Analytics Insights

# Covenant Insights

## Considering quantitative approaches to bond covenant scoring

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## Introduction

Bondholders' understanding of the protection offered by the provisions within bond indentures (covenants) is of high importance for a thoroughly-informed investment decision.

Covenants are often utilized to enhance the attractiveness of the risk characteristic to the high-yield space beyond the yields themselves, with tighter covenant packages that restrict issuers from engaging in behavior that could potentially deteriorate their creditworthiness.

This study conducts a literature review centered around the effects of covenant packages in the investment process. It contains sample analyses of covenant packages found in two universes defined by broad fixed income indexes (USBIG and HYM) based on data from the Mergent Fixed Income Securities Database.

Covenants are written in complex legal language and require significant efforts in terms of information processing and comparability. Therefore, a simple summary of covenant-related information, such as a score, is a very helpful approach to gaining a high-level understanding on where a bond sits in terms of bondholder protection when compared to similar issues. Given the covenant data characteristics, two covenant scoring methods are proposed—a simple density-based score, and a maximum representative bond model.

# Contents

# Motivation

The degree of protection offered by bond covenants does play a part in the investment decision process, as highlighted by findings discussed in the Literature Review section. The analysis of covenant packages is very manual in nature, and requires specialist subject matter expertise and a thorough understanding of the legal provisions for proper interpretation. Processing the covenant-related information within a bond indenture or prospectus can become a very time-intensive task, further compounded by the complexity of varying levels of disclosure historically, geographically and growing corporate issuance.

Translation of these provisions into quantifiable measures can facilitate the mitigation of this—Yield Book propose a score to assess the covenant strength of a particular bond relative to a benchmark universe (e.g. defined by investment-grade/high-yield quality or sector). Example formulations of such a quantitative mechanism are showcased in the Toward a Bond Covenant Scoring Method section. There are many possible choices when it comes to quantifying this information; the ones illustrated in this report include a transparent density-based score, and a score measuring the similarity of a particular issue to a (virtual) maximum representative bond. Both scoring methods can make use of peer group definition through sector and high-yield/investment-grade quality, and potentially other characteristics by which grouping is desirable.

# Literature Review

A strong covenant package is an effective protection for bondholders—for example, event-related restrictions are critical to bond value preservation [1]. Moreover, adequate protection can also reduce the consequences of fundamental credit deterioration, especially by mitigating the risk of subordination. Covenants also protect bondholders in the context of risky decisions taken by equity stakeholders and management (e.g. as incentivized by credit quality deterioration) through limiting such opportunities, or (at least) by allowing bondholders to assess whether consenting to such actions is beneficial [1]. More commentary around the role of covenants, including descriptions and example analysis, can be found in [2]. The intense pressure companies face to reward shareholders may bring behavior often detrimental to bondholders. **Event risk** is one of the contexts in which covenants are crucial.

While issuers may argue that stronger covenant packages can impair strategic flexibility, it is possible that event risk and de-capitalization covenants (**restricted payments**, **change-of-control**, **dividends**, and others), presented in [1] as the most important, can be included without adverse effects in terms of liquidity access or flexibility [1].

In response to the mentions and covenant strength mapping grid presented in a request for comment [1], the **Association of British Insurers** (ABI) confirms that covenants play a very important role in bondholder investing decisions, and highlight that protection in case of event-risk affects both primary and secondary market investment processes [3]. ABI also adds that there should be no distinction between rating categories or security types subject to a covenant analysis, but hints that certain sectors might need to be prioritized due to vulnerability or prevalence of private equity. It is interesting to note, though, that some members consider that the high-yield space is particularly important to be covered by such analysis. *All in all, ABI's point of view is that such an analysis allows investors to navigate more efficiently original documentation [3], and the greater disclosure and clarity at time of issuance plus the greater ease of cross-market comparison should also be to the benefit of issuers, reflected in the pricing of the debt that they bring to market [3].*

The **Association of Corporate Treasurers** (ACT) assumes the issuer's position in their response, and states that a third party covenant analysis can help avoid misunderstandings between lenders and borrowers [4]. Within the investment-grade space, they consider that the impact of covenants is severely limited relative to more important factors such as business performance, free cash flow generation, [and] management capability [4]. ACT adds that the covenants covered by the proposed mapping grid are certainly not suitable for the investment-grade space, but only for high-yield, project finance, or bankruptcy remote vehicles. Moreover, they consider that covenants (except the event risk put) add nothing to the prospects of recovery in many instances of corporate failure [4], and could even hurt these prospects by over-complicating the process. In their view, it can be determined whether covenant packages have a direct effect on bond pricing by studying the negotiation between borrowers and lenders during the issuance process.

Regarding investment-grade issuers, management might be restricted by a strong covenant package to such an extent that both bondholders and shareholders would suffer, with this reduced financial flexibility possibly impacting the overall credit rating as well. In conclusion, ACT considers that commentary on the general covenant package might be helpful in the case of high-yield or highly leveraged issuers, but are skeptical of the grid mapping method proposed in [1] within the investment-grade space. In [5], the authors go through the shortcomings of existing covenant packages within the investment-grade space, and propose model covenants constructed with both adequate bondholder protection and issuer flexibility in mind.

Given that the high-yield space does indeed imply higher risk to investors, the protection delivered by means of covenant packages has to be improved when compared to investment-grade issuers. [6], [7] offer insight on the covenant structure specific to the high-yield universe, including detailed descriptions. **Western Asset** confirms that it's critical for high-yield investors to have a thorough understanding of the covenants [8], and highlights covenant analysis as a component of their investment process. They consider that the first thing to note about the structure of the bond is its seniority—certain covenants, such as the **limitation on liens** and **limitation on indebtedness** further define and protect the place in the capital structure. Western Asset offers a list of what they consider to be the key covenants for high-yield issues—additional commentary is available in [8]:

- **Limitation on indebtedness**. This type of covenant imposes restrictions on incremental borrowing beyond a certain level. Additionally, secured debt can also be limited in order to preserve the bond's place in the capital structure. Carve-outs that elude these limits are typically present in the indentures.
- **Limitation on restricted payments**. This covenant addresses the bondholder-shareholder conflict, limiting the power of the latter by protecting asset coverage for bondholders through restrictions on cash outflows, acquisitions, investments, and dividends.
- **Limitation on liens**. This covenant addresses event risk (can support recoveries in case of default), and protects the bond's place in the capital structure. It may include permitted liens that may subordinate a new bond issue, and typically allows for existing bank credit facilities to be secured. In the investment-grade space, this covenant usually comes in the form of the negative pledge, and is typically the single meaningful covenant. Carve-outs and definitions have to be clearly understood for these covenants as well.
- **Limitation on asset sales**. This covenant dictates the issuer to reinvest the proceeds of asset sales or offer to pay back bondholders, usually within a 365-day timeframe. Exceptions can also be included, thereby weakening the covenant.
- **Change of control**. While simple in theory (allowing holders to put the bond at 101 in case of change in ownership/control), this type of covenant can include conditions such as carve-outs for permitted holders. The events that trigger this covenant must be understood thoroughly—for example, in certain cases, it might not be triggered unless the change of control is followed by a rating decline, or when the company acquiring the high-yield issuer is public.
- **Reports**. Important for 144A bonds—these are not registered by the SEC and do not require the issuer to file financials on EDGAR. In this case, the reports covenant enables the lenders to access financial information, and typically sets a limit of 45 days after the end of a quarterly period and 90 days after the end of an annual period for the issuer to provide.
- **Mergers**. This covenant allows mergers only if the issuer is the surviving entity and continues to observe the indenture, or if the old bonds and terms of the indenture are assumed by the surviving corporation. Another condition is that the combined company is not in default and does not breach the debt incurrence test in case of taking on an additional $1 of debt.
- **Events of default**. Under this covenant, an event of default could be: bankruptcy of issuer or material subsidiaries, failure to make interest or principal payments, not filing financial statements on time, or a legal judgment against the company in excess of a certain amount. Typically, this type of covenant allows for a grace period in which the issuer can address the problem—if not addressed, an actual default occurs and the bonds are immediately due. The trustee is responsible for monitoring covenant breaches and declaring events of default; it is, however, common for a group of >25% of bondholders to be able to declare a default.

- **Other covenants**. The following less frequently employed covenants may or may not be critical in the investment decision process: covenant suspension, amendment/consent solicitation, inter-creditor agreement, anti-layering, limitation on dividends of restricted subsidiaries, designation of unrestricted subsidiaries, future subsidiary guarantees, and transactions with affiliates.

Covenants are a key component of the risk profile of a high-yield bond—investments are typically driven by the fundamentals, credit characteristics, and company valuation, but covenant packages can make the difference between valuable or undesirable investments [8]. Table 1 gives a high-level overview of the differences between investment-grade and high-yield issues in terms of covenants.

**Table 1: Structural and Covenant differences between IG/HY issues. Source: Western Asset [8]**

| | Investment Grade | High Yield |
|---|---|---|
| **Security** | Unsecured | Typically unsecured |
| **Subsidiary Guarantee** | Typically no | Usually |
| **Typical Maturities** | 5-30 years | 5-10 years |
| **Callable** | Non-callable | Callable at par + ½ coupon |
| **Financial Covenants** | None | Incurrence |
| **Other Covenants** | Negative Pledge only | Restricted Payments, Leins, Asset Sales, Merger, etc. |
| **Public Filings** | Yes | Only if registered securities |

It is important to note that, even if investors are actively lobbying for increased covenant strength, there are factors (e.g. global liquidity, the credit environment) that can, at times, render these efforts ineffective [1]. Another aspect to take into account is that the presence of certain covenants tends to be cyclical and often lags the very concerns they are meant to address [1]. Additionally, exceptions and carve-outs can alter the strength of covenants to the extent of making them irrelevant—a good example is the **negative pledge**, probably the most common covenant, in case of which liberal allowances such as carve-outs for bank borrowing or subsidiary borrowing significantly hinder its effectiveness [1]. In order to offer more protection, **sale of all (or substantially all) assets** covenants can be included in the indenture. Note that, along with the **restrictions on mergers** provisions, these rarely offer adequate protection due to important exceptions and large carve-outs. Another important protection, especially in the context of a leveraged buy-out, is the **limitation on debt incurrence**—in this case, the definition of debt covered by this covenant is important [1]. The **limitation on sale/leaseback** covenant can also be subject to carve-outs, such as allowing transactions that do not trigger the negative pledge clause.

Some indentures might specify that, should the issuer receive an investment-grade rating, certain covenants may be suspended [1]. Issuers have incentives to offer looser bondholder protection—it is then left up to the investors to push back on their efforts and ensure an adequate covenant package. There is clear evidence in which investors were able to influence the covenant language [9]. In [9], **Covenant Review** analyzes the inclusion of “no premium on default” language in bond indentures—this allows for issuers to breach covenants without bondholder consent or paying any premium (as in make-whole redemptions), and only allows the investors to put at par or accept the credit erosion.

The Southern District of New York has ruled against this argument, enforcing a redemption premium. However, in [9] it is shown that there are indentures that include remarks that allow the issuers to avoid the court ruling, therefore altering the consequences of breaching covenants. Covenant Review sees this issue not only as a make-whole premium problem, but as the "beginning of the end of bond covenants" [9], and as "the single worst change to ever emerge in corporate bond indentures"—note that, in a typical year, covenant breach consent fees and make-whole redemption premiums amount to hundreds of millions of dollars, in both high-yield and investment-grade spaces. It is up to the investors to reject deals that include such language in the indentures, and there are instances of their efforts leading to the elimination of these remarks.

Clearly, covenants do play an important role in investment decision processes and are meant not to only assure that borrowers are able to pay on time, but also motivate them to act in the interest of bondholders and sanction breaches. Therefore, a thorough understanding of covenant packages is required in order to make an informed decision. Given the complexity of covenant language, investors face contractual and information processing costs when conducting a proper analysis. These costs can be mitigated by looking at issues with similar covenant strength—this approach is discussed in [10], a thorough analysis that looks at similarity both between a bond and its peers, and on a time-series basis for particular issuers. For consistency purposes, the segmentation proposed in [10] slices the data in two dimensions: by sector and by high-yield/investment-grade category—this is similar to the scheme used in our covenant scoring strategy described in the Toward a Bond Covenant Scoring Method section. Covenant strength similarity, according to [10], seems to drive lower yields at issuance—a one standard-deviation increase in similarity to peer bonds is associated with a reduction of 0.12% in spreads. Given the average principal value and maturity of the bonds used in the analysis, this difference translates to around $4 million in interest savings over the bond lifetime [10]. The reason for this negative correlation might be that similarity brings lower contracting and comparability costs. Furthermore, it is found that the similarity in the most complex covenants (restricted payments, limitations on debt, and asset-transaction limitations) drives the yield results.

In this light, one could conclude that the contracting and comparability costs of tailoring covenants potentially offset the credit risk protection benefits. Additionally, bonds with similar covenant strength to their peers display higher liquidity in the secondary markets—a one-standard deviation increase in similarity was found to bring a 6% increase in the mean bond trading volume and a 19% increase in the mean number of transactions [10]; this increased liquidity can be thought of as brought by lower information processing costs (higher comparability). Another thing to note is that highly-tailored covenant packages have not been previously interpreted, scrutinized, and enforced by the courts, therefore possibly injecting a certain degree of uncertainty should disputes arise [10].

# Sample Universe Analysis

An analysis was run on the covenants for the constituents of the FTSE US Broad Investment-Grade Bond Index (USBIG) as of the 1st of October 2020 and FTSE US High-Yield Market Index (HYM) as of November the 12th 2020. The covenant data used within this report was sourced from Mergent, an LSEG company.

The **population density** $\rho$ of a covenant $c$ is defined as $\rho^c = \frac{\#\, valid\ entries}{\#\, bonds}$. A covenant entry is considered a *valid entry* if it is marked as either a '$yes$' or a '$no$'; the rest of the entries are null.

The **presence density** (or *'yes'-density*) of a covenant $c$ is the ratio of the number of occurrences of that particular covenant within the universe and the number of bonds within the same universe $\left(\frac{\#'yes'^c}{\#bonds}\right)$. This is used in measuring the difference between different universes, e.g. newer and older bond subsets, as per the formula $\left(\frac{\#'yes'^c}{\#bonds_{new}} - \frac{\#'yes'^c}{\#bonds_{old}}\right)$.

## USBIG

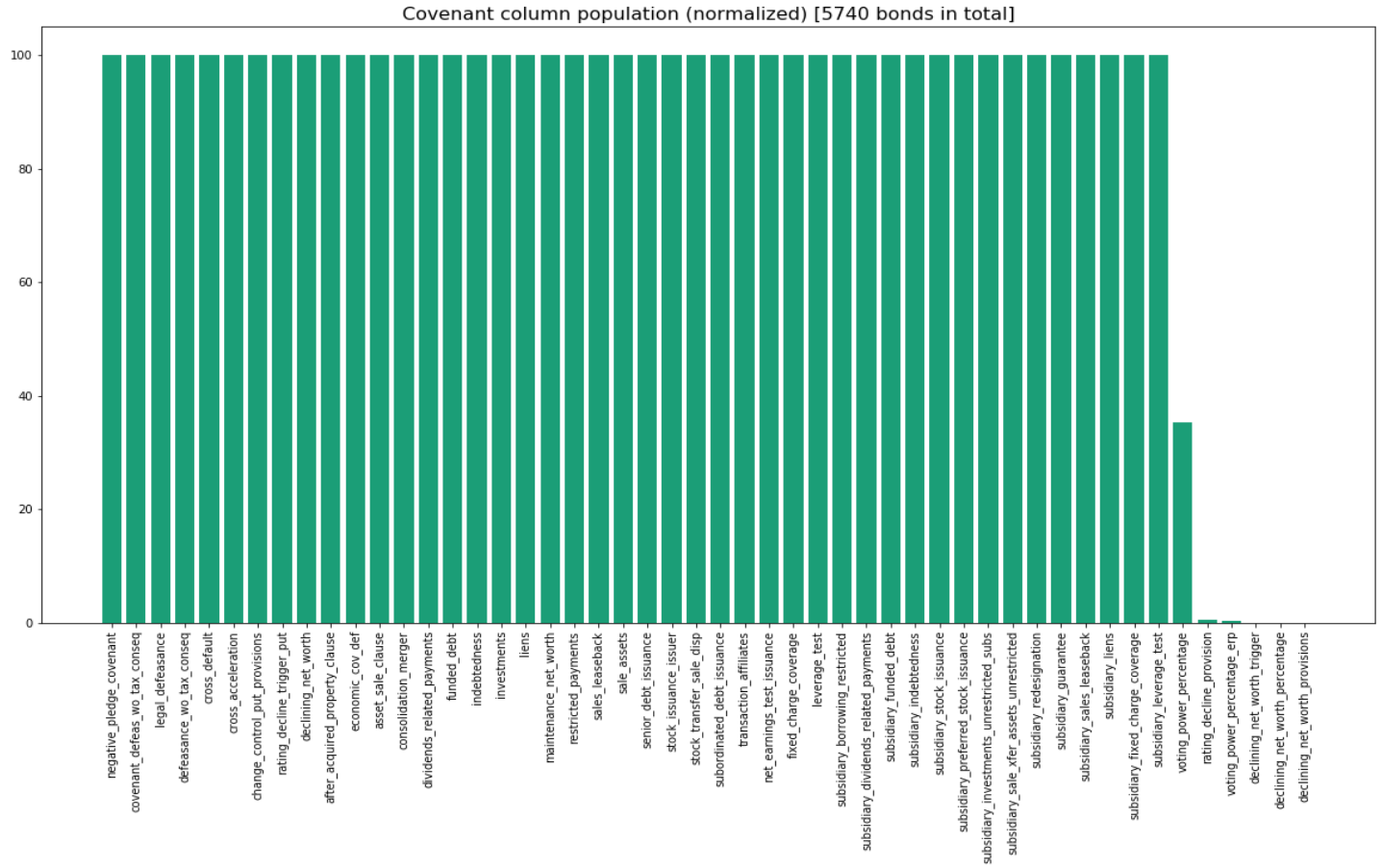
The USBIG index tracks the performance of the USD-denominated bonds in the US investment grade space. It is comprised of corporate, collateralized, government-sponsored and US Treasury debt. For the analyses below, the index as of the 1st of October 2020 was used, consisting in 7,710 bonds in total.

The covenant data covers 5,878 out of the 7,710 bonds in the USBIG index (1,832 bonds missing). Removing all sectors but financials, industrials, and utilities shrinks the data further by 138 bonds, leaving 5,740 for the remainder of the analysis.

There are no bonds for which the covenant-related information is missing completely—in fact, missing values are observed for a very restricted set of fields: voting_power_percentage, rating_decline_provision, voting_power_percentage_erp, declining_net_worth_trigger, declining_net_worth_percentage, declining_net_worth_provisions. Therefore, an assumption regarding the data quality could be made, and it is possible to place trust in most of the covenant data—especially since missing values are observed in fields that do not describe covenant presence itself, but provide additional information. Figure 1 below shows the normalized covenant column population.

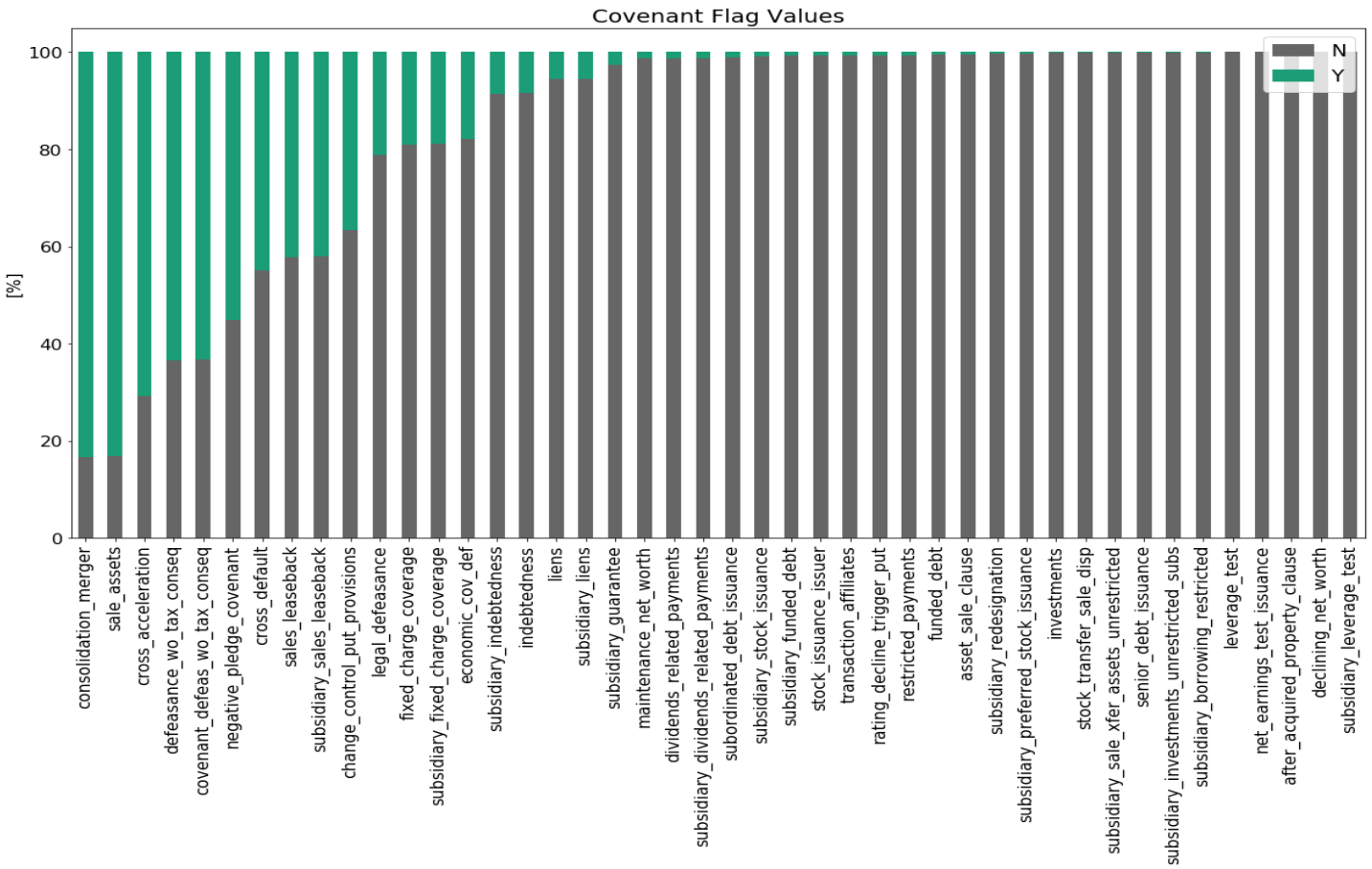
The average number of covenant fields populated per bond is 44.36.

**Figure 1: Covenant column population density, normalized (USBIG).**




The distribution of $Yes/No$ entries corresponding to the covenant fields can be seen in Figure 2. Event risk provisions are highly represented: consolidation/merger covenants, cross acceleration, and cross default; the limitations on asset sales have an important presence, as well.

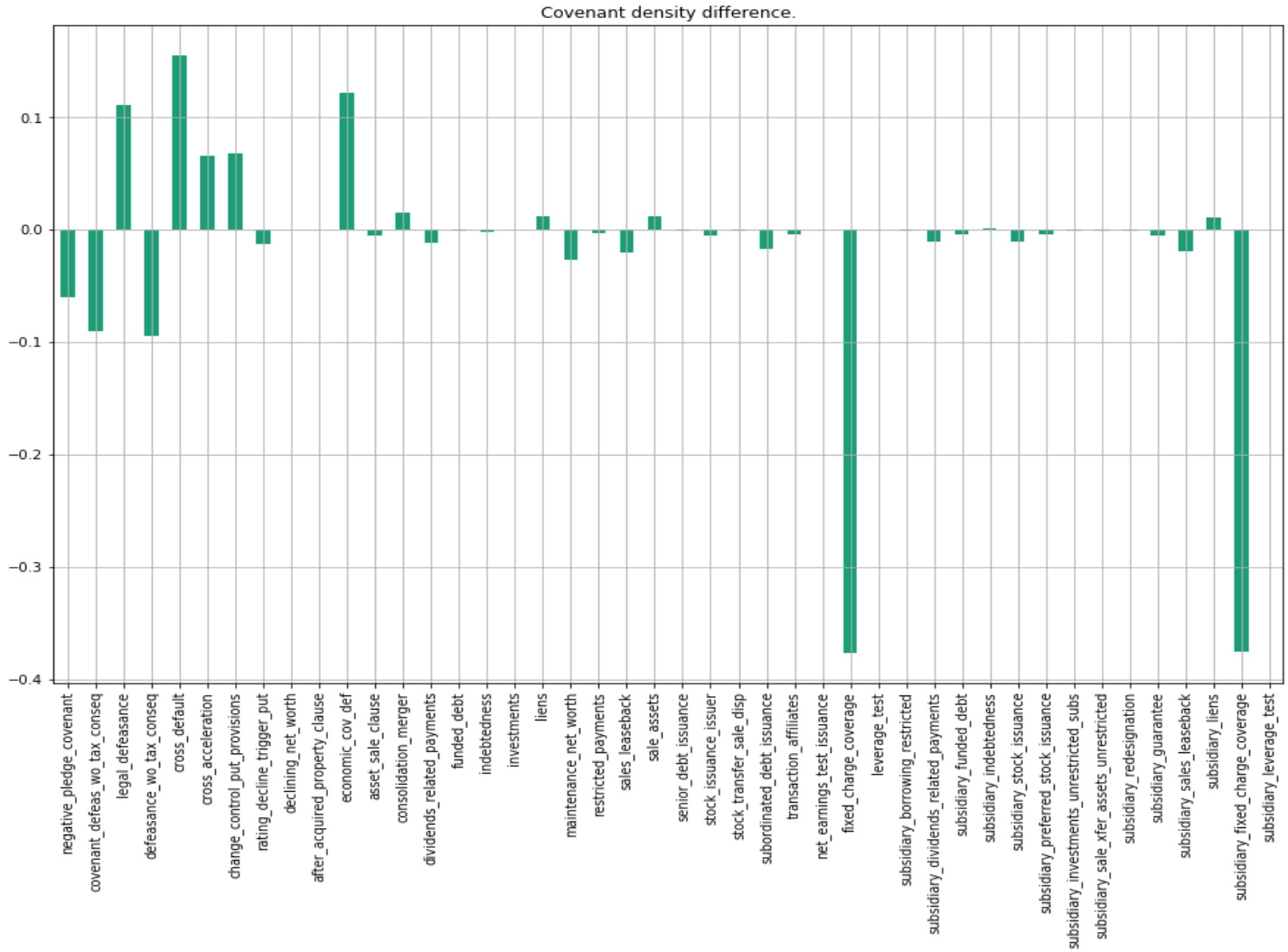
**Figure 2: Distribution of valid covenant entries, normalized (USBIG).**




A temporal view of the covenant strength was obtained by observing differences in covenant occurrence in older and newer bonds in the index, as split by the median issue date. The difference between the number of occurrences of each covenant in the new bond subset and the old bond subset is represented in Figure 3. Positive values indicate an increase in a certain provision's representation, and negative values a decrease. The issue dates range from January 15, 1991 to March 25, 2017 for the old bond subset, and from April 27, 2017 to September 29, 2020 for the new bond subset, respectively.

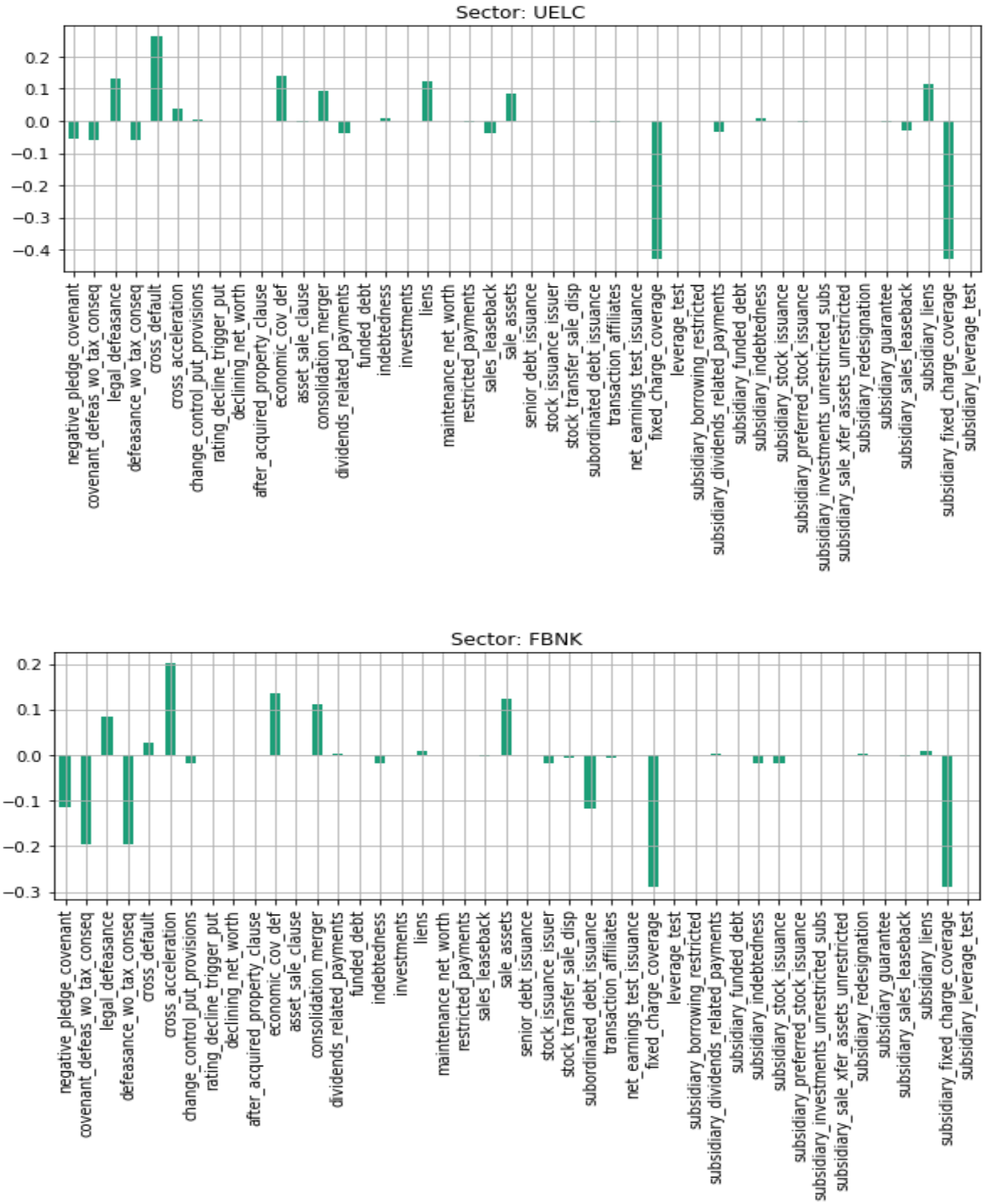
The most noticeable weakening is in the fixed charge coverage provision, for both the actual issuers and their subsidiaries. Further, fewer new issues contain negative pledge covenants, which could be considered the most meaningful covenant in investment-grade bonds [8], leaving bondholders more exposed to subordination risk.

**Figure 3: Covenant 'yes'-density difference between new/old bond subsets (USBIG).**




A sector-based view of covenant "yes"-density differences is also available, in both Global Industry Code (GLIC) and Corporate Bond Sector (COBS) code splits. For the remainder of this study the GLIC code is used, which splits the bonds in six broad categories (Sovereign, Regional, Collateralized, Industrial, Utility, Finance), each with its sub-categories. Figure 4 presents the covenant presence for Utility-Electric (UELC) and Finance-Bank (FBNK) sectors. Given that these are the most represented sectors in the broader index, the findings are generally consistent to the above analysis. Note how the FBNK sector shows weakening in the subordinated debt issuance prohibitions.

**Figure 4: Covenant 'yes'-density difference between new/old bond subsets in UELC & FBNK sectors (USBIG).**



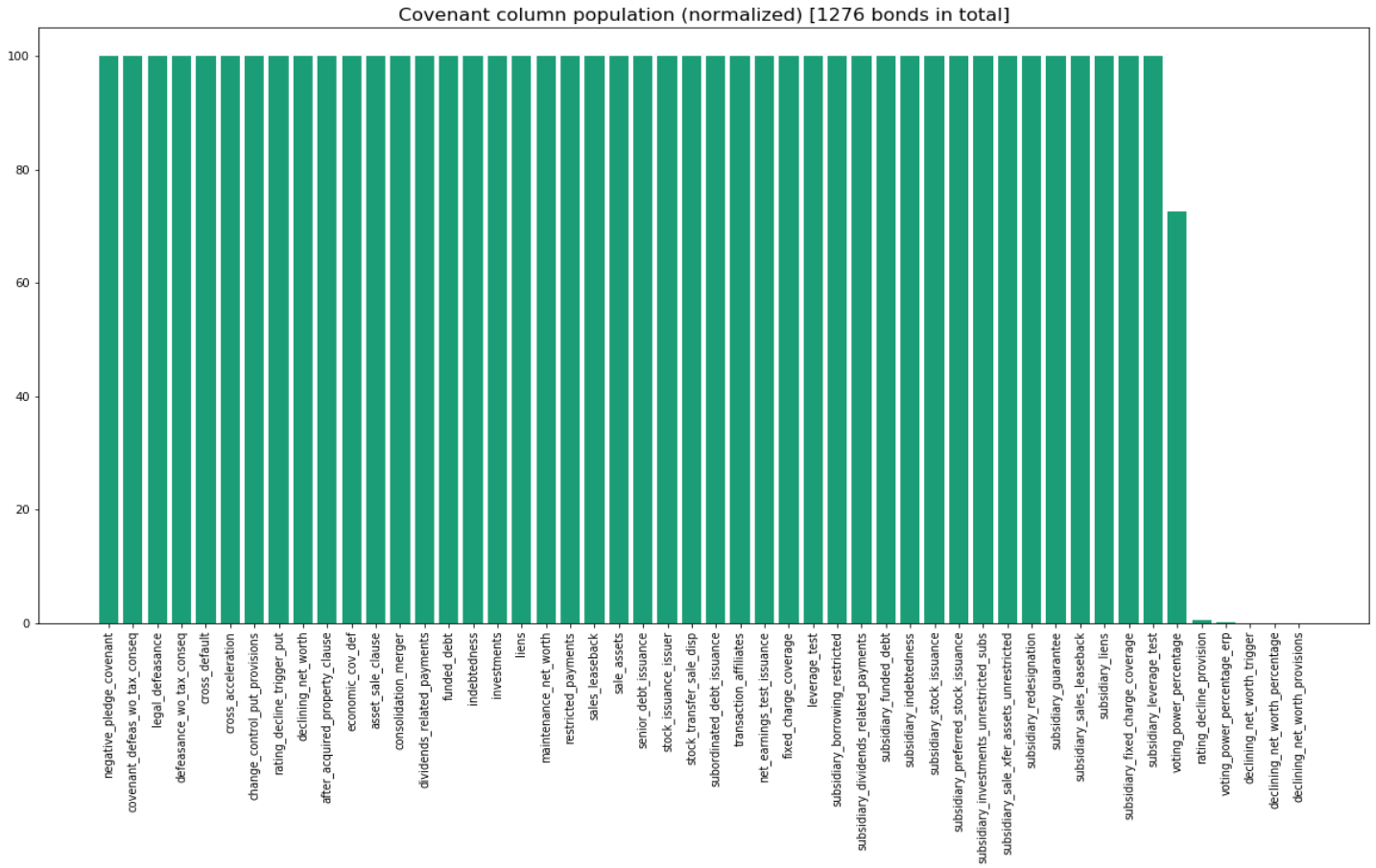
# HYM

The FTSE US High-Yield Market Index tracks the performance of USD-denominated debt issued by US or Canadian companies; it covers cash-pay, deferred-interest securities, and Rule 144A debt. The analyses make use of the HYM index as of the 12th of November 2020, consisting of 1,726 bonds. The HYM index did not contain any bonds in sectors other than financials, industrials, and utilities.

The covenant data covers only 1,276 bonds out of the 1,726 in the HYM index (450 bonds missing). As in the case of the USBIG index, out of these there are no bonds for which all covenant-related data is missing. On average, a bond has 44.73 covenant fields populated.

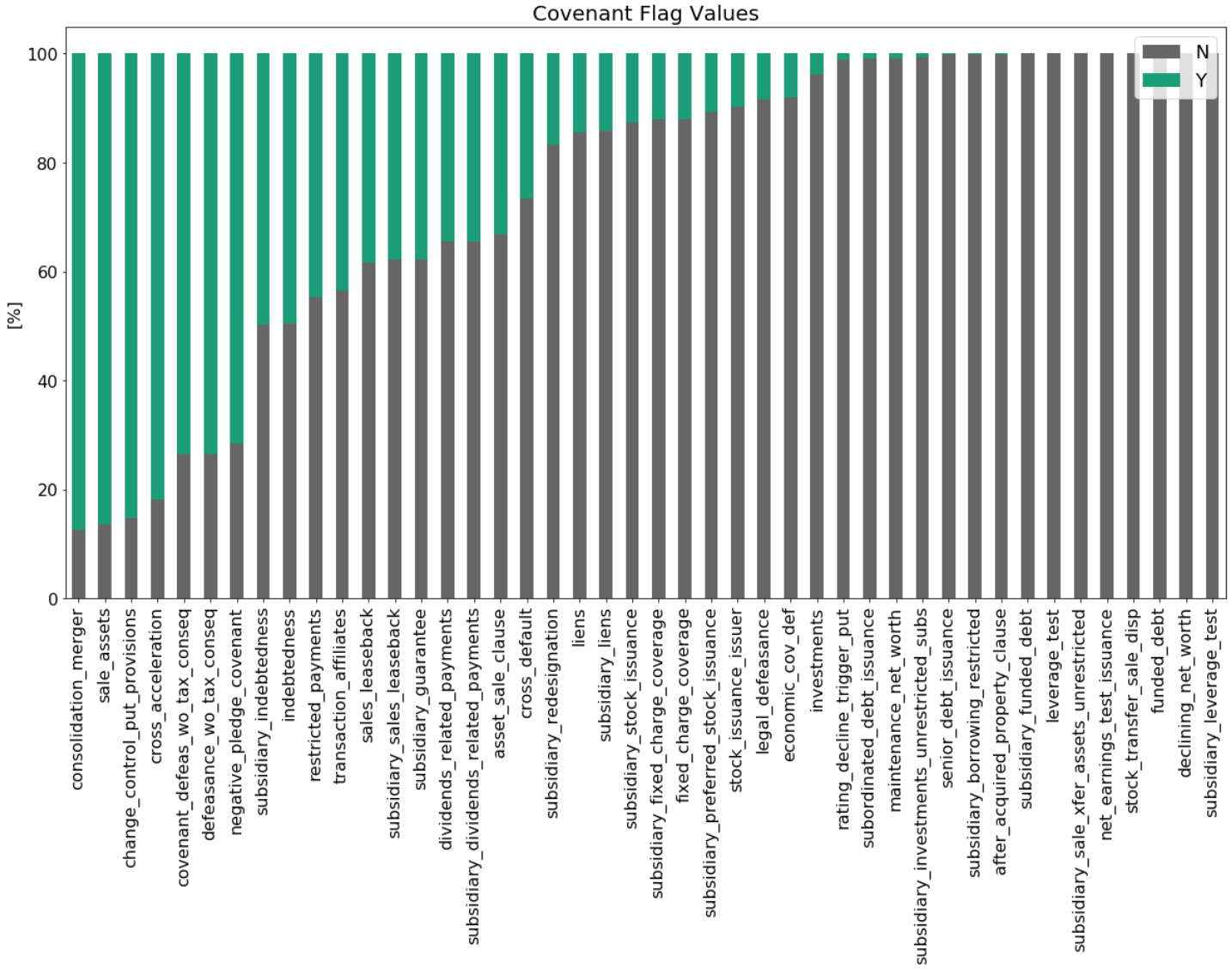
Similar to the covenant data for the USBIG index, the covenant column population is very high; the only fields that are not 100% populated represent additional information that does not describe covenant presence itself (Figure 5).

**Figure 5: Covenant column population, normalized (HYM).**



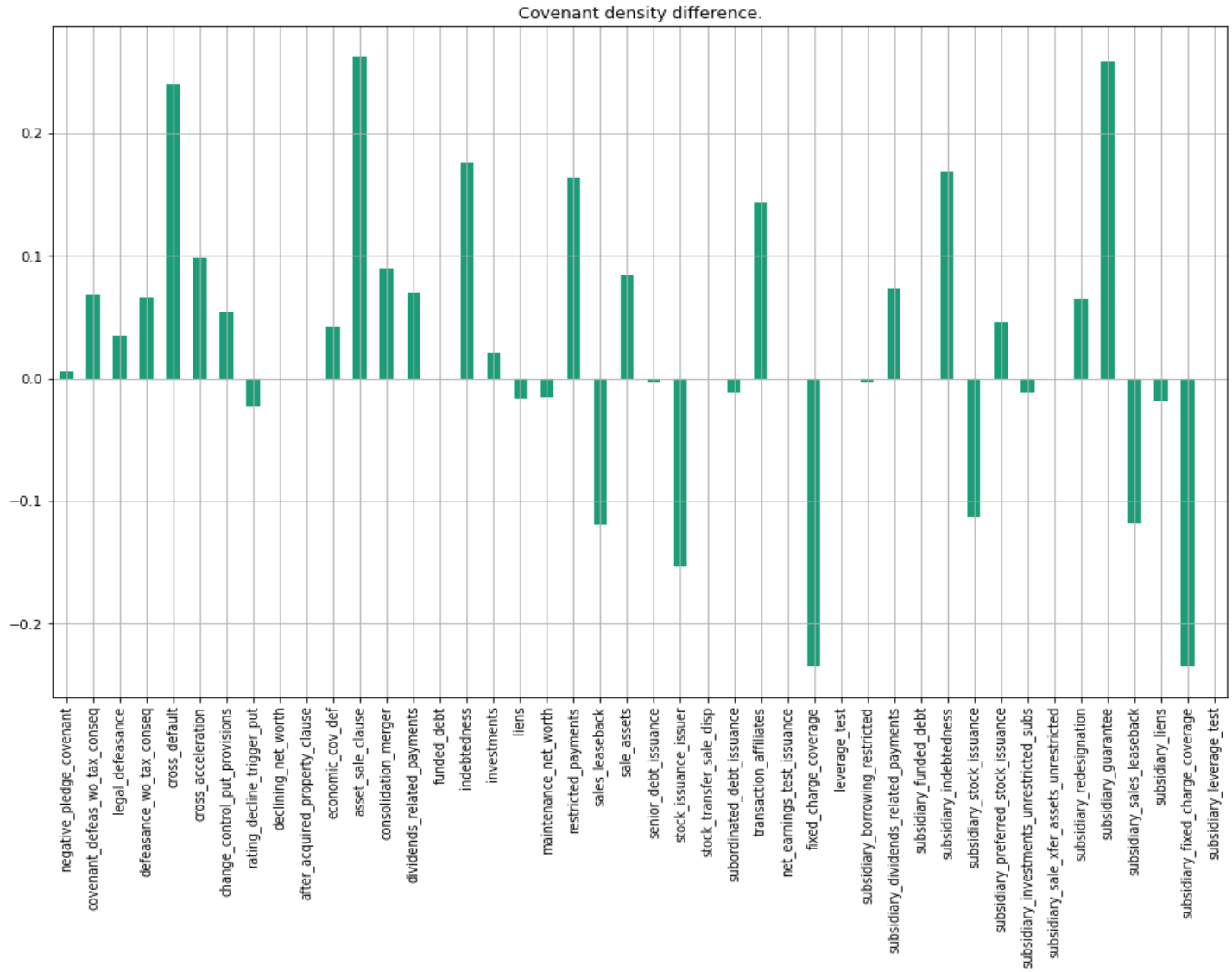

The distribution of Yes/No entries corresponding to the covenant fields can be seen in Figure 6. Note the high presence of event-risk related covenants.

**Figure 6: Distribution of covenant entries, normalized (HYM).**



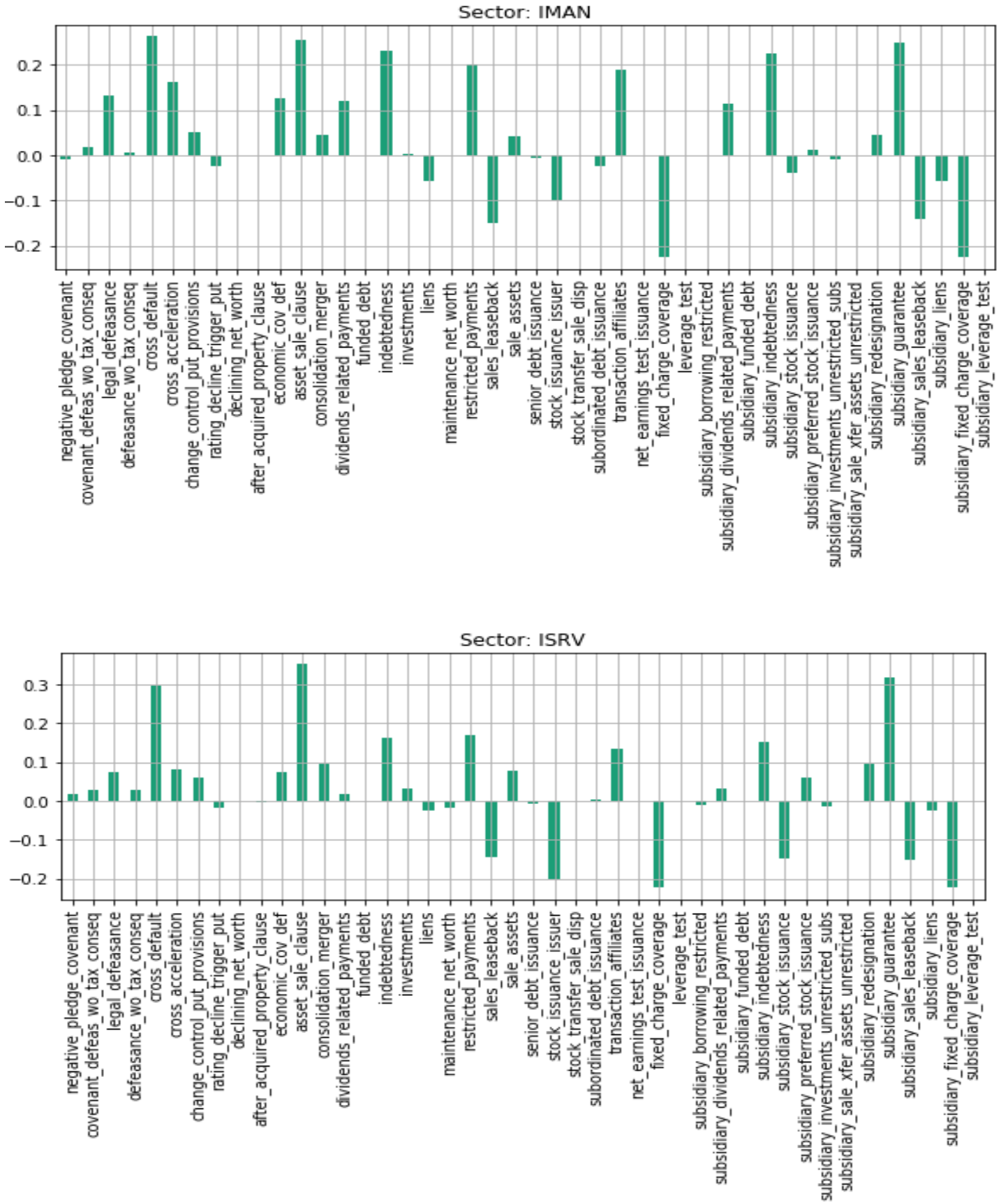

A temporal comparison of the covenant strength was obtained by splitting the HYM composition into two subsets according to the median issue date. The resulting subsets range from June 30, 1995 to July 6, 2018, and from July 11, 2018 to October 29, 2020 respectively. The differences in covenant "yes"-densities between the new and old bond subsets are found in Figure 7. There is a significant drop in fixed charge coverage and stock issuance provisions (for both the issuer and its subsidiaries), along with weakening leaseback limitations. On the other hand, there is strengthening related to asset sale, indebtedness, and restricted payments covenants.

**Figure 7: Covenant “yes”-density difference between new/old bond subsets (HYM).**




The same kind of analysis can be carried out on a per-sector basis, as in Figure 8. For the high-yield index, the highest represented sectors are Industrial-Services (ISRV) and Industrial-Manufacturing (IMAN). Within both sectors, the cross default provision is more represented in the newer bond subset, and the fixed charge coverage is less likely to be included in newer issues.

**Figure 8: Covenant "yes"-density difference between new and old bond subsets in IMAN & ISRV sectors (HYM).**



# Toward a Bond Covenant Scoring Method

## Overview

It is possible to construct statistical covenant scores using the same data as in the analyses presented in the Sample Universe Analysis section. Keep in mind that most of this data takes the form of binary flags indicating the presence or absence of a certain covenant from a bond prospectus.

The covenant scores are ideally split by universe type (investment-grade or high-yield) and sector—the Sample Universe Analysis indicates large differences in covenants and their evolution when compared across these categories.

The following are suggestions regarding ways such scores can be built. These scoring methods have to be carefully **placed within a time frame**: for example, the weights of a certain covenant within a universe could be re-computed each year, or they could be fixed on a decided-upon snapshot.

### Simple density-based score

Let $BU$ the bond universe of interest. A suggestion is to define these universes of interest based on the quality (investment-grade/high-yield) and sector, as per the GLIC or COBS code. First, "$\mathrm{yes}$"-density based weights within universe $BU$ for each covenant $c$ are computed as follows:

$$w_{BU}^{c} = \frac{\#'yes_{BU}^{'c}}{\#\ bonds_{BU}}$$

The simplest model using such weights can assign a bond $b$ (similar to the ones in $BU$ by universe type and sector) a covenant score of the following form:

$$CovScore_b = \sum_c w_{BU}^{c} * cov_b^{c}, \text{ where}$$

$$cov_b^{c} = \begin{cases} 1, & if\ bond\ b\ has\ covenant\ c \\ 0, & otherwise \end{cases}$$

The assumption made is that the more represented a certain type of covenant is within universe $BU$, the higher it affects the scoring. Therefore, adding or removing a rarely-seen covenant to a bond will not influence the score significantly. This can be an advantage or a disadvantage depending on the reason behind the scarcity of that certain covenant—do the investors not care about it, or is it too restrictive for the issuer? This is an argument for injecting domain-specific knowledge into the model.

### A maximum representative bond model

For a bond universe $BU$, it is possible to build a *maximum representative bond* ($RB$), with covenants set to match the most popular covenants within $BU$ according to a certain threshold. Note that, in this context, *maximum* emphasizes that this virtual bond has **all** covenants that are found within $BU$ with a "$\mathrm{yes}$"-density higher than the threshold. For example, $RB$ might be a bond containing only the covenants with a "$\mathrm{yes}$"-density higher than $0.3$ within $BU$. Therefore, a bond $b$ might be scored in the following manner:

$$CovScore_b = \sum_c w_{BU}^c (cov_b^c - cov_{RB}^c)$$

It is possible to drop the weights from the above model; the result is that the impact of the covenant deviation of $b$ from $RB$ is fixed across all covenants:

$$CovScore_b = \sum_c (cov_b^c - cov_{RB}^c)$$

There are other ways in which to measure the difference between a bond $b$ and $RB$, such as the Jaccard distance or the Hamming distance.

## Practical Example

The covenant strength scoring schemes previously described were applied to the USBIG and HYM indexes (section Sample Universe Analysis showcases a detailed assessment of the corresponding covenant data). The same processing was applied (i.e. only Financial, Industrial, and Utility sector bonds were kept) for the application of covenant scores. Note that the scores are defined relative to a peer group, defined in terms of credit quality (investment-grade/high-yield). Scores computed by including the sector as a peer group characteristic, given by the GLIC or COBS codes, are also available. Since the constituents of the USBIG and HYM indexes were analyzed separately, the credit quality grouping is implicit in this analysis. Both weighted and unweighted versions of the maximum representative bond scores are shown.

The covenant density threshold used for building the (virtual) maximum representative bonds used in order to compute certain scores was set to $0.35$; this translates into virtual bonds that contain covenants with a popularity of over 35% in a certain peer group.

### USBIG

Figure 9, Figure 11, and Figure 12 below illustrate the distribution of the density-based covenant score and maximum representative bond scores (weighted and unweighted) for the USBIG universe. In these figures, the covenant weights were computed across the entire USBIG universe (therefore not treating sectors as separate peer groups). The top view is an overall assessment, and the bottom plots in each figure showcase the scores when splitting the universe by the median issue date.

**Figure 9: Distribution of density-based score in USBIG (universally weighted).**

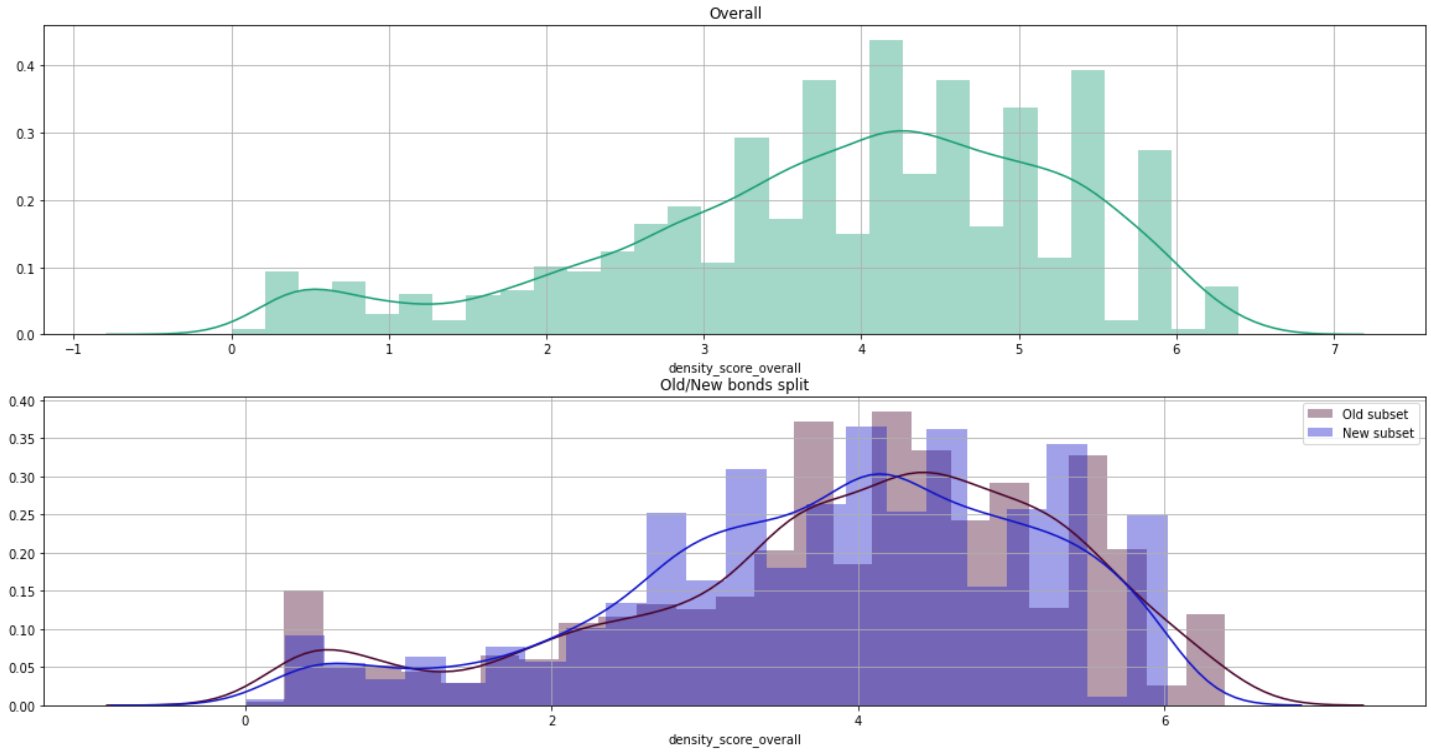



Figure 9 shows that the top-end values for the density-based score occur within the old bond subset. However, this representation does not lead to more general conclusions regarding differences between older and newer bond subsets.

On average, the highest density-based scores occur in the industrial sectors (Industrial-Other, Industrial-Manufacturing, Industrial-Consumer). Note that the Industrial-Other category is represented by only four bonds in this example. The lowest scores are observed in the Financial-Banks, Utility-Telecom, and Utility-Electric. The differences between these scores are quite large (e.g. a mean score of $4.51$ for the Industrial-Manufacturing category and of $2.36$ for bonds in the Financial-Banks sector). On average, bonds issued by companies in the Industrial sector sit between Utilities and Finance in terms of duration ($20.69$ years for Utilities, $16.9$ for Industrials, and $13.2$ years for issuers in the Finance sector, respectively). Additionally, yields are highest for financial issuers, followed by those within the utility and industrial sectors.

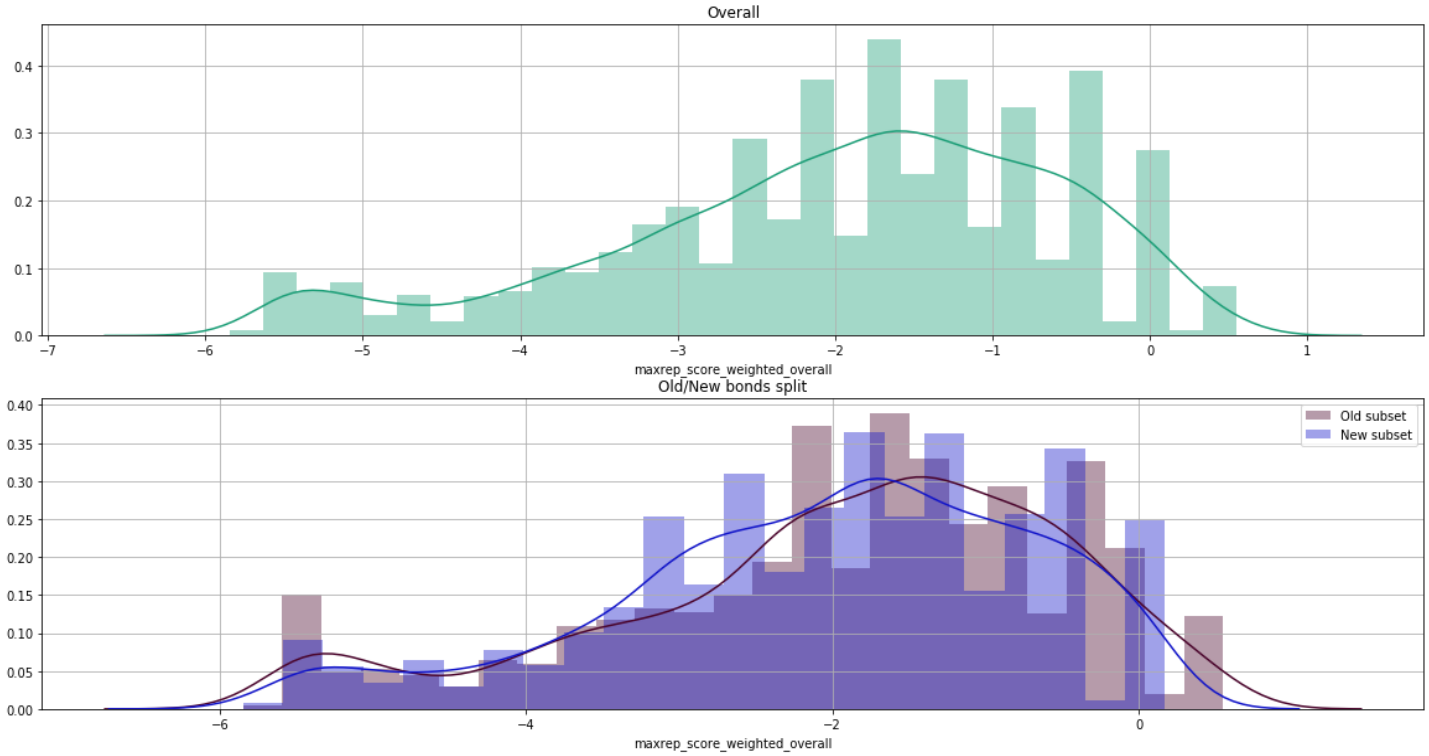
Comparing sector scores across old and new bond subsets yields interesting results. The most significant downgrade in terms of the density-based score occurs in the Industrial-Energy sector ($-16.75\%$). Finance-Insurance, Industrial-Services, Industrial-Consumer sectors also show decreases of over $5\%$. The highest increases occur in the Utility sector (Telecom $+17.85\%$, Gas $+5.4\%$, and Other $+3.33\%$), while the Industrial-Transportation sector indicates the highest consistency between old and new bonds ($-0.2\%$). The Finance-Independent and Industrial-Other results are not very interesting due to the small sample present in the index.

Among the financial sub-sectors represented in the index (Bank, Insurance, Independent, Others), banks have the lowest density-based covenant scores by far ($2.36$ as opposed to $3.65$ for issuers within the insurance space, for example, case in which this is given by a significant decrease in the negative pledge, cross acceleration, consolidated merger, and sale of assets covenants). Bonds in the Utility-Other category have a higher average score than other Utility-related bonds. Similarly, the Industrial sector demonstrates significantly higher scores in the Industrial-Other sub-category than in Manufacturing, Consumer, Service, Energy, or Transportation.

**Figure 10: Average density-based score across rating categories (USBIG).**


The assumption that covenants are stronger for lower-rated bonds is confirmed by the density-based score, as observable in Figure 10. Note that the rating categories were aggregated (e.g. BBB includes BBB-, BBB, and BBB+ rated bonds) for this figure. When investigating at a more granular level, an observable peculiarity is that the density scores are higher for bonds rated A+ than for A, and for A than for A-. Additionally, bonds rated as AA- have a higher score than the A-ones. The largest differences in the density-based score between two successive credit rating categories is found when moving from AA to AA+, and from BBB to BBB+.

**Figure 11: Distribution of weighted maximum representative bond score in USBIG (universally weighted).**

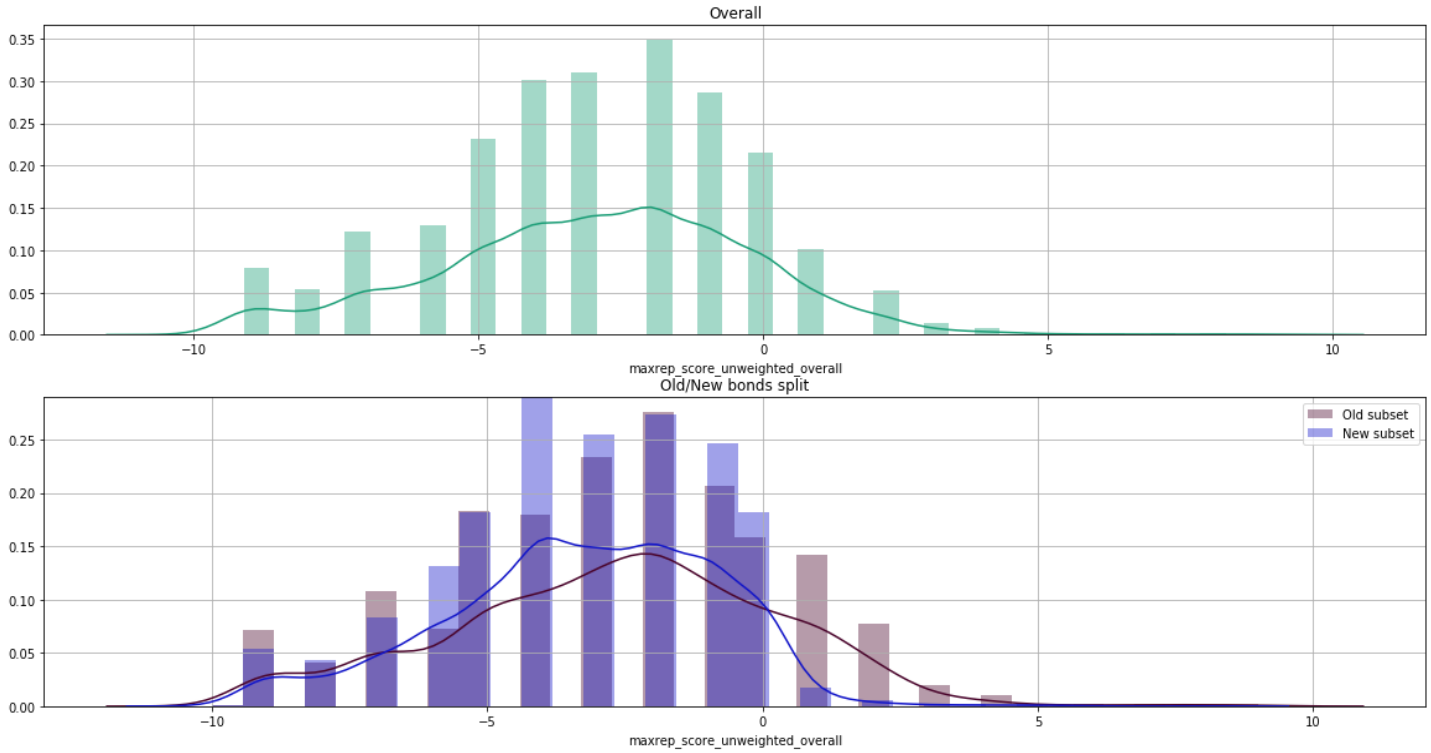



The maximum representative bond scores (Figure 11 and Figure 12) were computed by building a *virtual* bond for each sector (given by GLIC code), containing the covenants with a density higher than a certain threshold within the sector. In this particular example, the threshold is set to $0.35$—therefore, each *virtual* bond is defined as employing the covenants that occur within $35\%$

or more of the bonds in the respective sector. The weighted version of the score (Figure 11) assigns weights based on the density of each covenant within the entire USBIG universe.

Notice how most of the values are negative; interestingly, the positive values are mostly found within the older bond subset. Sector-wise, the score is consistent with the density-based one, as the hierarchy is maintained. When averaging scores across sector groups, bonds issued by financial companies are similar to issuers within the utility space ($\cong -2.4$), while industrials show stronger covenants ($-1.5$). The assumption that stronger covenants are required as the credit rating decreases is confirmed by the weighted maximum representative bond score as well.

**Figure 12: Distribution of unweighted maximum representative bond score in USBIG.**




The unweighted version of the maximum representative bond score (Figure 12) gives a clear distinction between the old and new bond subsets, as higher values are found predominantly for old bonds. When averaging across entire sectors, the difference between issuers in the Utility and Finance sectors becomes noticeable; Industrials still sit at the top, followed by Utility and Finance company bonds. The top and bottom sectors in terms of score are the same as before, but there are minor changes in the middle of the range; the Gas, Electricity, and Telecom Utility companies display wider differences, and Insurance company bonds score higher than Finance-Independent and Finance-Other issues.

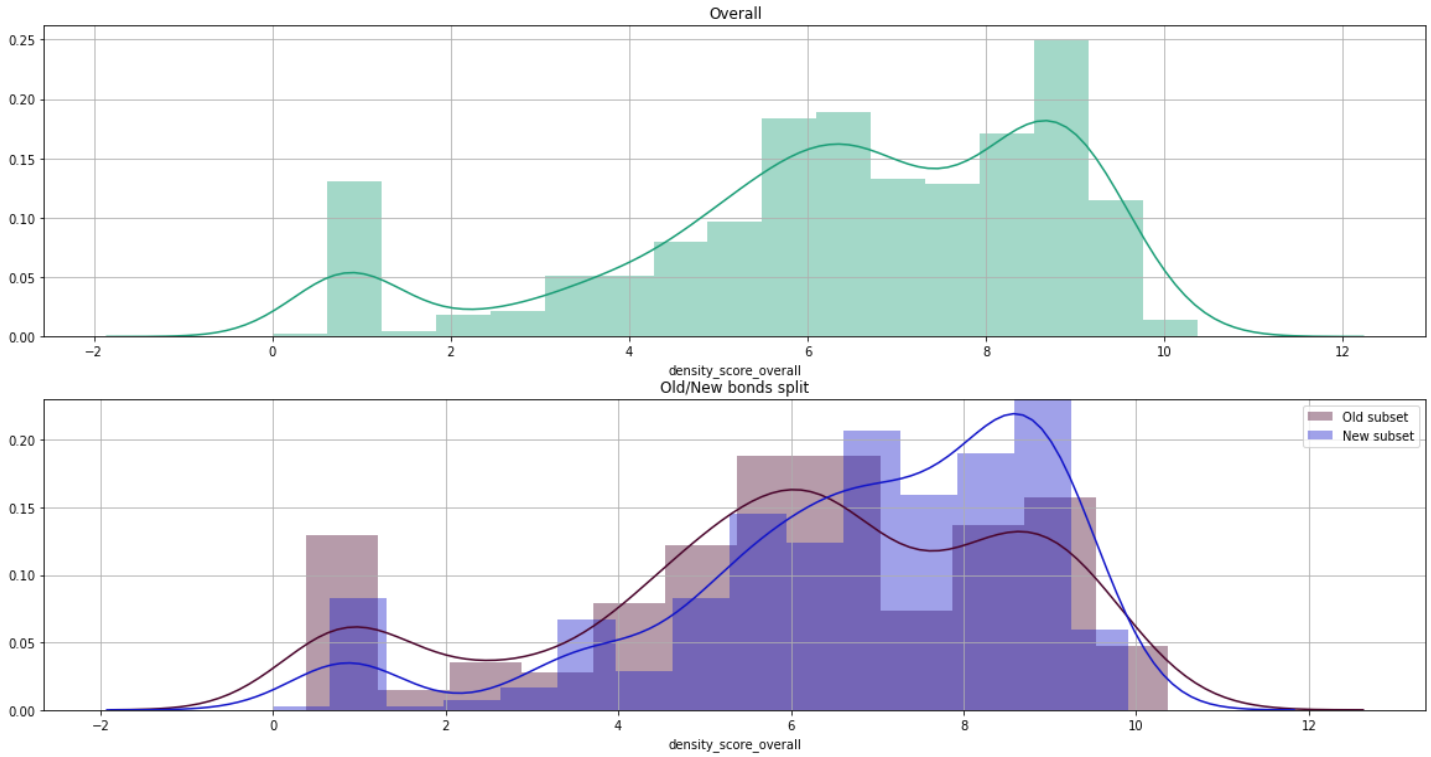
## HYM

The same variety of scores as for USBIG were computed for the HYM index. The discussion involves the scores for which covenant weights were computed based on the popularity of each covenant within the entire HYM universe, but a per-sector weighing scheme is possible as well.

The Industrial sector is a very significant part of the analyzed HYM universe subset: 1100 bonds, compared to 104 Finance and 72 Utility sector bonds. The most underrepresented sectors are

Finance-Banks (one bond), Utility-Gas (four bonds), Industrial-Other (seven bonds), and Finance-Insurance (eight bonds).

**Figure 13: Distribution of density-based score in HYM (universally weighted).**




The top three density-based scores occur for Utility-Gas, Industrial-Consumer, and Industrial-Services sectors. Since there are very few Utility-Gas bonds, it's inappropriate to draw a more general conclusion regarding this space. The bottom three density-based scores are found in Finance-Banks, Finance-Insurance and Utility-Electric sectors; note that these sectors are some of the most underrepresented in the universe, as well.

Should sectors from which there are fewer than 30 bonds in the HYM index be disregarded, the ones left are Industrial-Services, Industrial-Manufacturing, Industrial-Energy, Finance-Other, Industrial-Consumer, and Utility-Telecom. After this, the top three highest density-based covenant scores occur for issues in the Industrial-Consumer, Industrial-Services, and Utility-Telecom sectors. Utility-Telecom sector bonds sit between Industrial-Service and Industrial-Energy bonds (in terms of density-based score), but have higher average yield and duration. The Industrial-Consumer sector displays the second-lowest average yield among the entries left after removing the aforementioned underrepresented sectors. On the other hand, bonds within the Finance-Other category have the lowest average density-based score (and the shortest duration, $\cong$ 7.5 years), followed by the Industrial-Manufacturing and Industrial-Energy bonds.

Comparing the old bond subset to the new bonds in terms of the density-based score shows that, except the Utility-Other sector, covenant strength within the HYM universe has grown in time. Taking into account only the relatively well represented sectors (as above), there is no decrease in the average scores. The Finance-Other sector displays the most significant strengthening $(+43.39\%)$; the second highest covenant score in\crease occurs in the Industrial-Manufacturing sector $(14.47\%)$, and the mildest in Industrial-Energy $(3.87\%)$.

**Figure 14: Average density-based score across rating categories (HYM).**

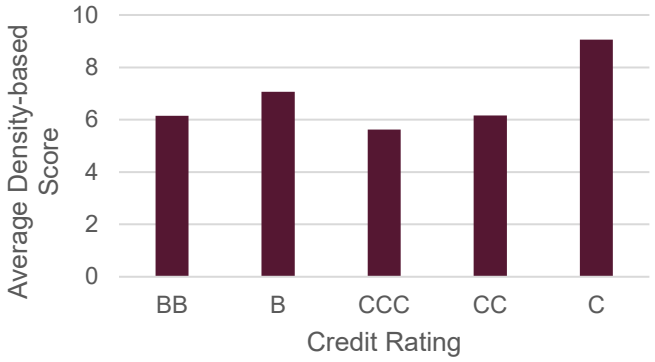
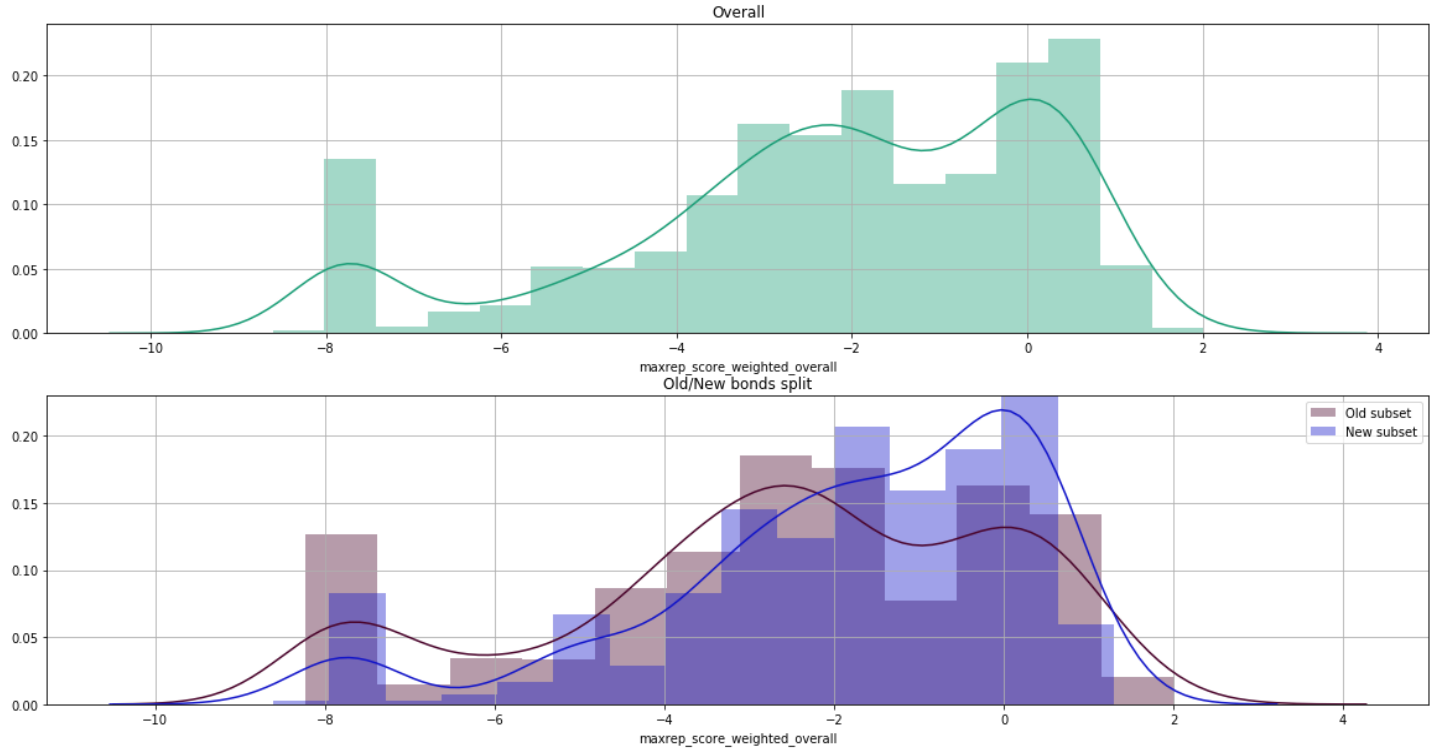


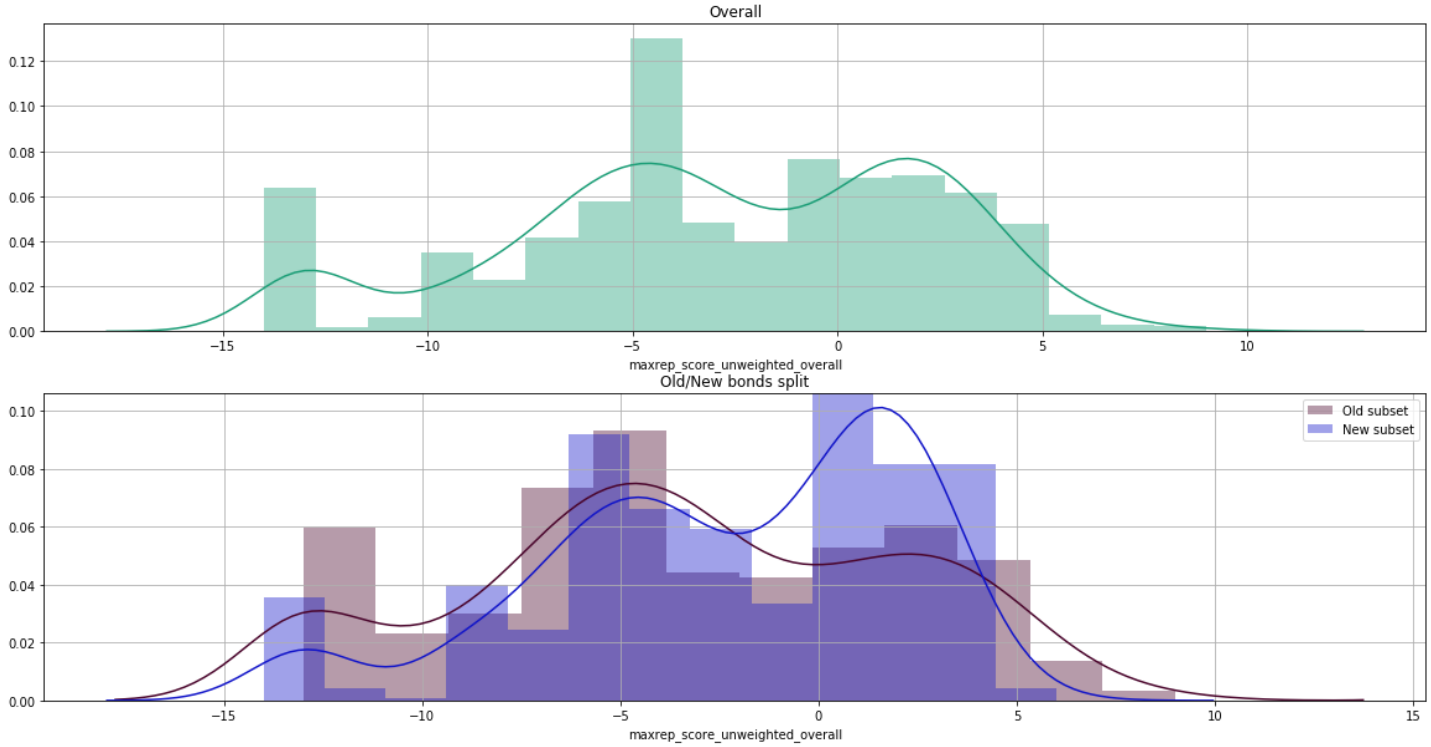

Figure 14 shows the average density-based score across credit rating categories. As before, these were aggregated (e.g. B+ and B- are included in B in the figure). There were only 2 bonds within the C category, and 12 rated as CC; as the sample is very small, it is not advisable to draw conclusions for these two categories. An interesting observation is that the 112 CCC-rated bonds have an average density-based score lower than B and BB-rated ones. It seems that, out of these 112 bonds, only 32 were rated CCC+ at issuance—the rest were considered to be of higher quality (B- and above). This might be an indication that the CCC bonds offer weaker protection than higher-rated bonds, an aspect which might have contributed to their lower ratings.

**Figure 15: Distribution of weighted maximum representative bond score in HYM (universally weighted).**




The weighted maximum representative bond score (Figure 15) delivers the same sectorial hierarchies as the density-based one discussed above, both in the original setting and when ignoring underrepresented sectors. The credit rating view of the maximum representative bond scores is consistent with the one for the density-based scores as well.

**Figure 16: Distribution of unweighted maximum representative bond score in HYM.**




The unweighted version of the maximum representative bond score (Figure 16) brings minor changes in the sector-averaged view: the Industrial-Transport sector shows higher values than Utility-Other, and Financial-Insurance overtakes the Utility-Electric sector. When looking across credit rating categories, the overall picture is very similar, with the mention that differences in average scores between certain ratings are more significant (e.g. between C and CC, or B and BB) than in the case of the weighted version of the score.

# Closing Remarks

As the legal provisions included to protect bondholders against potentially creditworthiness deterioration of the borrower are a complex matter in which a high degree of expertise is required, this study aims to (1) offer insight on how these covenant packages affect investment decisions following a literature review, (2) illustrate covenant structure within two indexes as an example analysis, and (3) bring forward two transparent bond covenant scoring mechanisms with the objective of summarizing high amounts of legal jargon into quantitative metrics so as to facilitate quick comparisons.

The Literature Review section delivers an overview of the purpose and effect of covenant packages. While there are various views regarding the importance of each type of covenant within a certain context (e.g. investment-grade or high-yield space, or a sector), evidence of covenant analysis included as part of the investment decision process is presented. Additionally, covenant comparability across bonds is discussed, highlighting the trade-off between the degree of protection brought by a tailored covenant package and the information processing costs.

A discussion around the covenants included in bonds belonging to the USBIG and HYM indexes is offered in the Sample Universe Analysis section, including a view of the covenant differences between older and newer bonds in each index.

Two bond covenant scoring mechanisms are proposed in the Toward a Bond Covenant Scoring Method section. Taking the characteristics of the available covenant data into account, the scores are built based on covenant occurrence, as described by binary flags. These scoring methods were employed on the constituents of the aforementioned indexes, and brief observations were made regarding the observed values. Some key findings highlighted below:

**USBIG**

- Top three scores occur in the Industrial sector, with the bottom three scores found in the Utility and Finance sectors. Industrial bonds also display the lowest yield on average.
- Bank bonds show significantly lower densities for negative pledge, cross acceleration, consolidation and merger, and sale of assets covenants compared to insurance company bonds.
- The most significant decrease in the density-based covenant scores between older and newer bond subsets (split as per the median issue date) occurs in the Industrial-Energy ($-16.75\%$) sector, followed by Finance-Insurance, Industrial-Services and Industrial-Consumer sectors. Conversely, the highest increase was found in the Utility-Telecom ($+17.85\%$) sector, followed by Utility-Gas and Utility-Other.
- The density-based covenant score is generally higher for lower-rated bonds, with some minor inconsistencies.
- The weighted maximum representative bond score is consistent with the density-based score; the unweighted version does bring small changes in the per-sector hierarchy around the middle.

**HYM**

- After discarding underrepresented sectors ($< 30$ bonds), the highest density-based scores occur in the Industrial-Consumer, Industrial-Services, and Utility-Telecom sectors. Conversely, the lowest score is found for Finance-Other, just under Industrial-Manufacturing. The differences between the top and bottom performers are smaller than those observed in the investment-grade space.

- After the aforementioned exclusion, all remaining sectors show higher covenant occurrence in the newer bonds than in the older ones. Interestingly, the Finance-Other sector (lowest score overall) shows the most significant strengthening in time ($43.39\%$ score increase), followed by Industrial-Manufacturing ($+14.47\%$).
- The relationship between the covenant scores and credit rating is not as clear as in the investment-grade space. An example is that CCC rated bonds show lower scores than B and BB rated issues; it seems that many of these CCC rated bonds had ratings of B- and above at the time of issuance, and were downgraded over their lifetime.
- The maximum representative bond scores are generally consistent with the density-based score. The unweighted version does bring small changes in the sector hierarchy, but only within the underrepresented sectors. Also, the differences between certain credit ratings are higher (e.g. C-CC, B-BB).

The above points serve to show how the proposed covenant scoring methods can be used to create a dimension of comparability and facilitate time efficient analysis, potentially highlighting risk-related considerations not necessarily reflected in asset pricing. Studies of the evolution in covenant strength across sectors (or universes defined by any other criteria, such as credit rating) are enabled and can lead to valuable insights. As such, this kind of information can be employed not only as part of a due diligence process, but also to control exposure to certain legal terms depending on views. Naturally, other potential use cases of such scoring mechanisms can be explored.

# Resources


[1] *Request for Comment on Moody's Indenture Covenant Research & Assessment Framework*. Moody's, September 2006

[2] *The Modern Role of Bond Covenants*. I. B. Malitz, The Research Foundation of The Institute of Chartered Financial Analysts, 1994

[3] *ABI Response To Moodys Request for Comment/Indenture Covenant Research and Assessment Framework*. The Association of British Insurers, September 2006

[4] *Comments in response to Request for Comment on Moody's Indenture Covenant Research & Assessment Framework*. The Association of Corporate Treasurers, October 2006

[5] *Improving Covenant Protections in the Investment Grade Bond Market*. The Credit Roundtable (in association with the Fixed Income Forum), 2008

[6] *Understanding High-Yield Bonds – A complete guide for investors, issuers, banks and advisers* (chapters 6-11). S. A. Morrissy, B. Nadritch, A. Heidt, J. McFarlane. Milbank, PEI, 2014

[7] *High-Yield Bonds: An Issuer's Guide (U.S. Edition)*. Mayer Brown, 2016

[8] *Introduction to High-Yield Bond Covenants*. Western Asset, 2011

[9] *The End of Covenants*: *The "No Premium on Default" Language is Spreading Like Wildfire – Your Future Covenant Enforcement Is Being Destroyed.* Covenant Review, January 2017

[10] *Similarity in Bond Covenants*. G. De Franco, F. P. Vasvari, D. Vyas, R. Wittenberg-Moerman, September 2015

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