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Corporate Bond Markets in a Time of Unconventional Monetary Policy

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FOREWORD

Corporate bond markets have become an increasingly important source of financing for non-financial companies. The total outstanding debt in the form of corporate bonds reached USD 13 trillion as of end-2018. In real terms, this is twice as much as in 2008. This paper documents a number of elevated risks and vulnerabilities associated with this development and looks at how the quality of today's outstanding stock of corporate bonds differs from earlier credit cycles. Bond ratings, bondholder rights and repayment requirements are areas of particular focus.

The paper presents:

- global trends in the use of corporate bond markets by non-financial companies
- developments of risks and vulnerabilities
- the potential impact of changes in economic and public policy conditions

The paper builds on a dataset of almost 85 000 unique corporate bond issues by non-financial companies from 114 countries between 2000 and 2018. A description of data sources as well as the methodology for data collection is provided in the annex. The paper builds on earlier work by the OECD Corporate Governance Committee on corporate bond market developments and bondholder rights. The content and methodologies used will provide a basis for discussions within the Committee and with other experts about further work on corporate bonds as an important source of market-based corporate finance.

OECD CAPITAL MARKET SERIES

The paper 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 paper 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, a Visiting Researcher from Sabanci University.

The authors are grateful to their OECD colleagues, in particular Laurence Boone and Lukasz Rawdanowicz (Economics Department); and Fatos Koç and Alejandra Medina (Directorate for Financial and Enterprise Affairs); and to Carmine di Noia (Vice-Chair, OECD Corporate Governance Committee and Commissioner, Consob), Rolf Skog (Member, OECD Corporate Governance Committee Bureau and Managing Director, Swedish Securities Council) and Jim Millstein (Co-Chairman, Guggenheim Securities), for valuable comments. 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

Since the financial crisis in 2008, non-financial companies have dramatically increased their borrowing in the form of corporate bonds. Between 2008-2018 global corporate bond issuance averaged USD 1.7 trillion per year, compared to an annual average of USD 864 billion during the years leading up to the financial crisis. As a result, the global outstanding debt in the form of corporate bonds issued by non-financial companies reached almost USD 13 trillion at the end of 2018. This is twice the amount in real terms that was outstanding in 2008.

The United States remains the largest market for corporate bonds. But non-financial companies from most other economies, including Japan, the United Kingdom, France and Korea, have all increased their use of corporate bonds as a means of borrowing. On a global scale, the most significant shift has been the rapid growth of the Chinese corporate bond market. The People's Republic of China (China) has moved from a negligible level of issuance prior to the 2008 crisis to a record issuance amount of USD 590 billion in 2016, ranking second highest in the world.

The increased use of corporate bonds has been supported by regulatory initiatives in many economies aiming at stimulating the use of corporate bonds as a viable source of long term funding for non-financial companies and an attractive asset class for investors. The increase in bond usage is also consistent with the objectives of expansionary monetary policy and the related unconventional measures by major central banks in the form of quantitative easing. Given the elevated risks and vulnerabilities associated with the current outstanding stock of corporate bonds that is documented in this paper, it is therefore important to understand how and to what extent today's corporate bond markets may be influenced by different economic and public policy scenarios.

First, there are concerns about global economic growth. And in the case of a downturn, highly leveraged companies would face difficulties in servicing their debt, which in turn, through lower investment and higher default rates may amplify the effects of a downturn. Second, while major central banks recently have modified the use of extraordinary measures, the future direction of monetary policy will continue to affect the dynamics on corporate bond markets. Last but not least, gross borrowings by governments from the bond markets are set to reach a new record level in 2019 as shown in the *OECD Sovereign Borrowing Outlook 2019*.

Any developments in these areas will come at a time when non-financial companies in the next three years will have to pay back or refinance about USD 4 trillion worth of corporate bonds. This is close to the total balance sheet of the US Federal Reserve. Moreover, global net issuance of corporate bonds in 2018 decreased by 41% compared to 2017, reaching its lowest volume since 2008. Importantly, net issuance of non-investment grade bonds turned negative in 2018 indicating a reduced risk appetite among investors. The only other year that this happened over the last two decades was in 2008.

Some key findings:

- **Historically low ratings for investment grade bonds.** There is a well-established relationship between a decrease in bond quality measured as the portion of non-investment grade bonds and an increase in default rates. This relationship marked the three latest credit cycles in 1990, 2000 and 2008. However, this simple ratio is a rather rough measure that does not fully capture changes in the aggregate bond quality. The reason is that it ignores movements with respect to bond ratings *within* the investment grade and non-investment grade bond categories themselves. Our more detailed analysis of the composition of the investment grade category reveals a marked continuous increase in BBB rated bonds, which is the rating just above non-investment grade. While BBB rated

bonds made up about 30% of all investment grade bonds issued in 2008 they accounted for almost 54% in 2018. This relative increase in lower rated investment grade bonds has come at the expense of a decrease in AA and AAA rated bonds.

- **Prolonged decline in overall bond quality.** By taking into account similar intra-category changes in ratings also within the non-investment grade category, our "global corporate bond rating index" reveals a clear downward trend in overall bond ratings since 1980. This global corporate bond rating index has now remained below BBB+ for 9 consecutive years. This is the longest period of sub-BBB+ rating since 1980. This prolonged decline in bond quality points to the risk that a future downturn may result in higher default rates than in previous credit cycles.
- **Decrease in covenant protection.** An additional measure of bond quality is the use of covenants, which are clauses in a bond contract designed to protect bondholder rights. Compared to the pre-2008 period there has been a marked decrease in the use of key covenants for non-investment grade bonds. As a result, the gap between covenant protection for investment grade and non-investment grade bonds has narrowed. This challenges the traditional relationship between bond quality and the degree of covenant protection demanded by investors. While lower levels of covenant protection may allow companies to escape default for a longer time, the expectation of a company's default and achievable recovery rates may still affect investor portfolios negatively. Moreover, historical data shows that low quality covenants have a significant negative effect on recovery rates.
- **Risk of amplified borrowing costs for lower quality issuers.** An economic downturn may also increase the rate of downgrades in the BBB rated corporate bond segment, which has undergone extraordinary growth in recent years. Issuers that downgrade from the BBB rating scale to non-investment grade, the so-called "fallen angels", have to face an amplified increase in borrowing costs, due to a sudden loss of a major investor base. Since there are regulatory restrictions on the holdings of non-investment grade bonds by important categories of institutional investors and many institutional investors follow rating-based investment mandates or procedures, the non-investment grade market has a smaller investor pool and is associated with lower levels of liquidity.
- **Increased pressure on the non-investment grade market.** In addition to the elevated borrowing costs that individual fallen angels will face, the downgrade of a large amount of investment grade bonds may be hard to absorb by the non-investment grade market, causing volatility and spreads to rise. In 2017, only 2.8% of BBB rated corporate issuers were downgraded to non-investment grade. But the rate of downgrading may be expected to increase during crisis times. In 2009 for example, 7.5% of corporate issuers rated BBB at the beginning of the year had been downgraded to non-investment grade by the end of the year. Considering that the current stock of BBB rated bonds amounts to USD 3.6 trillion, this would be the equivalent of USD 274 billion worth of non-financial corporate bonds migrating to the non-investment grade market within a year. If financial companies are included, the number would rise to nearly USD 500 billion.
- **Record level repayments ahead.** Considering the size and maturity profile of the current outstanding stock of corporate bonds, corporations in both advanced and emerging markets are facing record levels of repayment requirements in the coming years. As of December 2018, companies in advanced economies need to pay or refinance USD 2.9 trillion within 3 years and their counterparts in emerging economies USD 1.3 trillion. At the 1-, 2- and 3-year horizons, advanced and emerging market companies have the highest corporate bond repayments since 2000. Notably, for emerging market companies, the amount due within the next 3 years has reached a record of 47% of the total outstanding amount; almost double the percentage in 2008.

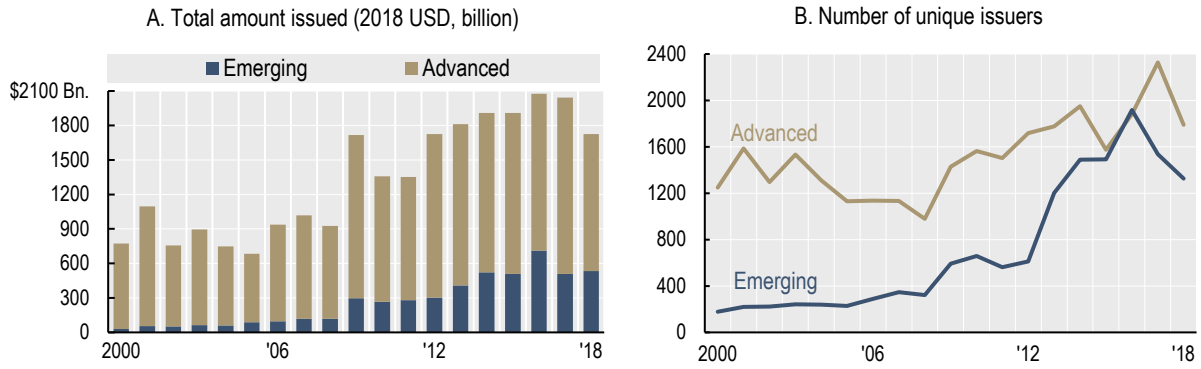
PART I. DEVELOPMENTS IN THE USE OF CORPORATE BOND MARKETS BY NON-FINANCIAL COMPANIES

In the aftermath of the 2008 financial crisis, corporate bonds have increasingly gained prominence as a source of corporate finance. Figure 1 presents the global trends in corporate bond issuance by non-financial companies in the period from 2000 to 2018. Panel A plots the total amount of money raised through corporate bond issues in each year, in real terms, and shows a clear upward shift from 2009. Prior to the crisis, global corporate bond issuance averaged USD 864 billion per year. In 2009, corporate bond issues surged and for the period 2008-2018 it came to average USD 1.7 trillion per year. This is almost twice the annual average during the pre-crisis era. After reaching record levels of just over USD 2 trillion in 2016 and 2017, global corporate bond issuances in 2018 amounted to USD 1.7 trillion.

A breakdown of global issuance into advanced and emerging economies reveals an extraordinary acceleration of corporate bond issuance in emerging markets. Before the financial crisis, corporate bond issues in emerging markets averaged USD 70 billion per year. This was followed by a rapid increase that peaked at USD 711 billion in 2016. In 2017, however, corporate bond issuance declined by 28.6%, and remained around the same level in 2018, which is still about 7.5 times higher than the pre-crisis level.

Annual corporate bond issuance in advanced economies has also shown a significant increase in the post-crisis era, although the growth rate is less pronounced than what we observe in emerging markets. From an amount of USD 898 billion in 2007, annual bond issuance by non-financial companies in advanced economies reached a record level of USD 1.5 trillion in 2017, falling back to USD 1.2 trillion in 2018.

Figure 1. Global corporate bond issuance



Note: The figures are based on the analysis of 83 842 unique corporate bond issues by non-financial companies from 114 countries.

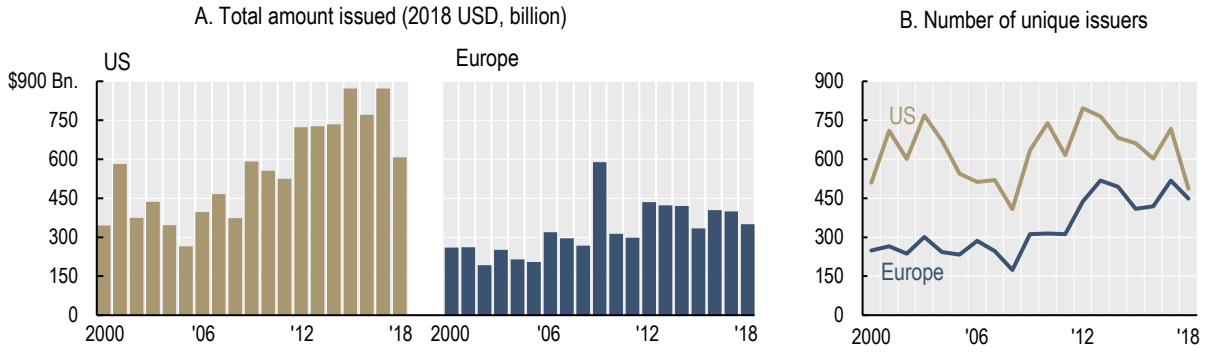
Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

Also, the number of non-financial companies that raise debt in the form of corporate bonds has increased. Panel B of Figure 1 presents the total number of non-financial companies that issued bonds in each year in advanced and emerging markets. The number of corporate bond issuers in advanced economies increased more than 2-fold from 1 133 in 2007 to 2 327 in 2017. However, in 2018, this figure declined to 1 789. For emerging markets, the increase was much steeper corresponding to a 5.5-fold increase from 347 issuers in 2007 to 1 917 in 2016. As a matter of fact, in 2016, the number of corporate bond issuers in emerging markets actually exceeded the number of issuers in advanced markets. In the last two years, however, the number has decreased quite considerably.

Figure 2 is focused on the trends in corporate bond issuance by US and European non-financial companies, which are the major actors in primary corporate bond markets. In 2018, corporate bond issuance by US companies made up 35% of global issuance, while European companies made up 20%. According to Panel A, corporate bond issuance in the US follows a pattern similar to the global trend but with a slower growth rate. The annual issuance amount has increased from an average of USD 401 billion in the pre-crisis period to 668 billion in the post-crisis period. In 2015 and 2017, issuance reached record levels of approximately USD 872 billion, followed by a 30% decline in 2018. It should be noted that the observed decline in 2018 is partly attributable to the recent changes to the US tax code, which lowered the corporate tax rate and also, unlocked overseas cash positions of US companies by reducing the cost of repatriating foreign earnings. As a result, both the need to borrow and the appeal of borrowing declined for US companies.

Panel B of Figure 2 reveals that despite a marked increase in the amount of debt raised through corporate bond issues, the number of US issuers has not shown any particular increase. While in the 2000-2007 period, an average number of 605 US non-financial companies tapped corporate bond markets each year, the average number increased only modestly to 646 issuers in the post-crisis era. These observations may be an indication of increased issuer concentration in US primary corporate bond markets. Consistent with this interpretation, the mean (median) issue size in the US has increased from an average of USD 479 (273) million in the 2000-2007 period to USD 837 (465) million in the 2008-2018 period.

Figure 2. Corporate bond issuance by US and European companies

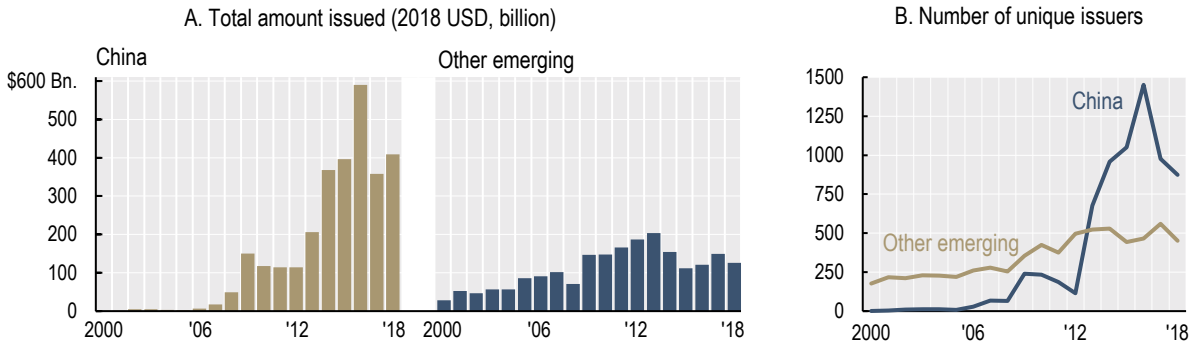


Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

Corporate bond issuance by European non-financial companies presents a rather different pattern. After a large increase in corporate bond issuance in 2009, providing an alternative to deleveraging banks, the growth in the annual bond issuance amount in Europe has remained modest relative to the growth in global issuance. In comparison to a pre-crisis average of USD 250 billion, average annual issuance increased by 54% to USD 385 billion in the post-crisis years. Likewise, the number of corporate bond issuers increased by 53% from an average of 258 companies a year in the 2000-2007 period to 396 in the subsequent period.

A closer look at corporate bond issuance by non-financial companies in emerging markets shows that China is by far the largest contributor to issuance growth. According to Figure 3, China has moved from a negligible level of issuance prior to the crisis to a record issuance amount of USD 590 billion in 2016. The number of Chinese companies issuing bonds in each year has also shown a steep increase from 68 issuers in 2007 to 1 451 issuers in 2016. After reaching a peak in 2016, bond issuance in China fell back to around its 2015 level in the last two years.

Figure 3. Corporate bond issuance by companies in China and in other emerging countries

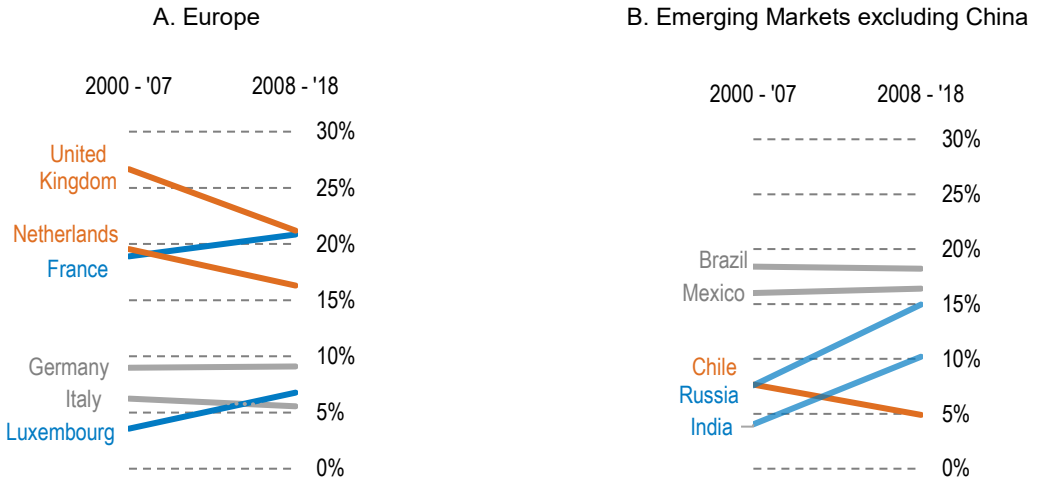


Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

To examine how the relative composition of bond issuance by European and emerging market non-financial companies has changed, Figure 4 plots the share of individual countries within their group in the pre- and post-crisis periods. Panel A of the figure presents the average share that each European country has in the annual amount of bond issuance by European companies over the years 2000-2007 vs. 2008-2018. Only the countries with the highest issuance shares in the pre- or post-crisis periods are included. The UK and the Netherlands appear to have lost some of their relative shares to France and Luxembourg[1] while Germany and Italy have maintained their shares. It is worth noting that the decrease in the share of UK companies began with a sharp drop in 2009.

Panel B of Figure 4 shows how market shares of emerging economies other than China have changed following the crisis. The share of Russian companies in total corporate bond issuance by companies in emerging markets other than China increased from 7.6% in the pre-crisis period to 15.0% in the post-crisis period, and that of Indian companies increased from 4.0% to 10.2%. On the other hand, Chile experienced a decline in its market share from 7.7% to 4.9% and Brazil and Mexico kept their market shares fairly stable.

Figure 4. Share of individual countries in corporate bond issuance within their group



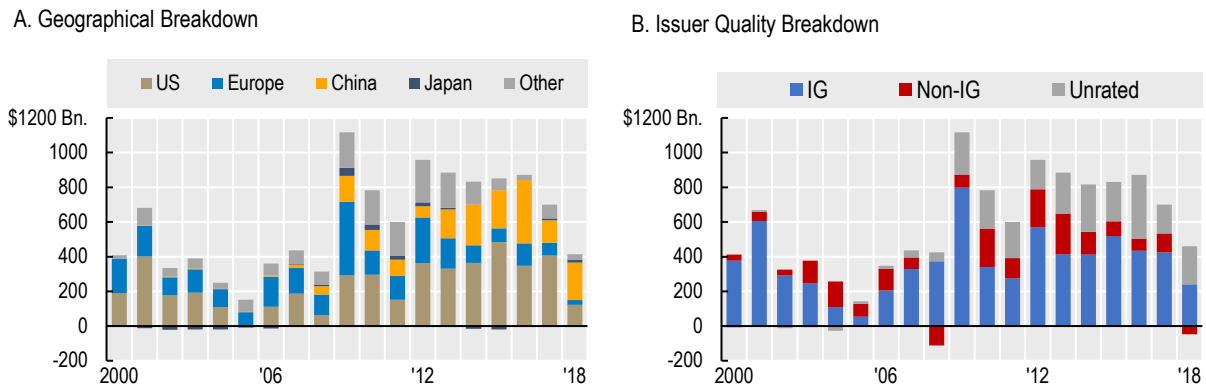
Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

[1] When considering the nationality of the ultimate parent company for the 2008-2018 period, amount issued by companies in Luxembourg is distributed as follows: Luxembourg 25.8%, Italy 18.2%, US 13.3%, Switzerland 9.4%, UK 8.7%, Netherlands 8.2%, Russia 7.7%, Others 8.6%.

To complement the gross corporate bond issuance figures presented above, Figure 5 plots net corporate bond issuance, which is defined as gross issuance less the total amount of corporate bonds that are retired in any given year. Although net corporate bond issuance, like gross issuance, saw an upward shift in the post-crisis period, the decline in 2018 appears more pronounced when net issuance is considered. Global net issuance of corporate bonds decreased by 41% from USD 699 billion in 2017 to USD 413 billion in 2018 and reached its lowest value since 2008 when net issuance equalled USD 314 billion. While some of this decline may be attributable to the US tax reform, according to Panel A of Figure 5 the weakening in net corporate bond issuance is clearly observed in other parts of the world as well.

Panel B of Figure 5 tracks net issuance according to bond quality. It shows that in 2018, net issuance of investment grade bonds reached its lowest level since the financial crisis and is actually below the 2008 level. Moreover, net issuance of non-investment grade bonds is also at its lowest level since the crisis and actually turned negative in 2018. The only other year that this happened since the turn of the century was in 2008. One contributing factor to the decline in non-investment grade bond issuance could be the shift of some non-investment grade issuers to the leveraged loan market, which has reached a volume of USD 1.3 trillion globally (Adrian et al., 2018).

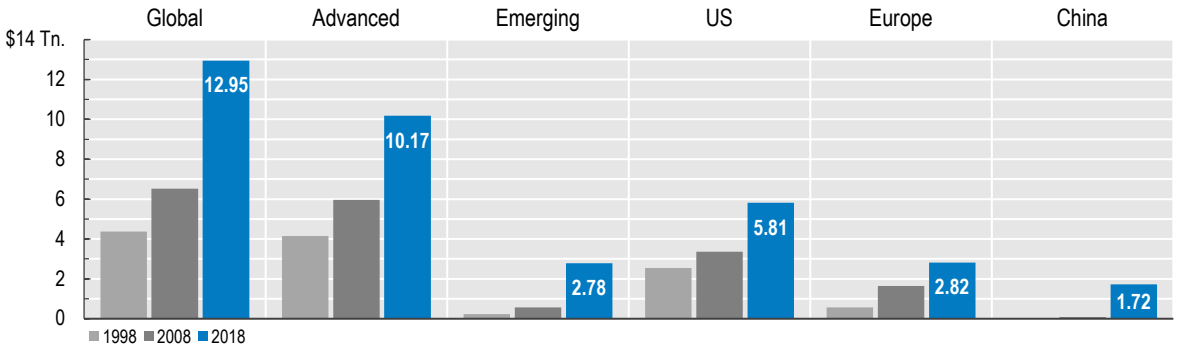
Figure 5. Net corporate bond issuance at geographical and issuer quality breakdowns (2018 USD, billion)



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

Despite the decline in net issuance levels in 2018, a decade of strong issuance activity has pushed the volume of outstanding corporate debt in the form of corporate bonds to record levels. According to Figure 6, as of end-2018, the total outstanding amount of corporate bonds issued by non-financial companies worldwide has reached USD 12.95 trillion, which is twice as much as in 2008. Companies from advanced economies, which hold 79% of the total global outstanding amount as of 2018, have seen their corporate bond volume grow by 70%, from USD 5.97 trillion in 2008 to USD 10.17 trillion in 2018. The corporate bond market in emerging markets, principally driven by the growth in China, has reached a total outstanding amount of USD 2.78 trillion in 2018, up by 395% compared to its level a decade ago.

Figure 6. Total outstanding amount of corporate bonds issued by non-financial companies (2018 USD, trillion)



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

In addition to a significant increase in real absolute terms, the corporate bond market has also increased its prominence in corporate finance relative to bank lending. For example, Aldasoro and Ehlers (2018) report that the composition of international credit (cross-border loans, local loans in foreign currency and debt securities issued in non-domestic markets) shifted from bank loans to debt securities. While debt securities constituted 48% of international credit in 2008, its share increased to 57% as of 2018.

Given the pivotal role that the corporate bond market has gained in financing non-financial companies, it is critical to understand how risks and vulnerabilities have evolved in this market in the recent years. This is explored in the following section.

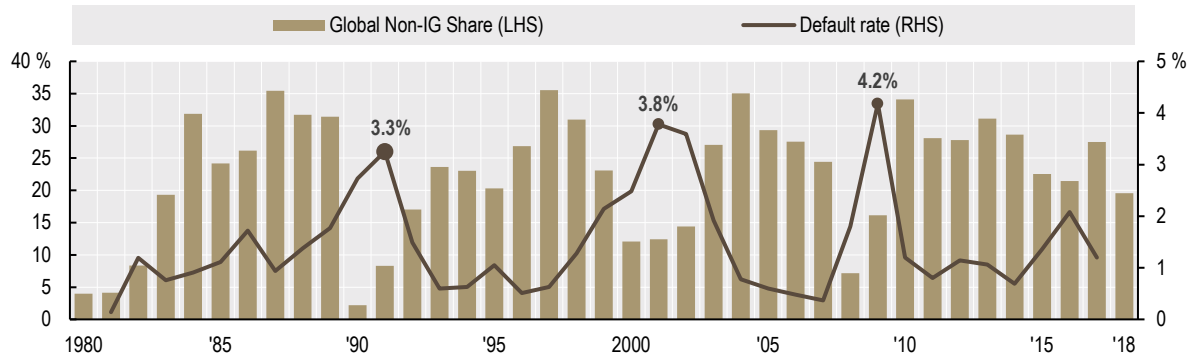
PART II. EVOLUTION OF RISKS AND VULNERABILITIES

2.1. Decrease in issuer quality

The significant increase in corporate bond issuance and the resulting record levels of outstanding debt may be interpreted as an indicator of increased risk-taking by investors that are searching for yield in a low interest rate environment. However, such conclusions between increased issuance and investor risk appetite may be incomplete without also examining the evolution of issuer quality. Indeed, recent research shows that a significant decline in corporate bond issuer quality is a better signal of excessive risk-taking in credit markets than a rapid increase in debt issuance. A recurring pattern of credit cycles appears to be that a deteriorating level of issuer quality is followed by lower investor returns due to the subsequent default of low-quality issuers and widening of credit spreads (Greenwood and Hanson, 2013).

One measure of market-wide issuer quality, which has been used to forecast excess corporate bond returns, is the share of non-financial corporate bond issuance with a non-investment grade rating (Greenwood and Hanson, 2013). We construct this measure for our dataset based on the subsample of bond issues, which have received a rating from any of the three leading credit rating agencies; Standard & Poor's, Moody's and Fitch. With an observation period starting from 1980, Figure 7 displays how the share of non-investment grade issuance moves over the credit cycles. Historically, the share of non-investment grade bonds at the global level reached its highest levels in late 1980s, and in the periods 1997-1998 and 2004-2005. It is also shown that these periods of declining issuer quality were regularly followed by a significant increase in default rates.

Figure 7. 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 60 712 corporate bond issues with rating information from 105 countries.

Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, Standard & Poor's Annual Global Corporate Default Study and Rating Transitions, see Annex for details.

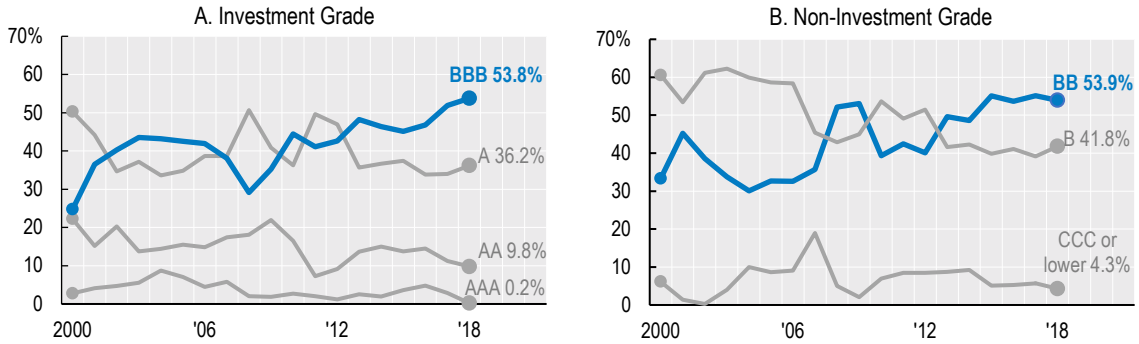
Figure 7 shows that after a sharp fall to 7% in 2008, the share of non-investment grade bonds in total issuance, successively increased to reach 34% in 2010. The share of non-investment grade issuance remained above 20% in the following 7 years and was only slightly below 20% in 2018. This is the longest period of time that the share of non-investment grade bonds has remained this elevated before a marked downturn sets in and default rates increase.

Despite the clear link with subsequent default rates, one drawback of simply using the share of non-investment grade bonds as a measure of overall issuer quality is that it does not take into account the relative importance of bonds with different ratings *within* the two aggregate bond categories; investment and non-investment grade. This drawback is especially relevant if the relative importance of bonds with different ratings is shifting and potentially influencing

the overall rating quality associated with the two main categories. To explore this point, Figure 8 shows the changing composition of bonds with different ratings within the investment grade and non-investment grade categories respectively during the last two decades.

With respect to the investment grade category, panel A of Figure 8 shows a long-term relative increase in the portion of BBB rated bonds. While in the 2000-2007 period, BBB rated bonds constituted on average 38.9% of global investment-grade issuance, they averaged 44.1% in the 2008-2018 period and reached 53.8% in 2018. This is the highest share that BBB issuance reached in our dataset which goes back to 1980. This shift in BBB share - which is the rating just above non-investment grade - occurred at the expense of bond issues with AA and AAA ratings. The average annual share of AA rated bonds moved from 16.7% to 13.7% between 2000-2007 and 2008-2018 periods and that of AAA rated bonds declined from 5.4% to 2.3%.

Figure 8. Composition of the investment and non-investment grade categories



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

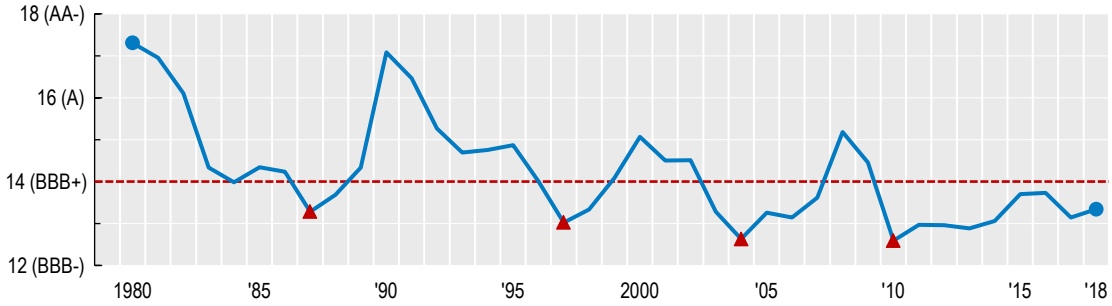
The shift in the composition of non-investment grade issuance, on the other hand, has a different character. Panel B shows that the shift here is towards the higher rating category. The average annual share of BB rated bonds in global non-investment grade issuance has increased from 35.2% in the pre-crisis era to 49.4% in the 2008-2018 period and amounted to 53.9% as of 2018. In return, the portion of B rated issues declined from an average of 57.5% to 44.3% between the two periods. This shift has been particularly pronounced in the last 6 years. Although this trend may be interpreted as a sign of decreasing risk appetite among investors of higher-risk corporate debt issuers, there is also an alternative explanation. Amid the rising interest rate environment in recent years, lower-rated issuers in the non-investment grade scale were pushed towards the loan market, where floating interest rates are more prevalent in comparison to the bond market. Indeed, issuance in the leveraged loan market, i.e. the lower-rated segment of the loan market, has grown significantly and is reported to have passed the USD 1 trillion mark in the US and USD 1.3 trillion globally (Wigglesworth and Scaggs, 2018; Adrian et al., 2018). The observed growth in the leveraged loan market is supported by the growth of the collateralised loan obligation (CLO) market, which in turn, obtains financing from the corporate bond market. It is worth noting that bond issuance by CLOs are recorded as issuance by financial companies and hence do not go into the figures provided in this paper.

Unlike the US Federal Reserve, the European Central Bank's (ECB) asset purchase programme involves investments in corporate bonds. The Corporate Sector Purchase Program (CSPP) was initiated by the ECB in June 2016 and invests in investment-grade euro-denominated bonds issued by non-bank corporations established in the euro area (ECB, 2016). This programme is argued to have led investment grade bond fund managers to increasingly purchase BB rated bonds (Smith, 2017a). In Europe, the total amount issued by BB-rated issuers in the following 2017-2018 period constituted, on average, 60.0% of total non-investment grade annual issuance, which is substantially higher than the 54.5% global average.

In order to measure the combined net effects of the two diverging movements within the investment and non-investment grade categories observed in Figure 8 we have constructed a "global corporate bond rating index". 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. The result is a more refined measure of overall bond quality rating than the traditional way of measuring just the portion of non-investment grade issuance.

Figure 9 shows the development of the "global corporate bond rating index" since 1980. Similar to Figure 7, there is an obvious cyclical movement, with the lowest levels of issuer quality reached in 1987, 1997, 2004 and 2010. However, in addition to the cyclical changes, the "global corporate bond rating index" also reveals a structural trend of weakening in overall issuing quality since 1980. While the lowest level of issuer quality in the 1980s was 13.28, it moved down to 13.02 in 1997, 12.63 in 2004 and finally 12.59 in 2010. Moreover, the length of the periods for which the index stays under 14, which corresponds to a BBB+ rating, has increased for each cycle. Currently, the index has stayed below BBB+ during the last 9 years. As of 2018, the index stood at 13.34, meaning that the average corporate bond has a rating of approximately BBB. Figure 8 indicates that the long-term decline in the index is not solely due to an increase in non-investment grade issuance but also due to a decline within the investment grade category itself.

Figure 9. Global corporate bond rating index

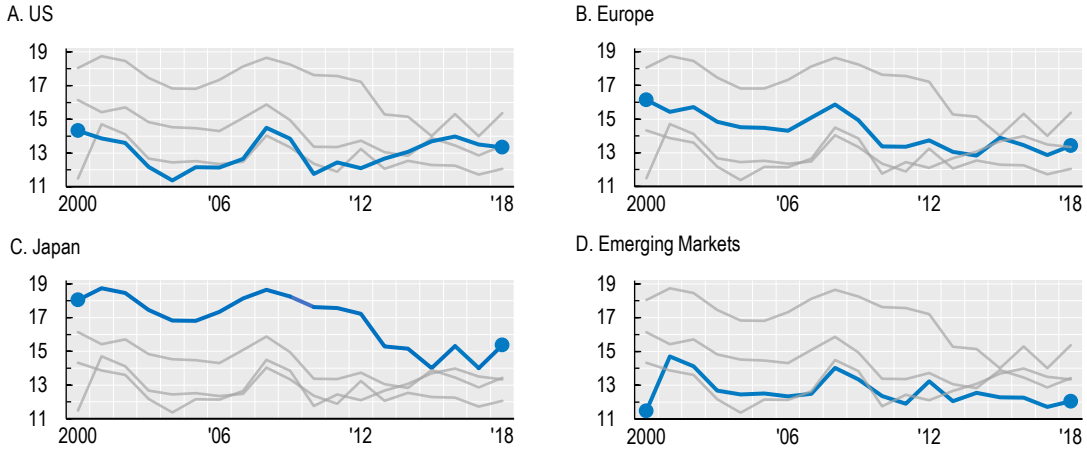


Note: The index assigns a score of 1 to a bond if it has the lowest credit quality rating and 21 if it has the highest rating. There are eleven non-investment grade categories: five from C (C to CCC+); and six from B (B- to BB+). There are ten investment grade categories: three from B (BBB- to BBB+); and seven from A (A- to AAA). The index is then calculated by taking a weighted average of individual bond scores, using issue amounts as weights.

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

Figure 10 plots the corporate bond rating index separately for the US, Europe, Japan and emerging markets. In each panel, the index for the given region is shown with other regions to allow comparison. Here, the observation period starts from 2000 to ensure a sufficient number of rated bonds in each region.

Figure 10. Corporate bond rating index for different geographical regions



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

In the US, the index starts at 14.3. After peaking with the onset of the financial crisis it dips to 11.8 in 2010. In the following years, the index displays a clear upward trend but has slightly decreased in the last two years and still remains under 14 (BBB+). As of 2018, the index for the US stands at 13.3. The upward trend in the US index contrasts the indices of other parts of the world, which mainly show a stable or decreasing trend.

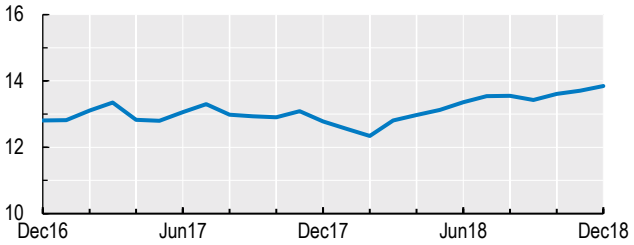
The index for Europe shows an almost 3-notch decline since 2000. The decline does not begin with the financial crisis but is a continuation from the prior period. The observed deterioration in the index can partly be attributed to the booming non-investment grade bond market in Europe in the same period. The rating downgrades experienced by many European countries, including Greece, Portugal, Spain, Italy, Ireland, Belgium and France, during the sovereign debt crisis would also have contributed to the decline in the later period, since sovereign ratings are significant determinants of company ratings. As of 2018, the European index stands at 13.4, which approximately corresponds to an average rating of BBB.

In Japan, the corporate bond rating index starts from a rather high level of 18, but except for an increase during the financial crisis, it has successively declined and reached 14 in 2017. In 2018, the index moved up to 15.4. Despite an overall decline since 2000, the index for Japan still remains above the indices of all other regions displayed in Figure 10.

According to the last panel of Figure 10, for most of the observation period, the index for emerging markets was lower than for other regions. From 2001 to 2017, the emerging markets index steadily declined with short-lived upward movements in 2008, 2012 and 2014. As a result, the index has experienced a 3-notch decline from 14.7 in 2001 to 11.7 in 2017 and by falling under 12 it has moved into non-investment grade territory. However, the index slightly recovered in 2018 when it reached 12.1.

To explore in more detail the modest increase in the “global corporate bond rating index” in 2018 shown in Figure 9 and 10 above, Figure 11 shows monthly movements since December 2016. According to Figure 11, corporate bond rating quality at the global level has been on an upward track since February 2018, experiencing a 1.5-notch increase from 12.3 to 13.8. This observation may point to a decrease in investor appetite in the recent months. Consistent with this, in the last quarter of 2018, bond issuance by non-investment grade issuers experienced the weakest quarterly period since 2009.

Figure 11. Global monthly corporate bond rating index (3-month moving average)



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

A decline in average issuer quality during the post-crisis period as displayed in Figures 9 and 10 indicates by definition a higher expected default rate in the case of a downturn. In addition to the downward path of average ratings, another important development is the increase in within-rating leverage. According to CreditSights research, the leverage of AA or AAA rated US issuers increased from 1 times EBITDA in 2007 to 1.8x in 2017 and that of A rated issuers increased from 1.5x to 2.2x. BBB rated issuers, on the other hand, saw a relatively modest increase in leverage from 2.2x to 2.5x (Scaggs, 2018). As a result of this shift, the average AAA/AA rated issuer now is more leveraged than the average A rated issuer was a decade ago, and the average A rated issuer today is as leveraged as the average BBB rated issuer was a decade ago.

Similarly, the US Federal Reserve notes in its latest financial stability report that the ratio of debt to assets for publicly traded non-financial companies in the US is near its highest level in 20 years. Furthermore, in contrast to previous years when high-earning firms with relatively low leverage were taking on most of the additional debt, in 2018 companies with high leverage, high interest expense ratios, and low earnings and cash holdings increased their debt levels the most (Federal Reserve, 2018a).

2.2. Weakening covenants

Covenants are clauses in a bond contract that are designed to protect bondholders against actions that issuers can take at their expense. They range from limiting the amount of future borrowing to specifying the conditions for dividend payments. Covenants also often oblige issuers to meet certain disclosure requirements and specify key financial indicators (e.g. interest coverage ratio) that issuers should meet.

In the post-crisis era, bond investors' search for yield in an environment of historically low levels of interest rates seem to have given bond issuers an opportunity to weaken the protection that covenants offer. Indeed, Moody's covenant quality indicator (CQI), which is a three-month rolling average covenant quality score tracked since January 2011, indicates extraordinarily weak covenant protection for North American non-investment grade bonds. CQI measures covenant quality on a five-point scale, with a higher score denoting weaker covenant quality. In November 2018, the CQI strengthened from 4.41 in the previous month to 4.30 but still remained in "weakest-level territory" (i.e. a score of 4.2 or worse) for a record-setting 19th consecutive month.

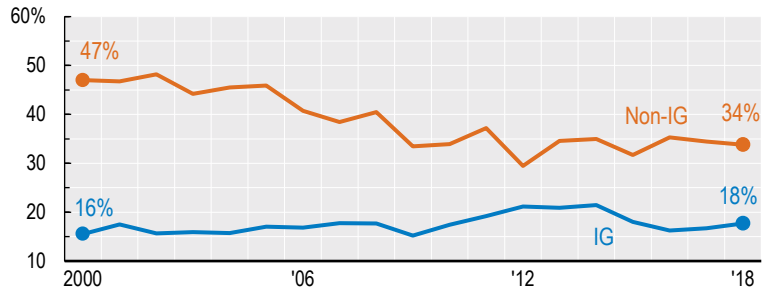
There is also evidence of covenant weakening in the European corporate bond market. In 2015, institutional investors in European non-investment grade bond market wrote a letter of concern to the Association for Financial Markets in Europe (AFME), an industry trade body, about the significant decline in covenant standards. Despite such investor action, research has shown that in the last 2 years covenant quality has further declined in the European market (Smith, 2018).

To arrive at a more comprehensive understanding of how covenant quality of corporate bonds has evolved, we construct a covenant protection index using data provided by the Mergent Fixed Income Securities Database. This database provides covenant information on publicly offered bonds in the US, issued by either US or non-US entities. For each corporate bond, we first sum up binary variables denoting the presence/absence of 27 different types of covenants in the bond contract. 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.[2]

Figure 12 displays the covenant protection index for bonds issued in the US by non-financial companies at the breakdown of investment and non-investment grade. The trends for the two categories are remarkably distinct. For investment grade bonds, the index stays in a narrow band between 15% and 21% throughout the period. In other words, the average investment grade bond has around 4 to 6 of the 27 covenant types included.

For non-investment grade bonds, on the other hand, the index moves on a clear downward path. Starting from a level of 47% in 2000, the index declines until 2012 when covenant protection offered by non-investment grade bonds reaches its weakest level with the average bond carrying only 8 of the 27 covenant types available. Importantly, the covenant protection gap between investment and non-investment grade bonds almost closed in the same year with an index of 29% for non-investment grade bonds, and 21% for investment grade bonds. The long-term narrowing of the covenant protection gap between the two rating categories challenges the expected inverse relation between issuer quality and level of covenant protection demanded by investors.

Figure 12. Covenant protection index for bonds issued in the US by non-financial companies



Note: The figure is based on the analysis of 15 024 corporate bond issues in the US by companies from the United States and 58 other countries.

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

Given covenants sitting in the weakest levels and spreads remaining narrow, some analysts argue that bondholders are not being adequately compensated for covenant risk. Moreover, the recent move of issuers with the lowest credit quality to the leveraged loan market is argued to have supported the bargaining power of bond issuers by cutting the supply of non-investment grade bonds (Moody's, 2018). Nevertheless, recent years have seen an improvement in the covenant protection index of non-investment grade bonds. After reaching a minimum in 2012, the index has stabilised at around 34% in the last 6 years. This modest improvement in covenant quality may partly be due to bond investors' emerging resistance against extraordinarily weak covenants.

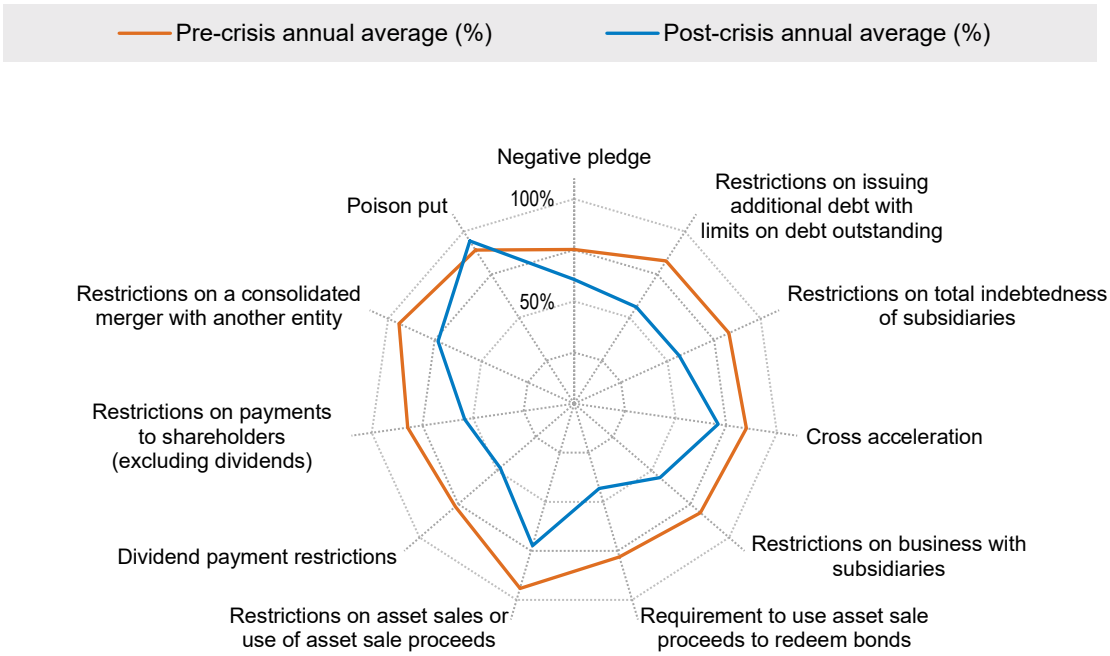
[2] Note that this index provides only a rough measure of covenant protection, since it only takes into account the presence or absence of a given covenant. Therefore, any change in covenant protection arising from the detailed drafting of individual covenants is not reflected in the index.

In recent years, there have been a number of cases where bond issuers wrote covenants that are so weak that potential bond investors pushed back the proposed deal with a requirement to eliminate the problematic covenant(s) or increase the yield. One such resistance occurred when a US car parts manufacturer attempted to issue a EUR 250 million bond in Europe. The troubling covenant, which was then deleted, would have allowed a value transfer from issuer's subsidiaries that bondholders have control over to those subsidiaries that are out of their reach. It is important to note that such bondholder action does not only affect the bond in question but also subsequent bond issues since it sets an example and the drafting of bond covenants are precedent-reliant (Smith, 2017b). The incidence of investors' resistance to extraordinarily weak covenants is reported to have increased also in the US (Duguid, 2018).

To understand the nature of the weakening in the covenant protection offered by non-investment grade bonds, we conduct further analysis of the covenants that make up the index. Figure 13 displays the change in the frequency of observing selected covenants in the 2000-2007 vs. 2008-2018 periods. The 11 covenants selected are those which are found in more than half of the non-investment grade bonds in an average year in the pre-crisis or post-crisis era.

Except for a slight increase in the "poison put" covenant, which gives bondholders the option of selling the issue back to the issuer upon a change of control in the issuer, all covenant types have seen a decrease in popularity from pre- to post-crisis period. Given the record levels of activity observed in the M&A industry in the aftermath of the crisis, it is understandable that bondholders remain unwilling to drop the poison put covenant and forgo their protection in case of takeovers. Likewise, two other M&A-related covenants, one restricting consolidated mergers with other entities and the other restricting assets sales and/or use of asset sale proceeds, are still observed in around 73% of corporate bonds. However, their frequency has declined from a significantly higher level, 94%. In contrast, the requirement to use proceeds of asset sales to redeem bonds has declined from a frequency of 78% to 43%.

Figure 13. Average annual incidence of observing selected covenants in non-investment grade bonds



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

According to Figure 13, other covenant types which have seen a significant decline in popularity are those which put restrictions on payouts to shareholders and on issuance of additional debt. Although such covenants are critical to prevent wealth transfer from existing bondholders to shareholders or new bondholders, it appears that bond investors have been eager to trade off some extra yield for less protection in this low interest rate environment.

An important side note is that the weakening in covenants is not limited to the corporate bond market. Leveraged loan markets have also seen a rapid decline in covenant quality. As of October 2018, the covenant-lite share in outstanding US leveraged loans is at a record rate of 79%. This share has been increasing steadily from approximately 64% in August 2015 but levelled off in September and October 2018 (Leveraged Commentary & Data, 2018a, 2018b). Due to this deterioration, Moody's estimates that in the next downturn, average recovery rates from leveraged loans will decline to 61% of face value, which is considerably below the historical average of 77% (Wirz, 2018).

2.3. Recent trends in other issue-level characteristics

A decreased level of issuer and covenant quality is an important sign that the bargaining power has shifted in favour of issuers in an environment of high liquidity worldwide. There are, however, other issue-level characteristics which may give further information on how investors fare in other points of negotiation.

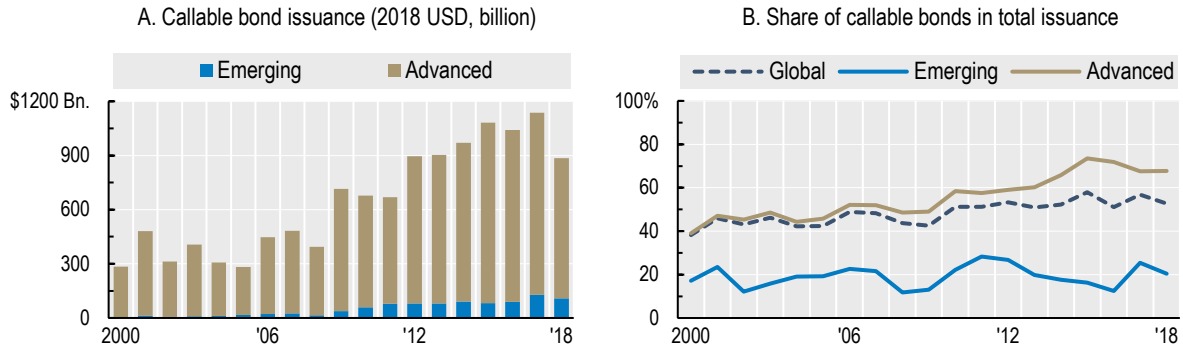
One such issue-level characteristic is callability. Callable bonds give issuers the flexibility to redeem their bonds before maturity subject to time constraints or other special constraints. All else being equal, callable bonds are less desirable by investors since they add reinvestment risk into the picture. Because a fall in interest rates provides the opportunity to refinance the outstanding debt at a lower cost, issuers are most likely to call their bonds when interest rates decline, in which case bond investors are forced to reinvest the proceeds at the lower-rate environment. For that matter, to induce demand, callable bonds tend to offer higher returns.

Lately, issuers, who want to keep their financial flexibility to call their bonds when they need to, but who also want to lower the upfront payment for keeping this option, have increasingly turned to "make-whole" calls. Based on corporate bond issuance of US non-financial companies, Elsaify and Roussanov (2016) report that the usage of bonds with make-whole call provisions has begun to increase post-1999 and that the increase in their prevalence has been even more pronounced since the financial crisis. In contrast to a traditional call with a fixed call price, a make-whole call price is typically calculated as the present value of the bond's remaining cash flows discounted at an artificially low spread, with a floor price equal to the par value. Due to the low discount rate used, make-whole calls typically result in a call price that is above the market price of the bond, hence making the investors "whole" and reducing their concerns about early redemption of their bond holdings. Because the exercise of make-whole calls rarely becomes economically meaningful, investors do not charge large premiums for offering such options. Although make-whole call options are rarely exercised, they continue to exist since they provide flexibility to their issuers to call their bonds when needed, though mainly for non-interest rate related reasons such as in the event of a restructuring or a recapitalisation or to eliminate a troublesome covenant (Mann and Powers, 2003).

Figure 14 shows that the amount of callable bond issuance increased more than two-fold, in real terms, from an annual average of USD 376 billion prior to the crisis to USD 852 billion in the 2008-2018 period. Based on bond issues for which callability information is available, Panel B of the figure shows that the observed increase in the callable share is driven by advanced economies. The share of callable bonds in total issuance by non-financial companies in advanced economies increased from an average of 46.8% in 2000-2007 period to an average of 61.7% in the subsequent period. As discussed above, the increase in make-whole calls accounts for much of the observed increase in callable bond issuance and hence this trend does not necessarily indicate a higher exposure of investors to reinvestment risk.

In contrast, callable share in emerging markets remained in a much lower range between 11.8% and 28.3% without showing any sustained upward trend and recently declined from 25.4% in 2017 to 20.4% in 2018. When lending to emerging market companies, bond investors have remained reluctant to add call options into the picture.

Figure 14. Global trends in callable corporate bond issuance

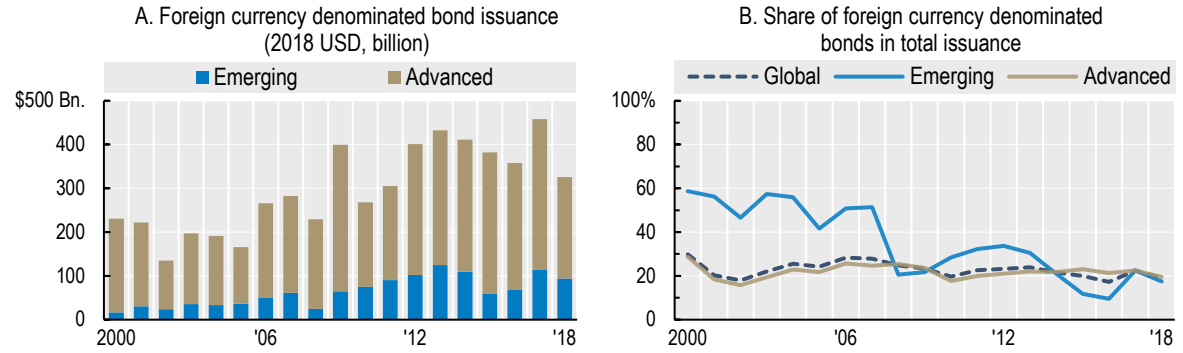


Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

Another important characteristic that may change the risk profile of a bond issue is foreign currency denomination. Local currency versus foreign currency denominated bonds pose different risks to bond investors. While local currency denominated bonds are more financially sustainable for emerging market issuers who have much of their revenues in local currency, they pose currency risks to international bond investors who often evaluate their returns in USD or EUR. Therefore, in any given time, the demand for foreign currency denominated bonds of an emerging market issuer is basically determined by, among other factors, weighing down the potential increase in company's default risk versus the currency risk faced by the bond investor.

Figure 15 indicates a slight decline in the share of foreign currency denominated bonds in total issuance at the global level. This decline is driven by an increased ability of emerging market companies to issue in their local currency. In 2018, only 18% of emerging market and 20% of advanced market corporate bond issuance were foreign currency denominated.

Figure 15. Global trends in foreign-currency denominated corporate bond issuance

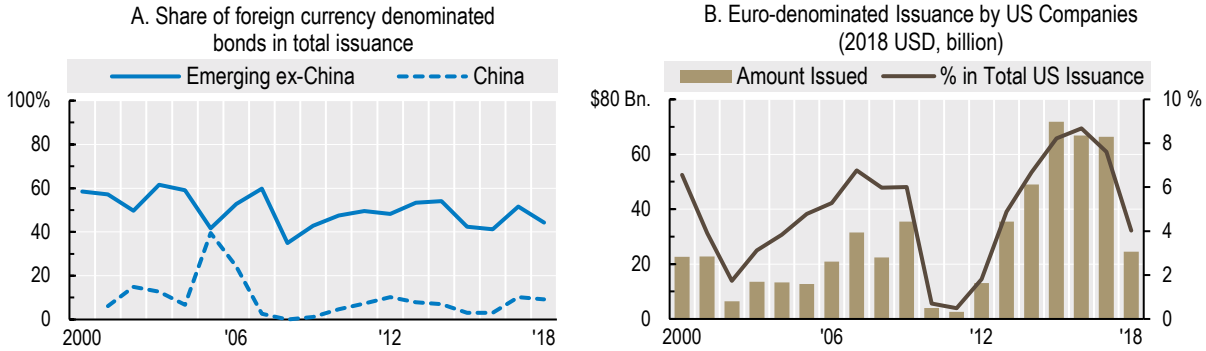


Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

Panel A of Figure 16 shows that the decline in foreign currency denominated bond issuance by emerging market companies is driven by the general ability of Chinese companies to borrow in local currency. Starting from 2008, when Chinese companies' bond issuance reached meaningful levels, the percentage of foreign currency denominated bonds in total amount issued by non-financial Chinese companies remained under 11%. In contrast, companies in emerging markets other than China are much more likely to issue bonds in foreign currencies.

The share of foreign currency denominated bonds in total issuance by such companies averaged 55.0% in the 2000-2007 period and 46.4% in the 2008-2018 period.

Figure 16. Foreign currency denominated corporate bond issuance by companies in emerging markets and the US

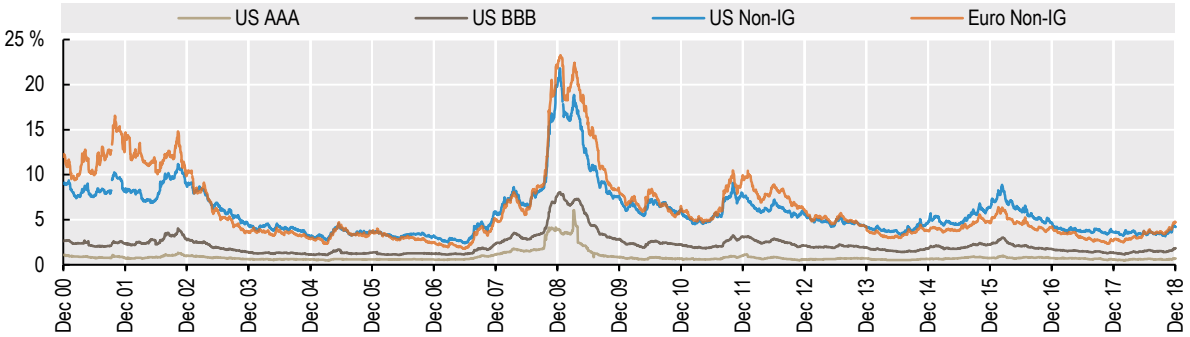


Source: OECD Capital Market Series dataset, Thomson Reuters Eikon, see Annex for details.

Panel B of Figure 16 displays another important trend in foreign currency denominated corporate bond issuance. As the US started to gradually tighten its monetary policies in 2015 while the ECB continued easing, the US and euro area interest rates diverged, leading US companies to increasingly issue euro-denominated bonds. In the 2015-2017 period, US companies issued record levels of euro-denominated bonds reaching an equivalent of around USD 68 billion per year. As a result, in this 3-year period, approximately 8% of total corporate bond issuance by US companies has been euro-denominated. However, in 2018, the share of euro-denominated bonds declined to 4%.

While issuer- and issue-level characteristics have evolved in ways described above, corporate bond spreads have reached historically low levels as shown in Figure 17. Credit spreads, which are computed as the difference in yield between a safe government bond and a riskier bond, provide a measure of the extra compensation bond investors are requiring to hold the riskier bond. Spreads on non-investment grade bonds, which exceeded 20 percentage points in the course of the financial crisis, were lower than 4 percentage points as of December 2017 and the gap between investment and non-investment grade bonds' spreads had almost collapsed. Hence, bond investors appeared less concerned about the increased default risk that non-investment grade issuers carry. However, data reveal an increasing pattern in non-investment grade bond spreads in the last months of 2018.

Figure 17. Corporate bond spreads



Source: FRED, Federal Reserve Bank of St. Louis. Based on the indices ICE BofAML US Corporate AAA, ICE BofAML US Corporate BBB, ICE BofAML US High Yield Master II, ICE BofAML Euro High Yield.

PART III. RISKS AND VULNERABILITIES IN A CHANGING POLICY ENVIRONMENT

3.1. Developments in monetary policy and spill-overs

In response to the 2008 financial crisis, central banks, including the US Federal Reserve and the ECB, adopted expansionary monetary policies to lower short-term market interest rates and stimulate economic activity. As short-term interest rates approached zero and left little room for these conventional policies, central banks also embarked on quantitative easing (QE) programmes to continue their support for the economy. Since these programmes involved large scale purchases of government or corporate bonds, they depressed bond yields and hence made it harder for bond investors to reach historical returns, playing a role in the search for yield observed in the recent years. Indeed, based on data from the US corporate bond market between 2008 and 2016, Albrizio et al. (2019) study market responses to monetary policy announcements and find that unconventional monetary policies have boosted investors' appetite for non-investment grade corporate bonds and by doing so, have increased higher risk companies' access to corporate bond markets.

Lately, in response to improvements in economic activity, major central banks have initiated or announced their intentions to retreat from extraordinary monetary policies adopted in the post-crisis period. The US Federal Reserve started normalising its policy in December 2015, when it increased interest rates for the first time. In addition to the regular hikes in interest rates that followed, in October 2017, the US Federal Reserve initiated its balance sheet normalisation programme, which would reduce its securities holdings in a gradual and predictable manner (Federal Reserve, 2017). Following its Federal Open Market Committee meeting in December 2018, the US Federal Reserve raised interest rates for the ninth time since December 2015 and communicated that future policy decisions will be guided by incoming data (Federal Reserve, 2018b; Federal Reserve, 2019a). In its most recent meeting in January 2019, the US Federal Reserve announced its decision to hold rates steady and to take a patient approach in evaluating what future rate adjustments may be appropriate given global economic and financial developments and muted inflation pressures (Federal Reserve, 2019b). It also expressed its readiness to adjust any of the details for completing its balance sheet normalisation in light of future economic conditions (Federal Reserve, 2019c). In the press conference following the meeting, Federal Reserve Chairman Jerome Powell cited slowing growth in China and Europe, uncertainties around several unresolved government policy issues, considerable tightening of financial conditions in late 2018 and lowering of business and consumer sentiment as reasons for caution. He also cited corporate debt as a risk that could amplify the effects of a potential downturn since in such a scenario, highly levered companies would be less able to service their debt and to serve their customers, which may require layoffs (Federal Reserve, 2019d).

Similarly, the ECB ended its net purchases under its asset purchase programme (APP) in December 2018 (ECB, 2018). It intends to reinvest the principal payments, in full, from maturing bonds purchased under the APP for an extended period of time, past the date when it starts raising the key ECB interest rates and in any case for as long as necessary to maintain favourable liquidity conditions and an ample degree of monetary accommodation. The ECB expects key interest rates to remain unchanged at least through the summer of 2019 (ECB, 2019a). Moreover, in a speech in January 2019, ECB President Mario Draghi stated that the balance of risks for growth has moved to the downside and that "if things go very wrong", the ECB is prepared to use all instruments in its toolbox, which includes restarting the APP. The President, however, noted that the ECB does not see such a contingency as likely to materialise this year (ECB, 2019b).

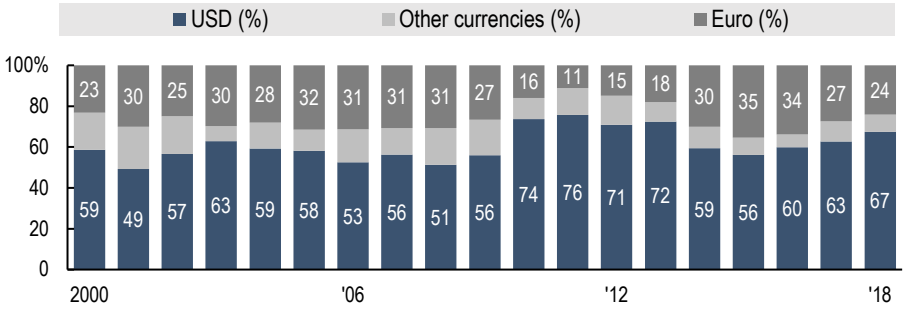
The Bank of Japan (BoJ) has maintained its monetary policy steady in its most recent monetary policy meeting and announced its intention to maintain current extremely low levels of interest rates for an extended period (BoJ, 2019a). At the same time, the BoJ lowered its inflation forecast for the 2019 fiscal year (BoJ, 2019b).

When addressing the effects of a changing monetary policy environment on corporate bond markets and the corporations that use them it should be kept in mind that in globally integrated financial markets, the effects of the actions by one central bank is not confined to its own jurisdiction.

One example of such interdependence is provided by recent research that suggests that the supply shortage created by ECB's asset purchase programme made European investors increasingly turn to foreign bonds in which they invested about USD 500 billion a year. They purchased more than half of the bonds issued by US companies during the last four years and it is estimated that they own almost 10% of the outstanding volume of US fixed-income assets. On the other hand, during the QE period, US investors spent USD 200 billion a year on foreign bond purchases, which is significantly lower than their European counterparts. It is expected that a retreat from QE policies will reduce cross-border purchases by US and European investors, which in turn will intensify the upward pressure on sovereign bond yields and corporate bond spreads (Flood, 2018).

The actions taken by the US Federal Reserve and the ECB are critical for other countries as well due to the dominance of USD and EUR denominations in the corporate bond market. According to Figure 18, both before and after the crisis, USD- and EUR-denominated corporate bonds made up more than 80% of all corporate bond issues that were denominated in a foreign currency. Furthermore, USD has clearly increased its importance after the crisis, with an annual average share of 64%. Similarly, Aldasoro and Ehlers (2018), who examine both bank loans and debt securities, report that the USD has become more dominant in all segments of international borrowing in the recent years. USD credit to the non-bank sector outside the US is reported to have increased from 9.5% of global GDP at the end of 2007 to 14% in the first quarter of 2018.

Figure 18. Share of USD and EUR in foreign-currency denominated bond issuance amount



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

Understanding the international spill-overs of quantitative easing policies may allow one to gauge the potential effects of a reversal of such policies on emerging markets. Lo Duca et al. (2016) examine the impact of US QE on global non-financial bond issuance and find that it had a large impact on corporate bond issuance, especially in emerging markets. Their counterfactual analysis shows that without the US QE, emerging market bond issuance would have been only half of the actual amount between 2009 and the first quarter of 2013. This finding may provide a benchmark for how a reversal of unconventional monetary policies may impact these countries. Given that corporate bonds issued by companies from emerging markets constitute about 21% of the global stock of outstanding corporate bonds, any problems that these companies face may have important repercussions in the market as a whole.

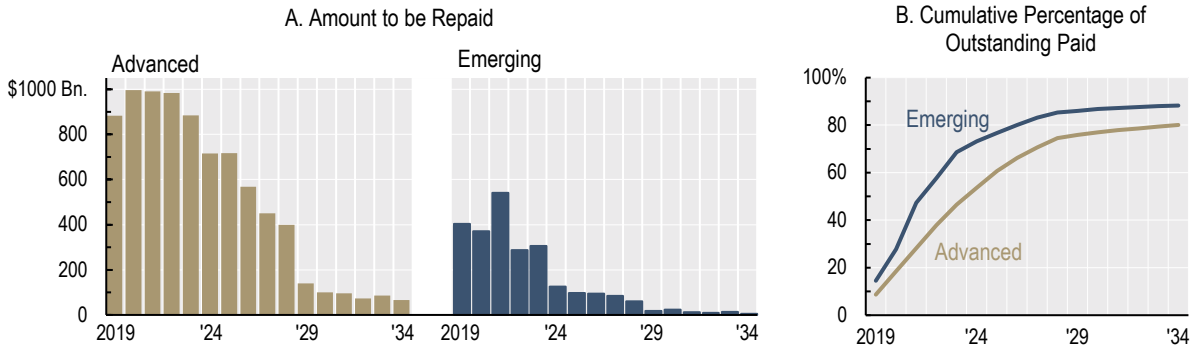
3.2. Future repayment requirements

The corporate bond market largely consists of fixed-rate borrowing. In 2018, for instance, 91% of corporate bond issuance by non-financial companies had fixed interest rates. This high percentage holds under advanced/emerging markets and investment grade/non-investment grade breakdowns, too. Given this dominance of fixed-rate bonds, examining the timing of future repayment requirements may prove useful to get an understanding of the speed at which a rise in interest rates will be reflected in borrowing costs. In a rising rate environment, when issuers' refinancing needs arise, borrowing costs will inevitably increase. The increased costs may sharply push interest rate coverage ratios, which in a low interest rate environment have been reassuring for investors due to their high levels.

Figure 19 shows that emerging market companies will have to pay back or refinance an average of USD 381 billion of corporate bonds outstanding in the next 5 years. After this concentration in the first 5 years, relatively smaller amounts are due in subsequent years. Non-financial companies from advanced economies do not have much breathing room for paying down their debt, either. They will in the coming 5 years be required to redeem, an annual average of about USD 948 billion a year. However, compared to emerging market companies, their refinancing needs are more levelled out into the future, most of which are distributed over the next 10 years.

Panel B of Figure 19 more clearly presents the difference in the speed with which companies in emerging and advanced economies will need to pay down their current outstanding bonds. For instance, up to 2023, companies in advanced economies are supposed to have repaid 47% of their corporate bond debt that was outstanding by the end of 2018. On the other hand, emerging market companies will need to have repaid 69% of the outstanding amount.

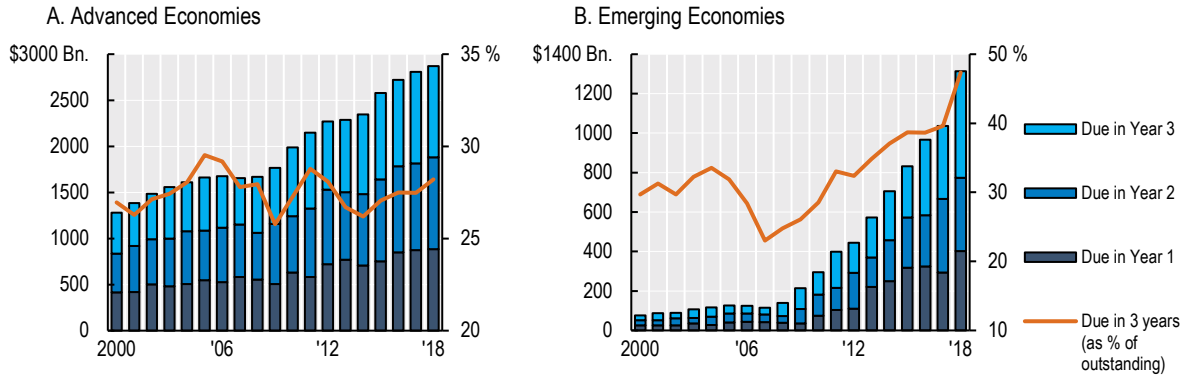
Figure 19. Corporate bond repayment requirements, year-end 2018



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

Figure 20 provides a historical perspective on the repayment requirements currently awaiting companies in advanced and emerging economies, respectively. For each year since 2000, the figure plots the inflation-adjusted outstanding amount by year-end that was due within the following 3 years. As of December 2018, companies in advanced economies need to pay a record amount of USD 1.9 trillion within 2 years, and USD 2.9 trillion within 3 years and their counterparts in emerging economies need to pay back USD 773 billion within 2 years and USD 1.3 trillion in 3 years. At the 1-, 2- and 3-year horizons, advanced and emerging market companies alike have the highest corporate bond repayment requirements since 2000. For emerging market companies, the amount due within the next 3 years has reached a record of 47% of total outstanding amount; almost double the percentage in 2008.

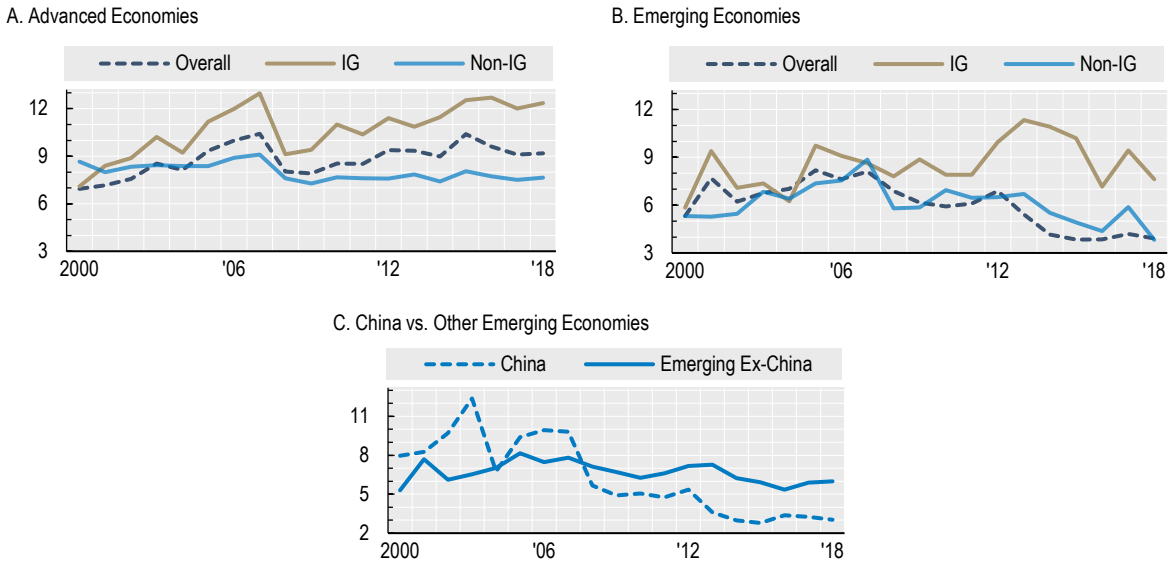
Figure 20. Outstanding amount due within the subsequent 3 years as of each year-end (2018 USD, billion)



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

The divergence between the speed with which advanced and emerging market companies have to pay back their debt is the result of their differing abilities in issuing longer maturity bonds. Bond investors tend to view longer maturity bonds riskier since a longer duration is associated with an increased price sensitivity to changes in interest rates. This is especially relevant for bond investors who have no intention of holding the bond until maturity. Furthermore, bond investors may be more reluctant to invest in long-maturity bonds since default probability increases with time horizon. A B-rated bond, for instance, defaults with a probability of 3.6% within a year, but this probability increases to 21.5% when a 7-year time frame is considered (S&P Global Ratings, 2018a). Figure 21 shows the equally-weighted average maturities of bonds issued by non-financial companies in advanced vs. emerging markets.[3]

Figure 21. Average maturities of corporate bonds (years)



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

[3] The "overall" line covers all bonds issued in the respective markets, including bonds that were not rated by one of the 3 leading rating agencies. Although the percentage of unrated bonds in total issuance amount is low in advanced economies (ranging between 9% to 18% annually), their percentage in emerging markets has increased in the recent years, especially with the acceleration in Chinese bond market activity. While the annual share of unrated bonds ranged between 32% - 45% in the pre-crisis years, this range shifted to 50% - 88% in the later period. Therefore for emerging markets, it is crucial to examine the "overall" line.

The figure reveals that investment grade issuers in advanced economies have experienced a significant lengthening in maturities from 9.1 years in 2008 to 12.3 in 2018. Their counterparts in emerging markets experienced an increase from 7.8 years in 2008 to 11.3 years in 2013. But all of this increase in maturity has been lost in the recent years. As of 2018, average bond maturity of investment grade issuers in emerging markets stands at 7.6 years.

In stark contrast to the maturity trends observed in the investment grade bond market, average maturities faced by non-investment grade issuers have mostly remained stable in advanced economies after their decline to 7.6 years in 2008. Non-investment grade issuers in emerging markets have even experienced a decline in average maturities from a peak of 8.9 years in 2007 to 5.8 in 2008 and down to 3.8 in 2018, which is 2 years shorter than its crisis level. Furthermore, examining the "overall line" for emerging markets, which also covers unrated bonds and hence is more representative of the entire market, shows that an emerging market company could on average borrow at a maturity of 3.9 years in 2018, compared to 8.1 years in 2007. Panel C reveals that the shortening of average maturity of bonds issued by emerging market companies is mainly driven by Chinese companies. While a Chinese company could issue bonds with an average maturity of 3.0 years in 2018, a non-Chinese emerging market company faced an average maturity of 6.0 years.

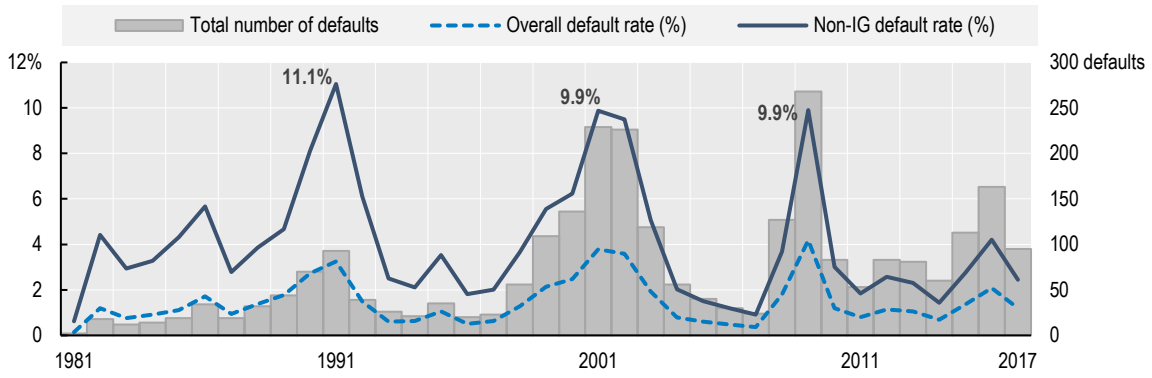
In summary, Figure 21 shows that although high quality issuers managed to lengthen their bond maturities in the post-crisis period, issuers of lower quality, namely non-investment grade and emerging market issuers, have failed to do so. Hence, their cushion against rising interest rates is weaker, since they will need to fulfil refinancing needs earlier than their high-quality counterparts.

3.3. Default and recovery rates

The key determinants of the level of credit risk that corporate bond investors carry are the probability of default and the expected recovery rate. Historical default and recovery rates in the corporate bond market provide a good starting point to understand how these two determinants might evolve over the credit cycle.

The exceptionally low levels of default rates experienced in recent years have been argued by some analysts as a reason for having faith in the corporate bond market despite the deterioration in average issuer and issue quality. This reasoning resembles the "this time is different syndrome" suggested by Reinhart and Rogoff (2014), referring to the tendency of investors to delude themselves into thinking that creditors have learned from their mistakes and the world is not likely to live through a major default wave again.

Figure 22. Historical default rates and annual number of defaults



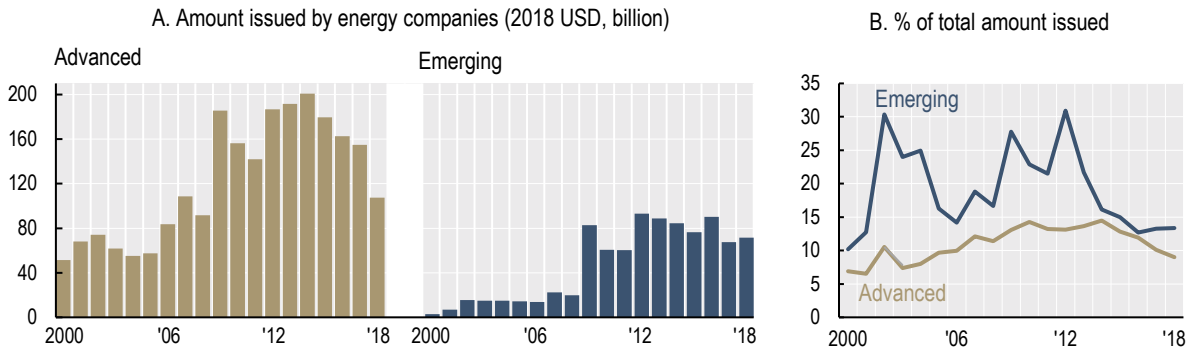
Source: Standard & Poor's Annual Global Corporate Default Study and Rating Transitions.

As a matter of fact, the observation that default rates in recent years have remained below their long-term averages should come as no surprise since steady economic growth typically

reduces the probability of default across the board. Figure 22 shows that it is the significant default clustering that takes place during crisis times that moves long-term default rate averages upward. Hence the relatively low percentage of defaults (2.44%) among non-investment grade issuers in 2017 may not be indicative of how things may unfold if servicing debt becomes more difficult in the case of an economic downturn or a rising interest rate environment.

Although the overall default rate remains low, examining industry-level default rates shows that the energy and natural resources industry has elevated levels of default rates, reaching 13.6% in 2016 and 4.7% in 2017 (S&P Global Ratings, 2018a). Panel A of Figure 23 displays the amount issued by energy companies at advanced and emerging markets breakdown and Panel B reports the share energy companies have in total corporate bond issuance. In both advanced and emerging markets, energy companies significantly increased their issuance starting from 2009. Since then, their annual issuance averaged USD 167 billion in advanced economies and USD 78 billion in emerging economies. Furthermore, in advanced economies energy companies' share in annual total issuance increased from an average of 8.9% in the 2000-2007 period to 12.5% in the subsequent period. Energy companies in emerging markets, on the other hand, constitute a larger share in the total, averaging around 19% since 2000.

Figure 23. Corporate bond issuance by energy companies



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

It is also important to note that beyond companies' joint exposure to systematic factors such as interest rates, an additional source of default clustering is default contagion. The default of one company cannot be seen as an isolated event due to the complex web of relationships that company has with other companies in the economy. Indeed, Azizpour et al. (2018) show that upon a default event of USD 173 million outstanding debt (the average in their US data set), the default rate increases by 2.8 events per year. Importantly, the authors note that the models used to estimate risk capital in financial institutions typically ignore default clustering arising from default contagion, and that this approach may leave them holding inadequate capital to withstand large losses in a default clustering period such as the 2008 financial crisis.

The "amount" of corporate bond investments that may be expected to default in the case of an economic downturn may be considerably larger than that experienced in the financial crisis. This divergence may arise not just because of a prolonged period of low issuer quality as evidenced in Figure 9 but also because of the increase in the total amount of outstanding corporate bonds from USD 6.53 trillion in 2008 to USD 12.95 trillion in 2018. Due to the lower levels of covenant protection, non-investment grade issuers may indeed escape default for a longer time as it is now less likely that they breach a covenant. Nevertheless, bond investors' portfolios may be hurt far before the occurrence of a default event, as the expectation of a company's default and achievable recovery rates will quickly be factored in the bond price.

Research by Jankowitsch et al. (2014) on defaulted US corporate bonds between 2002 and 2010 shows that the mean market-based recovery rate[4] during this period was 38.6%, with substantial variation over time. While the average recovery rate was around 60% in 2007, it moved down to 20% at the end of 2008. A high overall default rate in the market is shown to be associated with significantly lower recovery rates upon default. Hence, a strongly cyclical pattern exists for recovery rates over time. Importantly, the authors find that covenants significantly affect recovery rates. Bonds with investment covenants recover up to 4.4% more of their face value and those with financing covenants recover up to 9.7% more. With this in mind the decline of covenant protection index of non-investment grade bonds from 47% in 2000 to 34% in 2018 is worth noting. If a weak covenant structure prevents bondholders from stepping in at the necessary time, when bond issuers eventually default, there may be less left for bond investors to recover.

Another factor that may affect corporate bond recovery is the large volume that leveraged loans reached in the recent years. As a consequence, in the next default cycle more creditors will be making claims against defaulted issuers with less assets left for unsecured bondholders. Moody's estimates that bondholders stand to recover around 32% in the next default cycle, significantly lower than a historical average of about 40% (Wirz, 2018).

3.4. The potential impact of fallen angels

A future downturn may also increase the rate of downgrades in the BBB rated corporate bond segment, which has undergone extraordinary growth in the recent years as shown in Figure 8. Issuers that downgrade from a BBB rating to non-investment grade, the so-called "fallen angels", have to face an amplified increase in borrowing costs, due to a sudden loss of a major pool of investors. The non-investment grade market has a smaller investor pool and is associated with lower levels of liquidity for two main reasons: First, certain types of institutional investors, such as insurance companies, face regulatory restrictions on their holdings of non-investment grade bonds. Second, contractual investment mandates and internal investment procedures at mutual funds, pension funds, investment advisors as well as insurance companies restrict such institutions' holdings of non-investment grade bonds and hence contribute to the rating-based segmentation of the corporate bond market (Chen et al., 2014).

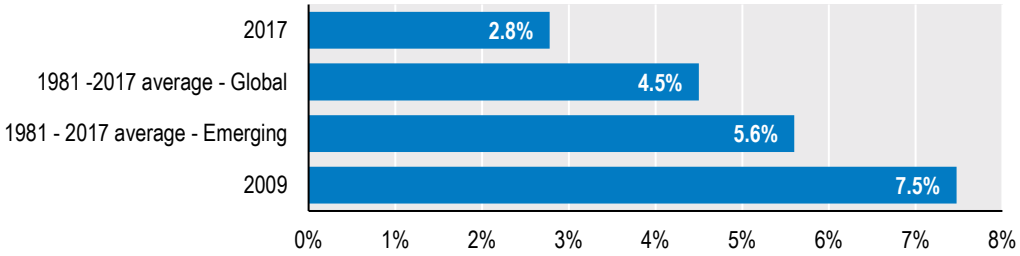
When a company is downgraded from investment grade, investors that are constrained by regulations or investment mandates will be forced to sell the company's bonds and will have a hard time finding potential buyers. Based on an observation period between 2001 and 2005, Ellul et al. (2011) find that such fire sales by insurance companies lead bond prices to deviate significantly from fundamental values. In the first five weeks after a downgrade to non-investment grade, downgraded bonds subject to fire sales experience median cumulative abnormal returns of almost −9% whereas other downgraded bonds experience a −3% return. Moreover, this difference of about 6 percentage points disappears only after 30 weeks. Since regulations enacted after the financial crisis have led dealer banks to decrease their inventories and reduce their market making activities, the effect of such fire sales may be stronger in a future downturn (Çelik et al., 2015).

In addition to the elevated borrowing costs that individual fallen angels will have to face, the downgrade of a large amount of investment grade bonds may be hard to absorb by the non-investment grade market and may cause volatility and spreads to rise across this market. To get a general idea of the percentage of BBB rated issuers that may be expected to downgrade to non-investment grade, Figure 24 shows the 1-year transition rates of BBB rated corporate

[4] Market-based recovery rate of a defaulted bond is defined by the authors as the average daily traded price per unit of face value, over the default date and the following 30 days. The market-based recovery rates serve as an estimate of actual recovery rates, i.e. the percentage of bondholders' investment that could be recovered with the amounts paid by the issuer at the resolution of formal bankruptcy.

issuers into non-investment grade. In 2017, this transition rate was at a very low level, 2.8%, which means that only 2.8% of issuers rated BBB as of Jan 1, 2017 were downgraded to non-investment grade by the end of the year. However, the historical (1981 – 2017) average 1-year transition rate of BBB rated issuers into non-investment grade is 4.5% at the global level and 5.6% when only emerging market issuers are considered. We also know that the transition rate can increase quite significantly in crisis times. In 2009 for example, 7.5% of corporate issuers rated BBB at the beginning of the year were downgraded to non-investment grade by year-end.

Figure 24. 1-year transition rates of BBB-rated corporate issuers into non-investment grade



Note: The data cover both financial and non-financial corporate issuers. The historical average (1981 – 2017) 1-year transition rates for financial and non-financial issuers are 4.4% and 4.5%, respectively.

Source: Standard & Poor's Annual Global Corporate Default Study and Rating Transitions.

As of year-end 2018, corporate bonds with a total outstanding value of USD 9.94 trillion have a rating in our dataset. Of those, USD 3.65 trillion (36.7%) have a BBB rating. Assuming the 1-year transition rate that was experienced in 2009 (i.e. 7.5%) and that the outstanding amount of the average fallen angel company is representative of that of the average BBB rated company, BBB rated bonds amounting to USD 274 billion would be downgraded to non-investment grade within one year, in the case of a significant economic downturn. Moreover, this new influx to the non-investment grade market may swell further as the time horizon lengthens. If bond issues by financial companies are also taken into account, BBB rated bonds with a total outstanding value of nearly USD 500 billion can be expected to become fallen angels within a year of a downturn. Furthermore, this figure may be pushed upwards if some top issuers in the BBB category fall to non-investment grade territory. One such shock in recent history was the downgrade of both General Motors Corp. and Ford Motor Co. to BB category in May 2005, when these companies' total outstanding debt, including corporate bonds and loans, exceeded USD 400 billion. With this new influx to non-investment grade debt market, non-investment grade bond spreads increased 200 basis points in only 2 months to 450 basis points in May 2005, and as the shock was gradually absorbed, the spreads settled down to some extent and fell below 300 basis points by August 2005 (S&P Global Ratings, 2018b).

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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 31 December 2018. 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 83 842 bond issues from 114 countries. When tranches under the same bond package is counted as a single issue, this figure reduces to 66 477.

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 2018 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 2000-2018 period are based on 38 818 bond issues from 101 countries and those covering the 1980-2018 period are based on 60 712 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 2018. 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 15 024 bond issues in the US by companies from the United States (88%) and 58 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-investment or investment grade bonds and therefore are excluded from covenant protection index calculations to ensure that they do not unnecessarily distort the index.

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