Trends and Policy Issues in Corporate Bond Markets

Serdar Çelik, Gül Demirtaş and Mats Isaksson

CORPORATE GOVERNANCE FORUM

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Preface

The use of corporate bonds has become an increasingly important source of funding for non-financial companies. In 2020, the issuing of corporate bonds reached unprecedented levels and the total amount of outstanding corporate debt in the form of corporate bonds reached an all-time high. Against this background, it is important to understand the functioning of corporate bond markets and their ability to serve as a viable long-term source of corporate finance. Moreover, it is important to realise that bondholders, just like shareholders, can play an important role in corporate governance. Not only do bondholders have the possibility of "exit", which can affect the company's cost of capital. Through the clauses in bond contracts, i.e. covenants, bondholders can also use their "voice" to influence a range of corporate actions and decisions with respect to dividends, share buybacks, mergers and acquisitions, the capital structure, sales of assets etc. This governance role of bondholders can be particularly important in times of financial distress and corporate insolvency.

Of special importance for business sector dynamics is the ability of smaller growth companies to access financing from the corporate bond market. This will broaden and complement their existing sources of finance and help smaller but viable businesses to grow to their full potential as independent enterprises. In order to inform and to stimulate this discussion, the Corporate Governance Forum launched the project "*How to improve capital market-based financing for growth companies: Challenges and good practices*".

This report provides a comprehensive overview of developments in corporate bond markets leading up to the COVID-19 outbreak. Through a detailed mapping of developments during the first half of 2020, it also provides a unique real time account of the short-term functioning of the corporate bond market during the initial stages of crisis and the factors that influenced market behaviour. Particular focus is put on the impact on bond issuers of different types and

size. The empirical findings and the related analysis in this report will form the foundation for future work that will address reforms and good practices that can improve the conditions for smaller growth companies that currently are facing structural difficulties in accessing market-based financing.

The report, which has received financial support from the Karl-Adam Bonnier Foundation has been developed by Gül Demirtaş, Senior Academic Researcher, Karl-Adam Bonnier Foundation and Visiting Researcher, Sabanci University, in co-operation with Serdar Çelik at the Corporate Governance and Corporate Finance Division of the OECD and Mats Isaksson, Managing Director, Swedish Corporate Governance Forum and Senior Visiting Fellow, Stockholm Centre for Commercial Law. The preliminary findings of the first chapter, which covers the first half of 2020, were discussed at a seminar organised by the Corporate Governance Forum in October 2020. The second chapter was published by the OECD in February 2020. The authors would like to thank participants to the event for invaluable comments.

Mats Isaksson *Rolf Skog*

Sammanfattning

*Mats Isaksson**

Denna volym ger en heltäckande global bild av utvecklingen på marknaden för företagsobligationer. Den består av två delar. Den första delen beskriver hur marknaden för företagsobligationer utvecklats under de 20 år som föregick Covid-19 pandemins utbrott år 2020. Därmed ger det också en ögonblicksbild av omfattningen, strukturen och kvalitén på företagens upplåning genom obligationer vid ingången till pandemin. Mot denna bakgrund kan del två betraktas som en empirisk fallstudie av marknadens funktionssätt vid en extern chock av det slag som pandemin och dess ekonomiska konsekvenser utgjorde. Genom att i detalj beskriva och analysera utvecklingen under dessa sex intensiva månader år 2020 bidrar del två till en diskussion om de politiska åtgärdernas effekter samt möjligheterna att på längre sikt förbättra, inte minst tillväxtföretagens, finansiering på kapitalmarknaden.

Den första delen beskriver först de icke-finansiella företagens ökade upplåning i form av företagsobligationer under en 20-årsperiod fram till december år 2019. Därefter redovisas de största ägarna av företagsobligationer och hur deras köp av obligationer med viss automatik bestäms av såväl tvingande regler och indexering som enskilda investeringsmandat och frivilliga åtaganden knutna till företagsobligationernas kreditbetyg. Del ett avslutas därför med en beskrivning av de kriterier och metoder som används för att fastställa företagens kreditbetyg samt tendenser och trender vad gäller kreditvärderingsinstitutens benägenhet att omvärdera ett företags kreditbetyg. Denna del publicerades också genom OECD i februari 2020, strax innan effekterna av COVID-19-utbrottet börjat göra sig gällande på kapitalmarknaderna.

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Med utgångspunkt i den detaljerade bild av utvecklingen de senaste 20 åren och situationen vid ingången till 2020 som ges i del ett fokuserar del två på utvecklingen under de sex första månaderna år 2020. Där redogörs för hur primärmarknaden för företagsobligationer samt företagens kreditvärdighet påverkades av pandemins ekonomiska konsekvenser och politiska beslut. Särskilt analyseras effekterna på företag av olika storlek samt skillnader mellan de företag som vid pandemins utbrott redan hade emitterat företagsobligationer och de företag som aldrig tidigare finansierat sig på obligationsmarknaden. Givet kreditbetygens betydelse ägnas särskild uppmärksamhet åt sambandet mellan företagsstorlek och kreditvärdighetsbedömningar, vilket i sig kan utgöra ett hinder för mindre tillväxtföretags tillgång till marknaden för företagsobligationer. De viktigaste resultaten i volymens två delar sammanfattas nedan.

UTVECKLINGEN FRAM TILL PANDEMINS UTBROTT

Långsiktigt ökad upplåning i form av företagsobligationer

I efterdyningarna av finanskrisen år 2008 följde en betydande och kontinuerlig ökning i de icke-finansiella företagens upplåning i form av företagsobligationer. Under perioden 2008 till 2019 uppgick de årliga emissionerna globalt till i genomsnitt USD 1,8 triljoner.[1] Detta var dubbelt så mycket som den genomsnittliga årliga obligationsupplåningen mellan åren 2000 och 2007. Som en reaktion på successiva räntehöjningar, tillkännagivanden om en stramare penningpolitik samt en viss oro för dämpad ekonomisk tillväxt minskade emissionerna av företagsobligationer betydligt under andra halvåret av 2018. Denna tydliga nedgång förbyttes dock i sin motsats i början av år 2019 då de större centralbankerna meddelade att de nu avsåg att återgå till en mer expansiv penningpolitik, vilken bland annat innefattade operationer på marknaden för företagsobligationer. Följden blev att det under år 2019 emitterades företagsobligationer till ett värde av totalt USD 2,1 triljoner, vilket i reala termer motsvarade värdet av emissionsvolymen under det tidigare rekordåret

[1] För att skapa överenstämmelse med vad som används i den engelska texten, uttrycks även i denna sammanfattning beloppens storlek i amerikanska termer.

2016. Denna omsvängning och den rekordstora upplåningen under år 2019 innebar att den redan historiskt stora stocken av utestående företagsobligationer ökade ytterligare till USD 13,5 triljoner. Därmed hade de icke-finansiella företagens utestående upplåning i form av företagsobligationer vid ingången till pandemin år 2020 nått ett ”all-time-high”.

Oro för den rekordstora upplåningens kvalitet

Förutom den rekordstora stocken av utestående icke-finansiella företagsobligationer vid ingången till pandemin år 2020 hade också obligationernas sammansättning och kvalitet kommit att förändras under årtiondet före pandemikrisen. Jämfört med tidigare kreditcykler hade den lägre kreditvärdighet, högre återbetalningskrav, längre löptider och sämre investerarskydd i form av kovenanter.

Varje enskilt år mellan 2010 och 2019 svarade segmentet non-investment grade status för omkring 20 procent av de icke-finansiella företagens obligationsupplåning och år 2019 utgjorde det hela 25 procent. Därmed hade marknaden genomlevt den längsta perioden sedan år 1980 där andelen upplåning i form av obligationer med kreditvärdighet inom segmentet non-investment grade var så hög. Dessutom svarade obligationer med kreditbetyget BBB, vilket är det lägsta kreditbetyget i segmentet med investment grade status, år 2019, för 51 procent av alla emissioner med investment grade status. Som jämförelse kan nämnas att under perioden 2000–2007 var denna andel endast 39 procent.

Vid ingången till pandemin var det samlade återbetalningskravet de närmaste tre åren för obligationer i segmentet non-investment grade, obligationer utan kreditbetyg samt obligationer utgivna av företag från tillväxtmarknaderna totalt USD 2,5 triljoner, vilket motsvarade 41 procent av det totala utestående beloppet.

Under perioden 2015 till 2019 var den genomsnittliga löptiden, vid tiden för emissionen, för obligationer inom segmentet investment grade 12,4 år. Detta kan jämföras med en genomsnittlig löptid på 9,4 år i början av 2000-talet. År 2019 var den genomsnittliga löptiden omkring 13 år. Eftersom längre löptider är förknippade med högre priskänslighet vid en ränteförändring bidrog kombinationen av längre löptider och ett decennium av försämrad kreditkvalitet

vad avser den aggregerade utestående stocken till att göra marknaden för företagsobligationer allt känsligare för förändringar i penningpolitiken.

Kreditbetygens betydelse och passiv förvaltning av företagsobligationer

Obligationsinnehavens sammansättning för större institutioner, såsom pensionsfonder, försäkringsbolag och investeringsfonder, styrs i stor utsträckning av obligationernas kreditbetyg (rating). Dels genom regleringar som använder kreditbetyg som referens för att fastställa kvantitativa gränser och kapitalkrav, dels genom självpåtagna ratingbaserade investeringsstrategier som återspeglas i förvaltarnas investeringsmandat och interna riktlinjer. Exempelvis ökade företagsobligationsinnehaven i börshandlade fonder (ETF) som vanligtvis använder passiva ratingbaserade strategier 13 gånger från USD 32 billioner år 2008 till USD 420 billioner år 2018. Det är också värt att notera att större icke-finansiella företag själva kommit att bli betydande ägare av icke-finansiella företagsobligationer. Mellan åren 2009 och 2018 tredubblade 25 stora icke-finansiella amerikanska företag sina innehav av företagsobligationer från USD 119 billioner till USD 356 billioner. Det icke-finansiella företag som hade det enskilt största innehavet av företagsobligationer ägde ensamt företagsobligationer för hela USD 124 billioner. Detta motsvarade det sammanlagda innehavet av företagsobligationer hos världens sex största ETF.

Fastställande och omvärdering av kreditbetyg

År 2017 hade median företaget inom varje kreditbetyg som omfattas av segmentet investment grade högre skuldsättningsgrad än ett decennium tidigare. Den låga räntenivån sedan år 2008 kom successivt att förbättra företagens räntebetalningsförmåga och genom de kriterier som används för kreditvärdighetsbedömningar möjliggjorde detta för företagen att öka sin skuldsättning och samtidigt behålla sitt kreditbetyg. En räntehöjning eller en plötslig realekonomisk nedgång som påverkar företagens lönsamhet negativt kan under sådana förhållanden snabbt försämra företagens förmåga att klara av sina räntebetalningar. I händelse av ett sådant scenario

skulle de kriterier som från början möjliggjorde högre skuldsättning också resultera i en ökad nedgradering av företagens kreditbetyg.

Den signifikanta ökningen av obligationer med kreditbetyget BBB de senaste åren skulle, i kombination det minskade antalet nedgraderingar i förhållande till uppgraderingar, kunna tolkas som att kreditvärderingsinstituten är särskilt försiktiga när det gäller att nedgradera obligationer med kreditbetyget BBB. Anledningen skulle vara att obligationen vid ett stegs nedgradering passerar gränsen från segmentet investment grade till segmentet non-investment grade, vilket i sin tur skulle föranleda omfattande automatiska omallokeringar (försäljningar) i de stora institutionernas portföljer. Som stöd för denna hypotes kan också anföras att den statistiska sannolikheten för en nedgradering med ett kreditbetyg inom ett år faktiskt är lägst just för obligationer med kreditbetyget BBB. Denna relativa tröghet när det gäller nedgradering av obligationer med kreditbetyget BBB kan emellertid också spegla förhållandet att företag med kreditbetyget BBB ägnar särskilt stor uppmärksamhet åt att vårda de nyckeltal som enligt kreditvärderingsinstitutens utvärderingsmetoder uppfyller kraven för en BBB värdering. Om kreditvärderingsinstitut skulle vara extra försiktiga med att omvärdera obligationer som vid en omvärdering skulle passera gränsen nedåt från segmentet investment grade till segmentet non-investment grade borde man också kunna förvänta sig att sannolikheten för en uppgradering mellan de två kreditvärdighetssegmenten är lägst för BB + obligationer som ju befinner sig just under gränsen för investment grade status. För alla de tre stora kreditvärderingsinstituten är sannolikheten för en uppgradering på ett steg inom ett år istället högst eller tredje högst för emittenter med kreditvärdigheten BB+.

ERFARENHETER FRÅN COVID-19-KRISENS FÖRSTA HALVÅR

COVID-19-krisens omedelbara inverkan på emissioner av företagsobligationer

Pandemin och de åtgärder som vidtagits för att lindra dess effekter orsakade en omedelbar och kraftig avmattning i världsekonomin. Många företag fick därför svårt att uppfylla sina ekonomiska åtaganden. Trots detta kom Covid-krisen inte att bryta den positiva

trenden för emissioner av företagsobligationer. Tvärtom slogs ännu ett nytt historiskt rekord då de icke-finansiella företagen enbart under första halvåret 2020 emitterade företagsobligationer till ett värde av totalt USD 1,7 triljoner. Detta är en och en halv gång mer än det tidigare rekordet för årets första 6 månader, vilket noterades under första halvåret 2015. Den intensiva emissionsaktiviteten var emellertid inte enbart ägnad att möta företagens akuta likviditetsbehov. I en tid av osäkerhet utnyttjade många företag de fördelaktiga marknadsförhållandena som penningpolitiken skapade till att skaffa sig en buffert i händelse av framtida svårigheter. De fördelaktiga marknadsbetingelserna gav också många företag en möjlighet att förlänga löptider och förfallodatum för redan utestående obligationer. Den övergripande bilden är således att marknaden för företagsobligationer med stöd av en expansiv penningpolitik som även omfattade direkta stödköp erbjöd en robust finansieringskälla för icke-finansiella företag under pandemins första fas.

En mer detaljerad granskning visar emellertid att perioden innebar relativt stora förskjutningar mellan emissioner med olika kreditbetyg. Medan utgivningen av obligationer med kreditbetyg inom segmentet investment grade ökade dramatiskt var emissionerna av obligationer med kreditbetyg inom non-investment grade segmentet ytterst begränsade under pandemins inledning och avstannade i praktiken helt under mars månad. Detta var en tydlig avvikelse från en decennielång trend mot en ökande andel emissioner med kreditbetyg inom segmentet non-investment grade. Bland annat med hjälp av utlovade stödköp från centralbankerna återhämtade sig emellertid emissionerna av obligationer inom segmentet non investment grade de följande tre månaderna fram till halvårsskiftet år 2020. Av särskild betydelse var stödköpen av så kallade ”fallen angels”, dvs. företag som förlorade investment grade status efter pandemin men som fortsatt bedömdes ha en kreditvärdighet motsvarande BB inom segmentet non-investment grade. Inom segmentet non-investment grade som helhet sjönk emellertid intresset för emittenter med lägre kreditvärdighet. Medan emissioner med kreditbetyget BB ökade under mars–juni år 2020 jämfört med samma period år 2019, minskade emissionerna med kreditbetyget B + med 33 procent.

Pandemins påverkan på kreditbetygen

Eftersom pandemiutbrottet orsakade kraftiga försämringar vad gäller många företags förväntade intäkter, försvagades deras räntebetalningsförmåga och lönsamhetsgrad betydligt. Detta resulterade i en ökning av antalet nedgraderingar. Till skillnad från i genomsnitt 65 nedgraderingar per månad under perioden 2015–2019, företogs 387 nedgraderingar enbart under mars månad år 2020. Detta följdes av 373 nedgraderingar under april. Även om det totala antalet nedgraderingar minskade något under maj och juni år 2020, låg de fortfarande klart över genomsnittet för 5-årsperioden som föregick pandemin. Totalt noterades 38 ”fallen angels” under perioden mars–juni år 2020, vilket är ungefär tre gånger det historiska genomsnittet för dessa månader.

Tillväxtföretagens tillgång till obligationsmarknaden

Både USA och Europa har följt en global trend där andelen företag som emitterar obligationer för första gången har minskat. Minskningen var särskilt tydlig i samband med pandemins utbrott. Vad som i vår analys betecknas som ”aktiva” emittenter ökade sin andel av emissionerna från 68 procent år 2019 till rekordhöga 75 procent år 2020. Detta skedde främst på bekostnad av förstagångsemittenter, vars andel minskade från 28 till 21 procent. Månadsdata visar att under pandemins inledande skede dominerades företagsobligationsmarknaderna i USA och Europa nästan helt av redan aktiva emittenter. Under de två månader som följde centralbankernas beslut om stödköp ökade emellertid både det totala antalet emittenter liksom andelen förstagångsemittenter. Trots denna relativa ökning av förstagångsemittenter fortsatte aktiva emittenter att dominera och svarade fortsatt för en något högre andel av emissionerna jämfört med vad de gjorde före pandemin.

Analyser baserade på emissionernas och emittenternas storlek visar att även om det har funnits en global tendens till en relativ ökning av antalet värdemässigt mindre emissioner emitterade av mindre företag, så gäller inte denna tendens för alla länder och regioner. I många delar av världen, inklusive USA och Europa, förstärkte pandemikrisen en förskjutning mot större emissionsbelopp utfärdade av större företag. En jämförelse av emissionernas storleksfördelning i de 20 länder, som svarade för 94 procent av världens

emissioner under perioden 2015–2019, visar att Korea, Thailand, Brasilien, Sverige och Indien var de 5 länderna med den högsta andelen mindre emissioner.

Samtidigt bekräftade pandemin de utmaningar som möter företag som inte var aktiva på företagsobligationsmarknaden före krisen; företag med lägre kreditbetyg och storleksmässigt mindre företag. Tillväxtföretag tillhör vanligtvis en eller flera av dessa grupper. Och eftersom samhällsekonomin kan dra nytta av att sådana i grunden sunda företag har tillgång till kapitalmarknaderna för att överbrygga en tillfällig extern kris, finns det skäl att analysera hur tillgängligheten till obligationsmarknaden kan underlättas för mindre tillväxtföretag med högre riskprofil. Faktorer som bör beaktas är bland annat den betydelse som idag tillmäts företagets storlek vid kreditbedömningar. Även emissionskostnadernas storlek och struktur, vilken gynnar frekventa och återkommande emittenter framför mindre förstagångsemittenter kan tänkas utgöra ett systematiskt hinder för mindre tillväxtföretag.

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CHAPTER I

Experiences from the Immediate Impact of COVID-19 Crisis on Corporate Bond Markets and Growth Companies' Access to Bond Financing[1]

Serdar Çelik, Gül Demirtaş and Mats Isaksson

The COVID-19 outbreak and the related measures to tackle the health crisis caused a sudden and sharp slowdown in economic activity. As a consequence, many companies faced severe difficulties to meet their financial obligations. The shock came at a time when there were already widespread concerns about the high levels of debt in the corporate sector and a record portion of corporate bonds that were due for repayment or refinancing within the next 3 years. There were also mounting concerns about the quality of the outstanding stock of corporate bonds issued by non-financial companies. While this financial burden on companies remained, the cash flow available to meet their financial obligations dropped sharply and put many companies in an acute liquidity crisis and possible solvency problems.

As a basis for a discussion about the effects of certain crisis policy interventions and possible medium and longer term measures to improve corporate access to market-based finance in times of a sudden external crisis, this chapter is focused on the immediate impact of the COVID-19 outbreak on the functioning of the corporate bond markets. In particular, corporate bond issuance and rating actions data from the first half of 2020 are used to illustrate the initial impact of the crisis on corporate bond issuance and on the credit quality of non-financial companies. Further analysis is conducted to investigate how smaller growth companies were affected differently

[1] This work should not be reported as representing the official views of the OECD or of its member countries. The opinions expressed and arguments employed are those of the authors.

than large and established corporate bond issuers. Finally, the link between company size and credit ratings is explored to discuss if the construct and use of credit ratings may act as a barrier for smaller growth companies to access the corporate bond market.

An account of the events during the first half of 2020 does not only provide a unique real-time account of the short-term functioning of the corporate bond market and related policies. It may also point to experiences that can guide structural policies that will improve affordable market-based financing of viable companies and strengthen their resilience in the case of future shocks of a similar nature, particularly to further address the conditions for smaller growth companies that currently are facing structural difficulties in entering capital markets and attracting market-based financing.

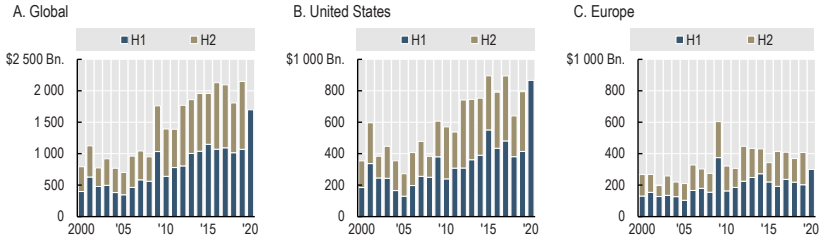
PART I. LONG-TERM GROWTH IN CORPORATE BOND BORROWING

Figure 1 presents the total amount of proceeds that non-financial companies received through corporate bond issues in each year over the past two decades. As discussed extensively in Chapter II of this book, there has been a significant and sustained increase in corporate bond issuance in the aftermath of the global financial crisis. This observation holds across all three panels, which report global annual issuance, US issuance and European issuance.

The figure also provides a breakdown into the first (H1) and second (H2) halves of each year to allow a comparison between the amount of corporate bond issuance in prior years with that during the first six months of 2020 presented here. Panel A shows that non-financial companies raised an unprecedented amount of USD 1.70 trillion in the first half of 2020, which is 1.5 times the prior record (USD 1.15 trillion) reached in the first half of 2015. Furthermore, Panel B shows that bond issuance of US non-financial companies in the first six months of 2020 reached USD 867 billion and exceeded even the full-year issuance in 2019. Finally, Panel C shows that European corporate bond issuance reached USD 300 billion in the first half of 2020. Although the increase in European issuance was less striking compared to the global or the US case, the total amount issued exceeded all prior years' first-half issuance amounts

except that of 2009, when corporate bond issuance surged to supplement diminished bank lending.

Figure 1. Global corporate bond issuance and issuance in the US and Europe (2020 USD, billion)

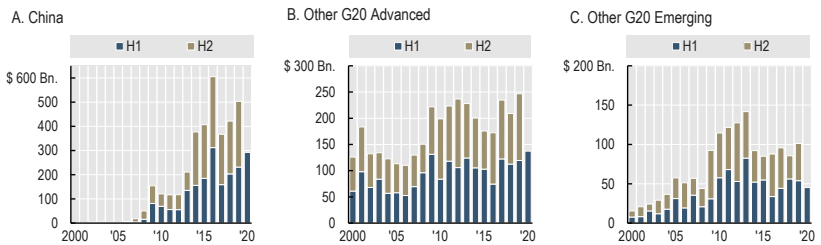


Note: The figures are based on the analysis of 97 225 unique corporate bond issues by non-financial companies from 114 countries. 2020 data cover issuance up to 30 June 2020.

Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

Figure 2 presents annual corporate bond issuance amounts by non-financial companies in the People's Republic of China (China), and in G20 countries other than China, US and the European G20 countries. As further detailed in Chapter II, Chinese corporate bond issuance accelerated sharply in the past decade, starting from a negligible level prior to the global financial crisis up to an annual average of USD 461 billion in the past 5 years, making Chinese non-financial companies the second largest issuers after US companies. During the pandemic, issuance remained strong in China, and exceeded all H1 issuance amounts except that observed in 2016, which was a record year for China.

Figure 2. Corporate bond issuance in China and in other G20 countries (2020 USD, billion)



Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

Panel B of Figure 2 reports bond issuance by companies in advanced G20 economies excluding those countries already reported in Figure 1. Japan, Korea, Australia and Canada make up this group. For this group of countries, too, corporate bond issuance in the first six months of 2020 set a half-year issuance record by reaching USD 137 billion. On the other hand, data in Panel C from emerging markets in the G20 other than the European countries and China indicate that in this group, corporate bond issuance in the first half of 2020 remained weak relative to prior years. This group consists of Argentina, Brazil, India, Indonesia, Mexico, Russia, Saudi Arabia, South Africa and Turkey.

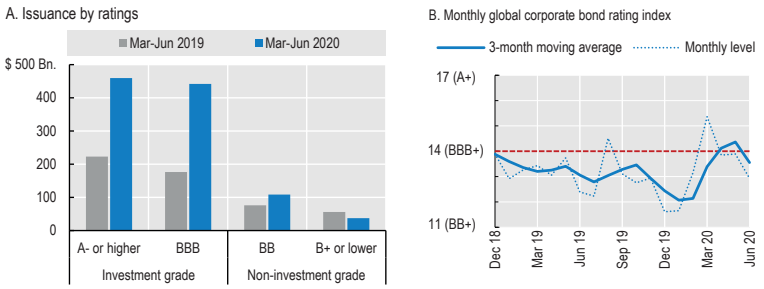
A look at monthly issuance data shows that during the first two months of 2020, issuance of corporate bonds by non-financial companies remained in line with the average for the same months in 2019. This is reasonable since in January and February, the potential harm that the virus could cause was not yet fully understood. As the COVID-19 cases reached more than a hundred countries and upon the announcement of the outbreak as a pandemic by the World Health Organization in the first half of March, many countries began to implement national or regional lockdowns. Given the economic uncertainty that these interventions triggered and the resulting liquidity problems faced by the corporate sector, many companies turned to the corporate bond market. This was not only motivated by a need to meet immediate cash flow obligations but also by a wish to build a cushion for future economic uncertainty and to push out debt maturities. As a matter of fact, March 2020 experienced the highest monthly global corporate bond issuance in the past two decades. The increase was mainly driven by issuances by US non-financial companies, which hit a record amount in March. In contrast, issuance by non-financial European companies remained weak in March 2020 compared to the March average in the previous five years. However, in the following months from April to June, corporate bond issuance rose above the previous 5-year average in all parts of the world reported in Figures 1 and 2 with the exception of the Other G20 Emerging group. As a result of this surge in issuance, the global outstanding stock of non-financial corporate bonds had, by the end of June, reached USD 14.4 trillion, which is up from USD 13.5 trillion at the end of 2019.

The strong support measures introduced by central banks to tackle the pandemic-induced challenges were undoubtedly instrumental in corporate bond markets' continued role in providing substantial financing to non-financial companies despite the shock triggered by the pandemic. In response to the COVID-19 crisis, the US Federal Reserve lowered its interest rates in the first half of March by a total of 150 basis points down to between 0 and 0.25% (Federal Reserve, 2020a and 2020b). Shortly thereafter, on March 23rd, the US Federal Reserve launched a corporate bond purchase programme for the first time through the establishment of two facilities to support credit to large employers. Specifically, the Primary Market Corporate Credit Facility (PMCCF) would purchase new bonds and loans from investment grade companies. The Secondary Market Corporate Credit Facility (SMCCF) would purchase in the secondary market corporate bonds issued by investment grade US companies and US-listed exchange-traded funds (ETFs) whose investment objective is to provide exposure to US investment grade corporate bonds (Federal Reserve, 2020c). Likewise, the European Central Bank (ECB), decided, on March 12th, on a temporary envelope of additional net asset purchases of EUR 120 billion, to be used until the end of 2020 (ECB, 2020a). On March 18th, the ECB introduced its EUR 750 billion Pandemic Emergency Purchase Programme (PEPP), an asset purchase programme of private and public sector securities, initially intended through end-2020. As in the existing Corporate Sector Purchase Programme (CSPP), investment grade euro-denominated bonds issued by non-bank corporations established in the euro area were deemed eligible for purchase under this new programme (ECB, 2020b; ECB, 2016). The size of the PEPP was later expanded in June by EUR 600 billion to EUR 1.35 trillion and the duration of the programme was extended to at least June 2021 (ECB, 2020c). The Bank of England (BoE) also took similar actions by reducing policy rates from 0.75% to an all-time low of 0.1% in two steps on the 11th and 19th of March. The bank also decided on March 19th to increase its holdings of UK government bonds and sterling non-financial investment grade corporate bonds by GBP 200 billion to a total of GBP 645 billion (BoE, 2020a and 2020b). As of March 2020, the one common eligibility criterion that the US Federal Reserve, the ECB and the BoE all adopted was

the requirement that the corporate bonds to be purchased have an investment grade rating.

Although the general picture in Figures 1 and 2 above suggests that overall, corporate bond markets continued its robust support for non-financial companies during the first phase of the health crisis, a look at the credit ratings of corporate bond issuance points to some new patterns with respect to the composition of bond issuances. Panel A of Figure 3 presents the rating distribution of global corporate bond issuance in the 4-month period from March to June 2020 and provides a comparison with the same 4-month period in 2019, which was a year of record-high corporate bond issuance. With the announcements by major central banks in March that they would purchase significant amounts of investment grade corporate bonds, corporate bonds with A or higher ratings reached a total issuance amount of USD 460 billion over the period from March to June. This was 2.1 times the corresponding amount in 2019. Similarly, BBB rated issuance reached a total amount of USD 442 billion over the March-June 2020 period, which was 2.5 times the issuance over the same period in 2019.

Figure 3. Corporate bond issuance by credit quality (2020 USD, billion)



Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

In contrast to the dramatic increase in investment grade issuance, the increase in non-investment grade issuance remained limited. Over the March-June 2020 period, a total amount of USD 146 billion of non-investment grade corporate bonds were issued. This represented only an 11% increase over the corresponding amount for 2019. As a result of such disparate reactions of the investment and non-investment grade segments to the pandemic, non-investment grade issuance represented only 14% of total corporate bond issu-

ance over the March-June period. This was a deviation from the decade-long trend of a high share of non-investment grade issuance discussed in Chapter II. The near-freeze in the non-investment grade segment in March was a major contributor to this. However, with the help of the support later introduced by central banks to address this segment of the market, non-investment grade issuance recovered in the following three months. Specifically, on April 9th, the US Federal Reserve broadened the scope of PMCCF and SMCCF to include corporate bonds issued by companies which have lost their investment grade rating after March 22nd but which continued to be rated at least BB-. Furthermore, SMCCF's scope would also include those ETFs whose primary investment objective is exposure to US high-yield corporate bonds (Federal Reserve, 2020d). Moreover, on April 22nd, the ECB announced that it would accept also so-called "fallen angel" bonds that have lost their investment grade credit rating after April 7th, as collateral until September 2021, as long as their rating remained at or above BB (ECB, 2020d). This move was important as non-investment grade issuers from Europe did not make a single corporate bond issue in March and issued only USD 216 million in April. Only after the ECB announcement in late April, issuance by European non-investment grade companies returned and subsequently reached amounts comparable to historical averages for May and June.

Another important observation from Panel A of Figure 3 is that the direction of the change in non-investment grade issuance varied depending on whether higher or lower credit quality bonds are considered. Specifically, while BB rated issuance increased in March-June 2020 compared to the same period in 2019, bonds rated B+ or lower experienced a decrease of 33%. As a result, the share of lower rated bonds within the non-investment grade category dropped markedly compared to previous years. These observations suggest that the support from the central banks seems to have helped the non-investment grade bond market to recover, with a bias towards the highest quality issuers.

To explore how the combined effect of a higher share of investment grade issuance and a further bias towards higher quality issuers within the non-investment grade segment has changed overall corporate bond quality, Panel B of Figure 3 presents the evolution of the "global corporate bond rating index" during the initial phase of

the pandemic.[2] To provide some perspective, it is important to note that the analyses in Chapter II based on yearly data show that the global corporate bond rating index stayed below 14 (i.e. BBB+) for a full 10 years between 2010 and 2019. This constituted the longest period of time that the index remained below this level over the past four decades, indicating a long-lasting decline in overall corporate bond quality. When the index is calculated on a monthly basis, there are only two brief periods when the 3-month moving average of the monthly index moved above 14 over the 2010-2019 period. Panel B of Figure 3 shows that in the second quarter of 2020, the smoothed monthly index once again moved above the BBB+ level. Indeed, the monthly level of the index, which is represented by the dotted line, shows that the index moved sharply to a level between A- and A in March as investors fled to quality amid a high degree of uncertainty. It then reverted back to just below BBB+ and further declined to around BBB level in June but still remained above its year-end level.

With respect to the industry distribution of corporate bond issuance, all broad categories of industries analysed have continued to access the bond market after the pandemic hit, reaching issuance amounts at least as high as those in the past 5 years.[3] Energy, industrials, utilities, consumer goods/services and especially technology sectors experienced considerable increases during and after March. The industry with the lowest level of increase in comparison to the historical average was the healthcare industry. Due to the relative resilience of this industry to a health crisis, it is possible that healthcare companies, in contrast to companies in other industries, did not feel pressured to issue bonds to address possible financial distress.

[2] The index assigns a score of 1 to a bond if it has the lowest credit quality rating and 21 if it has the highest rating. The corporate bond rating index is then calculated by taking a weighted average of individual bond scores, using issue amounts as weights.

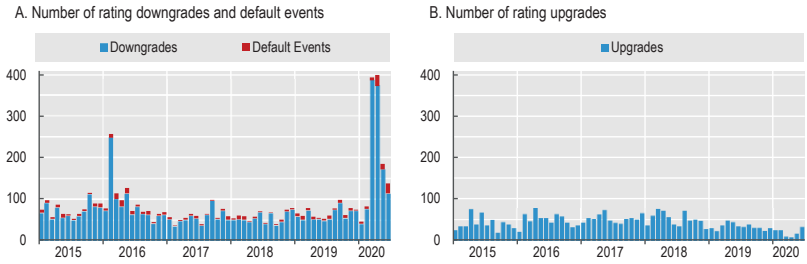
[3] The industry classification used in the analysis includes the following categories: Basic materials, cyclical consumer goods/services, energy, healthcare, industrials, non-cyclical consumer goods/services, technology, telecommunications services, utilities.

PART II. THE COVID-19 IMPACT ON CREDIT RATINGS

As documented in Chapter II of this book, despite the decline in overall bond credit quality over recent years, both the default rates and downgrade ratios remained quite stable at low levels compared to the historical averages. An important reason is that the unprecedented low interest rates since 2008 have improved the ability of non-financial companies to cover their interest obligations. However, as the COVID-19 outbreak caused sharp reversals in earnings expectations for companies, their interest coverage and profitability ratios significantly weakened, limiting such ratios' ability to offset high leverage ratios. This has resulted in pressure towards higher downgrade ratios.

Figure 4 presents the monthly number of default events, as well as rating downgrades and upgrades starting from January 2015. According to Panel A, there were only four months during the entire period 2015-2019 when there were more than 100 downgrades and default events. In an average month over this 5-year period, there were 65 downgrades and 5 default events. Strikingly, in March 2020 alone there were 387 downgrades of non-financial companies and 7 default events. This was followed by 373 downgrades and 27 default events in April. Although the total number of downgrades and defaults somewhat declined in May and June, they still remained above 100 and in June the share of default events increased reaching 24. The highest number of downgrade and default events in 2020 were related to the energy, industrials, transportation, and hotels and entertainment industries. In contrast to the observed surge in downgrades, Panel B shows that at the start of the pandemic, the number of rating upgrades were depressed far below its historical monthly average of 44.

Figure 4. Corporate rating changes (January 2015 - June 2020)

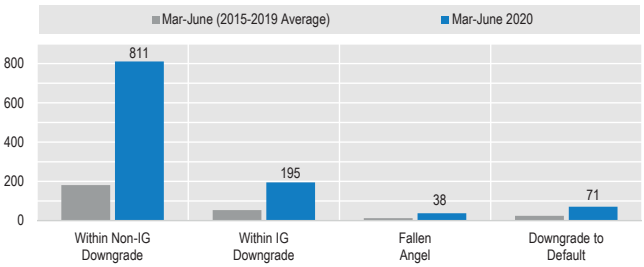


Note: Each company is matched to a single credit rating agency for any given period and only the actions, if any, of that agency are taken into account in downgrade counts. If a company is rated by more than one agency in a given time, matching priority is given to S&P ratings, followed by Moody's and then by Fitch. Only long-term local-currency ratings are considered.

Source: OECD Capital Market Series dataset, Thomson Reuters Eikon.

According to Figure 4, a total number of 1115 downgrade and default events took place over the months from March to June 2020. Figure 5 provides a breakdown of these 1115 events based on the type of event. Downgrades within the non-investment grade category constituted the most common event type, with 811 events falling under this type. This is 4.5 times the previous 5-year average for the same months. Downgrades within the non-investment grade category are noteworthy because a move down the rating ladder in this category can disproportionately change investors' willingness to lend to a given issuer especially in times of crisis, as suggested in Figure 3 by the marked decline observed in 2020 in the prevalence of bonds rated B+ and lower.

Figure 5. Corporate bond downgrades and defaults by rating category



Note: Each company is matched to a single credit rating agency for any given period and only the actions, if any, of that agency is taken into account in downgrade counts. If a company is rated by more than one agency in a given time, matching priority is given to S&P ratings, followed by Moody's and then by Fitch. Only long-term local-currency ratings are considered. "Fallen angels" refer to investment grade companies that move into the non-investment grade category.

Source: OECD Capital Market Series dataset, Thomson Reuters Eikon.

Downgrade of an investment grade company could either involve a downward move within the investment grade category or a move into the non-investment grade category, in which case the company would be referred to as a fallen angel. The latter move would be expected to have a more significant impact on a company's borrowing costs due to the emphasis put on the distinction between investment and non-investment grade bonds. Figure 5 shows that a total number of 38 companies became fallen angels over the March-June 2020 period, which is about 3 times the historical average for these months. Even prior to the pandemic, the significant increase over recent years of BBB issuance, which is the lowest rating in the investment grade category, has caused concern about the potential impact of their downgrades on the non-investment grade segment. And as the pandemic became a trigger for a spike in the number of fallen angels monetary policy adjustments were also made to address this group of companies.

Finally, there was also a significant increase in the number of default events compared to the historical average, with a total of 71 default events taking place over the 4-month period.

PART III. THE SHORT-TERM IMPACT ON GROWTH COMPANY ACCESS TO BOND MARKETS

As mentioned above, corporate bond buying programmes of major central banks mainly covered companies that had an investment grade rating. However, with the start of the pandemic, some major central banks broadened the scope of their monetary policy interventions to include also companies that recently lost their investment grade rating but still held a rating of at least BB or BB-. The focus on highly-rated companies is a reasonable choice as it provides a simple proxy to distinguish otherwise viable companies from companies that are less likely to survive the crisis. Nevertheless, this rule may also be oversimplistic and exclude promising growth companies who are still at an early phase of their development. It should be noted, however, that this link to rating status is not unique for the programmes launched during the crisis. Rather, as detailed in Chapter II, the reliance on credit ratings in the corporate bond market and the importance of the demarcation line between

investment and non-investment grade bonds already constituted an important divide for purchase programmes and a potential hurdle for lower-rated companies.

With growth companies, we refer to larger SMEs that have high growth potential and under the right circumstances would be able to benefit from raising capital in the market. These companies often exhibit viable business models but their expansion is constrained by lack of access to affordable risk capital or concerns about losing their independence through an acquisition by private equity investors or a larger potential competitor. Having access to the bond market could ease the financial challenges faced by growth companies, which tend to be heavily reliant on bank lending. As shown in Chapter II, the corporate bond investor base is not only limited to banks, but include pension funds, insurance companies, investment funds and even the non-financial sector. Therefore, bond financing would allow growth companies to reach a more diversified financing mix and a larger pool of potential investors, expanding their funding sources beyond banks. This can be critical especially during difficult times when banks' risk tolerance is reduced and may improve growth companies' financial resilience to adverse shocks. A larger investor base could also increase the bargaining power of growth companies, possibly leading to better borrowing terms. Furthermore, because corporate bonds can typically reach longer maturities compared to bank loans, they can offer more flexibility to growth companies for raising capital for their long-term investment and expansion goals. Longer maturities would also require less frequent refinancing. Another benefit of having capital markets access would be enhanced market visibility, increasing the ease of reaching other forms of market-based financing in the future.

Despite the critical role growth companies play in innovation, productivity growth and net job creation by challenging established corporations and stimulating new entrepreneurs, they are likely to face difficulties in accessing the corporate bond market. This section addresses the immediate effects of the crisis on the accessibility of corporate bond markets for growth companies in general and in comparison with large and established corporate bond issuers. First, the openness of the corporate bond market to first-time issuers is analysed over time, with a focus on times of crisis. Growth companies that are seeking to enter the bond market may find it hard to do

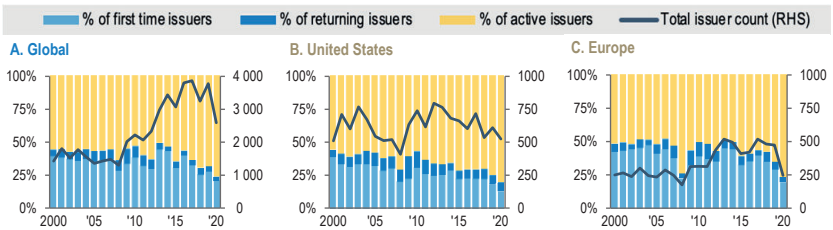
so if the market is heavily dominated by active, incumbent issuers. Second, the changing distribution of corporate bond issue sizes is analysed as growth companies can typically attain only smaller issue sizes. Finally, the issue size analysis is complemented with an analysis of the distribution of corporate bond issuers' asset sizes.

3.1. Prior issuance experience and emergency access to the corporate bond market

In examining the bond market's viability as an alternative source of finance in times of crisis, it is important to consider whether the market remains readily accessible during crises also to those companies with no or limited prior experience in this market. Having ready access to the bond market and hence to an alternative investor base other than banks can be critical for the financial resilience of an otherwise viable company, especially in times when banks have a lower risk tolerance. This can be particularly important for growth companies that rely mainly on bank lending.

For each year in the period between 2000 and 2020, Figure 6 provides a breakdown of corporate bond issuers based on their prior experience in the market. A company is defined as a first-time issuer if its bond issue in a given year is its first issuance since the start of our time series (January 1980). A "returning issuer" is a company who made its most recent bond issue more than 5 years ago. If the company issued bonds in at least one of the past 5 years, it is defined as an "active issuer".

Figure 6. Number and distribution of different types of corporate bond issuers



Note: A company is defined as a first-time issuer if its bond issue in a given year is its first since the start of our series (January 1980). A "returning issuer" is a company who made its last bond issue more than 5 years ago. If the company issued bonds in at least one of the past 5 years, it is defined as an "active issuer".

Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

Both at the global scale and separately in the US and Europe, the share of first-time issuers among the total number of corporate bond issuers has declined over the past two decades. Importantly, the decline in first-time issuers was particularly marked with the start of the pandemic in 2020. While "active issuers" constituted 68% of the total number of companies issuing bonds in 2019, their share increased to a record level of 75% in 2020. This happened at the expense of "first-time issuers", who saw their share decrease from 28% to an all-time low of 21%, while the share of "returning issuers" remained stable at 4%. The increased dominance of active issuers in the corporate bond market is even more pronounced when we consider their share of the total value of bonds issued, which reached an unprecedented level of 85%.

A similar pattern was observed as the global financial crisis took hold in 2008. At that time, the share of first-time issuers in the global corporate bond market declined from 38% in 2007 to 29% in 2008. While 556 new issuers entered the market in 2007, the number decreased to 377 in 2008. In contrast, the percentage of active issuers in the market increased from 55% in 2007 to 63% in 2008. The immediate effect on returning issuers remained quite limited with 106 companies returning to the corporate bond market in 2007 and 101 in 2008. In 2009 however, "returning issuers" increased their share of total number of bond issuers from 8% in 2008 to 11%.

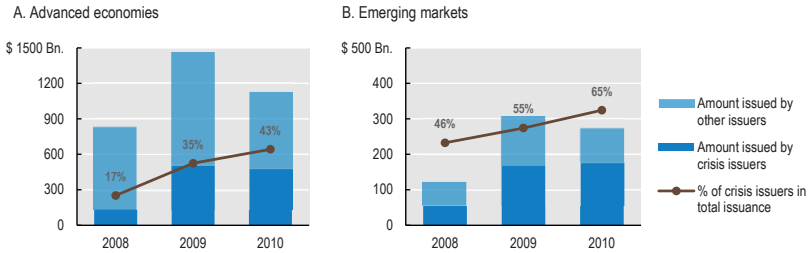
The 2008 decline in first-time issuers and a corresponding increase in the share of active issuers is illustrated also in Panels B and C of Figure 6, for the US and European corporate bond markets, respectively. The panels also show that the subsequent 2009 global increase in first-time issuers and returning issuers took place in both the US and Europe. The immediate negative impact on first-time issuers observed in 2008 is more pronounced in Europe where companies are typically more dependent on bank lending and access to alternative funding was actually more important.

These observations from the 2008 financial crisis suggest that the short-term impact of a crisis reduces the ability or willingness of companies to make their first corporate bond issue, while past issuers, more easily return to take advantage of bonds as a source of finance. Likewise, companies that are already active in the corporate bond market appear to have an advantage in market access during

hard times. However and despite the immediate decrease of first-time issuers, the number and share of first-time issuers as well as returning issuers increased quite significantly in the two years that followed.

If first-time issuers and issuers that returned after at least 5 years to issue bonds between 2008 and 2010 can be characterised as "crisis issuers", Figure 7 shows how the corporate bond market was able to serve these companies in need of capital during and shortly after the 2008 financial crisis.

Figure 7. Corporate bond issuance by "crisis issuers" (2020 USD, billion)



Note: First-time issuers and issuers that returned after at least 5 years to issue bonds between 2008 and 2010 are characterised as "crisis issuers".

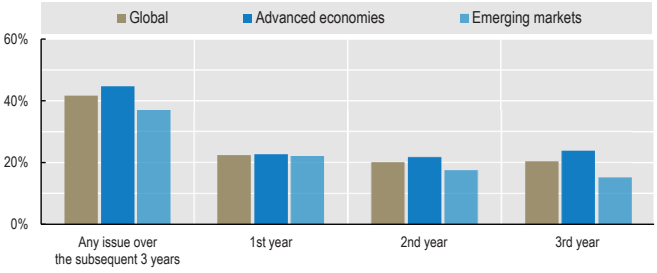
Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

In 2008, the amount of funds that crisis issuers obtained from the corporate bond market remained low in both absolute terms and in relation to the amount raised by issuers that were already active in the market. However, Figure 7 shows that in the following 2 years, crisis issuers successively increased their presence. Crisis issuers from advanced economies issued corporate bonds amounting to USD 508 billion in 2009 and USD 480 billion in 2010, when they came to dominate the primary market with 43% of all issuances, and constituting 55% of all issuers in the market in that year. Similarly, the amount issued by crisis issuers from emerging markets increased in 2009 and 2010 and reached a total of USD 343 billion over the 2 years. In 2010 they represented 65% of all issuance.

For many of the crisis issuers in 2008-2010, the use of corporate bond markets as a source of finance did not remain temporary. Once they had entered the market, many of them became active corporate bond issuers in the years that followed. Figure 8 shows the percentage of crisis issuers that made a subsequent issue in the three years

following their first issue in the 2008-2010 period. The figure shows that 42% of crisis issuers made another issue in the next three years after their first issue. In each of the three years that followed the first issue, around 20% of crisis issuers again turned to the corporate bond market to raise funds. The percentage of companies returning to the corporate bond market was somewhat higher for issuers in advanced economies compared to issuers from emerging markets.

Figure 8. Percentage of crisis issuers making a subsequent issue in the 3 years following their first issue in the 2008-2010 period



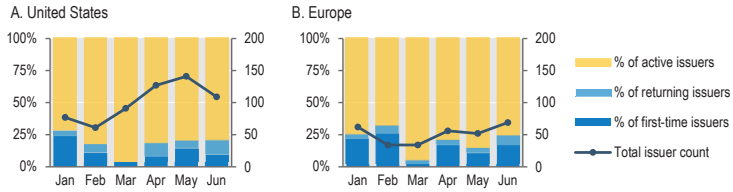
Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

Although the corporate bond markets at the initial phase of the COVID-19 crisis channelled an increasing portion of funds to already active issuers, evidence from the 2008 financial crisis shows that as economic conditions started to improve and uncertainty subsided, backed by accommodative monetary policies, the bond market emerged as an increasingly important source of funding also for those companies that during the immediate financial crisis stood further away or were fully absent from the bond market. It remains to be seen whether and for how long the initial corporate bond market patterns at the outbreak will continue in favour of those companies that are already active in the market or if a development similar to the post 2008 financial crisis may emerge. Looking at monthly data from 2020 may provide some preliminary insight.

In the US and Europe, the immediate impact of the crisis was first felt in March 2020 when the virus started to spread widely. Figure 9 shows the immediate impact of the pandemic on the distribution of corporate bond issuers across the different groups of issuers that have been defined based on their past use of the primary corporate bond market.

When the outbreaks began, the corporate bond markets in the US and Europe became almost entirely confined to already active issuers: There were only four first-time issuers in the US and one in Europe. In the following two months as central banks and governments showed their commitment to support the economy, both the total number of corporate bond issuers and the share of first-time and returning issuers increased. Despite this relative improvement, active issuers continued to dominate and had a somewhat higher presence compared to the pre-pandemic period. Similar trends are observed if the total issuance amount is considered instead of the total number of issuances.

Figure 9. Number and distribution of different types of corporate bond issuers (2020)



Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

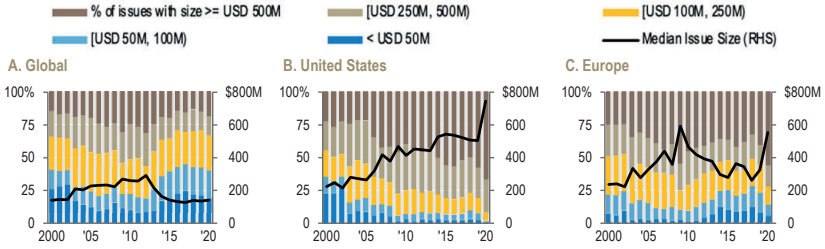
These observations are in line with observations with respect to the aftermath of the 2008 financial crisis that having some sort of previous presence in the corporate bond market, even after a relatively long gap of 5 years, in itself provides an advantage in enabling a company to fulfil its funding needs through the bond market, especially in the immediate period after a crisis hits. Moreover, swift and strong monetary policy actions appear to successfully have mitigated the immediate negative impact of the pandemic on the corporate bond market and to some extent influenced the pattern of issuers and corporate bond quality.

3.2. Changing patterns of issue and issuer sizes

Figure 10 reports how the size of a typical corporate bond issue and the percentage of small issues in the total number of issues have evolved over the past two decades across different regions. The distribution of issue sizes are examined across 5 issue size brackets. It is reasonable to expect that for growth companies, the two lower

issue size brackets, which require an issue size of less than USD 100 million, are the most attainable. Indeed, according to issuance data during the past 5 years for issuers with a relatively small asset size of less than USD 1 billion, 69% of the issuances fall into the first issue size bracket (less than USD 50 million) and 18% fall into the second size bracket. Hence, the share of small issues in a given market provides a good proxy for the extent to which that market serves also growth companies.

Figure 10. Median issue size and the distribution of issue sizes in the corporate bond market



Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

Looking only at the global picture, Panel A shows that the median issue size in the global corporate bond market started to decline after reaching a maximum of USD 292 million in 2012 and has stayed relatively stable in an interval between USD 125 to 140 million in the past five years. This decline has been accompanied by an increase in the share of small issues. Over the past five years, issues with a size smaller than USD 50 million accounted for 21% of the total number of issues, on average. When issues smaller than USD 100 million are considered, the average portion of smaller issues increases to 43%. With the outbreak of the pandemic, the median issue size only slightly increased from USD 135 to 141 million and the share of issues in the smallest size bracket declined to 20%.

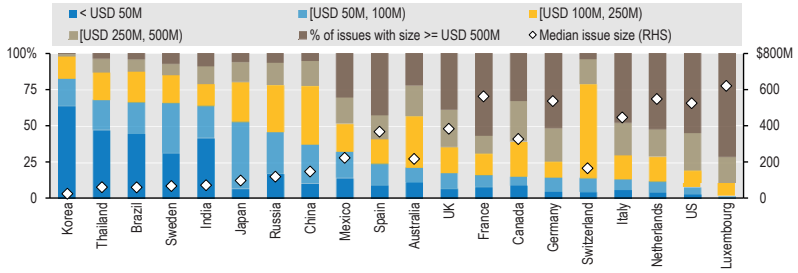
However, a look at individual markets in the next two panels reveals that this is not a general trend. Notably, in the US, the median issue size has increased successively and has since 2014 remained above USD 500 million. Moreover, in the past decade the percentage of issues that are smaller than USD 50 million (USD 100 million) has never exceeded 4% (10%). Strikingly, in the first six months of 2020, the median issue size in the US increased dra-

matically to USD 745 million and issues with a size greater than or equal to USD 500 million constituted 67% of all issues. Out of the 627 issues during the first six months of 2020, only 3 were smaller than USD 50 million.

Europe experienced a decline in median issue size between 2009 and 2018 when 12% of issues made by European companies had a size smaller than USD 50 million and an additional 16% were between USD 50 and 100 million. However, similar to the developments in the US, the median issue size in Europe jumped sharply to USD 553 million in the first half of 2020 and the corporate bond market became strongly dominated by large issues. In Europe, a sharp move towards large issue sizes was also observed during the global financial crisis, when the median issue size increased from USD 359 million in 2008 to USD 593 million in 2009.

To provide a general overview of which countries are more likely to accommodate small issues, Figure 11 provides the size distribution of issues in a selection of countries using 5-year issuance data from January 2015 to December 2019. The 20 countries selected are those with the highest total issuance amount over the 2015-2019 period, accounting for 94% of global corporate bond issuance.

Figure 11. Median issue size and issue size distribution across selected countries (2015-2019)



Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

The figure shows significant differences in issue size distribution across countries. Among the 20 countries, Korea, Thailand, Brazil, Sweden and India are the 5 countries with the highest percentage of small issues. Correspondingly, these countries also have the lowest median issue sizes. For instance, in Korea, which has the highest percentage of small issues, 64% of bond issues by non-financial compa-

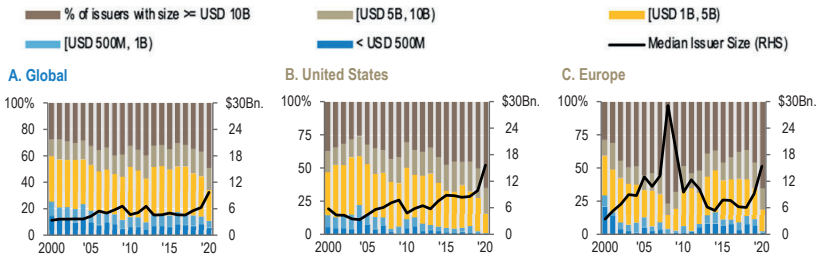
nies were smaller than USD 50 million, 83% were smaller than USD 100 million and the median issue size was USD 23 million.

On the other side of the spectrum are Luxembourg, the US, the Netherlands, Italy and Switzerland, which are the 5 countries with the lowest share of small issues. Non-financial companies in the US accounted for 40% of global corporate bond issuance over the 2015-2019 period, and only 3% (7.6%) of their bond issues were smaller than USD 50 million (100 million) with a median issue size of USD 525 million. Non-financial companies from Luxembourg made no issues smaller than USD 50 million over this period.

Using issue size as a proxy for the bond market accessibility of smaller growth companies has its limitations since large companies can also choose to make small issues. To complement the above analyses based on issue sizes, Figure 12 therefore uses the asset size of issuers to distinguish between small and large issuers. The limitation with this approach is that not every corporate bond issuer has asset size information available in our dataset.[4] Hence, the observations from Figure 12, which are intended as a complement to the above analysis of issue size, are based on the subset of issuers for which asset size information is available.

The panels provide issuer size distribution across 5 brackets determined based on the issuers' asset size before the issue. Growth companies can be expected to fall into the two lowest size brackets, which mean an asset size lower than USD 500 million and an asset size between USD 500 million and 1 billion, respectively.

Figure 12. Median issuer size and the distribution of issuer sizes in the corporate bond market



Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

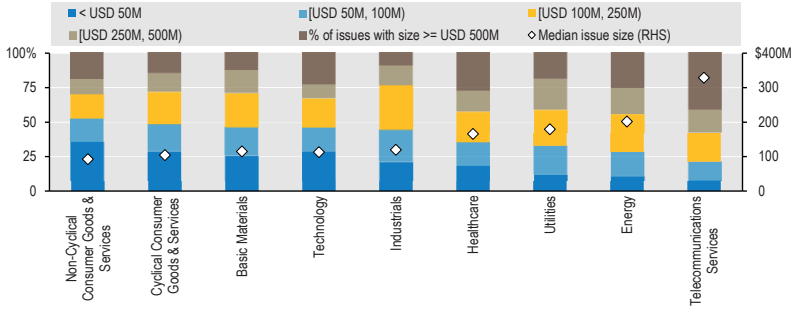
[4] Globally, around 40 to 65% of corporate bond issuers have their asset size information available in each year between 2000 and 2020.

The general trends observed in Figure 12 are largely parallel to those in Figure 10. The median issuer size is significantly larger in the US and Europe compared to the other parts of the world and with the pandemic both US and Europe experienced a significant jump in the median issuer size. This 2020 increase is also observed at the global level. Moreover, in the US, the share of issuers with an asset size less than USD 500 million has remained below 2% since 2015 and in the first half of 2020, there were no issuers in that size bracket. In Europe, where the share of smaller issuers actually increased and median issuer size decreased during the past decade, there were only 3 issuers in the lowest two size brackets during the first six months of 2020.

The empirical evidence from Figures 10 to 12 presented above shows that although there has been a global tendency towards a relative increase in the number of smaller issue and issuer sizes, this tendency does not hold for all countries or regions. Moreover, the pandemic crisis triggered an immediate sharp move towards larger issue and issuer sizes in many parts of the world, including Europe, provoking questions about the short-term ability of the market and related policies to serve smaller and less established growth companies.

As a final analysis on issue sizes, Figure 13 presents issue size distribution across nine major non-financial industries. The variation in issue size distribution across the different industries is less pronounced compared to the variation across countries reported in Figure 11. Non-cyclical and cyclical consumer goods and services, basic materials, technology and industrials sectors have rather similar distributions with roughly half of the issues having a size smaller than USD 100 million and a median issue size around USD 90-120 million. On the other hand, utilities, energy and especially telecommunication sectors tend to have fewer small issues. Median issue size is highest in the telecommunication sector at USD 329 million.

Figure 13. Median issue size and issue size distribution across industries (2015-2019)



Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

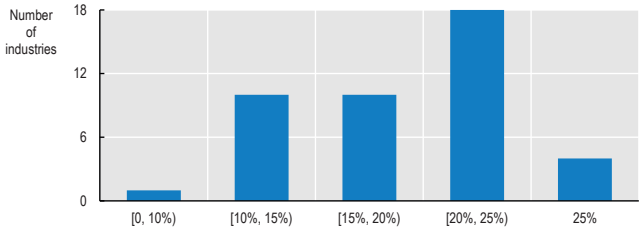
PART IV. CORPORATE BOND RATINGS AND COMPANY SIZE

In order to reach the large and growing pool of institutional bond investors, a company's bond issue typically needs to be rated by one of the established rating agencies. These external ratings obviously reduce the costs for diversified investors to assess the quality of each and every bond issue that they acquire. But the ratings also have a more far-reaching, systemic and increasing influence on the portfolio allocation of major bondholders, such as pension funds, insurance corporations and investment funds. This influence is through regulations that use rating grades as a reference for establishing quantitative limits and capital requirements. The ratings are also used to define and comply with self-imposed rating-based investment strategies as reflected in their investment mandates and policies. For example, corporate bond holdings by ETFs who typically use passive rating-based strategies increased 13-fold from USD 32 billion in 2008 to USD 420 billion in 2018. Typically, a rating is also necessary in order for a company's bond issue to be eligible for any central bank bond purchasing programme. The question therefore announces itself whether the rating requirement and process has any impact on corporate access to bond markets and the size of bond issuers. A more detailed discussion about the nature and impact of ratings can be found in Chapter II.

Indeed, the "scale" of a company is typically an important determinant of its probability of default and a key factor for its credit

rating. Figure 14 reports the weights that Moody's, a leading credit rating agency, assigns to the scale factor across the 43 non-financial industries for which it discloses its rating methodology. The metric(s) used to proxy the scale of a company varies across industries and includes measures such as total sales, total revenues, total assets, fixed assets, EBITDA. In the median industry, the scale factor has a weight of 20% in the final scorecard-indicated rating of a company and in 4 industries, it has a 25% weight.

Figure 14. The weight of the "scale" factor in the final scorecard-indicated rating (distribution across 43 industries)



Note: As of August 2020, Moody's has separately defined rating methodologies for 48 different non-financial industries. There are 5 main rating factors that are kept consistently across 43 of the 48 industries. The figure reports the weight of the scale factor across these 43 industries.

Source: Moody's rating methodologies for non-financial corporates.

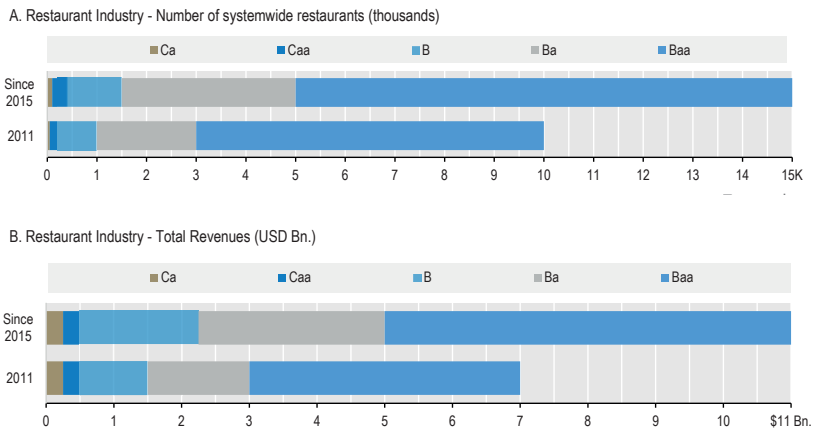
Moody's combines the scale factor with 4 other factors, which are (i) leverage and coverage, (ii) profitability, (iii) business profile, and (iv) financial policy. For each of the 5 factors (and their sub-factors, when applicable), the rating methodology provides a grid to map them against Moody's broad rating categories (i.e. Aaa, Aa, A, Baa, Ba, B, Caa or Ca), which are then converted into a numeric value. To determine the overall scorecard-indicated rating, each of these values is then multiplied by the weight of each factor to produce a composite weighted-factor score, which is mapped against Moody's more detailed alphanumeric ratings (i.e. Aaa, Aa1, Aa2, Aa3, A1, A2, A3...).

Hence, even if one risk factor indicates a low rating category, this can be compensated by another risk factor that indicates a higher rating category, resulting in a final rating between the two rating categories. In this sense, the size disadvantage faced by a growth company may be partially offset if it scores high on other factors that feed into credit ratings. However, reaching scores in other fac-

tors that are sufficiently high to carry the final rating up to a level above the investment grade threshold could be challenging for a growth company.

Figure 15 reports an example of how Moody's scores a company's scale by matching it to different broad rating categories and how the thresholds for the matching may change as the industry and the rating models develop over time. According to Moody's rating methodology, the restaurant industry, which is one of the most severely affected industries by the pandemic, the weight of the scale factor is 20%. Within this factor, there are 3 sub-factors that proxy for size: revenues (10%), number of system-wide restaurant units (5%) and revenue by geographic region (5%). Among the 3 sub-factors, revenues and number of restaurant units underwent a change that is to the disadvantage of smaller companies when the methodology was updated in 2015. First, the number of restaurant units that were required to receive an investment grade score (Baa) was increased from 3000 to 5000 (Figure 15, Panel A). Second, the threshold for total revenues required for an investment grade rating increased from USD 3 billion to USD 5 billion (Figure 15, Panel B). Both changes re-enforced the importance of size in credit ratings. Thresholds that were already hard to attain by growth companies were raised further.

Figure 15. Assessment of the scale subfactors for the scorecard (2011 vs. 2015)

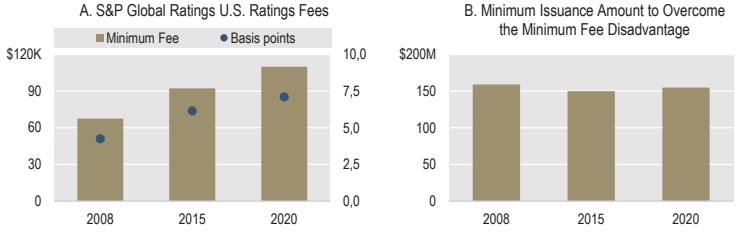


Source: Moody's rating methodologies for non-financial corporates.

Another possible barrier for smaller growth company issuers are the fees associated with obtaining a rating. This fee is paid by the issuing company and can sometimes be quite a significant cost. According to S&P Global Ratings' disclosure of ratings fees in 2020, a fee of up to 7.10 basis points of the transaction value is charged for most transactions involving US corporations, with a minimum fee of USD 110,000. This means that for any issue of less than USD 155 million, the effective fee will be higher than 7.10 basis points.

A comparison of the fee structures in 2008, 2015 and 2020 in Figure 16 shows that rating fees have increased faster than inflation. In all three years, the minimum issuance amount to overcome the minimum fee disadvantage was approximately USD 150 million. While the fee structure for ratings may constitute entry barriers for smaller companies, larger companies may instead benefit from discounts. S&P, for example, states in its disclosure that it will consider "alternative fee arrangements for volume issuers and other entities that want multi-year ratings services agreements", which is likely to further benefit frequent and larger issuers.

Figure 16. S&P Global Ratings U.S. Rating Fee Structure

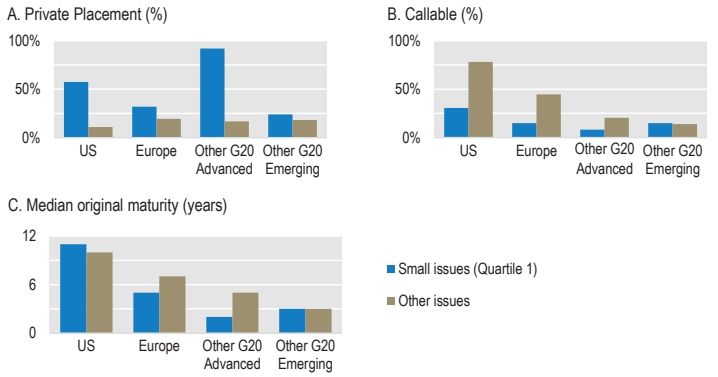


Source: Becker and Milbourn (2011), OECD (2015), S&P Global Ratings U.S. Ratings Fees Disclosure disclosed on www.standardandpoors.com/usratingsfees and retrieved in August 2020.

Even if a smaller growth company manages to access the corporate bond market after overcoming rating and fee barriers, it is likely to face different conditions than larger issuers. A comparison of the characteristics of small issues versus those of larger issues may provide some insight into the differences in the ability or willingness of small companies to enter the corporate bond market relative to larger companies. Using corporate bond issuance data for the 5-year period from 2015 to 2019 for each region plotted in Figure 17, small issues are defined as those that fall into the bottom quartile in terms

of issue size, separately for each region.[5] Figure 17 compares the tranche-level characteristics of these issues that are in the bottom issue size quartile versus those in quartiles from 2 to 4. It should be noted that the fact that large companies can also make small issues in principle will reduce the potential size difference between the two groups.

Figure 17. Differences in tranche-level characteristics of small versus large issues (2015-2019)



Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

Across all regions, small issue tranches are more likely to be privately placed. One reason for this could be small issuers' preference to present their issues to a relatively small group of qualified investors to keep information costs down. Figure 17 also shows that across all regions except the Other G20 Emerging category callable bonds are less frequent for smaller issues. Callable bonds give issuers the flexibility to redeem their bonds before maturity subject to time constraints or other special constraints. Consequently, being able to issue a callable bond increases the financial flexibility of the issuer and allows it to adapt its borrowing costs to new circumstances.

Finally, in the third panel of Figure 17, a comparison of the median original maturity is provided. Here, the evidence is rather mixed. In the US, tranches of small issues have an original maturity

[5] Using different size cut-offs for small issues is necessary to allow meaningful within-region comparisons because if a single cut-off point is used across all regions, small issues sample would not be sufficiently populated for some regions with higher issue sizes.

of 11 years on average compared with an average of 10 years for larger issues. In Europe and other G20 advanced economies categories, large issues have longer maturities whereas in other G20 emerging markets category there is no difference between maturities faced by small versus large issues.

The analyses in this chapter reveal that although the corporate bond market maintained its strong support to non-financial companies immediately after the pandemic shock, some issuer types seem to have been somewhat disadvantaged. Challenges remain for companies that were not active in the corporate bond market prior to the crisis, for lower-rated companies and for smaller companies. Growth companies typically belong to one or more of these groups that are facing challenges. As these companies may benefit greatly from access to capital markets during a temporary crisis, there is a need to further analyse the reasons for this and consider specific frameworks that would facilitate for smaller growth companies with higher risk profiles to use corporate bonds as a means of finance. This can include easing administrative procedures, speeding up processes and reducing dependence on ratings. In addition, requirements could be eased further for instruments exclusively offered to qualified investors.

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ANNEX 1 – METHODOLOGY FOR DATA COLLECTION AND CLASSIFICATION

Primary corporate bond market data

Primary corporate bond market data are based on original OECD calculations using data obtained from Thomson Reuters Eikon that provides international deal-level data on new issues of corporate bonds, which are underwritten by an investment bank. The database provides a detailed set of information for each corporate bond issue, including the identity, nationality and sector of the issuer; the type, interest rate structure, maturity date and rating category of the bond, the amount of and use of proceeds obtained from the issue.

The initial dataset covers observations in the period from 1 January 2000 to 30 June 2020. From this initial set, convertible bonds, deals that were registered but not consummated, preferred shares, sukuk bonds, bonds with an original maturity less than or equal to 1 year or an issue size less than USD 1 million are excluded. The analyses in the paper are limited to bond issues by non-financial companies. This industry classification is carried out based on Thomson Reuters Business Classification (TRBC). The final dataset after all exclusions covers 97 225 bond issues from 114 countries. When tranches under the same bond package are counted as a single issue, this figure reduces to 77 722.

Given that a significant portion of bonds are issued internationally, it is not possible to assign such issues to a certain country of issue. For this reason, the country breakdown is carried out based on the domicile country of the issuer. The advanced/emerging market classification is based on IMF country classification. Issuance amounts are presented in 2020 USD adjusted by US CPI.

Rating data

Thomson Reuters Eikon provides rating information from three leading rating agencies: S&P, Fitch and Moody's. For each bond that has rating information in the dataset, a value of 1 to the lowest credit quality rating (C) and 21 to the highest credit quality rating (AAA for S&P and Fitch and Aaa for Moody's) is assigned. There are eleven non-investment grade categories: five from C (C to CCC+);

and six from B (B- to BB+). There are ten investment grade categories: three from B (BBB- to BBB+); and seven from A (A- to AAA).

If for a given issue, ratings from multiple rating agencies are available, their average is taken. Some issues in the dataset, on the other hand, do not have rating information available. For such issues, the average rating of all bonds issued by the same issuer in the same year (t) is assigned. If the issuer has no rated bonds in year t, year t-1 and year t-2 are also considered, respectively. This procedure increases the number of rated bonds in the dataset and hence improves the representativeness of rating-based analyses. As a result of this procedure, our rating analyses covering the 2000-2020 period are based on 43 716 bond issues from 101 countries. When differentiating between investment and non-investment grade bonds, the final rating is rounded to the closest integer and issues with a rounded rating less than or equal to 11 are classified as non-investment grade.

Early redemption data

When calculating the outstanding amount of corporate bonds in a given year, issues that are no longer outstanding due to being redeemed earlier than their maturity should also be deducted. The early redemption data are obtained from Thomson Reuters Eikon and cover bonds that have been redeemed early due to being repaid via final default distribution, called, liquidated, put or repurchased. The early redemption data are merged with the primary corporate bond market data via international securities identification numbers (i.e. ISINs).

CHAPTER II

Corporate Bond Market Trends, Emerging Risks and Monetary Policy

Serdar Çelik, Gül Demirtaş and Mats Isaksson

FOREWORD

By the end of 2019, the global outstanding stock of non-financial corporate bonds reached an all-time high of USD 13.5 trillion in real terms. This record amount is the result of an unprecedented build-up in corporate bond debt since 2008 and a further USD 2.1 trillion in borrowing by non-financial companies during 2019, in the wake of a return to more expansionary monetary policies early in the year. The new data in this report shows that, in comparison with previous credit cycles, today's stock of outstanding corporate bonds has lower overall rating quality, higher payback requirements, longer maturities and inferior investor protection.

This report presents:

- recent developments and emerging risks in the corporate bond market
- the use of rating-based investment and the holders of corporate bonds
- credit rating methodologies and historical trends in rating changes

It builds on a dataset of more than 92 000 unique corporate bond issues by non-financial companies from 114 countries between 2000 and 2019. A description of data sources as well as the methodology for data collection are provided in the annex. The report builds on earlier work by the OECD Corporate Governance Committee on corporate finance and the development of more complete cap-

ital markets in the form of equity and long-term debt financing. The content and methodologies used in this report are provided as a basis for discussion with OECD committees and other experts about further work on corporate bonds as a source of market-based financing.

The report is part of the OECD Capital Market Series, which informs policy discussions on how capital markets can serve their important role to channel financial resources from households to productive investments in the real economy.

This report has been developed by Mats Isaksson, Head of the Corporate Governance and Corporate Finance Division of the OECD Directorate for Financial and Enterprise Affairs; Serdar Çelik, Senior Economist in the Corporate Governance and Corporate Finance Division, and Gül Demirtaş, Visiting Researcher from Sabanci University.

The authors are grateful to their OECD colleagues for valuable comments, in particular Juan Yermo, OECD Deputy Chief of Staff; Yoshiyuki Fukuda and Lukasz Rawdanowicz (Economics Department); and Adriana De La Cruz, Alejandra Medina, Tugba Mulazimoglu, Robert Patalano and Yun Tang (Directorate for Financial and Enterprise Affairs). Further thanks to Pamela Duffin (OECD) for excellent editorial support. Gül Demirtaş would like to thank the Swedish Corporate Governance Forum of the Karl-Adam Bonnier Foundation for its financial support for her work.

EXECUTIVE SUMMARY

After a return to more expansionary monetary policies in early 2019, the world's non-financial corporations borrowed an additional USD 2.1 trillion in the form of corporate bonds. In real terms, this is equivalent to the amount borrowed in the previous record year 2016 and represents a clear reversal of the decrease in corporate bond issuance during 2018. Adding the record borrowing during 2019 to the unprecedented build-up of corporate bond debt since 2008 means that the global outstanding stock of non-financial corporate bonds at the end of 2019 reached an all-time high of USD 13.5 trillion.

In addition to its growing size, policy makers need to consider that the quality and dynamics of the outstanding stock of corporate

bonds have changed. Compared with previous credit cycles, today's stock of outstanding corporate bonds has lower overall credit quality, higher payback requirements, longer maturities and inferior covenant protection. These are features that may amplify the negative effects that an economic downturn would have on the non-financial corporate sector and the overall economy. As a result, the size, quality and dynamics of today's corporate bond markets has become a factor to consider in the different scenarios that underpin monetary policy.

Supported by a low-interest-rate environment, the mechanics of the credit rating system have allowed companies to increase their leverage ratios and still maintain a BBB rating, which has come to dominate the investment grade category. Over the last three years, BBB rated bonds have made up 52% of all new investment grade bond issuance. As BBB is also the lowest rating in the investment grade category, the significance of the demarcation line between investment and non-investment grade bonds has become increasingly important. Absent the support of low interest rates or in the case of a business downturn, the same rating mechanics that allowed increased leverage will lead to downgrades that increase the borrowing costs for companies and limit their scope for investments.

Extensive migration of bonds from investment grade status to non-investment grade status will also test the liquidity of the non-investment grade bond market, as many large investors will be obliged to sell in order to meet their capital requirements and rating-based investment mandates. Given that the average original maturity of investment grade corporate bond issues worldwide has increased from 9 to 12 years, the decrease in the value of bond portfolios that follow from the downgrades will be more pronounced.

Some key findings:

- **Extended growth in corporate bond borrowing.** Since 2008, the annual global issuance of corporate bonds has averaged USD 1.8 trillion. This is double the annual average between 2000 and 2007. As a reaction to successive increases in interest rates, announcements of a less accommodative monetary policy and fears over slowing growth, corporate bond issuance declined significantly during the second half of 2018. However, when major

central banks announced in early 2019 that they were ready to reintroduce or adjust their accommodative policies, the issuing of corporate bonds rebounded pushing the total amount issued in 2019 to the equivalent amount they borrowed in the previous record year 2016 at USD 2.1 trillion.

- **Long-lasting decline in overall bond quality.** In every year since 2010, around 20% of the total amount of all bond issues has been non-investment grade and in 2019 the portion reached 25%. This is the longest period since 1980 that the portion of non-investment grade issuance has remained so high, indicating that default rates in a future downturn are likely to be higher than in previous credit cycles. Importantly in 2019, the portion of BBB rated bonds – the lowest quality of bonds that enjoy investment grade status – accounted for 51% of all investment grade issuance. During the period 2000-2007, the portion was just 39%.
- **Lower quality bonds now dominate.** In December 2019, the global outstanding amount of non-financial corporate bonds reached USD 13.5 trillion. In real terms, this is more than twice the amount outstanding in December 2008. Large issuance of BBB rated bonds, non-investment grade bonds and bonds from emerging market corporations since 2008 has resulted in a situation where lower credit quality bonds have come to dominate the global outstanding stock. In 2019, only 30% of the global outstanding stock of non-financial corporate bonds were rated A or above and issued by companies from advanced economies. In addition, for emerging market issuers and non-investment grade and unrated bonds issued by companies from advanced markets, the total payback or refinancing requirements within the next three years is USD 2.5 trillion, equivalent to 41% of their total outstanding amount.
- **Longer maturities and increased price sensitivity.** In the last five years, the average length of maturity for investment grade bonds at the date of issue has been 12.4 years compared to 9.4 years in the early 2000s. In 2019, the average maturity of investment grade bonds was about 13 years. As longer maturities are associated with higher price sensitivity to changes in interest rates, the combination of longer maturities and declining credit quality has made bond markets more sensitive to changes in monetary policy.

- **The use of rating-based investments, passive management and corporate bond ownership.** The portfolio allocation of all major bondholders, such as pension funds, insurance corporations and investment funds is influenced by external credit ratings. This influence is either through regulations that use rating grades as a reference for establishing quantitative limits and capital requirements or through self-imposed rating-based investment strategies that are reflected in their investment mandates and policies. For example, corporate bond holdings by exchange traded funds (ETFs) who typically use passive rating-based strategies increased 13-fold from USD 32 billion in 2008 to USD 420 billion in 2018. Interestingly also, non-financial companies have become significant owners of corporate bonds. Between 2009 and 2018, the combined value of corporate bond holdings by 25 large non-financial US companies tripled from USD 119 billion to USD 356 billion. The company with the largest portfolio alone held USD 124 billion in corporate debt securities. This equals the combined holdings of the world's 6 largest corporate bond ETFs.
- **Within-rating leverage ratios have increased.** Today, the median firm in each investment grade rating has higher leverage ratios compared to a decade ago. At the same time, influenced by unprecedented low interest rates since 2008, their ability to cover their current interest obligations has improved. If interest rates start to increase or an economic downturn leads to lower earnings, interest coverage and profitability ratios may deteriorate rather rapidly, limiting their ability to offset the high leverage. In such a scenario, the rating mechanics that allowed increased leverage would result in pressure towards higher overall downgrade ratios.
- **Issuer quality and rating stability.** The significant increase of BBB rated bonds and the declining frequency of downgrades relative to upgrades in recent years, may suggest that credit rating agencies are mindful of downgrading BBB issuers due to their special status just above the non-investment grade category. The one-year 1-notch downgrade probability is lowest for bonds rated BBB-, which is also the lowest rating notch before crossing the line to non-investment grade. It may also reflect that companies with BBB status pay extra close attention to their rating metrics in order to maintain their rating status and borrowing costs. If

rating agencies were to be extra cautious to re-rate bonds that are in the vicinity of the investment / non-investment grade frontier, one might expect that the upgrade probability is lowest for the BB+ category. However, for all the three major credit rating agencies the probability of a 1-notch upgrade within a year is either highest or third highest for BB+ rated issuers.

- **Sell-offs and financial stability concerns.** While the growing stock of the BBB rated bonds has allowed investors to seek higher yields, their choice of portfolio allocation is typically influenced by regulations and defined by rating-based investment mandates. Given these limitations, together with a concentration of outstanding bonds just above the demarcation line between investment and non-investment grade, extensive downgrades of BBB rated bonds to non-investment grade status may lead to substantial sell-offs that put corporate bond markets in general under stress, giving rise to financial stability concerns.

PART I. RECENT DEVELOPMENTS AND EMERGING RISKS IN THE CORPORATE BOND MARKET

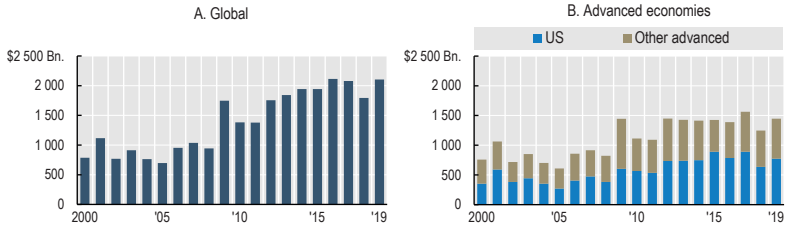
Following the return to a more expansionary monetary policy by major central banks in 2019, the world's non-financial companies have borrowed an additional USD 2.1 trillion in the form of corporate bonds. This is equivalent to the previous record year 2016 and a clear reversal of the nascent decrease in corporate bond issuance in 2018. Adding the 2019 bond issues to the unprecedented use of corporate bonds since 2008 means that the outstanding stock of non-financial corporate bonds has reached yet another all-time high of USD 13.5 trillion.

1.1. Trends in corporate bond issuance by non-financial companies

Figure 1 presents the total amount of debt raised by non-financial companies in the form of corporate bonds in each year between 2000 and 2019. As seen in Panel A, there was a significant and lasting increase around the time of the 2008 financial crisis. Between 2008 and 2019, the average global issuance annually was USD 1.8

trillion, which is double the average annual amount of USD 879 billion between 2000 and 2007.

Figure 1. Global corporate bond issuance and issuance in advanced economies (2019 USD, billion)



Note: The figures are based on the analysis of 92 069 unique corporate bond issues by non-financial companies from 114 countries.

Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

Panel B of Figure 1 shows corporate bond issuance by companies in the United States and other advanced economies. In line with the global trend, issuance in advanced economies decreased in the second half of 2018, resulting in the lowest annual issuance since the 2011 European debt crisis. However, in 2019, issuance bounced back and in advanced economies, it almost reached the 2017 record. This drop and reversal pattern is similar for the United States and other advanced economies. Taking a longer term perspective, the average annual issuance of corporate bonds by non-financial companies in advanced economies grew by 63% from USD 808 billion during the 2000-2007 period to USD 1.3 trillion during the 2008-2019 period.

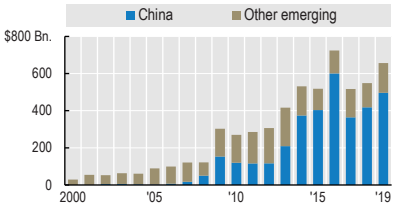
The decline in corporate bond issuance during the second half of 2018 can be linked to the successive rise in interest rates, coupled with investor fears over slowing growth and less accommodative monetary policy. By the end of 2018, the US Federal Reserve had raised interest rates for the ninth time since December 2015 and had already initiated its balance sheet normalisation programme (Federal Reserve, 2017 and 2018). Likewise, in August 2018, the Bank of England increased interest rates for the first time since the crisis and in December 2018, the ECB ended its net purchases under the asset purchase programme (BoE, 2018; ECB, 2018). However, this changed in the first month of 2019 when both the US Federal Reserve and the ECB expressed their readiness to reintroduce or adjust their accommodative strategies in light of future economic

and financial conditions (Federal Reserve, 2019a and 2019b; ECB, 2019a). Similarly, the Bank of England adjusted its growth forecasts significantly downward, which lowered the expectations of future interest rate increases (BoE, 2019a). The Bank of Japan also confirmed its intention to maintain the existing and extremely low levels of interest rates for an extended period (BoJ, 2019a). With such reassurances, corporate bond issuance quickly rebounded pushing the total amount in the first six months of 2019 above that of the same period in 2018.

In July 2019, US Federal Reserve cut interest rates for the first time since 2008. Two more rate cuts followed in September and October (Federal Reserve 2019c, 2019d, 2019e). Similarly, in September 2019, the ECB lowered interest rates and announced its plan to restart net purchases under its asset purchase programme at a monthly pace of EUR 20 billion starting from November 2019 (ECB, 2019b). Furthermore, in October 2019, the Bank of Japan stated its willingness to cut interest rates if deemed necessary to achieve the inflation target (BoJ, 2019b). In November 2019, the Bank of England followed suit and signalled that it will be ready to adjust its monetary policy to reinforce the expected recovery in economic growth and inflation (BoE, 2019b). Following these developments, full year issuance of non-financial corporate bonds in 2019 in advanced economies climbed above the average post-financial crisis level to USD 1.4 trillion.

Figure 2 presents issuance by companies in the People's Republic of China (China) and other emerging markets where the pre- and post-crisis difference is even more pronounced than that for advanced economies. While bond issuance by Chinese companies was negligible prior to 2008, it averaged USD 285 billion during the period 2008 to 2019. In 2017, China experienced a sharp decline of almost 40% in bond issuance compared with the 2016 peak level of USD 601 billion. During the last 2 years however, annual issuance has continued to grow. Issuance by companies from other emerging market economies has remained relatively limited during the past two decades and ranged between USD 110-190 billion in the last 10 years except for a peak at USD 207 billion in 2013.

Figure 2. Corporate bond issuance by companies in China and in other emerging market economies (2019 USD, billion)

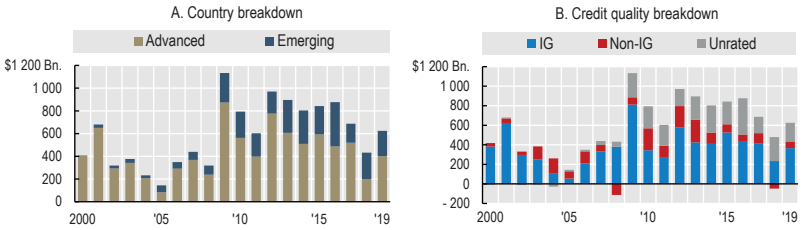


Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

In order to understand how annual issuing activity affects the outstanding stock of corporate bond debt, it is necessary to calculate gross issuance minus the total amount of corporate bonds matured or retired in any given year. This is done in Figure 3 with respect to country groups as well as credit quality. Panel A shows positive net issuances of corporate bonds every year since 2000, which continuously have added to the outstanding stock. In addition to a period of successive increases in interest rates and expectations of a return to a less accommodating monetary policy mentioned above, the decline in net corporate bond issuance in 2017 and 2018 may partly be attributable to the US tax reform, which lowered the corporate tax rate and unlocked overseas cash holdings of US companies through a reduction in the cost of repatriating foreign earnings. As a consequence, both the need to borrow and the tax advantage of borrowing declined for US companies. In 2018, global net issuance reached its lowest level since 2008.

Panel B shows that the 2018 decline affected the net issuance of both investment grade and non-investment grade bonds. As a matter of fact, in 2018 the net issuance of non-investment grade bonds was actually negative for the first time since 2008. This all changed in 2019, which saw an increase in the net issuance for both non-investment and investment grade bonds when net issuance by companies in advanced economies reached USD 401 billion. This was more than twice the net amount issued in 2018. Net issuance of investment grade bonds increased from USD 235 billion in 2018 to USD 366 billion in 2019 and that of non-investment grade bonds turned from negative to positive. However, net issuance of companies in emerging market economies and that of unrated companies remained weak and decreased compared to 2018.

Figure 3. Net corporate bond issuance (2019 USD, billion)

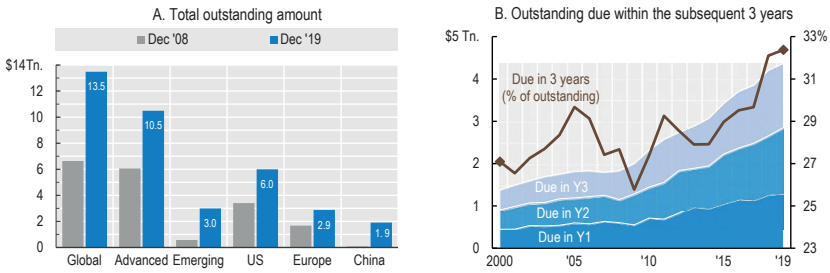


Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

The extensive net issuance of corporate bonds by non-financial companies during the past decade has resulted in a record amount of corporate bond debt. This is documented in Figure 4 where Panel A shows that as of year-end 2019, the total outstanding amount of corporate bonds issued by non-financial companies worldwide had reached USD 13.5 trillion. This is, in real terms, more than twice the amount in December 2008. Of the total outstanding amount, 78% (USD 10.5 trillion) was attributable to companies from advanced economies and the remaining 22% (USD 3 trillion) to companies from emerging markets.

The significant increase in the outstanding stock of corporate bonds implies a cumulative increase in repayment obligations. For each year-end between 2000 and 2019, Panel B of Figure 4 provides the inflation-adjusted outstanding amount of corporate bonds that needs to be paid back or re-financed within each of the following 3 years. As of December 2019, non-financial companies worldwide need to repay or refinance an unprecedented USD 1.3 trillion within one year, USD 2.9 trillion within 2 years and USD 4.4 trillion within 3 years. The amount due within 3 years represents a record 32.4% of the total outstanding amount.

Figure 4. Total outstanding amount of corporate bonds issued by non-financial companies and outstanding amount due within the subsequent 3 years (2019 USD, trillion)



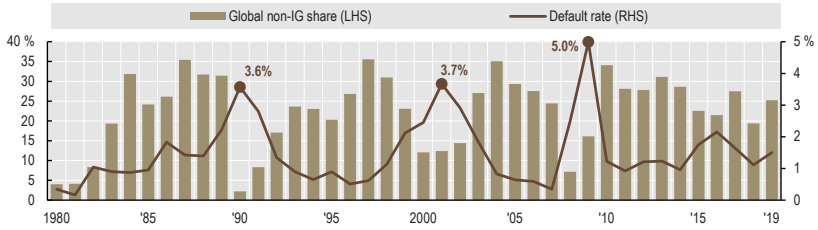
Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

1.2. Risks associated with the current outstanding stock of corporate bonds

The large outstanding amounts and the record repayment requirements are not the only characteristics that distinguish today's outstanding stock of corporate bond debt from that of the previous credit cycles. Other important differences include the aggregate credit quality of issuers, the length of maturities and the level of bondholder rights.

A common measure of market-wide issuer quality that has been used to forecast excess corporate bond returns is the ratio of non-investment grade bond issuance to total corporate bond issuance (Greenwood and Hanson, 2013). Construction of this measure for the non-financial corporate bond market in Figure 5 shows that the share of non-investment grade issuance remained above 20% in every year between 2010 and 2017. It fell only slightly below 20% in 2018 and then rose to 25.2% in 2019. This is the longest period of time since 1980 that the portion of non-investment grade issuance has remained this elevated before a significant decrease in its level and a subsequent increase in default rates. However, as discussed in Çelik et al. (2019), this broad measure of issuer quality captures only a part of the story. The reason is that it does not take into account changes in credit quality within the two broad categories of investment grade and non-investment grade bonds, which are often used to define investment policies but which themselves include bonds of rather different credit quality.

Figure 5. Share of non-investment grade bonds in global bond issuance by non-financial companies and average default rates of rated companies



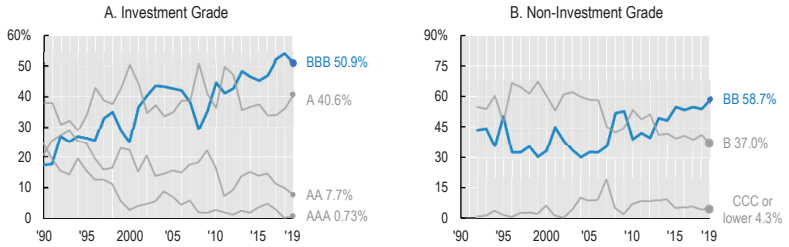
Note: The figure is based on the analysis of 63 562 corporate bond issues with rating information from 105 countries.

Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, MIS (2019, 2020), see Annex for details.

To explore in more detail the changes in credit quality, Figure 6 uses issuance data to show that such changes in rating composition indeed have occurred within both the investment grade and non-investment grade categories. Notably, Panel A shows that the portion of BBB rated bonds, which is the lowest quality of bonds that are included in the investment grade category, has increased significantly. During the period 2000-2007, on average 38.9% of all investment grade issuance was rated BBB. During the period 2008-2019, their average share in total issuance increased to 44.6%. Since 2017, BBB rated issuances have accounted for more than half of all investment grade issuance and stood at 51% in 2019.

Within the non-investment grade category, Panel B shows that the credit quality shift has been in the opposite direction towards a higher portion of higher rated bonds. The average annual share of BB rated bonds in global non-investment grade issuance increased from 35.2% in the pre-crisis period to 50.2% during the period 2008-2019 and reached its highest value of 58.7% in 2019. The shift may partly be attributable to the fact that some issuers below BB have left the bond market for the leveraged loan market.

Figure 6. Composition of issuance in investment and non-investment grade categories



Note: In Panel B, 1990-1991 data are not reported due to an insufficient number of non-investment grade issues in those years.

Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

While investments in BBB rated bonds allow investors to increase risk and potential returns, institutional investors are often bound or restricted by investment mandates, regulations and self-imposed policies to hold bonds that are included in the investment grade category. Under such restrictions of rating-based investment rules, extensive downgrades of BBB rated bonds to non-investment grade status may lead to substantial sell-offs that put corporate bond markets in general under stress. It is therefore important to pay special attention to the issuance of BBB rated bonds and to the increased importance that the demarcation line between investment grade and non-investment grade plays for the asset allocation of institutional investors and market movements.

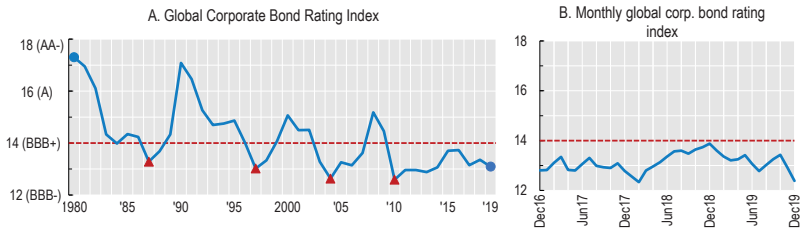
After years of high BBB issuance, the outstanding stock of BBB rated bonds stood at USD 3.8 trillion in December 2019. This is almost 30% of the value of all outstanding corporate bonds in the world. Their significance is also reflected in the portfolio composition of investors. Aramonte and Eren (2019) report that since the financial crisis, the portion of BBB bonds in the portfolios of investment grade corporate bond mutual funds in the US steadily grew from around 20% in 2010 to about 45% in 2018. Similarly, ECB (2019c) reported that by the end of 2018, BBB rated bonds represented a significant and growing portion of the non-financial corporate bond holdings of euro area non-bank financial institutions and accounted for 40% of the holdings of insurance corporations and pension funds and 35% of the holdings of investment funds compared with 33% and 31% respectively at the end of 2013.

In order to meet the obligations and requirements that are imposed by investment mandates, regulations and self-imposed policies, the occurrence of extensive downgrades from BBB to non-investment grade status may force many institutional investors to offload a large amount of bonds. Based on the 1-year transition rate reported by Moody's for the year 2009 (i.e. 6.8%) as a proxy and assuming that the outstanding amount of the average downgraded BBB rated company is representative of that of the average BBB rated company, BBB rated bonds amounting to USD 261 billion could be expected to be downgraded to non-investment grade within one year, in case of a significant economic downturn. If corporate bonds issued by financial companies are also taken into account, the amount of so-called "fallen angels" would increase to approximately USD 500 billion. This influx to non-investment grade market may swell as the time horizon for possible downgrades lengthens.

Given the major changes in intra-category quality and the critical importance of the demarcation line between investment and non-investment grade categories, a "global corporate bond rating index" is constructed, which provides a more refined measure of overall bond quality rating.[1] Panel A of Figure 7 plots this index for each year since 1980, based on information about all rated bonds that have been issued by non-financial companies worldwide. According to the figure, the lowest levels of issuer quality were reached in 1987, 1997, 2004 and 2010, with an absolute minimum (12.59) in 2010. Moreover, the number of years for which this index has stayed under 14, which corresponds to a BBB+ rating, has increased in each cycle: From two years in 1987 to five years around the 2004 low. From the all-time low in 2010, the global corporate bond rating index has stayed below BBB+ for a full 10 years and remained at 13.09 in 2019. This means that the average corporate bond issued has a rating of approximately BBB.

[1] The index assigns a score of 1 to a bond if it has the lowest credit quality rating and 21 if it has the highest rating. The corporate bond rating index is then calculated by taking a weighted average of individual bond scores, using issue amounts as weights.

Figure 7. Global corporate bond rating index



Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

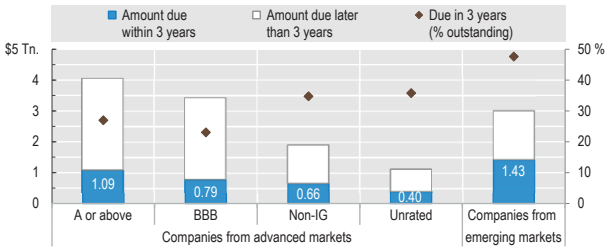
A closer look at the past 3 years in Panel B reveals that issuer quality began to improve in February 2018, which coincided with a time of large net redemptions from non-investment grade funds, amid increasing investor concerns that inflation in the US could lead to more substantial interest rate hikes. As the major central banks had already become or were expected to become less accommodative in 2018, the prospect of rising interest rates pushed non-investment grade issuers to the loan market, where interest rates are -as opposed to the corporate bond market- mainly floating. However, the resulting improvement in the global corporate bond rating index was only temporary and has been reversed in 2019, when central banks voiced their readiness to re-launch accommodative strategies, as necessary.

Large issuance of BBB rated bonds, non-investment grade bonds and bonds from emerging market corporations since 2008 has resulted in a situation where lower credit quality bonds have come to dominate the global outstanding stock. Figure 8 shows the composition of the global outstanding stock in terms of credit quality as of year-end 2019. Non-investment grade bonds together with unrated bonds issued by companies from advanced economies and corporate bonds issued by companies from emerging markets make up 45% of all outstanding non-financial corporate bonds globally. The lowest rated bonds in the investment grade category, BBB rated bonds, issued by companies from advanced economies account for another 25%. In other words, only 30% of the global outstanding stock of corporate bonds is rated A or above and issued by companies from advanced economies.

As a complement to the maturity walls shown in Figure 4 above, Figure 8 shows the outstanding amounts that are due for payback or re-financing within the next three years (2020-2022) for each credit

quality category. For emerging market issuers and for non-investment grade and unrated bonds issued by companies from advanced markets, the share of the outstanding amount that is due within the next 3 years is significantly higher than the share for investment grade bonds issued by companies from advanced economies. Together, the amount of these bonds that are due for payback or re-financing within the next three years is USD 2.5 trillion, equivalent to 41% of their total outstanding amount.

Figure 8. Outstanding amount of corporate bonds by credit quality categories (2019 USD, trillion)



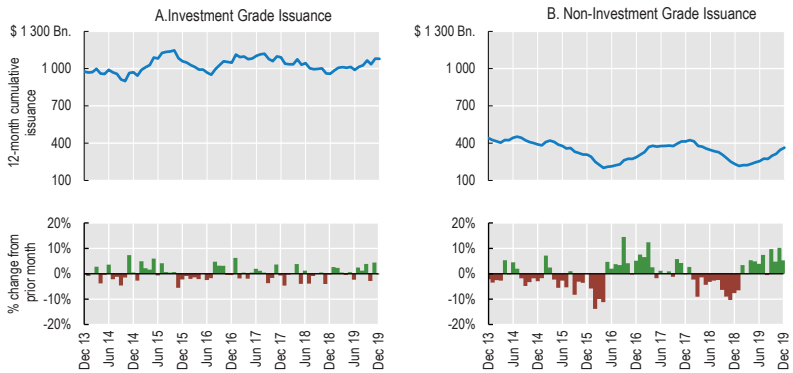
Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

In addition to the higher repayment requirements that issuers of non-investment grade bonds face, the fluctuations in the amounts that are issued by them are also considerably higher than the fluctuations observed in investment grade bond issuance. Figure 9 shows the 12-month cumulative issuance amounts for each month and the corresponding percentage changes from prior month. While the total issuance of investment grade bonds has remained stable at around USD 1 trillion per year since 2014, the total issuance amount of non-investment grade bonds has fluctuated between USD 200 and 450 billion. These higher fluctuations in non-investment grade issuing are also reflected on a monthly basis. While the monthly absolute change in investment grade issuance exceeded 5% only during 4 months over the period 2014 to 2019, the same occurred during 26 months for non-investment grade issuance.

There are four distinct periods of growth and decline in non-investment grade issuance as illustrated in Panel B of Figure 9. The first period of decline was from early 2015 to mid-2016, in particular in the first four months of 2016 with an average monthly decline of 10%. This coincided with a period when the US Federal

Reserve, in response to improvements in economic activity, started normalising its monetary policy. The US Federal Reserve started a series of interest rate increases in December 2015. The following 12 months from mid-2016 to mid-2017 saw a strong upward trend with monthly increases in non-investment grade issuance reaching 15%. Concerns about the uncertainties about the economic outlook were expressed by central banks in mid-2016 (ECB, 2016a; Yellen, 2016), which was followed by a decline in long-term expected interest rates. As discussed above, interest rates rose in 2018 coupled with investor fears over slowing growth and gradually decreasing support of major central banks for the economy. An important development in this period was the launch of the US Federal Reserve's balance sheet normalisation programme, which would reduce its securities holdings in a gradual and predictable manner, in October 2017. This third period saw a 12 consecutive month of decline in non-investment grade issuance and ended in early 2019. This was when both the US FED and the ECB expressed their readiness to reintroduce or adjust their accommodative strategies in light of future economic and financial conditions. With such reassurance, non-investment grade issuance increased throughout 2019. It is noteworthy that during all the four periods, changes in the monetary policy environment are associated with more pronounced reactions in the primary non-investment grade market compared to the primary investment grade market.

Figure 9. 12-month cumulative issuance (2019 USD, trillion) and the corresponding monthly changes (%)

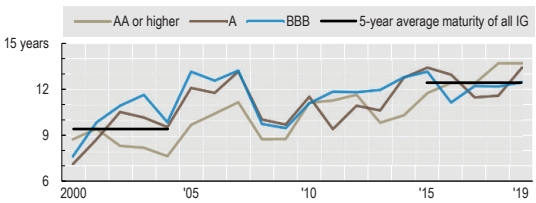


Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

There is also a negative correlation between credit quality and bond price volatility. The lower the rating (the higher the credit risk), the higher the price volatility (Bao et al., 2015). As illustrated in Figure 6 and 7 above, there has been a clear downward trend in overall credit quality worldwide. This was not only because of the increase in non-investment grade issuance but also because the relative share of BBB rated bonds has increased at the expense of bonds that are rated AA or above.

Another important feature with respect to the long-term changes in the outstanding stock of corporate bonds is the positive relationship between bond maturity and price sensitivity. Longer maturities are typically associated with higher price sensitivity to changes in interest rates.[2] Figure 10 reveals that for investment grade bonds average years to maturity at the issue date have increased significantly during the past two decades. Compared to 9.4 years in the early 2000s, average maturities have in the last five years increased to 12.4 years. In 2019, the average bond maturity of all three categories of investment grade bonds was around 13 years. The evolving decline in rating quality and increase in maturities are factors that have made corporate bond markets more sensitive to any future changes in interest rates and other monetary policy conditions.

Figure 10. Value-weighted original maturity of investment grade corporate bonds (years)



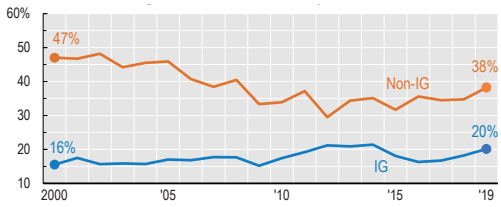
Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

The significant increase in corporate bond issuance by non-financial companies coupled with a prolonged decline in overall bond credit quality and longer maturities is consistent with increased risk-taking by investors that are searching for yield in a low interest rate

[2] In addition, default probability also increases with longer maturities. For a B rated bond, for instance, the default probability within one year is 3.6%. Over a 7-year period however the default probability increases to 21.5% (S&P, 2018).

environment. Another indication of this change in investor sentiment is the decline in the covenant quality of non-investment grade bonds. Covenants are clauses in a bond contract that are designed to protect bondholders against actions that bond issuers can take at their expense. Agreeing to weaker covenants typically means increased returns to bond investors since they forego their own protection and may therefore be attractive, especially in a low interest rate environment.

Figure 11. Covenant protection index for bonds issued in the US by non-financial companies



Note: The figure is based on the analysis of 16 106 corporate bond issues in the US by companies from the United States and 66 other countries.

Source: Mergent FISD, authors' calculations, see Annex for details.

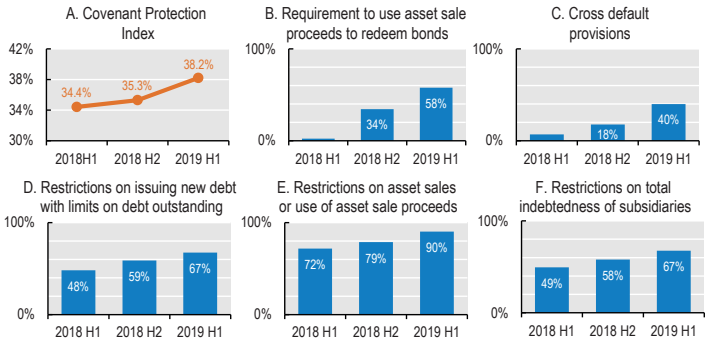
Figure 11 above presents the covenant protection index for bonds issued in the US market by non-financial companies.[3] The higher the index, the stronger is the covenant protection. As shown, the covenant protection index for non-investment grade bonds decreased significantly from 47% in 2000 to 30% in 2012. Since then, the index for non-investment grade bonds has increased and reached 38% in 2019. Importantly, despite the increase in BBB rated issuance over the recent years, the index for investment grade bonds has stayed in a narrower band between 15% and 21% throughout the period.

A closer look at developments during the past two years shows that the covenant protection index for non-investment grade bonds reached its highest level since 2008 in the first half of 2019. Figure 12 displays the trends with respect to the inclusion of the five different covenants that experienced the highest increases over the period. Two of these five covenants are related to restricting asset sales and/or the use of asset sale proceeds, and two are related to restricting issuing new debt by the issuer or the indebtedness of its subsidiaries.

[3] Please see the Annex for details on the covenant data source and the calculation of the covenant index.

The last covenant shown in Panel C is cross default provisions, which trigger default when any other debt of the issuer moves into default. Although it is too early to conclude whether these most recent changes indicate a reversal of the long-term trend of weakening bondholder rights, they still point to an increased investor attention to the overall debt levels of corporate bond issuers.

Figure 12. Recent changes in the covenant protection index and the incidence of observing selected covenants in non-investment grade bonds



Source: Mergent FISD, authors' calculations, see Annex for details.

Keeping interest rates low with the objective of supporting economic recovery in the post-crisis period has also led institutional investors to search for yield in the riskier parts of the corporate bond market in order to meet their return targets. The observed decline in average issuer quality, increase in average maturities and the deterioration in non-investment grade bonds' covenant protection in the post-crisis era indicates a period of increased risk appetite among investors, shifting the lending terms in favour of issuers. The threefold lockstep movement of issuer quality, the monetary policy conditions as presented in Panel B of Figure 7 and the increased amounts of corporate bonds due in the medium-term now present one of the factors to be taken into account when assessing different financial market scenarios and setting monetary policy.

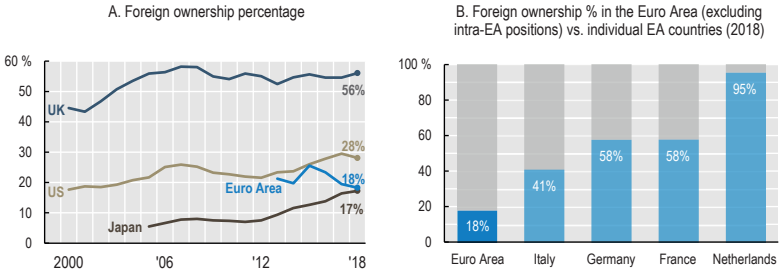
PART II. CORPORATE BOND INVESTORS AND RATING-BASED INVESTMENT

The increase in corporate bond issues and the changing character of the outstanding stock of corporate bonds during the past decades have been accompanied by changes in the investor base and the emergence of new investment vehicles. When analysing the dynamics and the future direction of the corporate bond market it is important to understand the systemic effects of these changes and the related financial market regulations. This part explores changes in the investor base during the past two decades and how investment practices together with the regulatory framework are likely to influence the behaviour and investment patterns of corporate bond investors.

2.1. An overview of the current investor base

Information about the different categories of investors that hold corporate bonds is available from the national financial accounts data published by central banks or statistical institutions. These national data typically cover direct owners of corporate bonds issued by companies resident in the country. One disadvantage is that countries cannot identify the different categories of investors among foreign bond owners. Instead, foreign ownership is reported as one aggregate number. The extent to which this reporting practice affects the ability to identify the distribution of corporate bond ownership between different categories of investors in a given country is therefore in proportion to the level of foreign ownership in that country.

Figure 13. Percentage of foreign ownership of outstanding corporate bonds issued by companies in different regions



Source: Authors' calculations based on national financial accounts data released by the ECB Statistical Data Warehouse, the UK Office for National Statistics, the Bank of Japan and the US Federal Reserve, see Annex for details.

As an illustration, Panel A of Figure 13 shows the foreign ownership share of the outstanding amount of corporate bonds issued by corporate residents of the UK, the US, the euro area and Japan.[4] Except in the euro area, where the series are relatively short, foreign ownership is clearly on the rise. In Japan, it has increased from 5.5% in 2005 to 17.2% in 2018 and in the US from 17.7% in 2000 to 28.1% in 2018. In the UK, which historically has had the highest portion of foreign bond ownership, it increased from 44.6% in 2000 to 56.1% in 2018. As a consequence the UK data only make it possible to identify the specific categories of bond investors for the remaining 43.9% of the outstanding amount of corporate bonds issued by UK corporations. However, for Japan, the euro area and the US, between 72% and 83% of the bondholders can be identified at a more detailed level.

Panel B of Figure 13 provides a comparison of foreign ownership in the euro area as a whole as well as selected euro area countries as of year-end 2018. Foreign ownership for the euro area is computed by first aggregating national data and then eliminating cross-border positions between euro area countries from what is reported as foreign ownership in the individual national financial accounts.

[4] It should be noted that across different countries, the scope of corporate bonds data may differ. For instance, some countries report the national financial accounts data at the breakdown of short-term vs. long-term debt securities. This allows us to focus only on the long-term, since corporate bonds are typically defined as having an original maturity longer than a year. On the other hand, other countries do not provide such a maturity breakdown. For details on the scope of each country, please refer to the Annex.

This means that the holdings of the residents of Italy in German companies' corporate bonds are not reported as foreign ownership in the euro area data. Because European countries have significant amounts of cross holdings among each other, individual European countries report a high portion of foreign ownership of corporate bonds, while the euro area figure remains comparatively low. Among the selected countries, the Netherlands has the highest portion of foreign ownership (95%), followed by Germany and France (both 58%), and Italy (41%). In contrast, the aggregate euro area figure stands at only 18%. Since the euro area data allow to identify the individual categories of owners for 82% of the outstanding corporate bond volume, the focus remains on the euro area, instead of the individual euro area countries.

When it comes to the classification of different categories there are some differences between countries. For the purpose of achieving broad comparability across countries and consistency with internationally accepted standards for sector classification,[5] the following investor categories are identified:

- **Financial sector:**
  - **Monetary financial institutions (MFIs):** Central banks, money market funds, deposit-taking corporations.
  - **Insurance corporations and pension funds** (including public pension funds)
  - **Investment funds:** All collective investment schemes such as open- and closed-end investment funds (including exchange traded funds), real estate investment funds, funds of funds, hedge funds.
  - **Other financial institutions:** Financial auxiliaries, captive financial institutions and money-lenders, other financial intermediaries except insurance corporations and pension funds.
- **Non-financial sector:**
  - **Household sector:** Households and non-profit institutions serving households (NPISHs).

[5] Japan adopts the System of National Accounts of the United Nations (2008 SNA) and the US maps its own classification to 2008 SNA sectors. The UK and the euro area adopt the European System of National and Regional Accounts (ESA 2010), which is broadly consistent with the 2008 SNA.

- **General government:** Central, state and local governments.
- **Non-financial corporations**

Figure 14 provides a breakdown of the domestic ownership of corporate bonds into the 7 different categories for the euro area, Japan, the UK, and the US, respectively.[6] The blue-shaded categories denote investor categories in the financial sector while the yellow-shaded categories denote the non-financial sector investors. In all four regions, the financial sector categories have an overwhelming dominance. Financial investors hold 86% of the outstanding amount of corporate bonds in the US and Japan, 93% in the euro area and 98% in the UK.

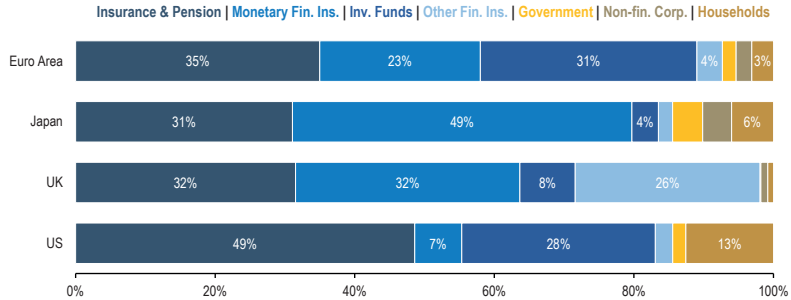
Among the financial investors, insurance companies and pension funds have a significant role, holding in excess of 30% of the outstanding stock of corporate bonds in all regions. In the US, they hold almost half of the outstanding amount. Monetary financial institutions are also a major corporate bond investor, except in the US. They make up 23% of domestic bond ownership in the euro area, 49% in Japan, 32% in the UK, and 7% in the US. Investment funds own a significant portion of the corporate bonds in the euro area (31%) and the US (28%) but less than 8% in the UK and Japan.

The non-financial corporate sector and general government holdings remain modest in all areas. Similarly, holdings by the household sector, exceeds 10% only in the US, which reflects the fact that the US Federal Reserve's classification includes domestic hedge funds in the household sector.[7]

[6] It should be noted that publicly-available corporate bond ownership data in general and Figure 14 in particular allow one to observe only the direct holdings of corporate bonds. Details on indirect holdings of corporate bonds, such as through investments in mutual funds, ETFs, funds-of-funds, insurance entitlements etc. cannot be observed.

[7] In the US financial accounts data, the holdings of the household sector are calculated as the total corporate bonds issued, less the holdings of all other sectors. Therefore, any sector that is not required to file a documentation on its assets such as hedge funds is picked up by the household sector.

Figure 14. Distribution of domestic ownership of outstanding corporate bonds issued by residents (as of 2018)



Source: Authors' calculations based on national financial accounts data released by the ECB Statistical Data Warehouse, the UK Office for National Statistics, the Bank of Japan and the US Federal Reserve, see Annex for details.

While the holdings by non-financial corporations remain below 5% in all regions, it should be noted that the US financial accounts data do not report the holdings by non-financial corporations separately. However, as discussed in Section 2.2.b below, a more detailed analysis shows that non-financial US corporations have increased their corporate bond investments significantly since the financial crisis. Because these corporations typically invest through their foreign subsidiaries, it is likely that their corporate bond investments are recorded as foreign ownership.

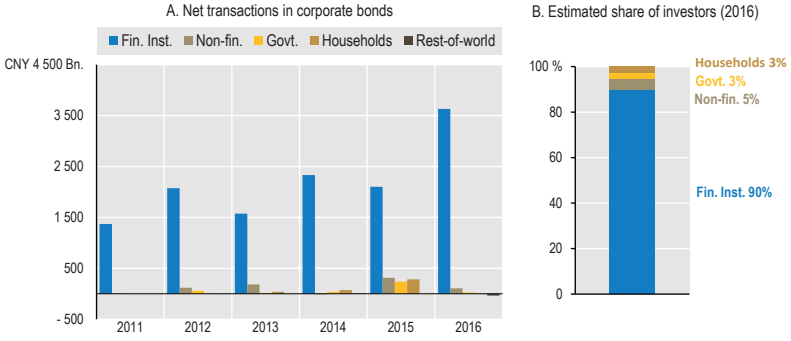
While China is not represented in Figure 14, it has played a pivotal role in the recent growth of the global corporate bond market. It has moved from an insignificant level of issuance prior to the 2008 financial crisis to a record amount of USD 601 billion in 2016, making Chinese companies the second largest issuers in the world. Despite the importance of the Chinese bond market, there are no publicly available data on the different categories of investors that hold the outstanding stock of Chinese corporate bonds. Instead, Panel A in Figure 15 provides annual data from mainland China on the different investor categories' net transactions of corporate bonds between 2011 and 2016.[8]

The figure shows that financial institutions accounted for almost all corporate bond purchases throughout the 2011-2016 period. Only in 2015 did the non-financial sector, including government,

[8] Note that the China Statistical Yearbook discloses the transaction data with a 2-year lag. Therefore, the latest data available from the China Statistical Yearbook 2018 are as of 2016.

account for any significant portion of domestic purchases (28%). The large gap between the non-financial and financial sectors is similar to that observed in the other regions analysed in Figure 14.

Figure 15. Investor base of corporate bonds issued by non-financial companies in China



Source: Authors' calculations based on national financial accounts data released by the National Bureau of Statistics of China, see Annex for details.

A distinctive characteristic of the Chinese corporate bond market is the limited presence of foreign investors. According to the transaction data, for the period 2011-2016, it was only in 2014 that foreign investors made a positive investment in the Chinese corporate bond market. Cerutti and Obstfeld (2019) report that foreign participation in Chinese bond markets represents only about 1.6% of the total value of outstanding bonds and that much of these bonds are issued by the government. In a related article, Longmei and Yuchen (2019) estimate that foreign investors currently hold less than 1 percent of Chinese credit bonds. Our corporate bond issuance data indicate that during the period 2011-2016, foreign-exchange denominated bonds constituted, on average, 6.4% of the total amount issued by all Chinese non-financial companies.

Panel B of Figure 15 provides an estimated distribution of the outstanding stock of Chinese corporate bonds across different investor groups. This estimate is calculated based on the assumption that prior to 2011, the stock of corporate bonds in China was negligible. This is not an unrealistic assumption given that corporate bond issuance in China remained close to zero prior to 2009. Given this assumption, the estimated ownership shares reported in Panel B are calculated by cumulating the yearly net corporate bond transactions of each investor group. As in Figure 14, foreign investors are

excluded from the analysis. On this basis it is estimated that, as of 2016, the financial sector in China holds 90% of the outstanding amount of corporate bonds. Non-financial corporations hold 5%, while the general government and households hold approximately 3% each.

The very limited foreign ownership of Chinese corporate bonds may partly be explained by concerns about the credit rating industry in China. In 2018, for instance, two Chinese regulators suspended Dagong Global Credit Rating, one of China's three main rating agencies, from rating debt instruments citing chaotic management, high fees charged to issuers for consulting services, unqualified senior management, and problems with the financial models that were used in bond ratings (Wildau, 2018). It is interesting to note, that of the 1 744 Chinese bond issuers rated as of June 2018, 97% were rated AA or above, according to China's National Association of Financial Market Institutional Investors (Cook, 2019). In contrast, globally, less than 5% of Moody's-rated companies have a rating AA- or above (MIS, 2019). Until very recently, none of the global credit rating agencies was accredited to rate Chinese companies in the domestic market. They were only able to assign credit ratings for Chinese firms that issue bonds in overseas markets. According to a BIS study, on jointly-rated bond issues, Chinese credit rating agencies on average assign 6-7 notches higher ratings compared to their international peers (Jiang and Packer, 2017).

In January 2019, S&P Global became the first international credit rating agency to receive permission from People's Bank of China to begin offering credit rating services through a wholly-owned local unit. Fitch Ratings and Moody's have also applied for licenses to conduct rating services in China (Zhu et al., 2019). The entry of global rating agencies into the Chinese domestic market is expected to provide greater comfort to potential foreign investors and help attract foreign investment into the country's corporate bond market.

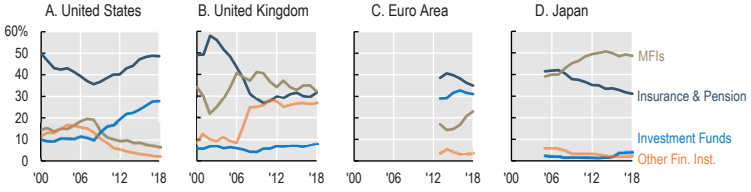
2.2. Recent developments in the investor landscape

2.2.a. Financial Investors

Figure 16 presents how the distribution of bond ownership among different categories of financial investors has evolved in the US, the UK, the euro area and Japan. For each region, their ownership is

expressed as percentages of the total amount of domestic corporate bonds issued by corporate residents in that region. With regular reference to Figure 16, the evolution of corporate bond ownership for each of the four types of financial investors identified in section 2.1 is discussed.

Figure 16. Evolution of financial institutions' ownership share in the corporate bond market (% of total domestic ownership)



Source: Authors' calculations based on national financial accounts data released by the ECB Statistical Data Warehouse, the UK Office for National Statistics, the Bank of Japan and the US Federal Reserve, see Annex for details.

Monetary Financial Institutions

According to Figure 16, Monetary Financial Institutions (MFIs), which include banks, central banks and money market funds, decreased their ownership share in the corporate bond market in the US and the UK after the financial crisis. In both countries, they also decreased their absolute amount of corporate bond holdings. The Volcker Rule, which is a part of the Dodd-Frank Wall Street Reform and Consumer Protection Act, is likely to have played a role in the decline in bond holdings of US banks. The Volcker Rule allows banks to facilitate client trades as market makers but prohibits banks from trading securities on their own accounts and to make speculative bets. Although banks were required to fully comply with the Volcker rule only by July 2015, it is likely that they took steps to adjust their activities and balance sheets in anticipation of the rule, which was originally issued in 2010.

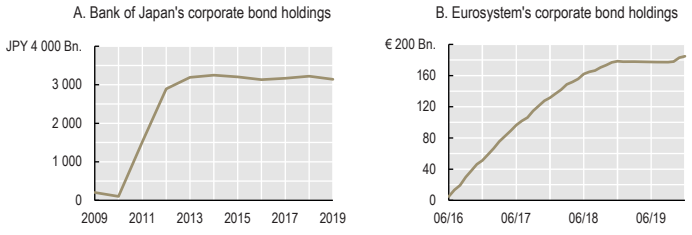
In contrast to the US and the UK, MFIs in the euro area and Japan have increased their ownership share in the corporate bond market. A contributing factor to this increase is that both the ECB and the Bank of Japan (BoJ) as part of their monetary policies entered the domestic corporate bond market as investors.

In February 2009, the BoJ announced that short-term corporate bonds with a rating of A or higher would be eligible for a purchase programme that ran until December 2009 (BoJ, 2009a, BoJ 2009b).

The programme was later resumed under the "Asset Purchase Program", which was launched in October 2010. Under this new programme, longer-term corporate bonds rated BBB were also deemed eligible for purchase (BoJ, 2010). In April 2013, the BoJ released its decision to purchase and continuously hold up to JPY 3.2 trillion worth of corporate bonds (BoJ, 2013a). The BoJ is also authorised to purchase non-investment grade bonds that are fully guaranteed by a company rated BBB or higher (BoJ, 2010; BoJ, 2013b). As of the end of September 2019, the BoJ corporate bond holdings amount to JPY 3.1 trillion (USD 29.2 billion).

The European Central Bank (ECB) started to buy corporate bonds in June 2016 under its "Corporate Sector Purchase Programme" (CSPP). As part of this programme, selected Eurosystem central banks can purchase investment grade euro-denominated bonds issued by non-bank corporations established in the euro area (ECB, 2016b). In case a corporate bond loses its eligibility after the purchase, e.g. due to a downgrade to a non-investment grade rating, the central banks may choose to, but are not required to sell the bond (ECB, 2019d). The net purchases under the CSPP came to an end in December 2018. However, the ECB expressed its intention to fully reinvest the principal payments that they received from maturing bonds for an extended period of time (ECB, 2018). As presented in Figure 17, since the beginning of 2019, the outstanding amount of corporate bonds held through the CSPP has been approximately EUR 178 billion. After the ECB announced in September 2019 its plans to resume the asset purchase program and started repurchases in November 2019, its corporate bond holdings moved up to EUR 184.8 billion (USD 205.3 billion) within two months.

Figure 17. Central banks' corporate bond holdings: BoJ and Eurosystem Central Banks



Source: ECB, Bank of Japan.

Similar to its Japanese and European counterparts, the Bank of England (BoE) also engaged in a corporate bond purchase programme, albeit for a shorter period and with a smaller dedicated budget. The purchases under BoE's "Corporate Bond Purchase Scheme" (CBPS) began in September 2016 and ceased in April 2017 when it reached the GBP 10 billion target. Bank of England stipulated that eligible corporate bonds had to be issued by companies that make a material contribution to the UK economy, be denominated in GBP and rated investment grade (BoE, 2016 and 2017). The BoE decided to reinvest the cash received from maturing bonds held under the CBPS, with the first reinvestment operation taking place in September 2019 (BoE, 2019c). As of year-end 2019, BoE's corporate bond holdings stand at GBP 9.85 (USD 12.91) billion (BoE, 2020).

The one common eligibility criterion that the BoJ, the ECB and the BoE all adopt is the requirement that the corporate bonds have an investment grade rating. Such limiting of the investment universe to investment grade bonds is typically not a hard constraint for deposit-taking institutions other than the central banks. However, the immediate link between the quality of the bonds that they hold and capital adequacy requirements still makes their investment choices sensitive to bond ratings. Of particular importance is the distinction between bonds that are rated as investment grade and bonds that are rated as non-investment grade.

The Basel II capital adequacy framework was revised in the aftermath of the financial crisis with an aim to make the banks and the banking system more resilient to possible future shocks. An initial version of the Basel III framework was agreed by the members of the Basel Committee on Banking Supervision (BCBS) and issued in December 2010.[9] After several revisions and consultations with the industry and other stakeholders, the framework was finalised in December 2017 and included some adjustments with respect to the capital requirements for holding corporate bonds. The Capital Requirements Regulation (CRR), which is the EU directive imple-

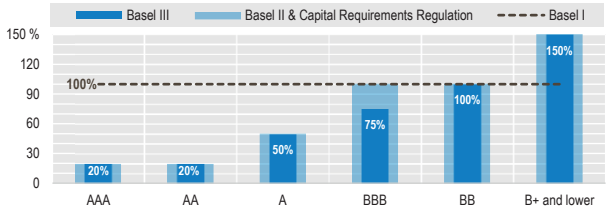
[9] Currently, BCBS has 28 member jurisdictions: Argentina, Australia, Belgium, Brazil, Canada, China, European Union, France, Germany, Hong Kong (China), India, Indonesia, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, Russia, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

menting the Basel III standards in the European Union, was published in June 2013 and became effective as of January 1, 2014.

Although Basel III standards are designed, in principle, for internationally active banks, they are in most countries, applied to a broader set of banks. In a recent survey, of 100 non-BCBS jurisdictions, all 100 were found to have adopted some iteration of the Basel rules for the banks operating under their jurisdictions, which included non-internationally active banks (Hohl et al., 2018).

Given its wide implementation across the world, the level of capital that the Basel framework requires for holding corporate bonds is quite likely to influence the structure of corporate bond holdings by banks. Figure 18 shows the risk weights assigned by the different versions of the Basel framework and CRR to obligations of corporations with varying credit quality.[10] A higher risk weight leads to a higher capital requirement.

Figure 18. Risk weights assigned to corporate obligations



Source: BCBS (1988, 2004, 2017); European Commission (2013).

Under Basel II, the risk weight assigned to a corporate bond rated AA or higher is 20% and that assigned to an A rated bond is 50%.

[10] The risk weights in Figure 18 apply only to banks who choose to adopt the standardised approach for credit risk. The standardised approach is relatively simple compared to the internal ratings-based (IRB) approach, which allows banks to calculate capital adequacy ratios based on their own internal models. According to BIS (2019), out of the 77 large internationally active banks (i.e. Tier 1 capital of more than EUR 3 billion) contributing the necessary data to the Basel III monitoring exercise, 7 (i.e. 9%) use only the standardised approach for credit risk. On the other hand, out of the remaining 63 banks, which are either smaller or not internationally active, 35 (56%) use only the standardised approach. Furthermore, according to ESMA (2015) even IRB-adopting banks will be required to meet an "output floor", which is calculated as a percentage of the capital required under the standardised approach. The output floor is intended to limit the benefits banks can derive by using internal models.

For BBB and BB rated corporate bonds the risk weight increases to 100%. Going from BB- to B+, the risk weight increases to 150% and remains at this level for all corporate obligations with a credit rating B+ or lower. With the Basel III revisions to the standardised approach for credit risk, which will be effective as of January 2022, however, the risk weight of BBB rated bonds is reduced to 75%, accentuating the segregation between investment and non-investment grade bonds. This change in risk weight is not observed in CRR. Indeed, the risk weight assigned to BBB rated corporate exposures was lowered after the release of the second consultative document on standardised approach for credit risk in December 2015 and upon receiving many comments in this direction. How BBB rated bonds are treated with respect to capital requirements is of course of particular importance given that they now dominate the investment grade market.

Insurance companies and pension funds

As shown in Figure 16 above, insurance companies and pension funds have traditionally been a dominant investor in the corporate bond market in all four regions. In the US, their relative share of corporate bond holdings decreased until the 2008 financial crisis as other types of investors, including MFIs increased in importance. Since the crisis their share of holdings has increased steadily and is now back to almost 50%. In the euro area as well, insurance companies and pension funds have been the largest holders of corporate bonds in every year for which data are available. In 2013, they accounted for 39% of the market but have declined slightly to 35% at the end of 2018 because of the increased holdings by MFIs. In the UK and Japan however, insurance companies and pension funds have lost their leading position in the corporate bond market to MFIs after the financial crisis, but they still hold 32% and 31% of the outstanding amount of corporate bonds, respectively.

Since insurance (especially life-insurance) companies and pension funds typically have long-term obligations to their clients, long-term debt securities are generally well-suited to meet their liability structure. However, due to different kinds of quantitative regulatory constraints, they are not completely flexible in their investment choices. There are two principally different types of quantitative investment regulations that influence their investments: First,

risk-based capital regimes that influence their portfolio composition by dictating a higher capital charge for assets with a higher level of risk. Second, quantitative investment limits that influence their portfolio composition through pre-defined limits on certain types of investments.

In recent years, there has been a clear trend for countries to move to risk-based capital regimes in the regulation of insurance companies. Many countries, including Australia, the EU countries, Canada, Japan, Korea, Mexico, Switzerland, US, South Africa, have already adopted a risk-based regime. A risk-based capital regime requires that insurance companies hold more capital for their investments in lower-rated debt securities. Such risk-based capital requirements are for example part of the Solvency II Directive, which insurance companies within the EU have been subject to since January 2016. In contrast, risk-based capital requirements for pension funds are still rare and as of 2015, were adopted only in a few OECD countries, namely Denmark, Finland, Ireland, the Netherlands and Sweden (OECD, 2015).

Adoption of risk-based capital regimes for insurance companies has generally led to a shift to market-based and market-adjusted valuations of assets and liabilities. In the case of an economic downturn, the value of assets generally declines while the value of liabilities typically remains unchanged or declines less than asset values. If this difference causes the risk-based solvency ratio to approach or fall below the minimum required ratio, the insurance company must reduce the risk by shifting to less risky assets. This may result in quite rapid sales (so-called fire sales) of the more risky assets that require higher capital charges (OECD, 2015). Ellul et al. (2011) investigate such fire sales of downgraded corporate bonds that were induced by regulatory constraints on insurance companies. Based on a dataset of 1 179 corporate bonds that were downgraded to non-investment grade, the authors find that insurance companies which have a lower risk capacity and so are relatively more constrained by regulation than other institutions are more likely to immediately sell their holdings of a downgraded bond. They also concluded that their forced sales of downgraded bonds caused bond prices to decline below fundamental values. Prices reverted fully only 35 weeks after the downgrade event. It is plausible that this extended period of undervaluation depends on the difficulty of finding buyers in a mar-

ket where many of the large potential buyers are also bound by various types of restrictions, such as risk-based capital requirements, quantitative regulatory limits, self-defined investment policies or investment mandates (Duffie et al., 2007).

In order to establish and verify the various risks that institutions and regulators have to monitor under a risk-based regime, market participants and regulators alike rely extensively on external ratings by rating agencies. A report from ESMA, which examined the extent to which EU regulations relied on external credit rating firms, concluded that they play an important part when applying the Solvency II framework in practice. Importantly, they are used to estimate the counterparty risk, market risk, spread risk, and concentration risk for the insurance and reinsurance companies that adopt the Standard Approach of Solvency II (ESMA, 2015). Likewise, in the US, according to guidelines from the National Association of Insurance Commissioners (NAIC), capital requirements for insurance companies increase significantly when the quality of the securities that they hold, as measured by ratings firms, decreases. When moving from the lowest investment grade category (BBB) to the highest non-investment grade category (BB), the capital charge for credit risk increases 3.5-fold (Becker and Ivashina, 2015).

Due to the move towards risk-based capital requirements, the use of other quantitative limits on insurance companies are becoming less common. However, some countries do put pre-defined quantitative limits on the portion of non-investment grade debt, while others define a minimum acceptable credit rating. Chile, for instance, limits the exposure to unrated or non-investment grade debt securities through a 5% ceiling (OECD, 2015). Likewise, in the US, although generally not binding, NAIC guidelines put a restriction of 20% for all non-investment grade bonds as a percentage of the portfolio.

While risk-based capital requirement rules are uncommon in pension fund regulation, many countries still impose different types of quantitative investment limits on pension funds. (OECD, 2015; OECD, 2018). One example is regulatory limit on foreign investments. In some countries (e.g. India and Egypt) pension funds are completely prohibited from investing abroad, while some other countries (e.g. Finland, Iceland, Luxembourg, Mexico, Norway, Portugal) limit foreign investments in countries that are considered

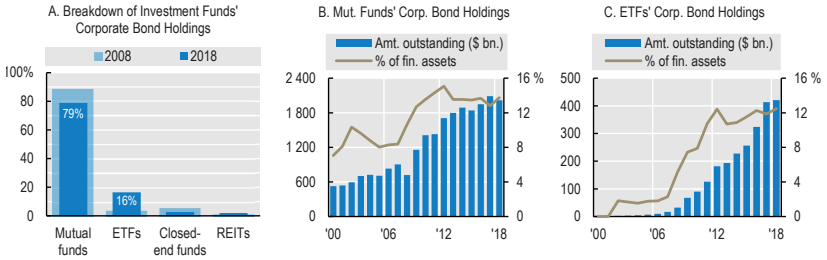
"ineligible". Some regulatory limits for pension funds relate specifically to investments in corporate bonds. Pension funds in Greece, for example, are not allowed to invest more than 70% of their assets in corporate bonds and those in Turkey and Poland face a limit of 40%. In Hungary, the limit is 10%. Some other countries, such as Czech Republic, Korea, Mexico, and Pakistan, have ratings-based rules, where non-investment grade bonds often are prohibited or subject to stricter limitations than higher-rated bonds. Another type of restriction is limitations based on the liquidity of the instruments. Such restrictions are particularly relevant for corporate bond holdings, especially for holdings of non-investment grade bonds, due to their inherent illiquidity.

Investment Funds

As shown in Figure 16 above, investment funds have since 2008 increased their share of corporate bond ownership in all the 4 regions. In Japan and the UK, their ownership share increased from relatively low levels by 2.4 and 3.7 percentage points respectively during the last decade. US investment funds increased their portion of ownership from 9.9% in 2008 to 27.7% in 2018. Investment funds are large owners of corporate bonds also in the euro area holding more than one-quarter of the 2018 outstanding stock of corporate bonds. Investment funds in the UK and Japan, held 7.9% and 3.8% respectively of the domestic outstanding stock of corporate bonds.

Figure 19 below provides a breakdown into the different types of investment funds for the US, where this data is available. According to the US statistics, investment funds include mutual funds, closed-end funds, exchange traded funds (ETFs) and real estate investment trusts (REITs). Panel A of Figure 19 presents the relative importance of these different types of investment funds. While closed-end funds and REITs have limited corporate bond holdings in both 2008 and 2018, the holdings by ETFs increased quite substantially from 3.9% to 16.4% at the expense of by far the largest holder, mutual funds, who declined from 88.6% to 78.8%.

Figure 19. Breakdown of corporate bond holdings among different types of US investment funds (2018 USD, billion)



Source: Financial Accounts of the United States.

According to Panel B of Figure 19, the value of corporate bond holdings by mutual funds almost tripled from USD 720 billion in 2008 to just over USD 2 trillion in 2018. During the same period, the portion of corporate bond holdings compared to their total financial assets increased from 10.7% to 13.7%. From a lower absolute level, the holdings of ETFs underwent an even larger change. Panel C of the figure shows that corporate bond holdings by ETFs increased 13-fold from USD 32 billion in 2008 to USD 420 billion in 2018. This means that corporate bonds now account for about 12% of the assets under management by US ETFs.[11]

The increased presence of ETFs in the corporate bond market is likely to increase the prevalence of passive investment strategies in the corporate bond market. Passively managed funds are likely to be attractive especially in a low interest rate environment such as the period following the financial crisis, since they are associated with lower expense ratios as compared to actively managed funds. Among the 100 largest US-listed ETFs by assets under management (AUM), 24 are bond ETFs.[12] Only one of these 24 ETFs is actively-managed, while the other 23 track an index. The 2 largest bond ETFs, which together manage USD 105 billion of assets, track the same index, the Barclays Capital US Aggregate Bond Index, which includes a spectrum of investment grade fixed income securities,

[11] The analyses of US ETFs in this section cover their global investments as well as their investments in the US. It is estimated that by assets under management, the US ETFs account for approximately 71% of the global ETF industry.

[12] Data on the 100 largest ETFs are obtained from the ETFdb.com website. Largest ETFs: Top 100 ETFs by Assets, ETFdb.com, https://etfdb.com/compare/market-cap/ (retrieved July 14, 2019).

including US corporate bonds. Furthermore, all of the 23 large passive ETFs are managed by 3 asset managers, namely BlackRock, Vanguard and State Street.

Again, the distinction between investment and non-investment grade bonds tends to be important for bond ETFs. 13 of the 24 largest bond ETFs invest in corporate bonds and 10 of those 13 ETFs invest exclusively in investment grade bonds. Two of them invest only in non-investment grade bonds. The remaining 1 ETF, which is also actively-managed, declares that it primarily focuses on investment grade bonds. Hence, even the actively-managed ETF follows an investment rule based on the credit quality of the bond. Such passive reliance on indexes for investment decisions is also observed in the government bond market, where the inclusion of a given security into a widely-tracked index typically has a critical impact on asset allocations. For instance, the inclusion of 363 Chinese government and policy bank bonds into the Bloomberg Barclays Global Aggregate index in April 2019 is expected to direct USD 2 trillion of fund inflows into China's onshore debt market over the 20-month phased inclusion period (Lockett, 2019).

The increase in corporate bond ownership by investment funds has triggered some concerns in the market. One is the extent to which an economic downturn would lead to sell-offs that could destabilise the market and cause further negative effects on the real economy. This scenario may be aggravated by the inherent illiquidity of the corporate bond market where buyers may be hard to find, especially at times of market distress. Such a potential mismatch between the liquidity requirements of investment funds (due to the daily redemption promise) and the illiquidity of their holdings, including corporate bonds, is viewed as a structural vulnerability by the Financial Stability Board (FSB, 2017). This mismatch is likely to generate a first-mover advantage in investors' decision to redeem their holdings. Indeed, Goldstein et al. (2017) find that corporate bond mutual fund outflows are more sensitive to bad performance than their inflows are sensitive to good performance. Furthermore, the sensitivity of outflows to bad performance is higher when the fund has more illiquid assets and in times of overall market illiquidity.

This potential structural vulnerability arising from the liquidity mismatch of investment funds has recently been a major subject for discussion among supervisors and regulators. The FSB also issued recommendations to address structural vulnerabilities from asset management activities in 2017 (FSB, 2017). Some institutions, including the UK Financial Conduct Authority, the French AMF and the Hong Kong Securities and Futures Commission, have updated their regulatory framework or guidance relating to liquidity risk management of investment funds. And at the request of FSB, IOSCO published recommendations on liquidity risk management for collective investment schemes, detailing how an effective liquidity risk management process could be achieved (IOSCO, 2018).

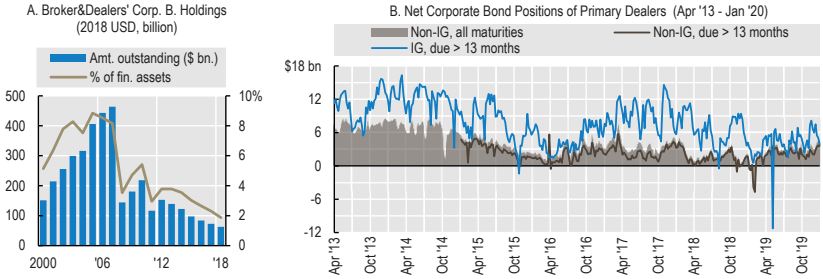
Other Financial Institutions

The share of "other financial institutions" in total domestic ownership of corporate bonds has remained limited in Japan and the euro area where it has never exceeded 6% (Figure 16). In the UK, however, their share increased from 16% in 2007 to 25% in 2008 and has remained around this level thereafter. In the US, the share of other financial institutions gradually declined from 15% in 2007 to 2% in 2018. Importantly and linked to the discussion about bond market illiquidity, this significant decrease can partly be explained by a significant reduction in corporate bond holdings by security brokers and dealers. Based on US financial accounts data, Panel A of Figure 20 presents the sharp reduction in the corporate bond holdings of securities brokers and dealers from USD 464 billion in 2007 to USD 63 billion in 2018.

To complement the observations from Panel A, Panel B presents the evolution of net corporate bond positions of primary dealers. The panel shows a downward trend in their holdings of both investment grade and non-investment grade corporate bonds. During the first 2 years from April 2013 to April 2015, investment grade positions averaged USD 11.1 billion. Since then the positions have averaged USD 6.3 billion. Similarly, while non-investment grade corporate bond positions averaged USD 6.5 billion in the former period, they have averaged USD 2.0 billion in the period after April

2015.[13] The decline in non-investment grade bond positions (69%) was proportionately larger compared to that in investment grade positions (43%). And it should be noted that these sharp declines have taken place during a period when corporate bond issuance and outstanding amounts have grown at record rates. Furthermore, in 2019, the net positions turned negative to levels that never have been observed.

Figure 20. Securities brokers and dealers' corporate bond holdings and primary dealer inventories in the US



Source: Panel A data are obtained from Financial Accounts of the United States and Panel B data are obtained from Federal Reserve Bank of New York / Primary Dealer Statistics.

In contrast to the stock market, secondary corporate bond market has traditionally been an over-the-counter market with most trades intermediated by dealers. Although in recent years, there is a move towards electronic trading platforms, which make direct matching of buyers and sellers possible, the heavy reliance on dealers continues. The sharp decline in dealers' corporate bond inventories is argued to be the combined result of new regulations, such as the Basel III and the Volcker Rule, and a lower risk tolerance among dealers. Whether dealers will step in to facilitate trades and efficiently absorb imbalances between supply and demand during market turbulence, possibly caused by fire sales due to extensive rating

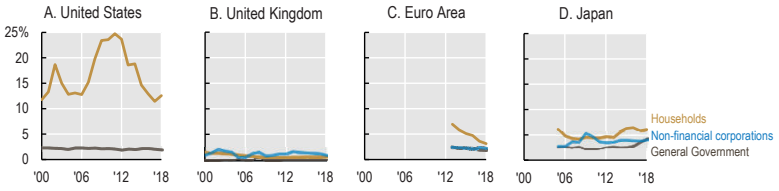
[13] Prior to January 2015, data based on a maturity breakdown of non-investment grade bonds were not available. Therefore, for dates prior to January 2015, the analysis is based on non-investment grade bonds of all maturities. However, in Figure 20, a comparison of the series of non-investment grade bonds of all maturities with the series of non-investment grade bonds having a maturity longer than 13 months reveals that the 2 series are actually very close to each other.

downgrades and/or large redemptions of investment funds, remains to be seen.

2.2.b. Non-Financial Investors

Figure 21 presents corporate bond ownership by households, non-financial corporations and the general government. According to the figure, corporate bond holdings by the non-financial sector have historically been quite modest. The exception is the US household sector, which as mentioned above, also includes domestic hedge funds and has seen a sharp decline since 2011.

Figure 21. Evolution of non-financial sector's ownership share in the corporate bond market (% of total domestic ownership)



Source: Authors' calculations based on national financial accounts data released by the ECB Statistical Data Warehouse, the UK Office for National Statistics, the Bank of Japan and the US Federal Reserve, see Annex for details.

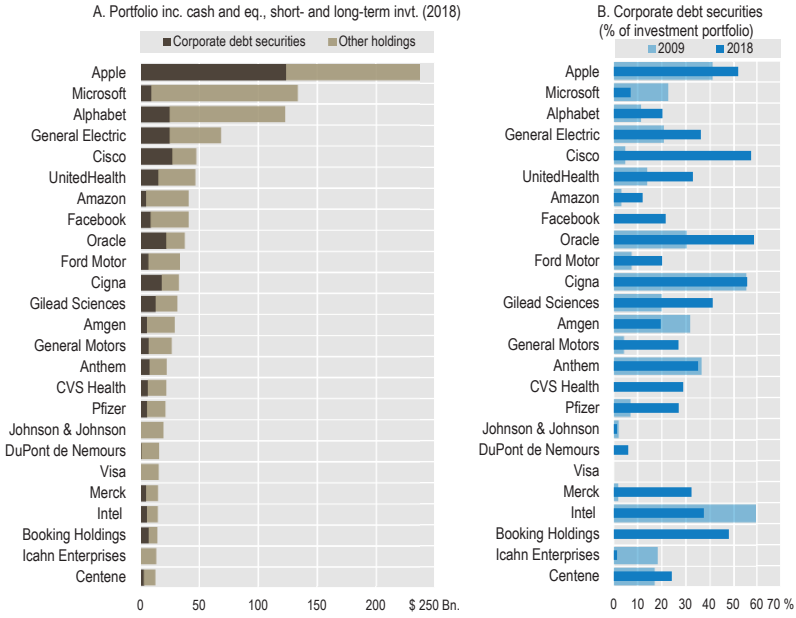
Seen over the whole period, corporate bond ownership by households has declined also in the UK and the euro area. It is important however to note that Figure 21 only reports the direct holdings of households in the corporate bond market. Their exposure to bonds as an asset class would obviously be higher if indirect holdings through pension and insurance entitlements and different kinds of investment funds were included. OECD National Accounts Data from 28 OECD countries for which data are available, indicate that the portion of the household sector's total financial assets that are held indirectly through different investment vehicles increased from an average of 26% in 2000 to 32% in 2017. Indeed, in all but five of the 28 countries, households' indirect ownership has increased. This means that households' exposure to different asset classes, including corporate bonds, increasingly depends on the investment strategies and asset allocations of investment funds, pension funds and insurance corporations.

According to Figure 21, the share of non-financial corporations in the total domestic ownership of corporate bonds is below 5% in all regions but there is a modest upward movement in their share in Japan. It should be noted that the US national financial accounts data do not present the corporate bond holdings of non-financial US companies separately. However, looking directly at the financial statements of large US companies suggests a major increase in their corporate bond investments, which is a trend that has received attention from the financial media too (Platt et al., 2017).

Figure 22 presents data for the 25 non-financial US companies with the largest investment portfolios.[14] Together these companies account for 13% of the aggregate investment portfolio value of publicly listed firms around the world. Panel A of the figure reports the size of the investment portfolio of each company as well as the value of their corporate debt securities holdings within this portfolio. The portfolio size of the company with the largest investment portfolio, for example, is USD 237.1 billion, of which USD 123.7 billion (52%) is in the form of corporate debt securities. To put this figure into perspective, it can be noted that the combined assets under management of all the 6 largest ETFs that only invest in corporate debt securities is USD 124 billion. In other words, a single non-financial company, alone, owns as much corporate debt securities as the world's 6 largest corporate bond ETFs.

[14] The ranking is done based on the size of the investment portfolio in 2018. The investment portfolio consists of cash and cash equivalents, short- and long-term investments and does not include investments on subsidiaries.

Figure 22. Corporate debt securities investments of US non-financial companies with the largest investment portfolios



Note: For some of these companies, the financial / non-financial company distinction is less clear-cut. UnitedHealth Group, Cigna Corp, Anthem Inc. and Centene Corp. are classified by Thomson Reuters Eikon as non-financial companies under the sector "healthcare providers and services" although their SIC code (6324 – Hospital & medical service plans) is in the financial sector. Icahn Enterprises LP is classified by Thomson Reuters Eikon as a non-financial company under the sector "industrial conglomerates", but its investments are mostly held by its investment segment rather than other industrial sectors. Coca-Cola Co. and Uber Technologies Inc. were excluded from the analysis as a clear breakdown to identify their corporate debt securities investments was not available in their SEC filings. In Panel B, 3 companies (Facebook, CVS Health and DuPont de Nemours) out of the 25 do not have the necessary data to calculate this ratio in 2009. To increase data consistency while adjusting the scope, investments reported under headings such as corporate debt securities, corporate notes, corporate bonds and commercial papers are all recorded as corporate debt securities investments.

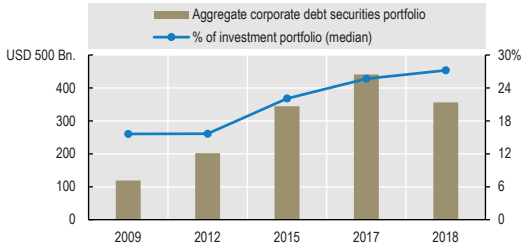
Source: SEC 10-K filings of companies, Thomson Reuters Eikon, see Annex for details.

Together, these 25 companies have an investment portfolio of USD 1.12 trillion and they own approximately USD 356 billion of corporate debt securities. Panel B of Figure 22 presents how the share of corporate debt securities in the investment portfolio has changed from 2009 to 2018. According to the figure, 15 of the 22 companies, for which data are available in both years, increased corporate debt securities' share in their portfolio. While the median company allo-

cated 15.6% of its investment portfolio to corporate debt securities in 2009, that share increased to 27.2% in 2018.

Figure 23 reports the evolution of the aggregate corporate debt securities portfolio of these 25 companies from 2009 to 2018. According to the figure, their combined holdings has tripled since the financial crisis, from USD 119 billion in 2009 to USD 356 billion in 2018. A similar increase can be observed for the average portion of corporate debt securities in their investment portfolios.

Figure 23. Aggregate corporate debt securities investments of 25 US non-financial companies with the largest investment portfolios (2018 USD, billion)



Source: SEC 10-K filings of companies, Thomson Reuters Eikon, see Annex for details.

Another important observation from reviewing the annual reports of these companies is their emphasis on rating-based investment. Of the 25 companies, 18 state that they take into account debt securities' ratings in their investment policies. And 13 of those 18 companies make a clear distinction between investment and non-investment grade debt securities and state that their investment portfolios primarily consist of investment grade securities. One company specifically states that it manages the credit risk and average maturity of its fixed-income portfolio in such a way that it achieves economic returns that correlate to certain fixed-income indices. Furthermore, there is evidence that some companies have lowered or removed their minimum credit rating requirement in the last decade. For instance, while one company stated in its 2009 annual report that its marketable securities portfolio was invested primarily in securities with a minimum rating of A, this requirement was lowered to the investment grade threshold of BBB- in its 2012 annual report. Similarly, another company still has a reference to credit ratings in the description of its investment policy, but it no longer refers to a

minimum investment grade rating requirement as it did in its 2015 annual report.

PART III. CREDIT RATING METHODOLOGIES AND TRENDS IN RATING CHANGES

Part II illustrates that external credit ratings play a pivotal and increasingly important role in the corporate bond market by influencing the investment decisions and asset allocation of financial and non-financial institutions in a number of different ways. One is through regulations that use external credit ratings to define quantitative limits and risk-based capital requirements. Frequently, credit ratings also dictate investment choices through self-defined policies that focus exclusively or primarily on buying investment grade bonds, as in the case of central banks (e.g. BoE, BoJ and ECB) and non-financial corporations. Importantly, large bond investors, such as investment funds are typically bound by rating-based indexes and investment mandates that are defined with reference to ratings. Furthermore, cross-border investments in corporate bonds, which now constitute a significant share of the market, are also likely to depend on rating- or index-based strategies.

It could be argued that instead of relying on the services of credit rating agencies (CRAs), institutional investors could have their own credit rating staff and internal methodologies to evaluate the credit worthiness of each corporate bond issue. Properly staffed, this could make investors better informed about what they are investing in and better placed to evaluate whether the associated risks are within their risk tolerance.

Although it is likely that institutional investors actually have some staff dedicated to evaluating bond issues quality, it would be unrealistic to expect them to set aside resources to fully analyse the credit worthiness of each and every corporate bond issue at initiation and on an ongoing basis. In 2019 alone 7 865 new corporate bond tranches came to the market, corresponding to 6 798 bond issues by 3 672 unique non-financial bond issuers. More generally, in every year after 2008, the number of new bond tranches issued exceeded 4 000 and averaged 5 913 annually. Hence, unlike the equity market, where there is typically a single instrument for each company and where the annual number of new issues is more lim-

ited, a single issuer in the corporate bond market may have hundreds of corporate bonds, each with different risk characteristics. In such a market, a consolidation of the efforts to evaluate the quality of different securities may be unavoidable and rational.

Another obstacle that may hinder individual investors to evaluate individual bond issues may be the issuers' reluctance to share sensitive business information with each potential investor. Since such information may still be relevant and necessary to properly determine the credit worthiness of a bond issue, the most practical solution may be sharing the proprietary data only with a limited number of CRAs.

Given their central role and the heavy reliance among both investors and regulators on external credit ratings, the quality and functioning of the credit rating industry play an important role when assessing the robustness and direction of the corporate bond market. In particular, because the distinction between investment and non-investment grade bonds play a critical role for investors' asset allocation. To complete the overview of today's corporate bond market, this section will therefore focus on the credit rating industry by using publicly available data from the 3 leading credit rating agencies, Standard & Poor's (S&P), Moody's and Fitch, which together received 93.5% of global revenues generated by the credit rating industry in 2018 (SEC, 2020).[15] Since CRAs are legally required to disclose information about their rating procedures and methodologies, all of the three leading CRAs provide a significant amount of comparable information in these respects.

3.1. How ratings are assigned

According to the filings of the three large CRAs with the US Securities and Exchange Commission (SEC), the general rating assignment procedure is quite similar across the agencies.[16] The rating

[15] Note that this percentage is reported as a share of the total revenue generated by the CRAs which have received the "Nationally Recognized Statistical Rating Organizations" (NRSRO) designation from the US Securities and Exchange Commission.

[16] Information on the procedures and methodologies for determining credit ratings is obtained from each CRAs' Form NRSRO filing dated 31 December, 2018.

process starts with a request from an issuer, arranger, sponsor or underwriter or is initiated by the CRA itself on an unsolicited basis. Upon initiation, an analytical team and a lead analyst are assigned to collect the necessary information and carry out the analysis with respect to the agency-defined rating methodology and criteria. The analyst then makes a rating recommendation and presents it to the agency's rating committee with supporting materials. The final rating decision is taken by the vote of the rating committee, not by an individual analyst. The rating decision is then communicated to the issuer. After the issuer reviews the rating documentation to ensure factual accuracy and the non-presence of proprietary information, the rating is disseminated to the public. The rating is then monitored on an ongoing basis and reviewed by the agency at least annually.

The rating analysis is typically supported by statistical methods. In addition to improving the predictive performance of credit ratings, standardised statistical methods also help dealing with the large number of instruments that have to be rated in today's financial markets. To give some perspective, for instance, as of year-end 2018 S&P employed 1 557 credit analysts covering their 1 058 211 outstanding ratings and the rating of new issues coming to the market. Of the outstanding ratings, 65 551 were associated with securities issued by financial institutions (including insurance companies) and 54 510 were associated with securities issued by corporate issuers.[17]

Despite the increasing role of quantitative models and standardised methods in the rating process, CRAs emphasise that their ratings are not simply driven by formulas. In its rating methodologies, Moody's provides a scorecard that summarises the qualitative considerations, the financial information and the ratios that are most important for its rating analysis, as well as their respective weights. Moody's notes that the actual weights for each factor shown on the scorecard may differ on a case-by-case basis, and that the rating methodologies are not intended to include an exhaustive discussion of all factors that are considered when assigning ratings. Nevertheless, the scorecards can provide a general idea of the relative weight of quantitative and qualitative factors that are likely to affect ratings.

[17] The number of ratings outstanding and the number of analysts as of year-end 2018 is obtained from SEC (2020).

As of September 2019, Moody's has separately defined rating methodologies for 48 different non-financial industries. Although the weights of each factor typically vary across industries, there are 5 main rating factors that are kept consistently across 44 of the 48 industries.[18] These 5 main factors are (i) leverage and coverage, (ii) scale, (iii) profitability, (iv) business profile, and (v) financial policy. In some industries, these factors are further broken down into sub-factors.

As the factor names suggest, the first 3 factors are calculated solely based on financial or other business data. The "leverage and coverage" factor is typically divided into sub-factors that measure the leverage and interest coverage of a given company through financial ratios such as debt / earnings before interest, taxes, depreciation and amortisation (EBITDA); retained cash flow / net debt; earnings before interest, taxes and amortisation (EBITA) / interest expense, etc. The "scale" factor proxies the size of the company using financial data such as total revenue, asset size, EBITDA, etc. Finally, the "profitability" factor measures profitability and efficiency typically through ratios such as EBITA margin, operating margin, return on sales etc.

Although the "business profile" and "financial policy" factors make use of some quantitative data, they are not as straightforward to calculate as the first three factors and require some qualitative judgment. The "business profile" factor serves as an indicator for the variability of performance, competitive position and long-term viability of a company. Sub-factors such as market share, product strengths, regulatory environment, earnings stability, competitive environment and diversification with respect to geography, market segment, product line, etc. may also be considered. The "financial policy" factor attempts to capture the tolerance of a company's management and board for financial risk as well as the future direction of the company's capital structure.

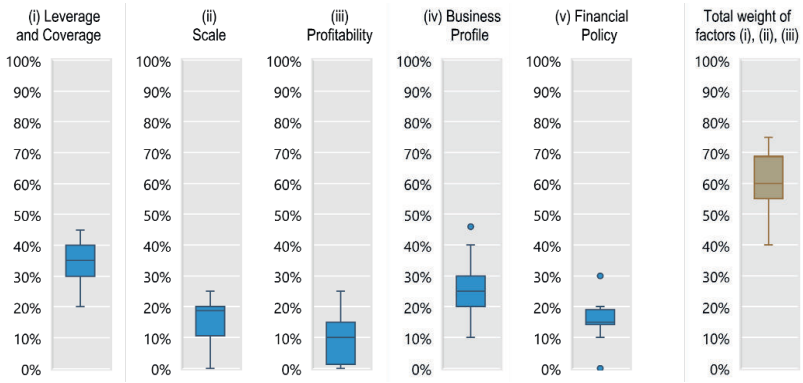
For each of the 5 factors (and their sub-factors, if applicable), the rating methodology provides a grid to map them against Moody's broad rating categories (i.e. Aaa, Aa, A, Baa, Ba, B, Caa or Ca). To

[18] The remaining four industries, which use different scorecard classifications are the following: (i) captive finance subsidiaries of nonfinancial corporations, (ii) enhanced equipment trust and equipment trust certificates, (iii) investment holding companies and conglomerates and (iv) shipping industry.

determine the overall scorecard-indicated rating, each of the rating factors is first converted into a numeric value. Each of these values is then multiplied by each factor weighting to produce a composite weighted-factor score, which is mapped against Moody's more detailed alphanumeric ratings. Hence, even if a risk factor, by itself, indicates a low rating category, it can be compensated by another risk factor that indicates a higher rating category, resulting in a final rating between the two rating categories.

Figure 24 provides the distribution of the weights that are assigned to the 5 rating factors across the 44 industries to give an understanding of their relative importance in credit ratings.

Figure 24. Weight of each risk factor in the final scorecard-indicated rating (distribution across 44 industries)



Note: In box-and-whisker plots, the lower and higher edges of the box indicate the first and third quartiles of the data, respectively while the line across the box shows the median. The whiskers show the range of the data, excluding outliers, if any. The outliers are plotted as dots falling outside the whiskers.

Source: Moody's rating methodologies for non-financial corporates.

The figure indicates that the leverage and coverage factor typically is the most critical factor in assigning ratings. Its weight across industries ranges between 20% and 45%, with a median of 35%. The leverage and coverage factor is followed by the business profile factor, which has a median weight of 25% and scale that has a median weight of 18.75%. The least influential factors are financial policy and profitability with median weights of 15% and 10% respectively across the 44 industries. The last panel of the figure plots the distribution of the total weight of the first 3 risk factors, which are the quantitative factors that can be directly calculated from financial statements

or other business reports. The total weight of purely quantitative factors is 60% in the median industry and ranges between 40% and 75% across all.

The range of the total weight of purely quantitative factors (40% - 75%) indicated by Moody's rating methodologies is largely consistent with the results of a recent study by Benmelech (2017), which econometrically evaluates the quantitative content of rating decisions made by S&P. The study finds that during the period 2012-2015, 10 quantitative variables obtained from financial statements alone can account for about 51.6% to 66.3% of the variation in the S&P credit rating decisions.

3.2. Potential of shifts in credit rating standards

Some financial economists have expressed concerns about the potential tendency of CRAs to relax their rating standards during good times. Based on a theoretical model of ratings reputation, Bar-Isaac and Shapiro (2013) find that during boom periods, ratings have lower quality compared to recessionary periods. The authors argue that the prospects of growing business opportunities during booms give the CRAs an opportunity to take advantage of their reputation and be less stringent in order to generate more revenue. It is also argued that lower default probabilities during booms imply a lower risk of getting "caught" for reduced accuracy. Both phenomena would predict lower ratings accuracy during booms.

Empirical evidence by Lobo et al. (2017) and Auh (2015) indicates the existence of procyclicality in credit ratings and hence provides support for the arguments made by Bar-Isaac and Shapiro (2013). Based on a long window from 1986 to 2012 and a broad sample of US companies rated by S&P, Lobo et al. (2017) find that CRAs assign lower credit ratings during downturns and higher ratings during upturns. The investor reaction to negative credit rating actions is also stronger during downturns, indicating that rating actions have greater information content during downturns, which is consistent with greater rating quality. Likewise, based on US corporate bond data from 2002 to 2011 and ratings assigned by the major CRAs, (Moody's, S&P, Fitch and Duff & Phelps), Auh (2015) finds that the median credit risk of firms within each rating is lower during a downturn than during an expansion and that bonds rated

during a recession perform better in terms of lower default frequencies, consistent with rating procyclicality. In contrast, based on a sample of non-financial companies from 27 developed markets over the period 1994 to 2016, Hung et al. (2019) document a tightening trend of corporate credit ratings.

Consistent with a possible loosening in credit standards during the current boom period, a study by CreditSights, a credit research firm, presents a marked deterioration in within-rating leverage ratios, especially in higher ratings. CreditSights finds that the leverage of AA or AAA rated US issuers increased from 1 times EBITDA in 2007 to 1.8x in 2017. The leverage of A rated issuers increased from 1.5x to 2.2x while that of BBB rated issuers saw a more modest increase from 2.2x to 2.5x (Scaggs, 2018). With reference to this recent deterioration in within-rating fundamentals, PIMCO, a leading fixed income investment management firm, has warned investors that "This suggests a greater tolerance from the credit rating agencies for higher leverage, which in turn warrants extra caution when investing in lower-rated investment grade names, especially in sectors where earnings are more closely tied to the business cycle" (Brons and Lin, 2018).

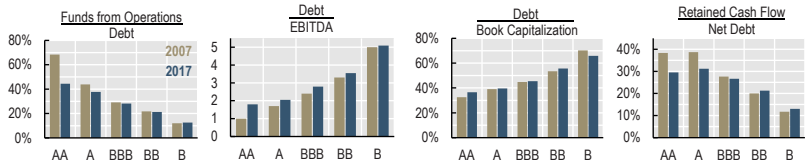
To explore whether CreditSights' evidence from the United States on the increasing level of within-rating leverage also holds at the global level, Figure 25 provides a comparison of median leverage ratios of global non-financial, non-utility corporations for each rating from AA to B.[19] In both years, 2007 and 2017, there is a monotonic relationship between leverage and rating quality, with lower ratings being associated with higher leverage. Moreover, consistent with the evidence from the United States, the median firm in each investment grade rating is now typically more levered compared to a decade ago and this increase in leverage is more pronounced in higher rating groups. For instance, the median ratio of debt-to-EBITDA increased from 1.7 to 2.1 for A rated issuers and from 2.4 to

[19] The AAA category was excluded from the analysis because it had too few observations: 6 in 2007 and only 3 in 2017. Ratings from CCC to C were also excluded because the financial ratios of firms with ratings in that range were averaged together and hence did not allow a rating-based analysis. Trends in the AA-level should also be interpreted with caution since the number of corporations in that rating level decreased from 35 in 2007 to 16 in 2017, and so the statistics may suffer from small sample bias.

2.8 for BBB rated issuers. In the non-investment grade rating scale, BB and B rated issuers also experienced a slight increase in this ratio. The debt-to-EBITDA ratio is a very prominent factor in determining credit ratings as it feeds into the rating scorecards of all but 4 of the Moody's 44 industries and it has a median weight of 10%.[20]

Similar trends can be observed for funds from operations (FFO) to debt, debt-to-capital and retained cash flow-to-net debt ratios, with higher-rated issuers experiencing a more significant deterioration in leverage and non-investment grade issuers experiencing either a slight improvement or a slight deterioration.

Figure 25. Median leverage ratios for global non-financial, non-utility corporations by rating (year-end 2007 vs. year-end 2017)



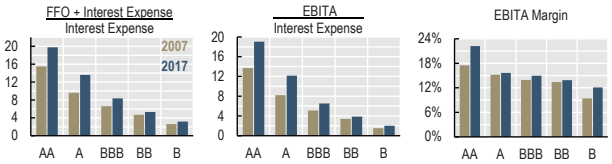
Source: Moody's Financial Metrics™ Key Ratios by Rating and Industry for Global Non-Financial Corporates: December 2007 and December 2017.

Another important rating factor is the interest coverage ratio, which measures the ability of a company to cover its current interest obligations. A lower ratio indicates a higher likelihood that the company may not be able to service its debt. Examining the interest coverage ratios presented in Figure 26 shows that interest coverage is decreasing from higher to lower ratings in both years and that

[20] It can be argued that the observed increase in leverage from 2007 to 2017 may be driven by an increase (decrease) in the dominance of a particular sector(s), in which firms tend to have higher (lower) leverage. However, an industry-level comparison of the median debt to EBITDA ratio of BBB rated issuers from 2007 to 2017 shows that the increase in leverage is observed across almost all industries. Specifically, out of the 13 industries reported, 10 has experienced an increase in leverage. Of the most dominant four industries, each of which represents more than 10% of the entire sample in 2017, the median debt to EBITDA ratio of BBB rated issuers increased from 2.6 to 3.0 in the consumer products sector, from 1.7 to 3.1 in the energy & environment sector, from 2.2 to 2.8 in the manufacturing sector and from 2.1 to 2.6 in the telecommunications sector. (The focus was put on BBB rated issuers in this analysis, since not all sectors are represented in all rating categories. The BBB category is the best represented investment-grade rating category across all industries.)

for each rating, interest coverage ratios have improved from 2007 to 2017. Similar observations can be made for the EBITA margin, which proxies firm profitability.

Figure 26. Median interest coverage and profitability ratios for global non-financial, non-utility corporations by rating (year-end 2007 vs. year-end 2017)



Source: Moody's Financial Metrics™ Key Ratios by Rating and Industry for Global Non-Financial Corporates: December 2007 and December 2017.

Comparing Figures 25 and 26 indicates that the worsening of within-rating median leverage ratios during the past decade appears to be offset by simultaneous increases in median interest coverage and profitability ratios. The improvement in interest coverage ratios can be partly attributed to the unprecedentedly low levels of interest rates. If interest rates start to increase from their currently low levels and the companies have to refinance their debt under higher interest rates and/or if an economic downturn hits highly leveraged companies' earnings, both interest coverage and profitability ratios may deteriorate rather rapidly, limiting their ability to offset the high leverage ratios.

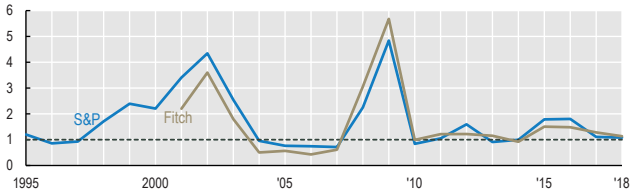
Figure 27 further explores whether CRAs' rating actions may be experiencing a shift during good times. The figure reports the global corporate downgrade-to-upgrade ratio, which is regularly reported in CRAs' annual default and transition studies. The ratio is calculated by dividing the total number of downgrades (including downgrades to default status) over the course of a year by the total number of upgrades in the same year.[21] A ratio of 1 indicates an equal number of downgrades and upgrades for that year.

The downgrade-to-upgrade ratios of Fitch and S&P have followed very similar trends over time. In the years leading up to the financial crisis, from 2004 up to and including 2007, the ratio of

[21] When annual downgrades and upgrades are counted, the end-of-year-rating is simply compared to the beginning-of-year rating. Hence, multiple rating actions for the same issuer throughout the year are not separately counted.

both agencies stayed under 1, meaning that the number of upgrades exceeded the number of downgrades. Only after the onset of the 2008 crisis did the market witness a major deterioration in ratings with the downgrade-to-upgrade ratio of Fitch reaching 5.7 and that of S&P reaching 4.8 in 2009.

Figure 27. Global corporate downgrade-to-upgrade ratio

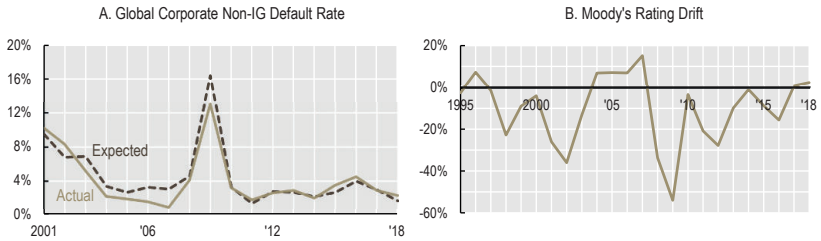


Source: Fitch Ratings Global Corporate Finance Transition and Default Studies (2003-2018), S&P Global Ratings 2018 Annual Global Corporate Default and Rating Transition Study.

Such an abrupt and disproportionate jump in the downgrade-to-upgrade ratio, preceded by years of improving overall rating levels, may arise if an unexpected worsening in companies' financial strength occurs. To explore the ability of CRAs to predict the overall health of the economy, Panel A of Figure 28 plots Moody's default rate forecast for the global corporate non-investment grade issuers for a given year vs. the actual default rate for that year. Interestingly, in the pre-crisis years, Moody's always predicted higher default rates than the realised rates and successfully foresaw the significant rise in default rates both in 2008 and 2009. However, like its competitors, Moody's kept its position in favour of upgrades over downgrades up until the crisis reached its peak in 2008. This may be influenced by the "rating stability" objective of CRAs, which results in a reluctance to update ratings despite expectations of a change in default rates. Higher rating stability may lead to less timely downgrades, which may be perceived as undesirable. However, downgrades are valuable to investors and other counterparties only when they are accurate. Importantly, rating downgrades have real effects on companies, such as increased borrowing costs and the triggering of ratings-based covenants, which means that inaccurate downgrades may put companies under unfounded financial pressure. Furthermore, downgrades that are later reversed are disruptive if they lead to frequent trading and require adjustments of the capital reserves of the bond owners. Taking these and related aspects into account, it is

widely considered that there is a trade-off between the timeliness and stability of ratings.

Figure 28. Moody's default rate estimate performance and rating drift



Source: Moody's Annual Default Studies (2000-2018).

Panel B of Figure 28 presents Moody's rating drift, which is an alternative metric based on both the relative occurrence and the magnitude of changes in ratings. Moody's defines rating drift, as the average upgraded notches per issuer minus the average downgraded notches per issuer. Rating drift is expressed as a percent of one notch. Similar to the trend observed for Fitch and S&P in Figure 27, the upgrades by Moody's exceeded downgrades in the 2004-2007 period. This period was followed by a sudden increase in downgrades relative to upgrades and in 2009, Moody's rating drift dipped to its minimum value.

Panel A of Figure 28 reveals that Moody's forecasts with a slight downward bias have continued to successfully track the overall trend in default rates after the financial crisis. For instance, Moody's predicted non-investment grade default rates of 2.7% and 4% for 2015 and 2016, respectively but, mostly due to pressures in the energy and commodity sectors, the actual default rates turned out at 3.5% and 4.5%, respectively. Consequently, the rating drift dived back into negative territory in 2015 and 2016 after being almost neutral at zero in 2014. Analogous observations can be made for S&P and Fitch in Figure 27. The observation that downgrades have, on average, dominated upgrades in the past decade, may suggest either that issuers' financial standing has deteriorated, that CRAs have become more stringent or a combination of these two effects.

During the last 2 years covered in Figure 27, S&P and Fitch almost reached breakeven between downgrades and upgrades. In 2018, the downgrade-to-upgrade ratio of S&P was 1.08 and that of Fitch was 1.13. For Moody's Panel B in Figure 28 shows that it

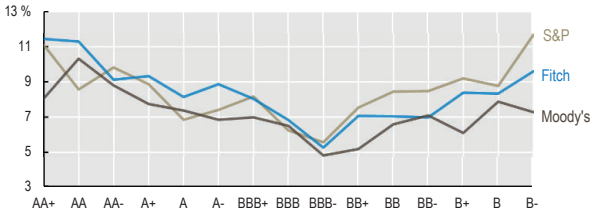
reached and actually exceeded the breakeven point in the last 2 years when its rating drift reached 0.7% in 2017 and 2.3% in 2018. The only periods that Moody's rating drift had moved into positive territory since 1985 was the 3 years prior to the Asian financial crisis (1993, 1994 and 1996) and the 4 years prior to the 2008 global financial crisis.

The substantial expansion of BBB ratings and the decreased frequency of downgrades relative to upgrades in the recent years, may indicate that CRAs are mindful of downgrading BBB issuers due to their special status just above the non-investment grade category. The question is if the important distinction between investment grade and non-investment grade bonds that is driven by regulatory requirements, rating-based investment strategies and the investment mandates described in Part II may give rise to additional "stability" concerns among CRAs when considering a change in rating that moves a bond across the line from the investment to the non-investment category.

Figure 29 provides the historical average one-year 1-notch downgrade probabilities from a given rating, separately for S&P, Moody's and Fitch. The data are based on the one-year average transition matrix of all global corporate issuers during the 1983-2018 period for Moody's, the 1990-2018 period for Fitch and the 1981-2018 period for S&P.[22] In the case of S&P for example, the figure shows that the historical probability of an AA+ rated issuer to be downgraded to AA within a given year is 11.1%.

[22] The analyses in Figures 29 and 30 exclude AAA rated issuers as this category suffers from small sample bias especially in the most recent years, when the number of AAA rated issuers dropped considerably. Issuers rated below B- are also excluded since S&P and Fitch report issuers rated CCC to C as a single group, making their comparison to other ratings unmeaningful. Because of this reporting practice, for S&P and Fitch the probability shown on the figure for issuers rated B- is the probability of moving from B- to any rating from CCC to C within a year.

Figure 29. Historical average one-year 1-notch downgrade probability from a given rating



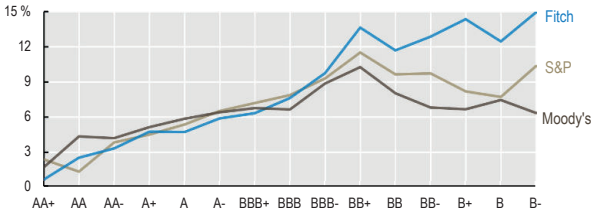
Note: The data are based on the average one-year transition matrix of all global corporate issuers over the 1983-2018 period for Moody's, 1990-2018 period for Fitch and 1981-2018 period for S&P.

Source: Fitch Ratings 2018 Transition and Default Studies, Moody's 2018 Annual Default Study, S&P Global Ratings 2018 Annual Global Corporate Default and Rating Transition Study.

Figure 29 clearly shows that for all CRAs, the one-year 1-notch downgrade probability is lowest for bonds rated BBB-, which is the lowest rating before crossing the line to non-investment grade. The probability of a 1-notch downgrade within a year ranges between 8-12% for the AA category; between 7-10% for the A category and falls below 5.6% for BBB- rated issuers. The probability jumps back to above 7% for BB+ rated issuers in the case of S&P and Fitch and moves up less sharply in the case of Moody's. These patterns stay the same if the probability of multiple-notch as well as 1-notch downgrades is considered and irrespective of whether moving to default is considered as a downgrade event or not.

Figure 30 explores whether a similar pattern can be observed for the average one-year 1-notch upgrade probabilities. If rating agencies are extra cautious to re-rate bonds that are in the vicinity of the investment / non-investment grade boundary as is suggested by Figure 29, one might expect that the 1-notch upgrade probability is lowest for the BB+ category. However, for S&P and Moody's, the probability of an upgrade within a year is actually highest for BB+ rated issuers. Although for Fitch-rated issuers, the one-year 1-notch upgrade probability is the highest for B- rated issuers followed by B+ and then by BB+ rated issuers, it should be noted that issuers rated BB+ by Fitch has a higher 1-notch upgrade probability compared to those rated BB+ by S&P and Moody's (13.6% vs. 11.5% and 10.2%, respectively). Reproducing Figure 30 for the one-year probability of any upgrade (i.e. both 1-notch and multiple-notch upgrades) leads to parallel results.

Figure 30. Historical average one-year 1-notch upgrade probability from a given rating



Note: The data are based on the average one-year transition matrix of all global corporate issuers over the 1983-2018 period for Moody's, 1990-2018 period for Fitch and 1981-2018 period for S&P.

Source: Fitch Ratings 2018 Transition and Default Studies, Moody's 2018 Annual Default Study, S&P Global Ratings 2018 Annual Global Corporate Default and Rating Transition Study.

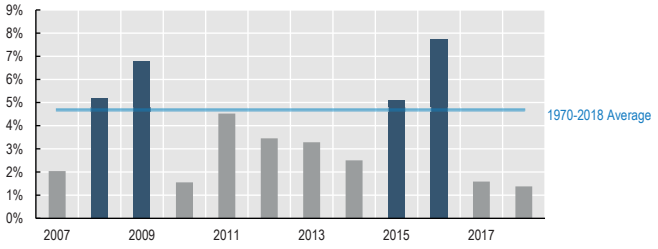
Taken together, the data presented in Figures 29 and 30 do not suggest in themselves that CRAs are more cautious when re-rating will move an issuer between the investment / non-investment grade categories. Rather, it may be the case that the companies with the lowest investment grade rating are paying close attention to their metrics and are taking the necessary step to make sure that they keep their rating. Similarly, highly-rated non-investment grade issuers actively seek to improve some key rating factors in order to move up the rating ladder to reach the investment grade level. Such efforts to actively keep or improve the credit rating may take different forms. It may include steps to improve those financial ratios that are known to influence credit ratings (e.g. leverage) and work closely with the rating agency to ensure that all the necessary information is effectively communicated. It may also include discussions with the credit rating agency to communicate non-financial factors that would warrant a favourable decision.

When General Electric was downgraded to BBB+ in 2018, its CEO stated that they will move quickly to raise cash and make asset sales, saying "We have no higher priority right now than bringing those leverage levels down" (Domm, 2018). Likewise, Kisgen (2009) reports that firms reduce leverage following rating downgrades and that the reductions are larger at downgrades to a non-investment grade rating. Specifically, firms downgraded to non-investment grade are about twice as likely to reduce debt as other firms, possibly with a hope of moving back to the investment grade category.

Figure 6 showed a significant increase in the issuing of BBB and BB rated bonds since 2008. When such a rating composition is coupled with the observation that the downgrade probability is the lowest in the BBB rating scale and that the upgrade probability is the highest in the BB rating scale, a downward pressure in the downgrade-to-upgrade ratios observed in Figure 27 can be expected.

In Figure 29, the historical average one-year downgrade probabilities was provided for each rating. To see how recent years' downgrade rates compare to these long-term averages, Figure 31 presents the percentage of BBB rated issuers that moved into the non-investment grade category (i.e. have become fallen angels) in each year after 2007. Focus is on the BBB category due to its position just above non-investment grade ratings and the large volume of BBB rated bonds.

Figure 31. Percentage of BBB rated issuers that become fallen angels within a year



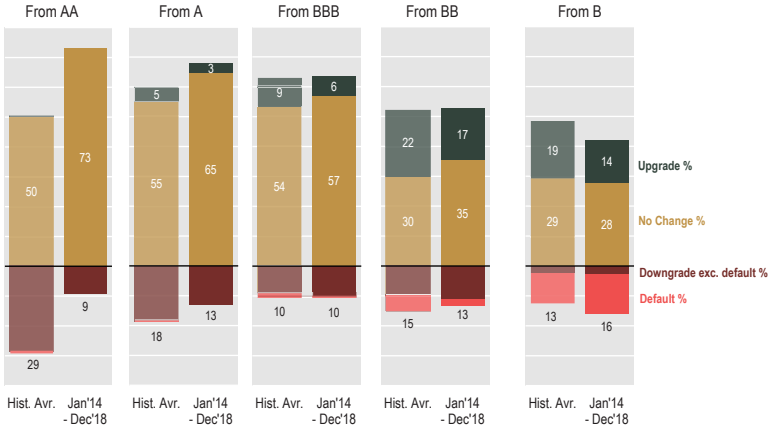
Source: Moody's Annual Default Studies (2007-2018).

According to the figure, the 1-year fallen angel percentage for BBB rated issuers exceeded its 1970-2018 average during the financial crisis and more recently, in 2015 and 2016. In 2016, the fallen angel percentage rose above its crisis peak of 6.8% and reached 7.7%. In contrast, in 2018, only 1.37% of the BBB rated issuers at the beginning of the year had become fallen angels by the end of the year. This is the minimum percentage reached since 2007 and it is well below the 1970-2018 average of 4.7%.

The rating stability objective of the CRAs, which manifests itself in the agencies' reluctance to update ratings each time default probabilities change, holds back the number of rating changes, in the short run. However, at longer time horizons, as the stability objective becomes less of a constraint, rating accuracy may improve. Longer time horizons are also less prone to the distortionary effect

of any short-term fluctuations in credit market conditions and consequently allow more reliable across-time comparisons. Furthermore, due to the seasoning effect, an increased percentage of first-time issuers may put upward pressure on short-term rating stability and so make short-term transition rate comparisons across years less reliable. For these reasons, Figure 32 presents Fitch's 5-year transition rates from different initial credit ratings. The rating changes within the most recent 5-year period from January 2014 to December 2018 are contrasted with historical averages of 5-year transition rates calculated over the 1990-2018 period.[23] Downgrade rates are reported in a way that downgrades to default status can be separately observed. The figure can be interpreted as a combination of Figures 29 to 31, but with Fitch-only transition rates and a longer time horizon for transitions.

Figure 32. Transition rates from a given rating within 5 years: Historical average vs. most recent cohort (%)



Source: Fitch Ratings, Global Corporate Finance 2018 Transition and Default Study.

Consistent with the observations in Figure 29, the historical averages indicate that a BBB rated issuer is the least likely to be downgraded compared to other rating groups. Within 5 years, a BBB rated issuer downgrades to non-investment grade category with a 10% probability, upgrades to A- or higher ratings with a 9% probability and remains unchanged in the BBB category with 54% probability.

[23] Note that in this analysis a move within BBB (e.g. from BBB+ to BBB) is not counted as a downgrade. Only moves across major rating groups are counted as changes.

The remaining 27% of issuers see their ratings withdrawn. As also documented by Altman and Kao (1992), investment grade ratings other than BBB show a greater propensity to be downgraded than to be upgraded. In contrast, for BBB rated issuers the likelihood of a downgrade and that of an upgrade are almost equal.

Likewise, consistent with Figure 30, the historical averages indicate that a BB rated issuer is the most likely to be upgraded compared to other rating groups. Historically, a BB rated issuer upgraded with 22% probability within a 5-year period, downgraded with 15% probability and remained unchanged with 30% probability.

According to Figure 32, the rating transitions experienced by the BBB and BB rated issuers in the most recent 5-year cohort from January 2014 to December 2018 have been quite similar to their historical averages. There has been only a minor change in favour of "no change" at the expense of upgrades. But the sum of no change and upgrade percentages is almost identical to the historical average.

Interestingly, the stability of the AA and A rating categories in the past 5 years has been remarkably higher than the historical averages. Historically, on average 29% of AA rated issuers have been downgraded within 5 years and 50% experienced no change. In contrast, in the past 5 years, only 9% of AA rated issuers experienced a downgrade and 73% remained unchanged. In the A category, 65% of issuers experienced no change in the past 5 years and only 13% were downgraded. These figures contrast the historical averages of 55% and 18%, respectively. The figure also shows that, overall, the stability of all rating groups except B is higher in the 2014 - 2018 period compared to historical averages.[24]

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[24] The main results remain unchanged when Figure 32 is reproduced with withdrawal-adjusted percentages.

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ANNEX 1 – METHODOLOGY FOR DATA COLLECTION AND CLASSIFICATION

Primary corporate bond market data

Primary corporate bond market data are based on original OECD calculations using data obtained from Thomson Reuters Eikon that provides international deal-level data on new issues of corporate bonds, which are underwritten by an investment bank. The data-

base provides a detailed set of information for each corporate bond issue, including the identity, nationality and sector of the issuer; the type, interest rate structure, maturity date and rating category of the bond, the amount of and use of proceeds obtained from the issue.

The initial dataset covers observations in the period from 1 January 2000 to 31 December 2019. From this initial set, convertible bonds, deals that were registered but not consummated, preferred shares, sukuk bonds, bonds with an original maturity less than 1 year or an issue size less than USD 1 million are excluded. The analyses in the paper are limited to bond issues by non-financial companies. This industry classification is carried out based on Thomson Reuters Business Classification (TRBC). The final dataset after all exclusions covers 92 069 bond issues from 114 countries. When tranches under the same bond package are counted as a single issue, this figure reduces to 73 457.

Given that a significant portion of bonds are issued internationally, it is not possible to assign such issues to a certain country of issue. For this reason, the country breakdown is carried out based on the domicile country of the issuer. The advanced/emerging market classification is based on IMF country classification. Issuance amounts are presented in 2019 USD adjusted by US CPI.

Rating data

Thomson Reuters Eikon provides rating information from three leading rating agencies: S&P, Fitch and Moody's. For each bond that has rating information in the dataset, a value of 1 to the lowest credit quality rating (C) and 21 to the highest credit quality rating (AAA for S&P and Fitch and Aaa for Moody's) is assigned. There are eleven non-investment grade categories: five from C (C to CCC+); and six from B (B- to BB+). There are ten investment grade categories: three from B (BBB- to BBB+); and seven from A (A- to AAA).

If for a given issue, ratings from multiple rating agencies are available, their average is taken. Some issues in the dataset, on the other hand, do not have rating information available. For such issues, the average rating of all bonds issued by the same issuer in the same year (t) is assigned. If the issuer has no rated bonds in year t, year t-1 and year t-2 are also considered, respectively. This procedure increases the number of rated bonds in the dataset and hence improves the

representativeness of rating-based analyses. As a result of this procedure, our rating analyses covering the 2000-2019 period are based on 41 668 bond issues from 101 countries and those covering the 1980-2019 period are based on 63 562 bond issues from 105 countries. When differentiating between investment and non-investment grade bonds, the final rating is rounded to the closest integer and issues with a rounded rating less than or equal to 11 are classified as non-investment grade.

Early redemption data

When calculating the outstanding amount of corporate bonds in a given year, issues that are no longer outstanding due to being redeemed earlier than their maturity should also be deducted. The early redemption data are obtained from Thomson Reuters Eikon and cover bonds that have been redeemed early due to being repaid via final default distribution, called, liquidated, put or repurchased. The early redemption data are merged with the primary corporate bond market data via international securities identification numbers (i.e. ISINs).

Covenant data

Covenant analyses are based on authors' original calculations performed on data obtained from Mergent Fixed Investment Securities Database (FISD), a database providing issue-level covenant data for publicly offered bonds in the US, issued either by US or non-US entities. The initial dataset covers observations in the period from 1 January 2000 to 30 June 2019. From this initial set, issues by non-corporate issuers, preferred shares, convertible bonds, bonds with an original maturity less than 1 year, bonds for which no covenant data have been collected and bonds with no rating data available are excluded. The analyses in the paper are limited to bond issues by non-financial companies. The final dataset after all exclusions covers 16 106 bond issues in the US by companies from the United States (87%) and 66 other countries.

Thirty seven covenant-related data fields, each of which corresponds to a covenant type, are taken into covenant analyses. Ten of those thirty seven covenant types are almost never used in non-in-

vestment or investment grade bonds and therefore are excluded from covenant protection index calculations to ensure that they do not unnecessarily distort the index. For each corporate bond, binary variables denoting the presence/absence of 27 different types of covenants in the bond contract are first summed up. This sum is then divided by 27 and multiplied by 100 to create a score that ranges between 0 and 100, with 100 denoting the highest level of protection for bond investors. For any given year, the index is the average of the covenant scores of bonds issued in that year.

Investor base data

The analyses on the investor base of corporate bonds in the euro area, the UK, Japan, the US and China are based on national financial accounts data released by the ECB Statistical Data Warehouse, the Office for National Statistics, the Bank of Japan, the US Federal Reserve and the National Bureau of Statistics of China, respectively. The time period considered for each region depends on the availability of data, which have the required level of detail and consistency across time. Accordingly, while the UK and the US have data for the full observation period from 2000 to 2018, the data from Japan and the euro area start from 2005 and 2013, respectively. The data from China, on the other hand, start from 2011 and end in 2016, due to a 2-year lag in data disclosure.

The scope of corporate bonds for each country/country group varies depending on the data breakdown released by each data source. While a focus on the holders of outstanding long-term debt securities issued by resident non-financial companies would have been the most compatible with this report's primary corporate bond market scope, a level of detail that would allow such a focus is not available except for the euro area. Hence, the investor base analysis for the UK is based on data on the holders of long-term debt securities issued by UK financial and non-financial companies, the analysis for Japan is based on the holders of debt securities issued by Japanese financial and non-financial companies and the analysis for China is based on the different investor groups' transactions of debt securities issued by non-financial companies in China. On the other hand, the financial accounts data of the US only provide information on the holders of "corporate and foreign bonds", bundling

together the bonds issued by US financial and non-financial companies with bonds issued by foreign governments and companies. The share of foreign bonds in the "corporate and foreign bonds" category averaged 16.8% over the 2000-2018 period. This percentage would have been smaller if it was possible to calculate the share of bonds issued by foreign governments, which is the portion that should ideally be excluded in a corporate bond analysis. For the sake of convenience, the US "corporate and foreign bonds" classification is referred to as "corporate bonds" in the study.

The sector classification that is adopted in this study to categorise corporate bond investors into different sectors is the one used by the ECB. Although there may be some differences across different countries' classifications, they all aim consistency with internationally accepted rules for sector classification. Japan adopts the System of National Accounts of the United Nations (2008 SNA) and the US maps its own classification to 2008 SNA sectors. The UK and the euro area adopt the European System of Accounts (ESA 2010) classification. According to the ESA 2010 guideline, "ESA 2010 is broadly consistent with the System of National Accounts of the United Nations (2008 SNA) with regard to definitions, accounting rules and classifications." Due to this broad consistency across countries, it is relatively straightforward to map each country's classification into the adopted sector classification. During the mapping, whenever public pension funds are reported as a separate item under the general government sector, they are reclassified under the insurance corporations and pension funds sector.

Data on the corporate debt securities investments of US non-financial companies

The 25 US non-financial public companies with the largest investment portfolios are determined based on the balance sheet data obtained from Thomson Reuters Eikon as of the end of the 2018 fiscal year. The investment portfolio consists of cash and cash equivalents, short- and long-term investments and does not include investments on subsidiaries. These 25 companies, as a whole, account for 13% of the aggregate investment portfolio of public firms around the world. Information on the corporate debt securities investments of these companies is then hand-collected from their filings (10-K, or

rarely 10-Q, filings) with the US Securities and Exchange Commission as of the fiscal years 2009, 2012, 2015 and 2018. The references to or the breakdown provided for corporate debt securities investments in the SEC filings are not always consistent across companies or through time. To increase data consistency while adjusting the scope, investments reported under headings such as corporate debt securities, corporate notes, corporate bonds and commercial paper are all recorded as corporate debt securities investments.

The use of corporate bonds has become an increasingly important source of funding for non-financial companies. In 2020, the issuing of corporate bonds reached unprecedented levels and the total amount of outstanding corporate debt in the form of corporate bonds reached an all-time high. This report provides a comprehensive overview of developments in corporate bond markets leading up to the COVID-19 outbreak and during the first half of 2020. Particular focus is put on the impact on bond issuers of different types and size. The analysis in this report will form the foundation for future work that will address reforms and good practices that can improve the conditions for smaller growth companies that currently are facing structural difficulties in accessing market-based financing.

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