comparable magnitude were recorded around the world: Brazil (46%), Japan (31%), Hong Kong (25%). The same dramatic development involved also the bond market, with the yield of both investment grade (IG) and high yield (HY) bonds skyrocketing in the euro area above the peaks reached during the sovereign debt crisis in 2012. Only in late March, when central banks stepped in providing liquidity to banks and restarting or increasing the purchases of both sovereign and corporate bonds, did financial markets change direction.

Not all bond segments were equally hit by the changing market conditions and not all bond segments equally recovered when the outlook improved. In order to assess which bonds suffered most from the Covid-19 pandemic and whether the ECB measures were effective in tackling the shock, in the first part of the paper I propose an empirical assessment of the two ECB corporate programmes (CSPP and PEPP) on the cost of funding of corporations, by providing an answer to the following questions: Were the programmes able to involve targeted and non-targeted bonds (via the portfolio rebalancing channel) before, during and after the Corona virus spreading? Were the ECB

purchases able to shelter the different euro-area bond market segments from the deteriorating market conditions as of end February 2020? Did eligible bonds enjoy a reduced cost of placement in both good and bad times?

In order to answer the above-mentioned questions I refer to the yield on bonds at issuance, i.e. I look at the developments in the primary bond market, which is the place where the cost of funding is set for the issuing corporations (Sironi 2003; Santos 2014; Zaghini 2019). Indeed, while secondary market prices can be thought of as the market assessment of a possible new placement in that moment, they do not change the face value of the already issued bonds: in other words, they do not change the cost for the issuing entity. Instead, the single originating trade on the primary market exactly defines the corporation's commitment and the actual funding cost.

While the impact of monetary policy measures on the price of secondary trades is fast, due to the large market liquidity and a time-continuous trading system, the adjustment on the primary bond market takes longer. For instance, while the initial effect of a policy measure is usually recorded in secondary market indexes on the same day of the announcement, it will show up later on primary placements. This is due not only to the fact that new placements occur at discrete points in time and are often agreed upon much in advance, but also to a much larger heterogeneity of issuers and bonds in the primary market. Thus, to assess the effect of the two ECB programmes, it is important to have a sufficient time span after the announcement and the start of the purchases and a clear timeline to work with.

In addition to the choice of focusing at the primary placements, another aspect of care of the paper is the identification of the correct sample of eligible and non-eligible bonds. First, the markets in which the ECB actively purchases at issuance (Eurosystem market, from now on) is a particular subset of the world market which has to be constructed by looking at the bond level. Second, the eligibility criteria, while making all HY bonds non eligible, further distinguish among IG bonds, since not all of them are eligible for

purchase even when placed in the Eurosystem market. Both issues are often not clearly tackled in the empirical literature.

By focusing on the markets in which the ECB programmes are active and looking at the yield on new bond placements by both IG and HY corporations, I find that the ECB purchases have successfully sheltered the eligible bond segment from the first significant deterioration in market conditions occurred between late February 2020 and mid March 2020: the cost at issuance being estimated to be smaller in the range 60-80 basis points than non-eligible bonds. On the contrary, the ECB purchases were not effective afterwards (from the second half of March to end May 2020): the further worsening that took place after the PEPP announcement was felt by eligible bonds in the same way as all other IG bonds. Both results hold even when restricting the sample to the set of issuers that were able to place both eligible and non-eligible bonds.

In addition, there is no evidence of the working of a portfolio rebalancing channel in favour of HY bonds, the spread with respect to eligible bond having dramatically increased to above 200 basis points from around 40 basis points before the start of the purchases. On the contrary, the HY issuance has shrunk to almost disappear in the second half of March 2020. Thus, a consequence of the crisis is that the bond market almost entirely collapsed to IG bonds only, with the share of eligible bonds growing to around 40%. This in turn has a relevant policy implication: corporations getting a downgrade to the HY segment (the so called "fallen angels") may not be able to issue bonds any more, since neither the ECB nor the other investors are willing to purchase in that segment.

In the second part of the paper I take into account other possible sources of price discrepancies among bonds and corporations by testing three (mutually non exclusive) hypotheses about the bond pricing. In particular, I first test whether market investors require a disaster-premium on the most vulnerable corporations as found by Pagano et al. (2020) for the US stock

market. In their study, they check for differences in the return performance due to pandemic resilience, where the latter is defined as reliance on technologies and/or organizational structures that are robust to social distancing. They find that not only more resilient companies outperformed less resilient during the Covid outbreak, but also that similar cross-sectional return differentials emerged before the crisis. In their opinion this in turn suggests a growing awareness of pandemic risk well in advance of its materialization ("pre-disaster learning model"). Relying on the same measure of dependence on physical human interaction provided by Koren and Pető (2020), I instead find that there was not pandemic awareness before the Covid spreading, and that it took time to learn during the crisis and eventually differentiate according to resilience to human interaction. Using Pagano et al. (2020) terminology, the result thus suggests that the Eurosystem bond market behaved according to the "unpriced–disaster risk model".

Another possible source of concerns regarding the different ability of corporations in facing the adverse environment brought about by the Corona virus is due to the different fiscal room available to governments. Indeed, countries with reduced fiscal space might not be able to implement adequate measures aimed at supporting the economy and preventing a large number of firms going bankrupt. However, it turns out that the corporations headquartered in the countries most hit by the sovereign debt crisis in 2010-2012 (Greece, Italy, Portugal and Spain) did not face, *coeteris paribus*, an additional cost of financing on the Eurosystem bond market neither during the early lockdown phase nor afterwards.

The policy decisions taken now to address the pandemic crisis are likely to have lasting effects on the global economy and the way business activities are carried on. At the same time, the commitments to a CO2 reduction and the transition to a low carbon environment taken within the 2015 Paris agreements are still to be achieved. Thus, from many sources claims are voiced that a "green recovery" through sustainable energy investments could

help economies out of the crisis and give the most needed push to the transition to a sustainable economy (Bleischwitz 2020; IMF 2020a; Moore 2020). Given that green bonds are among the most suitable financial instruments to finance green projects, I test whether they enjoy a reduced cost of placement. It turns out that the 315 green bonds placed in the Eurosystem market since January 2019, do not show any additional (positive or negative) cost at issuance.

The remainder of the paper is organized as follows. Section 2 describes the CSPP and PEPP features. Section 3 deals with the construction of the dataset. Section 4 depicts the evolution of the funding cost on the primary bond market. Section 5 introduces the econometric approach. Section 6 discusses the empirical results about the effects of the ECB programmes. Section 7 deals with the additional features of the pricing mechanism. Section 8 draws the conclusions and derives the policy implications.

2 The Eurosystem corporate market

The ECB set the conditions for corporate eligibility under the first CSPP programme on April 2016 and since then they were just marginally updated. Thus, when on September 2019 a new wave of (corporate) purchases was announced, the criteria were already known in the financial markets. In addition, following the experience of the global crisis, when faced with the Corona virus spreading, the ECB acted promptly: the launch of the PEPP, while introducing more flexibility in the actual purchases, still maintained the CSPP eligibility criteria.[1]

The eligibility criteria are listed below and concern both the bond and

[1]The most relevant change to the eligibility framework concerns the expansion of the purchases to non-financial commercial paper, which was announcend together with the PEPP on 18 March, 2020. For further details see the ECB press releases:
https://www.ecb.europa.eu/press/pr/date/2016/html/pr160421_1.en
https://www.ecb.europa.eu/press/pr/date/2020/html/ecb.pr200318_1~3949d6f266.en

the issuer:

- the bond must be eligible as collateral for Eurosystem credit operations;
- the bond must be denominated in euro;
- the bond must have a minimum first-best credit assessment of at least BBB- or equivalent (obtained from an external credit assessment institution);
- the bond must have a minimum (remaining) maturity of six months and a maximum (remaining) maturity of less than 31 years;[2]
- the issuer must be a corporation established in the euro area, defined as the location of incorporation of the issuer;
- the issuer must not be a credit institution nor have any parent undertaking which is a credit institution.

From the credit assessment criterion it emerges that the ECB relies on a slightly different definition of IG bonds with respect to the one used by market investors. Indeed, in the paper I label IG bonds all bonds which fulfill the ECB requirement of a first-best credit assessment of at least BBB-, even though this definition is not exactly matched by the financial investors' definition of IG bond, which usually requires the mean or the median rating to be at least BBB-. While it is argued that this difference made bonds between the two thresholds, or even just slightly below, to behave in the same way (Li et al. 2020), it also happened that after the first CSPP announcement,

[2] After 18 March, 2020 the ECB can purchase marketable debt instruments that have an initial maturity of 365/366 days or less with a minimum remaining maturity of at least 28 days. The six-month minimum remaining maturity requirement continues to apply for marketable debt instruments with an initial maturity of at least 367 days.

rating upgrades were mostly noticeable for bonds initially located below, but close to, the eligibility frontier (Abidi et al. 2019).[3]

In addition, from the joint working of the above-listed criteria, it turns out that not all IG bonds are eligible, regardless of the definition adopted. Provided that the other criteria are fulfilled, when an IG firm incorporated in the euro area issues euro-denominated bonds they are eligible, but the same firm may well issue bonds in currencies other than euro, which are not eligible under the ECB programmes. For instance, the German company BMW AG issued in 2019 bonds in 8 different currencies, but only those denominated in euro were eligible for purchase. Another interesting case is that of IG extra-euro area companies which issue via a financial subsidiary incorporated in the euro area. The Swiss Zurich Insurance, for example, cannot issue eligible bonds neither in the euro area or elsewhere, but it may do so when the bond is placed via the subsidiary Zurich Finance DAC, which is incorporated in Ireland.[4] These examples suggest that the eligibility criteria are of utmost relevance in guiding the correct construction of the sample for the analysis of the effects of the ECB purchases, concerning both the eligible set of bonds and the control group.

In order to have access to the universe of issued bonds, I rely on one of the most used data provider as concerns the primary market: DCM Analytics by Dealogic. Not considering commercial paper and neglecting issuers in the industry groups of Government, Development Banks and Multilateral Agencies, Export Credit Agencies I have a universe of 15,581 bonds placed all over the world in the 17 months from 1 January, 2019 to 31 May, 2020 for which

[3]The bonds for which the two criteria do not coincide are only 51 worldwide and 24 in the Eurosystem market. Including them in either the IG or HY segment does not change neither qualitatively nor quantitatively the results of the paper.

[4]Note that the country of nationality is the country in which the main company business is carried out. However, mostly for tax purposes, the place of official incorporation may be different. The Cayman Islands and Bermuda are the most frequent tax heavens for euro-area companies, while Ireland, Luxembourg and the Netherlands are the favourite euro-area countries of incorporation by companies of foreign nationality.

both the ISIN code and the yield at issuance are available. However, the ECB purchases the eligible bonds in a much smaller sub-set which includes only the 19 domestic euro-area markets and the generic European market. Thus, to frame this *ad hoc* market, I initially consider the first two letters of the ISIN code of each bond, which uniquely identify the market of issuance. For instance, all bonds with an ISIN code starting with "FR" or "DE" are placed in the domestic markets of France and Germany, respectively. At the same time the broader common European bond market is identified by ISINs starting with "XS". The bonds selected according to this criterion amount to 4,494.

Since there are no nationality restrictions to issue in any of the above-mentioned markets, this implies that while they mainly include bonds issued by euro-area corporations, they also allow for foreign extra-euro area placements from both other European countries and the rest of the world. At the same time, corporations with a euro-area nationality can find it convenient to issue bonds in markets outside the euro area. Coming back to BMW AG example, over the period under analysis, the German car maker issued also in Canada, Switzerland and the US. Given that these bonds are a relevant alternative for euro-area corporations I include them in the overall sample. Note that in the latter case, the ISIN starts with a couple of letters different from the ones already selected (CA for Canada, CH for Switzerland, US for the United States...) and the bond cannot be purchased under the CSPP/PEPP rules. By adding the 539 placements in all other world markets by companies with a euro-area nationality/incorporation I have a final sample of 5,033 bonds, which I label the Eurosystem market.

As concerns the eligible placements, I rely on the proprietary data from the ECB: excluding commercial paper, in the period under analysis 540 new bond tranches fulfilling all the eligibility criteria were placed in the Eurosystem market.

Notwithstanding the restrictions used to construct it, the Eurosystem

market is an open and international market. Looking at the parent level, there are 1,281 corporations - which issued through 1,590 issuers - placing at least one bond over the period January 2019 - May 2020, for a total of 2.3 trillions euro (Table 1). While around one third of them shows a euro-area nationality (423 parents for almost half of the bonds), they belong to 71 different countries. In particular, there are 264 issuers from China, 115 from the UK and 111 from the US.

Table 1. The Eurosystem market by country

	Parents	Issuers	Bonds	Eligible bonds	Value	Value %
Australia	19	26	71	0	21	0.9
Canada	13	15	67	0	47	2.1
China	264	323	646	0	214	9.5
euro area	423	549	2,485	471	1,175	52.0
Hong Kong	34	48	87	4	28	1.3
India	21	23	30	0	11	0.5
Japan	18	26	71	0	27	1.2
Norway	13	19	81	0	33	1.5
other EU	56	66	294	2	85	3.8
RoW	108	122	232	1	109	4.8
Russian Federation	24	28	49	0	22	1.0
South Korea	22	25	38	0	11	0.5
Switzerland	22	26	62	17	39	1.7
United Arab Emirates	18	18	50	2	17	0.8
United Kingdom	115	140	334	12	159	7.0
United States	111	136	436	31	261	11.5
Total	**1,281**	**1,590**	**5,033**	**540**	**2,260**	**100**

This Table presents some summary statistics of the Eurosystem bond market by country. Parents, Issuers, Bonds, Eligible Bonds are reported in units; Value is the amount placed in the market in billions euro. Value % is the percentage of the amount placed by each country. Sources: DCM Analytics, ECB.

A similar picture applies to the total value placed: more than half of the

total is due to euro-area corporations (52%), followed by the US, China and the UK (11.5%, 9.5% and 7%, respectively). Also important is the role played by Canada, Switzerland and the other EU countries which together account for another 7.6% of the total market size. As already explained above, it is not surprising to see that not all eligible bonds are placed by euro-area parents: there are 69 bonds issued through euro-area incorporated subsidiaries by parents whose nationality is not in a euro-area country (mainly US, UK and Switzerland).

In the next sections I describe the evolution over time of the Eurosystem market and how the amounts placed and the bond yields were affected by the outburst and diffusion of the Corona virus.

3 A disease among bonds

The Covid-19 pandemic has paralyzed the global economy in early 2020, when considering both each single domestic economy and the international trade flows. The rapid spread of the virus has required drastic measures to be taken by governments all over the globe, ranging from social distancing and the banning of public events to shutdowns, lockdowns and restrictions on most economic activities. These needed measures are however the driving factor behind the sharp decline in economic activity recorded in the first two quarters of 2020. It is now acknowledged that the pace of this contraction is faster and its magnitude greater than seen in the Great Recession (IMF 2020b).

Market reactions to news about the virus have been surprisingly quiet up to the last week of February 2020. Indeed, up to the 23th of February the implications of the virus spreading have been largely underestimated. There is a fast-growing body of research looking at the responses of stock markets to the Covid-19 pandemic, which in not conclusive about whether stock markets were able to incorporate all available information. Indeed,

while they initially ignored the pandemic, stock markets strongly reacted from the 24th of February to the news of virus diffusion, closely following the additional news of the spreading of the virus. Up to then, country-specific characteristics appeared to have had little influence, if any, on stock market responses (Capelle-Blancard and Desroziers 2020). After the intervention of almost all central banks from mid March 2020, prices rebounded all around the world and in some instances markets even completely recovered in a few months the losses from the start of the year. Several studies suggest that stock markets were effective, in this second phase, in discounting the most vulnerable firms: those who were more financially fragile, subject to the disruption of international value chains, or less resilient to social distancing (Alburque et al. 2020, Baker et a. 2020, Ding et al. 2020, Fahlenbrach et al. 2020, Pagano et al. 2020, Ramelli and Wagner 2020).

To frame the development over time in the Eurosystem bond market described in the previous Section, I follow the chronology outlined above and link it to the ECB policy measures. In particular, I rely on five sub-periods: i) a "Calm period" from 1 January, 2019 to the announcement of the new wave of corporate purchases (12 September, 2019); ii) a "CSPP announcement" period from 13 September, 2019 up to the day before the actual implementation of the programme (31 October, 2019); iii) a "CSPP purchases" period of corporate purchases from 1 November, 2020 up to 23 February, 2020; iv) a period of "Covid lockdowns" which starts the day after the announcement by the Italian government of the first lockdowns in the Red zones in Northern Italy and when financial markets started to react (24 February, 2020), and ends when the ECB announced the PEPP, the new larger asset purchase programme related to the pandemic (18 March, 2020); v) a "PEPP period" from the day after the announcement of the programme to 31 May, 2020 (the last day of available data).

Table 2 Corporate bond issuance by periods

	Bonds	Bonds per week	Eligible bonds	Eligible %	Other IG %	HY %
Calm period	2,612	72	209	8.0	73.6	18.4
CSPP announcement	598	85	54	9.0	66.4	24.6
CSPP purchases	1,129	75	82	7.3	69.2	23.6
Covid lockdowns	101	32	11	10.9	77.2	11.9
PEPP	593	59	184	31.0	63.7	5.2
Total	**5,033**	**70**	**540**	**10.7**	**70.7**	**18.6**

This table shows the evolution of the primary bond placements by subperiods: Calm period (1/1/2019 - 12/9/2019); CSPP announcement (13/9/2019 - 31/10/2019); CSPP purchases (1/11/2019 - 23/2/2020); Covid lockdowns (24/2/2020 - 18/3/2020); PEPP (19/3/2020 - 31/5/2020). Bonds, Bonds per week and Eligible bonds are reported in units, Eligible%, Other IG% and HY% are reported in percentage points. Sources: DCM Analytics, ECB.

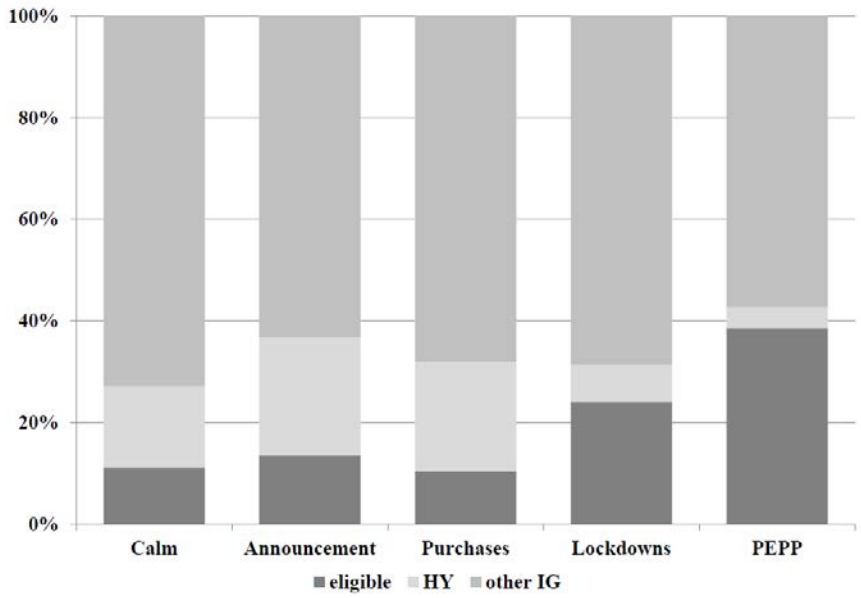
Table 2 reports the development over time of bond placements when dividing the whole time frame into the suggested five sub-periods and taking into account the three bond segments of interest: eligible bonds, other IG bonds which are not eligible, HY bonds (which are never eligible). Not surprisingly, the evolution of bond issuance strongly reflect the changing market conditions: there is a large positive announcement effect of the CSPP, a dramatic drop of placements during the lockdown period, and a partial rebound in the last period, characterized by the announcement and deployment of the PEPP and by the introduction of additional extraordinary measures by the ECB itself, the European Union and the single governments.[5]

Instead, a maybe less expected and most evident change concerns the relative market composition, especially during the last two periods, not only when distinguishing between eligible and non-eligible bonds, but also when taking into account just the bond grade (IG vs HY). While decreasing in

[5] For an analysis of the policy measures taken to sustain banks' lending conditions after the pandemic outbreak in the euro area see Altavilla et al. (2020).

absolute terms, during the Covid lockdowns, there was a large increase in the share of IG placements (both eligible and other IG) with respect to HY bonds, which halved their share from 24% to 12%. In the final PEPP period, the share of IG bonds continued growing reaching 95%, with the eligible bonds increasing to almost one third of all placements and the other IG bonds recovering in terms of items placed (from 24 to 38 bonds per week). The number of HY bonds instead dropped even further to reach a historical minimum of three bonds placed per week (from an already low level of 4 per week in the previous period).

Figure 1 Evolution of market shares by bond segments



This Figure depicts the percentage market shares from the total amount placed in the Eurosystem market of the three bond segments of IG eligible bonds, other IG non-eligible bonds and HY bonds over five consecutive time periods: Calm period (1 January, 2019 - 12 September, 2019); CSPP announcement (12 September, 2019 - 31 October, 2019), CSPP purchases (1 November, 2019 - 23 February, 2020); Covid lockdowns (24 February, 2020 - 18 March, 2020); PEPP (19 March, 2020 – 31 May, 2020). Sources: DCM Analytics and ECB.

Even when looking at the total value placed (Figure 1), the drop in the market share of the HY segment is striking: after having increased to almost

one fourth of total bond issuance after the CSPP announcement, most likely due to the market expectation of the triggering of the portfolio rebalancing channel, which led to a significant increase of HY issuance over the first wave of ECB corporate purchases (June 2016 - December 2018), it remained strong in the period of actual CSPP purchases, but in just three weeks it went down to 8% during the Covid lockdowns and to a mere 4% in the last period. Without any doubt, the segment most hit by the Corona virus is the HY segment.

While it is true that, regardless of the market grade, euro-area corporations in nearly all sectors faced sharp declines in revenue since the February lockdowns, with the vast majority of them witnessing also continuing costs of business, market investors were also aware that HY issuers – usually SMEs – could have faced stronger drains on the cash buffers, increased demand for credit and most likely increased missed payments or default on existing debt. This translated into the "flight to safety" to IG bonds recorded in the two last periods under analysis.

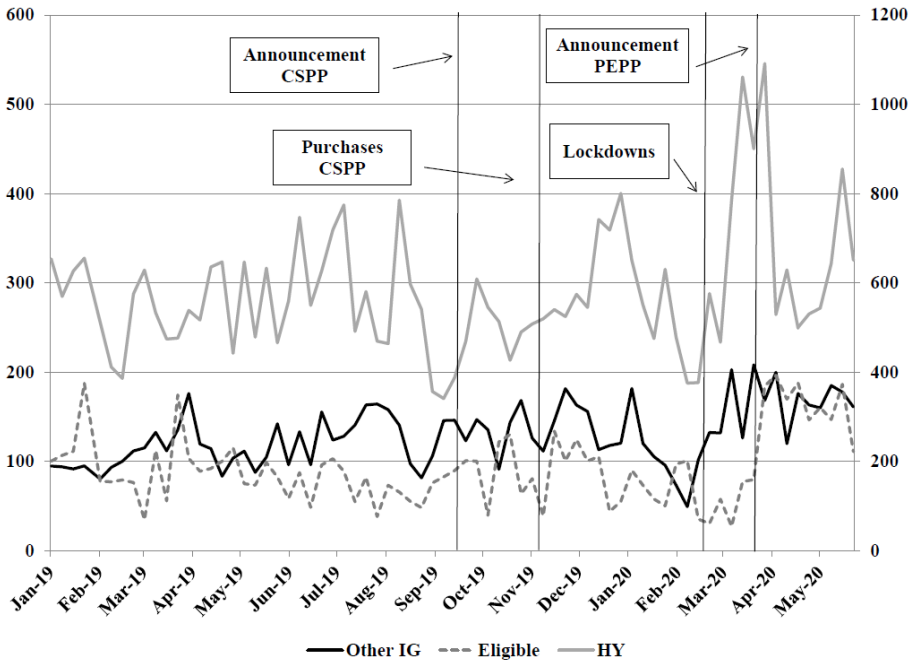
Together with the reported significant changes in market shares, the Eurosystem market was characterized by large swings in bond prices. Since one aim of the paper is to assess the effectiveness of the ECB programmes in lowering and sheltering the cost of bond issuance for euro-area corporations, in the next Section I introduce the cost measure of bonds' placement and describe its evolution over time, highlighting the difficulties to be faced when dealing with the price of bonds in the primary market.

4 The cost of bonds at issuance

As the measure of the cost of financing in the primary bond market, I rely on the asset swap (ASW) spread, which is the difference between the bond yield and the yield of an asset swap contract of similar characteristics taken as the risk-free benchmark. In particular, an asset swap contract is a synthetic

instrument which allows an investor to swap the payments on a bond (i.e. coupons) to a floating rate payments (risk free rate plus the ASW spread), while maintaining the original credit exposure to the fixed rate bond. In the euro area, it is supposed to perform better than the spread with respect to sovereign bonds, especially in periods of high volatility and when the flight to quality phenomenon pushes the yield of the (German) sovereign benchmark below the fundamentals (De Santis 2018).

Figure 2 ASW spread by market segments (basis points)



This Figure depicts the weekly average ASW spreads (in basis points) on bonds placed in the Eurosystem market for the three bond segments of IG eligible bonds, other IG non-eligible bonds and HY bonds. Sources: DCM Analytics and ECB.

Figure 2 depicts the average weekly values of the ASW spread for the bonds placed in the Eurosystem market. The graph is telling about the changing market conditions, which are broadly in line with the chronology of the pandemic crisis and fit fairly well the time partition into five sub-

periods adopted in the previous Section. For the HY and other IG bonds, the increase in the cost of placement starts during the Covid lockdowns, while for the eligible bonds the negative effect is postponed in the early weeks after the PEPP announcement. For the three segments it is clear that the cost conditions reached in the last period, while lower that in the previous period, are still higher than before the pandemic crisis.

Another aspect which is immediately evident is the irregular development of the ASW spread over time, regardless of the market segment. This is due to the fact that in each week the bond issuance differs not only with respect to the amount placed but also with respect to the characteristics of the bonds and the issuers. Since the ASW spread strongly depends on the latter characteristics, it is not possible to compare even two consecutive weekly averages as they were in a *coeteris paribus* condition.[6]

Actually, the issuance on the primary bond market is not a continuous-time activity as the trading in the secondary market and the placement conditions are usually agreed upon well before the actual market issuance. Hence, it is not surprising that the effects of a monetary policy measures take more time to show in primary market volumes and prices than secondary trades (De Santis and Zaghini, 2019). For instance, even though showing a declining trend afterwards, the peak of the ASW spread is recorded for both the HY and the eligible segment not in the same week but in the week after the announcement of the PEPP. Thus, in order to correctly isolate the effect of the ECB programmes, in the next Section I propose a fully-fledged econometric approach that allow to assess whether they had an impact on the cost of bond placements and, if any, on which bonds.

[6] This should be compared, for instance, with the much smoother development of secondary market price indexes (as the iBoxx index), which are instead constructed on bonds with the same characteristics and trading volumes.

5 The econometric approach

I develop the analysis of the impact of the CSPP and PEPP programmes on bond yields at issuance by building on the econometric approach proposed by Sironi (2003) and framed for the euro area by Zaghini (2019). The spread with respect to a risk-free asset is determined by the two main sources of risk of bond features and issuer characteristics:

$$spread_i = \alpha_0 + \sum_k \beta_k V_{i,k}^{bond} + \sum_l \beta_l V_{i,l}^{issuer} + FE_i + \varepsilon_i \tag{1}$$

where $spread_i$ is a generic yield spread of bond i with respect to a risk-free asset, V_k^{bond} are the K variables tracking the bond features, V_l^{issuer} are the L variables characterizing the issuing corporation and FE_i are the fixed effect by country and time, constructed by sets of dummy variables.

Relying on ASW spread as the yield spread measure and given that the announcement of the CSPP in September 2019 and that of the PEPP in March 2020 can be easily considered exogenous shocks, an extension of (1) to a difference-in-differences (DID) framework, in which the treated group is the segment of eligible bonds, can be analytically implemented as:

$$\begin{aligned} ASW_i = \alpha_0 + \alpha_1 eligible_i + \delta_0 Post_i + \delta_1 Post_i * eligible_i + \\ + \sum_k \beta_k V_{i,k}^{bond} + \sum_l \beta_l V_{i,l}^{issuer} + FE_i + \varepsilon_i \end{aligned} \tag{2}$$

where ASW_i is the ASW spread at origination on bond i, $eligible_i$ is a dummy which takes 1 if the bond is eligible and 0 otherwise, $Post_i$ is a time step dummy which takes 1 after the date of the relevant policy measure (CSPP announcement, CSPP start of purchases, PEPP announcement, PEPP start of purchases) and 0 otherwise.

However, the extremely volatile market conditions and the significant changes over time in the control sample may weigh on the DID approach, which is based on the rigid comparison of time periods and market segments.

Thus a different approach is also envisaged.

The working hypothesis of equation (1) is that once the model is saturated by using a broad set of control variables and fixed effects to take into account all possible sources of systematic difference between bonds and issuers, the constant represents the overall market conditions. Since the aim of the exercise is to assess how the ECB monetary policy stance (i.e., the two corporate purchase programmes) has affected the market conditions and given that market conditions depend on several factors other than the monetary policy stance, I rely on control variables to clean as much as possible the constant and time dummies to shape it according to the chronology of the events. Therefore, I first introduce a broad set of market stress indicators, which help to clean the constant and isolate the monetary policy stance, then I rely on a set of time dummies appropriately tailored on the CSPP and PEPP chronology to assess their impact on the financing conditions.

Analytically:

$$ASW_i = \sum_j \alpha_j Time_{i,j} + \sum_j \delta_j eligible_i * Time_{i,j} + \sum_k \beta_k V_{i,k}^{bond} + \quad (3)$$

$$+ \sum_l \beta_l V_{i,l}^{issuer} + \sum_z \beta_z V_{i,z}^{market} + FE_i + \varepsilon_i$$

where ASW_i is again the ASW spread at origination on bond i, and V_z^{market} are the additional Z variables which take into account the financial stress at the time bond i was issued. Note that also the value of all other regressors is taken at time t (the exact issuance day). Therefore, for each bond i, the regressors' value is fixed at time t (the day of the bond placement), even if regressors take different values over time for the same issuer. Thus the model has a cross-section structure and the estimation procedure can be thought of as equivalent to a standard pooled OLS panel estimation in which the issuance date is just another characteristic of bond i and can be taken into

account by a set of J time dummies ($Time_j$). Finally, in order to assess whether the effect of ECB purchases was constant over time and whether it did spill over to other than eligible bonds, I interact the variable tracking the eligible bonds with the time dummies. By looking, period by period, at the coefficient on this interaction it is possible to follow the evolution over time of the direct (additional) effect of the programme on the eligible segment.

Note, that a useful feature of the cross-section approach is that it allows a much larger selection of bonds and issuing institutions than a time series analysis. Indeed, many bonds, especially from smaller issuers, are not constantly priced and traded in the secondary market and thus can not be employed in a time series approach. Even when secondary market quotes exist, prices are most of the times not coupled with actual trades. By focusing on the primary market, I then avoid the market distortions due to the scarce liquidity of many euro-area bonds in secondary trades (Bao et al. 2011, Dick-Nielsen et al. 2012, Wang and Wu 2015).

I saturate the model using a broad set of controls and dummy variables to take into account all possible sources of systematic difference among bonds and issuers. The selection of the regressors is based on the traditional drivers of the risk premium.[7] In particular, as regards the bond features $\left(V_k^{bond}\right)$, the variables taken into account are: the time to maturity at origination, the amount issued (single tranche), the currency of denomination, the coupon frequency and the type of deal (fixed, floating or zero-coupon).[8]

The set V_l^{issuer} characterizing the issuer includes a measure of the creditworthiness of the corporation, the general industry sector and the business nationality.[9] As for the creditworthiness, I rely on the rating provided by the

[7] The literature on the topic is abundant, the interested reader is referred to the seminal contributions by Elton et al. (2001), Collin-Dufresne et al. (2001), Campbell and Taksler (2003).

[8] Note that standard measures of bond-specific liquidity used when analysing secondary market spreads (e.g., the number of trades per day or the bid-ask spreads), cannot be used when dealing with the bonds issued on the primary market, since just the features concerning the originating trade are available.

[9] The 31 sectors are: Aerospace, Agribusiness, Alcoholic Beverages, Auto/Truck, Bank,

three most important rating agencies: Moody's, Fitch and Standard&Poors. Given the likely non linear relation between the probability of default and the rating, I use a set of dummy variables, one for each rating grade.[10]

In the set V_z^{market} of variables tracking the financial stress, there are three market indices at the daily frequency: the VSTOXX index, which is a measure of the equity market volatility in the euro area (computed relying on both call- and put-implied volatilities from the DJ Euro STOXX 50 index); the CISS bond index (Composite Indicator of Systemic Stress), which is the systemic stress indicator for the euro-area financial markets proposed by Hollo et al. (2012); the iTraxx Europe index (the average of 125 equally-weighted single-name European CDS spreads), which should capture market-wide variation in CDS spreads due to changes in fundamental credit risk, liquidity, and CDS market-specific shock (Acharya et al., 2014). In addition, also at the daily frequency, I include the index of macro news for the US and the euro-area provided by Citi, the index of economic policy uncertainty (EPU) by Baker et al. (2016) for the US and the UK, the nominal effective exchange rate of the euro computed by the ECB with respect to the 19 main trading partners of the euro area.

Finally, to deal with possible idiosyncratic shocks affecting the different currencies in which the bonds are issued (17 in the Eurosystem market), I use the interaction of currency and quarter dummies. Instead, to take into account idiosyncratic shocks affecting countries and sectors, I rely on the interaction of sector and country dummies.

Chemicals, Computers & Electronics, Construction/Building, Consumer Products, Defense, Dining & Lodging, Finance other, Food & Beverage, Forestry & Paper, Healthcare, Holding Companies, Insurance, Leisure & Recreation, Machinery, Metal & Steel, Mining, Oil & Gas, Professional Services, Publishing, Real Estate/Property, Retail, Telecommunications, Textile, Tobacco, Transportation, Utility & Energy.

[10] The rating of the issuer is first linearized between 1 (CC/Ca) and 20 (AAA/Aaa), so that when the same bond receives more than one assessment from Moody's, Fitch and Standard&Poors they can be averaged. Then the average is transformed into a set of dummy variables. I also add a dummy tracking the firms whose rating is not available at all.

6 The effects of the ECB purchases

A set of DID regressions as in (2) is run over different time horizons, each characterized by a policy measure. In particular, I start by referring to the CSPP announcement period (13 September, 2019 to 31 October, 2019) as the treatment period for eligible bonds, then, step by step, I enlarge the treatment period to take into account also the four months of CSPP purchases (up to 23 February, 2020), the PEPP period divided into announcement (up to 27 March, 2020) and purchases (up to 31 May, 2020). The starting day of each sample is 1 January, 2019. In addition, an *ad hoc* sample is made on the PEPP alone: the treatment period starts with the PEPP announcement and ends on 31 May, 2019, thus the control period includes also the CSPP.

The top panel of Table 3 reports the coefficients of a basic DID regression without any time or market controls in addition to the $Post_i$ dummy. While the coefficient on the treated group suggests significantly better placement conditions for the eligible bonds segment in the range of 32-37 basis points, the coefficient on the interaction term is never significantly different from zero. Thus, independently on how large we consider the period of intervention on the corporate market by the ECB, the effect on the treated group is not different from the rest of the bond market. This is true also when considering just the PEPP programme alone.

The evidence reported for the basic DID regressions is confirmed when introducing control variables which should help distentangling the effect of the ECB from the changing market conditions. Both the middle panel (in which the daily market stress indicators are introduced) and the lower panel of Table 3 (in which weekly time dummies are introduced) show that the coefficient on the interaction term is never significantly different from zero, even when considering the PEPP programme alone. At the same time it is also confirmed a structural advantage of the eligible bonds segment in the range of 31-38 basis points.

Table 3 DID regressions with expanding treatment periods

	CSPP annoucement	CSPP purchases	PEPP annoucement	PEPP purchases	PEPP alone
No time controls					
Eligible	-37.3074 ***	-31.9823 ***	-33.1325 ***	-35.3689 ***	-38.0881 ***
	(12.8421)	(11.8215)	(11.8912)	(10.9614)	(10.2496)
Post policy measure	2.9066	3.1768	1.0382	1.0274	91.7344 ***
	(12.9660)	(12.5209)	(12.4537)	(12.0676)	(18.6289)
Eligible * Post policy measure	-10.1610	-8.9940	12.4942	17.5044	20.7542
	(17.2969)	(11.8269)	(12.4521)	(10.4913)	(13.5370)
Market stress controls					
Eligible	-37.1995 ***	-31.4685 ***	-32.2773 ***	-34.4198 ***	-37.8565 ***
	(12.9506)	(11.8137)	(11.6992)	(10.7913)	(10.2320)
Post policy measure	14.4016	7.5375	13.8970	13.9018	47.2332
	(17.3553)	(16.1396)	(15.7995)	(14.0675)	(34.0735)
Eligible * Post policy measure	-10.9057	-9.5302	-4.9538	3.4526	19.994
	(17.2747)	(11.7591)	(11.1385)	(9.6367)	(13.7867)
Weekly time dummies					
Eligible	-37.0507 ***	-31.2237 ***	-32.0642 ***	-35.5666 ***	-38.1781 ***
	(12.7328)	(11.6313)	(11.5746)	(9.1263)	(10.3315)
Eligible * Post policy measure	-9.2473	-8.2534	-4.0988	3.8268	18.7114
	(18.6218)	(12.4246)	(11.7441)	(9.9573)	(14.0040)
Bond and Issuer controls	YES	YES	YES	YES	YES
Currency*Time dummies	YES	YES	YES	YES	YES
Sector*Country dummies	YES	YES	YES	YES	YES
No. observations	3,210	4,339	4,499	5,033	5,033

This Table reports the estimated coefficients from DID regressions as of equation (2) with different (expanding) treatment periods. The dependent variable is the ASW spread. Robust standar errors (in parentheses) are clustered by time and issuer. From column 1 to column 4, Post policy measure is a dummy which takes 1 from 13 September, 2019 and 0 before, and ends on: 31 October, 2019 (column 1); 23 February, 2020 (column 2); 27 March, 2020 (column 3); 31 May, 2020 (column 4). In column 5 it takes 1 from 18 March, 2020 to 31 May, 2020 and 0 otherwise. The top panel shows the results when no time controls are included, the middle panel when daily market controls are added, the lower panel when weekly time dummies are added.

As already mentioned, the strong heterogeneity in markets conditions and the large changes in the control sample may make less effective the DID approach over the selected horizon. Thus I also employ the approach described by equation (3), which allows more flexibility and *ad hoc* time partitions.

Table 4 reports in the top panel the estimated α_j coefficients showing the evolution of the market conditions for the segment of non-eligible bonds. For the ease of interpretation the coefficient concerning the calm period before the CSPP is left out. In this way the remaining α_j coefficients show the

change with respect to that initial period.

Table 4 Funding conditions by market segments over time

	Eurosystem	IG	HY	Within-sample	Euro area	Full Sample
			Time dummies			
Before CSPP	-	-	-	-	-	-
CSPP Announcement	8.6827	-0.6155	-27.9643	-5.9968	4.4453	11.8464
	(14.8278)	(9.4865)	(45.0384)	(12.7412)	(9.8483)	(15.4699)
CSPP Purchases	0.7051	7.6973	-18.9453	-7.7105	-12.5523	7.1026
	(20.8524)	(13.0567)	(60.6006)	(14.4567)	(15.9197)	(20.1536)
Lockdowns	51.0090 *	32.7781 *	204.330 ***	35.333 *	38.615 **	58.187 ***
	(30.4278)	(18.9191)	(76.1315)	(19.2371)	(18.2413)	(27.7427)
PEPP	88.560 **	54.773 *	253.907 *	64.131 *	67.752 **	74.303 ***
	(28.6115)	(29.2759)	(136.3086)	(37.2563)	(34.0831)	(43.9767)
			Time dummies * eligible dummy			
Before CSPP	-34.8474 ***	-24.9812 ***	-300.0121 ***	-20.7396 **	-36.7159 ***	-36.4820 ***
	(10.7901)	(7.6347)	(54.7626)	(9.2560)	(11.6518)	(10.4201)
CSPP Announcement	-49.2711 ***	-23.6884 *	-279.7134 ***	-34.4415	-51.4715 ***	-42.9733 **
	(17.0261)	(14.3966)	(57.1777)	(28.3854)	(17.7316)	(17.0772)
CSPP Purchases	-39.3293 ***	-33.0614 ***	-258.5415 ***	-11.8015	-37.2862 ***	-39.7651 ***
	(14.5120)	(9.4943)	(57.3654)	(15.0052)	(15.4796)	(12.8164)
Lockdowns	-73.8511 ***	-59.4791 ***	-428.7544 ***	-62.1189 ***	-80.1138 ***	-70.2426 ***
	(21.3213)	(17.1419)	(80.3393)	(17.6157)	(22.1263)	(16.5381)
PEPP	-18.7177	-0.3173	-383.6322 ***	11.6822	-21.6967	-12.0678
	(14.3060)	(11.3287)	(82.1507)	(16.5514)	(15.0192)	(13.0764)
Bond and Issuer controls	YES	YES	YES	YES	YES	YES
Financial stress controls	YES	YES	YES	YES	YES	YES
Currency*Time dummies	YES	YES	YES	YES	YES	YES
Sector*Country dummies	YES	YES	YES	YES	YES	YES
Issuer dummies	NO	NO	NO	YES	NO	NO
No. observations	5,033	4,096	1,477	861	4,494	15,573
R^2	0.777	0.720	0.834	0.849	0.776	0.671

This Table reports the estimated coefficients α_j (top panel) and δ_j (lower panel) from regressions as of (3) with different samples. The dependent variable is the ASW spread. Robust standard errors (in parentheses) are clustered by issuer and time. In column (1) the sample is made by the Eurosystem market; in column (2) by IG bonds only (both eligible and non-eligible); in column (3) by eligible bonds and HY bonds (thus, it does not include IG non-eligible bonds); in column (4) by bonds placed by corporations which issued both eligible and non-eligible bonds; in column (5) by bonds placed in the international euro-area market and the 19 domestic markets; in column (6) by all placements available around the world.

Focusing on the first column, it is clear that neither the CSPP announcement nor the relatively long period of CSPP purchases changed the market conditions for the bonds non eligible to the programme: the estimated coefficients are not significantly different from zero. Instead, the three weeks of early lockdowns brought about a sudden worsening in the placement condi-

tions of 51 basis points, which is also economically relevant given that the unconditional mean of the ASW spread up to then was 104 basis points. Then, the conditions further deteriorated up to 88 basis points over the last period characterized by the PEPP announcement and deployment, suggesting that the financing conditions in the bond market did not return to pre-Covid levels, at least for the segment of non-eligible bonds.

How did eligible bonds comparatively cope is instead shown in the lower panel of Table 4, which reports the estimated δ_j coefficients. They measure the additional cost in term of placing conditions faced by eligible bonds in each period. A first circumstance that emerges is that even before the CSPP announcement, eligible bonds benefited from a discount on the spread at issuance of 35 basis points. This is most likely due to the fact that eligible bonds have, *coeteris paribus*, the additional property of always being eligible as collateral in the ECB refinancing operations. The lower spread increased after the announcement of the new wave of ECB purchases, remained strong over the period of actual corporate purchases and peaked to 74 basis points during the weeks of early lockdowns, when the presence of a constant buyer as the ECB was most beneficial for this market segment. Somewhat surprisingly, the spread turned non statistically significant in the last PEPP period.

In order to further investigate the latter circumstance, Table 4 shows also the estimates when two different control samples are employed: IG and HY bonds only, respectively. Indeed, the evidence reported in Section 3 (Table 2 and Figure 1) suggests that the composition of the bond market changed a lot both in absolute and relative terms, this in turn may influence the estimations based on the full sample.

As expected, the deterioration in the financing conditions witnessed by the segment of IG bonds is much smaller than the whole sample (column 2, top panel). During the early lockdowns the ASW spread increased by 32 basis points in the segment of IG non-eligible bonds and further deteriorated to 55 basis points in the last period. However, the behavior of the

market conditions for the segment of eligible bonds is not dissimilar from when employing the whole sample (column 2, lower panel). Before the Covid pandemic they enjoyed a smaller ASW spread in the range of 23-33 basis points, which peaked to almost 60 basis points during the early lockdowns and then disappeared.

Column (3) in Table 4 shows instead the (somewhat unfair) comparison of the changes in financing conditions for the set of HY bonds and eligible bonds (which are all IG bonds). The estimated deterioration with respect to the calm period is flabbergasting: during the Covid pandemic and the following PEPP period the ASW spread of HY bonds increased, *coeteris paribus*, by 204 and 254 basis points, respectively. At the same time the set of eligible bonds benefited from a better environment of around 400 basis points.

All in all, the estimations in the first three columns of Table 4 suggest that during the most critical phase of the Covid spreading the ECB purchases (under the already existing CSPP programme) were effective in shielding the eligible bond segment from a stronger deterioration in the financing conditions. That happened in a context of diminishing placements, especially by HY issuers, hinting, in turn, to a strong preference for eligible bonds even within the IG segment. Then, in the last period, characterized in addition to the PEPP by a set of policy interventions of unprecedented magnitude by the EU and the single governments, and by a rebound in the issuance activity (mainly from IG corporations), the peculiarity of a negative premium on the yield of eligible bonds vanished (it was maintained only with respect to the few HY bonds placed). This circumstance is even more surprising given the increased market segmentation by which the share of the eligible bonds grew to close to 40% of the total market value. A possible interpretation goes through the working of the portfolio rebalancing channel within the IG segment. Given that under the PEPP purchases a large share of the market was "engaged" by the ECB demand, investors started purchasing other (similar) bonds within the same IG segment, generating an endogenous increase in

demand for non-eligible bonds, which was able to offset the price advantage of eligible placements.

Unfortunately, given the increased market uncertainty and volatility, the rebalancing did not extend to the HY segment, in which bond placements almost disappeared. The bond market collapsed to IG bonds only, strongly affecting the ability of many corporations to issue debt on the market. From this unexpected change in the market composition stems a relevant policy implication: once a corporation is downgraded to HY, it has almost no possibility of placing a bond, since it loses the eligibility to ECB programmes and the other investors are focused on "safe" IG bonds only.

In a further exercise I take a within-sample perspective and rely on the set of corporations which could, and actually did, issue both eligible and non eligible bonds. In this way the bonds in the two samples are all issued by the same set of companies and thus are subject to the same underlying default risk. At the parent level there are 86 such issuers, which placed 861 bonds, 309 of which were eligible, 243 non eligible but placed in euro-area markets, and 307 non eligible placed in foreign markets. They are large international corporations (25 of them from extra-euro area countries), which placed bonds over the period under analysis via 225 different issuers.

From column (4) it turns out that while the R-squared of 0.85 suggests a good fit of the model, the relatively limited number of observations results in larger standard errors. However, the main results remain: i) the market worsening started in the early lockdowns period but further deteriorated up to May 2020; ii) eligible bonds enjoyed a large spread reduction in the lockdowns period, which vanished afterwards.

In addition, by looking at the amount placed, it emerges that the 86 corporations under analysis first increased the bond financing via eligible bonds from a share of 33% before the ECB corporate purchases to 48% during the CSPP programme, but then significantly diminished it to 31% over the lockdown period, in a way missing the sheltering provided by the ECB

steady demand. Eventually, they strongly returned to the eligible segment by placing up to 56% of their total issuance in the last PEPP period.

Columns (5) and (6) of Table 4 provide some robustness checks of the results. In column (5) the sample employed does not include the 539 bonds, which still being part of the Eurosystem market, were placed outside the euro-area international market and the 19 domestic markets, while in column (6) the whole set of available bonds placed around the world is used. While both sets of estimates are in line with those stemming from the Eurosystem market, an additional indication comes from column (6): the further deterioration recorded in the financing conditions in the period up to May 2020 is a worldwide phenomenon. Thus, over the two months and a half from 19 March, 2020 to 31 May, 2020, which followed the three most critical weeks in which most of the anti-virus measures were taken (24 February, 2020 - 18 March, 2020), the bond market was not able to recover to the pre-crisis conditions, even at the global level.

7 Features of the pricing mechanism

While in the previous Section the empirical evidence suggests a market segmentation along the bond grade and the eligibility to the ECB programmes, in what follow I investigate whether other additional characteristics at the firm and bond level have been taken into account by market participants in the wake of the pandemic outburst. In particular, I test three (mutually non exclusive) hypotheses about the bond pricing: 1) that the Pagano et al. (2020) pre-disaster learning model of US stock returns applies also to the Eurosystem bond market; 2) that corporations from countries with less fiscal room of manoeuvre are penalized when issuing bonds; 3) that the idea a "green recovery" has taken place and it is financed via green bonds.

The empirical approach I use is again via regression (3). However, instead of using the CSPP eligibility as the distinguishing characteristic, I create *ad*

hoc dummy variables which take 1 when bond i (or the corporation issuing bond i) shows the characteristic under investigation and 0 otherwise. For instance, in column (1) of Table 5 the distinguishing characteristic is that the issuing corporation is a non-financial corporation (NFC). As in Table 4, the top panel shows the changes in the financing conditions for the "control" group, which now is the set of bonds not showing the selected characteristic, while the lower panel reports the additional effect of the distinguishing characteristic. From column (1), it turns out that being a NFC did not imply any additional spread on the yield at issuance up to the last period, when instead an additional cost of 34 basis points is estimated.

While NFCs faced a stronger increase than banks and other non-financial corporations in the cost of issuance in the PEPP period, were all NFCs treated in the same way, or was the market able to distinguish those more affected by the measure taken to tackle the Covid pandemic? In order to answer the latter question I rely on a measure of pandemic resilience proposed by Koren and Pető (2020) and used in Pagano et al. (2020) for their assessment of the US stock returns. Indeed, to measure the consequences of social distancing on firms, recent research in labor economics has developed several indicators of the extent to which jobs can be done from home or rely on face-to-face interaction and physical proximity. Among them, Koren and Pető (2020) construct three types of industry-level measures of human interactions, depending on whether these are due to internal communication (teamwork), external communication (customers), or physical proximity to others (presence). In particular, they also provide an aggregate measure of "communication" intensity and construct an industry-level measure of the percentage of employees affected by social distancing regulations due to their occupations being communication-intensive and/or requiring close physical proximity to others. Based on the latter measure, I construct a dummy which takes 1 for the firms more affected by social distancing (top tercile) and 0 otherwise.

Table 5 Sources of risk in the bond pricing

	NFCs	Vulnerable firms	GIPS	Green bonds	Green firms	Green certification
			Time dummies			
CSPP Announcement	7.8502	8.3752	8.1701	8.0476	7.5882	8.1264
	(13.5561)	(13.1579)	(14.6418)	(13.1535)	(14.4641)	(14.5255)
CSPP Purchases	-0.7314	2.3554	3.9495	-0.5975	-0.2410	-0.2896
	(20.7992)	(15.1551)	(20.7595)	(15.5634)	(20.7151)	(20.7483)
Lockdowns	40.051 *	45.869 *	45.654 *	44.520 *	44.764 *	45.694 *
	(22.2955)	(24.1443)	(29.6956)	(23.9318)	(29.6228)	(29.7564)
PEPP	77.060 **	86.248 **	85.066 **	87.833 **	86.293 **	87.424 **
	(40.6245)	(42.5309)	(41.8490)	(41.8579)	(41.8832)	(41.8143)
			Time dummies * factor dummy			
CSPP Announcement	3.5918	11.755	-28.204	-15.631	-10.916	-17.776
	(15.3459)	(25.3017)	(26.1886)	(17.1817)	(23.9626)	(17.0055)
CSPP Purchases	1.4389	0.6803	-56.238 ***	13.198	28.267	13.903
	(13.9599)	(39.7786)	(19.3115)	(19.2812)	(21.9159)	(18.7001)
Lockdowns	16.428	10.327	-454.74	10.330	18.250	8.245
	(44.0507)	(30.2085)	(380.8605)	(22.6239)	(35.1562)	(33.3826)
PEPP	33.737 ***	31.240 **	-14.163	6.3449	20.9194	31.4484
	(12.9728)	(14.4998)	(22.2659)	(17.5704)	(20.5283)	(19.1893)
Bond and Issuer controls	YES	YES	YES	YES	YES	YES
Financial stress controls	YES	YES	YES	YES	YES	YES
Currency*Time dummies	YES	YES	YES	YES	YES	YES
Sector*Country dummies	YES	YES	YES	YES	YES	YES
No. observations	5,033	5,033	5,033	5,033	5,033	5,033
R^2	0.777	0.776	0.777	0.776	0.776	0.776

This Table reports the estimated coefficients α_j (top panel) and δ_j (lower panel) from regressions as of (3) with different factor dummies which take 1 when the factor is positively held by $bond_i$ and 0 otherwise. The dependent variable is the ASW spread. Robust standard errors (in parentheses) are clustered by issuer and time. In column (1) the factor dummy is made by NFCs; in column (2) by NFCs more sensible to social distancing according to Koren and Peto (2020) measure; in column (3) by corporations from countries with less fiscal space (Greece, Italy, Portugal, Spain); in column (4) by green bonds; in column (5) by green firms (i.e., firms issuing green bonds to finance their own projects); in column (6) by green bonds with an official certification.

Column (2) in Table 5 shows again that the δ_j coefficient concerning the last period is positive and statistically significant. In addition, the magnitude is very similar to column (1) suggesting in turn that the whole effect on NFCs is due to firms sensitive to social distancing. The market was thus able to distinguish among firms in the last period, penalizing those which, by business model, were most affected by the pandemic and the measures taken to limit its spreading. However, this evidence does not fully match the findings and the interpretation suggested by Pagano et al. (2020) for

the US stock market: in the Eurosystem bond market there is no evidence of a pandemic awareness before the Covid crisis, since all the δ_j coefficients before the last PEPP period are not statistically significant, including the Covid lockdown period itself. It thus seems that not only the Eurosystem market is characterized by the "unpriced–disaster risk model" (using Pagano et al. (2020) terminology), but also that in the first phase of price adjustment (the Covid lockdown period) all corporations were treated in the same way, confirming the finding by Capelle-Blancard and Desroziers (2020) of a (somewhat puzzling) stock market behavior that did not match the corporations' fundamentals.

An additional source of concern which emerged in the aftermath of the first containment measures against the Covid spreading is due to the unfortunate circumstance that, at least at the beginning, the countries most exposed to the pandemic were those with less fiscal space (Italy and Spain, in particular). Indeed, a higher prevalence of the pandemic is expected to have more adverse effects on the economy and hence trigger a stronger policy response, provided that sufficient budgetary room is available (Alberola et al. 2020). This in turn implies that countries with reduced fiscal space might not be able to implement adequate measures aimed at preventing that the temporary pandemic disruptions could inflict a permanent damage to the economy.[11]

In column (3) in Table 5 I test the hypothesis that the corporations from the countries with less fiscal space faced a higher financing cost after the Covid spreading due to an expected higher default rate linked to the lack of resources from their governments. In particular, I refer to the four euro-area countries which were most involved in the sovereign debt crisis in 2010-2012: Greece, Italy, Portugal and Spain (GIPS).[12] It turns out that in both the

[11]Note that the Recovery Fund proposal by the two French and German governments to create a fund at the EU level to deal with the recovery in the countries most hit by the pandemic is dated only 18 May, 2020, within the sample but almost at the end of it.

[12]I do not include Ireland in the group of countries with less fiscal space, notwithstanding

Covid period and the PEPP period – the time span in which the market started to asses the pandemic risk on corporations – the additional δ_j coefficients are not statistically significant.[13] It thus seems that the possibility of a different involvement by euro-area government was not taken into account by the bond market. Instead, it emerges that GIPS countries benefited a lot from the increased and stable ECB demand over the months of CSPP purchases (56 basis points).

The third possible source of differences among firms and bonds that I investigate is related to the idea that a "green recovery" through sustainable energy investments could help governments out of the crisis and toward a low carbon environment (IEA 2020, NGFS 2020). From the one hand, the policy steps needed to come out of the crisis are likely to have lasting effects on the global economy and shape societies for decades to come; from the other hand, the commitments to a CO2 reduction and the transition to sustainable economy taken within the 2015 Paris agreements are still to be achieved. One way to finance sustainable energy investment is via green bonds. Green bonds are debt instruments, whose proceeds are committed to the financing of low-carbon, climate-friendly projects. In addition, they are a very good candidate to satisfy the appetite of investor attending to environmental concerns. Indeed, a rapidly increasing number of investors are taking into account climate change in their investment decisions, with survey and anecdotal evidence suggesting that also non-pecuniary motives, specifically pro-environmental preferences, may motivate the holding of green assets (Bolton and Kacperczyk 2020, Krueger et al. 2020). The empirical evidence gathered so far suggests that the pricing of green bonds include a (nega-

it was involved in the sovereign debt crisis, for two main reasons. First, the fiscal outlook has significantly improved from the 2010-2012 period; second, Ireland is the country of incorporation of many foreign financial subsidiaries, thus making difficult disentangling the domestic risk from the foreign risk.

[13] While non statistically significant, the very large and negative coefficient estimated over the lockdowns period is due to the extremely small number of placements in that period: only two bonds were issued by corporations from the GIPS group.

tive) premium for some categories of issuers. For instance, Zerbib (2019) finds that for the whole group of green bond issuers the premium is significantly different from zero, even though very limited in magnitude (around 2 basis point). Fatica et al. (2019) suggest instead that non-financial corporations and especially supranational institutions benefit of a much larger yield spread (22 and 80 basis point, respectively). At the same time they find that financial corporations do not enjoy any negative yield differential. Flammer (2019) reports that also stock markets seem to respond positively to the announcement of green bond issuance, and documents a significant increase in firms' environmental performance afterwards, suggesting that green bonds are effective in improving companies' environmental footprint.

In the Eurosystem market 315 green bonds were placed over the time horizon under analysis, 49 of which eligible for CSPP and PEPP purchase. They are taken into account by a dummy variable and results from regression (3) are reported in Table 5, column (4). The evidence is clearly against a different treatment in the pricing of green bonds: all the δ_j coefficients are not statistically significant. However, within the set of 315 green bonds it is possible to further distinguishing between bonds issued by the firms directly financing on the bond market and those issued by a bank or another financial institution with the aim of financing a green project of a given corporations. In addition, only a share of the green bonds placed in the Eurosystem market have received an official certification by ad hoc agencies that they are indeed used to finance green projects and they are not just a way to greenwash the balance sheet.[14] Thus, two further checks are proposed by taking into account separately the 224 bonds of "green corporations" (i.e. those issuing green bonds for their own financing needs) and the 226 green bonds with received an official certification. Column (5) and column (6) show that also when restricting the focus on the two samples of more homogeneous green

[14] Greenwashing is the practice of channeling proceeds from green bonds towards projects or activities having negligible or even negative environmental benefits.

bonds the δ_j coefficients suggest that euro-area investors were not moved by environmental concerns neither before nor after the Covid pandemic, and that a price advantage in favour of green projects related to a "green recovery" is still absent in the bond market.[15]

8 Conclusions

The empirical evidence provided in the paper shows that not only the effects of the Covid pandemic in the euro-area bond market were different across bonds and firms, but also that the market composition was significantly affected by the Corona virus. In particular, after the first weeks of early lockdowns (late February to mid March 2020) the market collapsed to investment-grade bonds only, a segment in which the share of bonds eligible to the ECB corporate programmes (CSPP and PEPP) has strikingly increased to 40% from a mere 15% before the crisis. At the same time the share of high-yield bonds shrunk to almost disappear at 4%.

As for the financing cost, as happened to the stock markets around the world, also the euro-area bond market was not much affected by the news about the Corona virus diffusion up to last week of February 2020, when the first severe lockdown measures were taken in Europe. The cost at issuance suddenly increased in all market segments and regardless of the business sector of the issuing corporation. However, it is estimated that the bonds eligible to the ECB corporate programme (CSPP) benefited from a more muted impact of around 40 basis points. This advantage instead disappeared in the period starting from mid-March 2020, characterized by the ECB launch of a extraordinary purchasing programme (PEEP) and policy measures of unprecedented magnitude by the domestic governments and the European Union. This evidence can be explained by two circumstances: i) the change

[15] This result is confirmed when looking at the value of the bonds placed. Neither a DID approach as in regression (2) or an analysis as in regression (3) show an increase in the green bonds placed after the Covid pandemic.

in the market composition; ii) the working of the portfolio rebalancing channel. Concerning the former, the flight-to-safety phenomenon moved financial agents away from the more risky assets (HY bonds) and towards the safer IG segment, thus making the bond market more homogeneous (also all eligible bonds are all IG). Regarding the latter, after the starting of the purchases under the PEPP, a large share of the market became unavailable because of the ECB demand, thus investors rebalanced their portfolio towards similar assets: IG bonds which were non eligible to the ECB purchases. This in turn generated an endogenous surge in the demand for non-eligible bonds which, increasing the bond price, reduced the cost at issuance and offset the difference with respect to eligible bonds.

While from the perspective of IG corporations the ECB intervention can be considered effective in protecting their bonds from the sudden deterioration in price conditions, the expected second-round effect through the portfolio rebalancing channel did not materialize for the HY bonds for which the cost at issuance has skyrocketed after the Covid spreading. The difficulties in financing on the bond market may further increase in the euro area since once downgraded to HY, a issuer has almost no possibility of placing a bond, since neither the ECB (due to the loss of the eligibility status) nor other investors are willing to purchase. Indeed, credit rating agencies (CRA), as the pandemic diffusion aggravated, started to downgrade euro-area corporations at a fast pace pushing several bonds in the junk segment (HY). These developments have been strongly affecting the ability of corporations to issue (more) debt on the market.

A possible measure to withstand the unexpected market composition change would be to introduce a waiver of the minimum credit quality requirement for bonds placed by euro-area non-financial corporations that have suffered a rating downgrade into the HY segment (the so called "fallen angels") in the wake of the Covid pandemic. The waiver could replicate the pre-crisis frozen rating or "grandfathering" already applied by the ECB for

the general collateral eligibility on 22 April, 2020. Such a measure would not even be new for a corporate bond market, since already on April 9, 2020, the FED announced the purpose to purchase HY corporate debt by fallen angels as part of a larger rescue package (PMCCF and SMCCF- Primary and Secondary Market Corporate Credit Facility, respectively) for businesses and municipalities hit hardest by the crisis (Gilchrist et al. 2020). In order to be eligible, corporate securities must have been rated at least BBB- by two or more CRAs as of March 22, 2020. Moreover, while the new rating will be in the HY segment, it is expected not to be too far from the IG threshold at the time of issuance (at least BB-).

Another source of risk detected in the bond pricing mechanism is the weak resilience to pandemic crises, where resilience is defined as the reliance on business models based on technologies and organizational structures that are robust to social distancing (those, for instance, that can adapt extensively to teleworking or do not require close contact with customers). Relying on an indicator proposed by Koren and Pető (2020), I find that the premium requested on bonds issued by non-resilient corporations (around 30 basis points) started to be statistically significant only in the period after the first wave of actions taken by the national authorities to withstand the virus spreading. This in turn suggests that before the spreading of the Corona virus, the market was not taking into account the possibility of a pandemic nor the possible negative consequences of the measures to be implemented in the wake of a pandemic crisis (unpriced–disaster risk model).

On the contrary, I do not find evidence supporting the pricing of an increased risk for corporations headquartered in countries with a reduced fiscal space, nor the existence of a premium in favour of green bonds, i.e. those bonds that are placed with the aim to finance sustainable energy projects, which should be the backbone of a possible "green recovery" out of the crisis.

References

[1] Abidi, N., Falagiarda M. and Miquel-Flores I. (2019), "Credit rating dynamics: evidence from a natural experiment", ECB Working Paper No. 2274.

[2] Acharya, V., Drechsler I. and Schnabl P. (2014), "A Pyrrhic Victory? Bank Bailouts and Sovereign Credit Risk", Journal of Finance, Vol.69, No. 6, pp.2689–2739.

[3] Alberola, E., Arslan Y., Cheng G. and Moessner R. (2020), "The fiscal response to the Covid-19 crisis in advanced and emerging market economies", BIS Bulletin No.23.

[4] Albuquerque, R. A., Koskinen Y., Yang S. and Zhang C. (2020), "Resiliency of environmental and social stocks: an analysis of the exogenous COVID-19 market crash", The Review of Corporate Finance Studies, Vol.9, pp. 593-621.

[5] Altavilla, C.,Barbiero F., Boucinha M. and Burlon L. (2020), "The great lockdown: pandemic response policies and bank lending conditions", ECB Working Paper No. 2465.

[6] Arce, O., Gimeno R. and Mayordomo S. (2020), "Making room for the needy: the credit-reallocation effects of the ECB's corporate QE", Review of Finance, forthcoming.

[7] Baker, S R, Bloom N., Davis S.J., Kost K., Sammon M. and Viratyosin T. (2020), "The unprecedented stock market reaction to COVID-19", NBER Working Paper No. 26945.

[8] Bao, J., Pan J. and Wang J. (2011), "The illiquidity of corporate bonds". Journal of Finance, Vol.66, pp. 911-946.

[9] Bolton, P. and Kacperczyk M. (2020), "Do Investors Care about Carbon Risk?", NBER Working Papers No. 26968.

[10] Campbell J.Y. and Taksler G.B. (2003), "Equity Volatility and Corporate Bond Yields", Journal of Finance, Vol.58, pp. 2321-2350.

[11] Capelle-Blancard, G. and A Desroziers A. (2020), "The stock market is not the economy? Insights from the COVID-19 crisis", Covid Economics: Vetted and Real-Time Papers, CEPR.

[12] Collin-Dufresne, P., Goldstein R.S. and Spencer Martin J. (2001), "The Determinants of Credit Spread Changes ", Journal of Finance, Vol.56, pp. 2177-2207.

[13] De Santis, R.A. (2018), "Unobservable country bond premia and fragmentation", Journal of International Money and Finance, Vol. 82, pp. 1-25.

[14] De Santis, R.A. and Zaghini A. (2019), "Unconventional monetary policy and corporate bond issuance", ECB Working Paper No. 2329.

[15] Dick-Nielsen, J., Feldhutter P. and Lando D. (2012), "Corporate bond liquidity before and after the onset of the subprime crisis", Journal of Financial Economics, Vol.103, pp. 471-492.

[16] Ding, W, Levine R., Lin C. and Xie W.(2020), "Corporate Immunity to the COVID-19 Pandemic", NBER Working Paper No. 27055.

[17] Elton, E., Gruber M., Agrawal D. and Mann C. (2001), "Explaining the rate spread on corporate bond", Journal of Finance, Vol.56, pp. 247-277.

[18] Fahlenbrach, R, Rageth K. and Stulz R.M. (2020), "How Valuable is Financial Flexibility when Revenue Stops? Evidence from the COVID-19 Crisis", NBER Working Papers 27106.

[19] Fatica, S., Panzica R. and Rancan M. (2019), "The pricing of green bonds: are financial institutions different?", JCR Working Paper paper No.2019/7.

[20] Flammer, C. (2019), "Green bonds: Effectiveness and implication for public policy", NBER WP No. 25950.

[21] Gilchrist, S., Wei B., Yue V.Z. and Zakrajšek E. (2020), "The FED takes on corporate credit risk: An analysis of the efficacy of the SMCCF", NBER Working Papers 27809.

[22] Grosse-Rueschkamp, B., Steffen S. and Streitz D. (2019), "A Capital structure channel of monetary policy", Journal of Financial Economics, Vol. 133, pp. 357-378.

[23] Hollo, D., Kremer M., Lo Duca M. (2012). "CISS - A composite indicator of systemic stress in the financial system", ECB Working Paper No.1426.

[24] IEA (2020), "Sustainable recovery", International Energy Agency, Paris.

[25] IMF (2020a), "Greening the Recovery", Fiscal Affairs Special Series on Fiscal Policy to Respond to COVID-19, International Monetary Fund, Washington DC.

[26] IMF (2020b), "World Economic Outlook: The Great Lockdown", International Monetary Fund, Washington DC.

[27] Koren, M., and Pető R. (2020), "Business disruptions from social distancing" Covid Economics Vetted and Real-Time Papers 2, CEPR.

[28] Krueger, P., Sautner Z. and Starks L.T. (2020), "The Importance of Climate Risks for Institutional Investors", Review of Financial Studies, Vol.33, pp. 1067–1111.

[29] Landier, A and Thesmar D. (2020), "Earnings Expectations in the COVID Crisis", NBER Working Paper No. 27160.

[30] Li, F., Mercatanti A., Mäkinen T. and Silvestrini A. (2020), "A regression discontinuity design for categorical ordered running variables applied to central bank purchases of corporate bonds,", Annals of Applied Statistics, forthcoming.

[31] Moore, J. (2020), "Progressing Sustainability in the Context of Covid-19: Grasping the Opportunity", European Environment and Sustainable Development Advisory Councils, The Hague.

[32] NGFS (2020), "Statement on the Need for a Green Recovery", Central Banks and Supervisors Network for Greening the Financial System, Paris.

[33] Pagano, M., Wagner C. and Zechner J. (2020), "Disaster Resilience and Asset Prices", CEPR Discussion Paper 14773/Covid Economics: Vetted and Real-Time Papers 21, CEPR.

[34] Ramelli, S. and Wagner A.F. (2020), "Feverish stock price reactions to COVID-19", The Review of Corporate Finance Studies, Vol.9, pp. 622-655.

[35] Santos, J. (2014), "Evidence from the Bond Market on Banks' "Too-Big-to-Fail" Subsidy", Economic Policy Review, Vol.20, No.2

[36] Todorov, K. (2020), "Quantify the Quantitative Easing: Impact on bonds and corporate debt issuance", Journal of Financial Economics, Vol.135, pp. 340-358.

[37] Wang, J. and Wu C. (2015), "Liquidity, credit quality, and the relation between volatility and trading activity: Evidence from the corporate bond market", Journal of Banking and Finance, Vol.50, pp. 183-203.

[38] Zaghini, A. (2019), "The CSPP at work: Yield heterogeneity and the portfolio rebalancing channel", Journal of Corporate Finance, Vol.56, pp. 282-297.

[39] Zerbib, O.D. (2019), "The effect of pro-environmental preferences on bond prices: Evidence from green bonds", Journal of Banking and Finance, Vol.98, pp.39-60.

Acknowledgements

The author would like to thank Philipp Hartmann, Florian Heider, Peter Hoffmann, Marcin Kacperczyk and Simone Manganelli for helpful comments and suggestions. The views and opinions expressed in this paper are those of the author and do not necessarily agree with the official policy or position of the ECB.

Andrea Zaghini
European Central Bank, Frankfurt am Main, Germany; email: andrea.zaghini@ecb.europa.eu

PDF ISBN 978-92-899-4749-7 ISSN 1725-2806 doi:10.2866/95501 QB-AR-21-054-EN-N