Bond Data Analysis
[PRELIMINARY]

Artur Carvalho

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I. Bond Data

I obtain the records of U.S. Corporate bond transactions from the enhanced Trade Reporting and Compliance Engine (TRACE). This database is maintained by the Financial Industry Regulatory Authority (FINRA) and contains information on all OTC secondary market trades in eligible corporate bonds. To classify the trades according to their underlying securities' characteristics, I merge the TRACE records with the Mergent Fixed Income Securities Database (FISD), a comprehensive database of publicly offered U.S. bonds that includes information on debt covenants. Next, I compare the profile of electronic trades taking place in Alternative Trading Systems (ATS) with trades executed through the regular voice OTC systems.

A. Transaction Data

The TRACE database records detailed information on every transaction of eligible securities, including a trade's date, time, (untruncated) principal, bond identifier (CUSIP), the reporting side's capacity (either principal or agent), the type of the reporting side's counterparty (dealer or customer), whether the trade took place in an ATS, among others. The use of this data, however, requires the application of filters to correct for reporting errors that can bias the estimations of standard measures of market-liquidity.

Following Dick-Nielsen (2013), I apply a number of filters to remove errors and eliminate the double counting of trades. Specifically, I remove transaction records where the bond identifier (CUSIP) is missing, records of trades that were cancelled in the first X days (trade *cancellations*) or at a later time (trade *reversals*), as well as their original reports. I also adjust the sample to account for the correction of earlier transaction reports (trade *corrections*). Since FINRA members are required to file a report for every transaction, trades between dealers (*inter-dealer* trades) are recorded twice. To avoid double-counting, which would distort measures of market volume, bond turnover, trade price impact, etc., I delete the buyer-side reports. Finally, I also remove reports of trades executed on an when-issued basis, trades executed under special conditions, trades where the reported price is a weighted-average price, locked-in trades (that is, trades in which a reporting firm reports on behalf

of both actual trading counterparties), trades of non-corporate securities, and the reports of trades which were settled more than 6 days after their execution date.

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Alternative Trading Systems are electronic platforms that take part in every transaction executed through their systems, and thus have a reporting obligation. Starting in July 2016, the TRACE enhanced dataset has included an indicator to mark trades executed in ATS platforms. I use this variable as a flag for electronic trades. It must be noted, however, that this approach leaves out trades executed in platforms that are not registered as ATS. [1] Moreover, as documented by Kozora, Mizrach, Peppe, Shachar, and Sokobin (2020), the industry has adopted a few electronic trading protocols, and many platforms can offer more than one. However, the available data does not distinguish among them.

The two most common types of protocols are the request-for-quote (RFQ) and the electronic limit order books protocols. The latter is similar to the electronic communication network (ECN) protocols used in the U.S. equity and Treasury markets, where automated matching systems which provide immediately executable liquidity. The RFQ protocols, on the other hand, hold similarities with the traditional voice OTC trading, where quotes submitted in response to a request are meant for the soliciting party only, and expire at the end of the session. Given the limitations of the data, in what follows I treat all ATS trades as electronic trades, regardless of their protocol, and all non-ATS trades as voice OTC transactions.

B. Bond Characteristics

I investigate the characteristics of the corporate bonds traded in the competing secondary venues using the Mergent Fixed Income Securities Database (FISD). This dataset contains detailed information on public-offered U.S. bonds, such as age, maturity, amount outstanding, credit rating, issuance amount, coupon information, and so on. Of particular interest to this analysis, the Mergent FISD data documents the presence of any call, put or convertibility features, as well as of covenants designed to protect bondholders.

From an FISD sample containing all the bonds issued up until the third quarter of 2020, I exclude non-perpetual bonds with a missing maturity date, as well as non-corporate bonds, and bonds denominated in foreign currency. This filtering preserves nearly 139 thousand Dollar-denominated US corporate bonds. Unfortunately, the vast majority of those (a little over 75%) are Medium Term Notes (MTNs), for which the FISD does not record covenant information.[2] After excluding MTNs and other bonds missing both covenant and subsequent data information, I am left with 27,962 unique bonds. I then merge the cleaned TRACE files with the Mergent FISD data by matching entries on the bonds' CUSIPs.

Bonds offer a variety of covenants designed to reduce the cost of debt by guaranteeing investors some protection from potential losses. These contractual clauses work either by restricting the actions of the issuer and its subsidiaries (*debt restrictive* covenants) or by triggering certain provisions upon the occurrence of a specific contingency (*bondholder pro-*

[1] Non-ATS platforms need only report a trade if they are a party to the transaction, such as when acting as a riskless counterparty to both sides of a trade involving anonymous buyer and seller.

[2] MTNs are Rule 415 shelf-registered securities. See Billett, King, and Mauer (2007).

tective covenants. In addition, bonds can have convertibility features FINISH. talk about credit rating variable

But the addition of covenants or convertibility features

I am interested in how bonds traded in electronic platforms differ from their counterparts in the more traditional voice OTC markets. in terms of the types and number of covenants offered.

evidence of what? more complex securities may be harder to price, therefore rendering them less liquid -> harder to find a counterparty/ higher adverse selection costs.

C. *Covenant Categories*

The FISD relies on over 50 variables to codify the many different bondholder and issuer restrictive covenants. These manifold variables, however, can be grouped into broader categories, according to the types of activities they restrict. I follow Billett et al. (2007) and sort covenants into 15 categories, listed in Table I below.[3] The first two categories restrict payouts to shareholders and other investors, either in the form of a dividend payment or share repurchase. Among these are covenants that prevent subsidiaries from making payments to their parent companies, and covenants that preclude issuers from redeeming subordinate debt.

The next seven categories relate to restrictions on the financing activities of the parent company or its subsidiaries. These include covenants precluding the issuance of additional debt with maturity of 1 year or longer (*funded*, or *long-term*, debt), or debt of varying seniority (*subordinate*, *senior* and *secured* debt). Covenants that place accounting-based restrictions on an issuer's or its subsidiaries' leverage are grouped into the "total leverage tests" category. Such covenants may impose a minimum net worth level, a minimum ratio of earnings or a specified fixed-charge coverage ratio, or even limitations on the total-indebtedness of the issuer. The following category consists of covenants that preclude an issuer or its subsidiaries from selling and then leasing back assets that serve as collateral, requiring instead that outstanding debt be retired or that the net proceeds from the sale be used to acquire equivalent assets. Another way covenants can affect a firm's funding decisions is by prohibiting the issuance of additional common or preferred stocks. The last three categories pertaining to financing activities consist of event-driven covenants. In the first group are covenants that trigger certain provisions when either the issuer's rating or its net worth fall below pre-specified levels. Next, cross-default provisions stipulate that default (or acceleration of payments in default) be triggered in the issue when default (or acceleration of payments in default) occurs for any other debt issue. Lastly, a poison put allows debt to be redeemed before its maturity in case of a change in control of the issuer, and is usually deployed by companies as a takeover defense mechanism.

The final three categories gather covenants that affect the investment activities of the issuer or its subsidiaries. These can take the form of a requirement that the net proceeds from the sale of specific assets be used to redeem outstanding debt, or a proscription of certain risky investments. They can also cover the legal obligations in the case of a merger

[3] A list of the all the FISD variables used in to form each group, as well as their FISD table of origin, can be found on https://github.com/abcarvalho/bond-data/wiki/Covenant-Categories.

by specifying the contractual clauses of existing debt that must be honored by the surviving entity.

If indeed electronic trading favors simpler, more standardized securities, we can expect trades in ATS to consist primarily of covenant-free bonds and debt with a fewer number of covenants relative to bonds traded in voice OTC systems. On the other hand, if trades in ATS are similar to trades in OTCS in terms of the types of types and overall number of covenants offered by the ,

In the next section, I analyze the profile of secondary-market trades by trading protocol (electronic v.s. voice systems), credit quality and the covenant categories described above.

II. The Profile of Trades

Using the combined TRACE and Mergent sample, I compare the characteristics of the transactions in Alternative Trading Systems (ATS) to the profile of the trades executed using the more traditional voice OTC system (OTCS). I focus on the third quarter of 2019, the latest quarter in my sample, and begin by comparing the breakdown of trades across Billett et al. (2007) covenant categories discussed in the previous section.

To do so, each bond covenant is then assigned a category.

After merging the TRACE and MERGENT FISD datasets and excluding bonds for which covenant information is not available, as outlined in section I, Each

I consider first the data on trades involving non-MTN bonds with at least one covenant. these bonds

, which I call the covenant sample. Figures 1 to 12 in Appendix B.1 contrast the prevalence of the Billett et al. (2007) covenant categories in ATS and OTCS along four variables, namely (i) number of bonds, (ii) number of issuers, (iii) trade count, and (iv) trade volume. The create the figures, I split the covenant sample into an ATS and an OTCS sub-samples by assigning each bond to one group or both, according to where its trades took place. Bonds that were traded in ATS as well as OTCS are thus present in both sub-samples, but trades are counted only once.

Figures 1 and 4 indicate that most non-MTN bonds with covenants are traded both on ATS and OTCS. In addition, the distribution of bonds and issuers over the covenant categories is quite similar across trading systems (figures 3 and 6). The most prevalent types of covenants are those that restrict share repurchases (category 2) and leverage (category 7), impose cross-default provision (category 11), prevent the sale of the assets of a firm or its subsidiaries (category 13), or secure the rights of creditors in case of mergers (category 15). This overlap in the pool of securities suggests there is no insurmountable barrier to the trade of bonds electronically. In fact, approximately 95% of the bonds in the covenant sample were traded in ATS.

It is still possible, however, that investors in electronic markets favor different types of covenants relative to bondholders in the more traditional voice OTC markets. The following set of plots help shed light on this question. Focusing once again exclusively on non-MTN bonds with covenants, the transactions in ATS comprised only a little over 22% of the total, while the trade volume in electronic platforms made up only a mere 6% of the total volume in the sample. This is in line with previous studies that found electronic trades to

be concentrated in smaller tickets. Nevertheless, the distribution of trades over the covenant groups is virtually identical in both trading systems (figure 9). A similar picture holds when we look at the trade volume (figure 12).

While the aggregate picture suggests the differences in the composition of debt protective covenants across trading systems are small, a closer inspection reveals

there appears to be no in bonds offering certain groups of covenants over others relative to trades in OTCS,

represents an even smaller fraction .

Even though ,

, so that ATS trades are more prevalent among bonds offering a

Turning to trade count and volume,

it is not evidence

that electronic traders favor the same kind of bonds.

Nonetheless, this similarity in the pool of securities across the competing trading systems does not necessarily imply that

holds when looking at the trade volume, with ATS volume

Notice the trading-system specific numbers do not add up to 1, as bonds can have several covenants, spanning multiple categories.

depending on whether its trades were made exclusively in one trading system or in both.

Next, for each trading system and covenant category, I identify the bonds offering one or more covenants pertaining to the category in question. Once

for each of the 4 variables, a set of 3 graphs is presented. The first graph plots the absolute values by trading-system and covenant category pair. The second shows these numbers as percentage of the total across the two trading systems. Finally, the third and more important chart displays the distribution of the variable among the covenant categories in each trading system.

I present 3 sets of graphs for each dimension.

by the 15 covenant groups.

Since a bond may be traded in both systems, the trading-system-contingent sub-sample overlap.

in the different trading systems by (i) number of bonds, (ii) number of issuers, (iii) trade count, and (iv) volume in these two systems. I then count the number of unique issuers among the selected bonds.

To do so, I begin by splitting the sample according to the

To do so, I split the sample into two groups: trades that took place in Alternative Trading Systems (ATS) and trades executed using the more traditional voice OTC system (OTC).

The sample consists of all corporate bonds, excluding medium-term notes (MTNs), with at least one covenant that were traded in 2019Q3.

The picture shows the share of issuers in each covenant category by trading system. Category- and market-specific shares were computed as the ratio of the number of issuers of bonds belonging to a specific category in the trading system in question to the total number of issuers across secondary venues in the sample. Notice covenant categories overlap, as bonds can have multiple covenants and thus belong to more than one group.

The picture shows the share of trades in each covenant category by trading system. Category- and market-specific shares were computed as the ratio of the total volume of trades

of bonds belonging to a specific category in the system in question to the total volume of trades across secondary venues in the sample. Notice covenant categories overlap, as bonds can have multiple covenants and thus belong to more than one group.

A. *draft*

either by granting certain rights to creditors contingent on the occurrence of some uncertain event, or by restricting the actions of an issuer and its subsidiaries.

I obtain the data on U.S. corporate bond transactions from a

The data from U.S. corporate bond transactions used in the analysis comes from the Trade Reporting and Compliance Engine (TRACE), maintained by the Financial Industry Regulatory Authority (FINRA).

In particular, I rely on the TRACE Enhanced dataset, which contains information on all maintained by FINRA.

FINRA disseminates information on all OTC secondary market trades in TRACE-eligible corporate bonds to investors, but caps reported trade sizes for trades that exceed $5 MIL for IG corporate bonds and $1 MIL for high-yield corporate bonds. I rely instead on the TRACE Enhanced dataset, which contains non-capped principal amounts, as well the variables disseminated in the regular TRACE data, such as the date, time and price of a transaction, the bond CUSIP, and indicators for the dealers trading capacity (whether as principal or agent), trade direction, and whether the dealer's counterparty in a trade was another dealer or a customer. In addition,

WHY ATS trades?

Every ATS that intermediates a trade of TRACE-eligible securities is required to file reports with FINRA. But discrimination between trades executed in ATS and non-ATS in the disseminated data began only in July 2016.[4]. Therefore, I restrict the analysis to the period starting in 08/2016. FInally, because the TRACE Enhanced data is available to researchers with a 6-month lag, my sample ends in 09/2019.

Starting on July 18, 2016, FINRA reporting discriminates between trades executed in ATS and non-ATS.

FINRA began

since July 18, 2016, trades executed in an Alternative Trading System (ATS)

2015:Q2. Each transaction record contains the trade date, time, (untruncated) principal amount, CUSIP, price, an indictor of whether the trade is either between a customer and a dealer or between two dealers, trading capacity of dealers (principal or agent), trade direction, and an anonymous dealer identifier, among many other variables.

both reports generated in interdealer trades.

, FINRA simply indicates their size exceed these thresholds by "5MM+" and "1MM+", respectively.

In particular, I rely on the TRACE Enhanced dataset, which does not cap obtained through the Wharton Research Data Services (WRDS.)

[4]See FINRA's Technical Notice from December 2015, available at https://www.finra.org/filing-reporting/trace/technical-notices/trace-reporting-and-dissemination-no-remuneration-trades-and-ats

References

Billett, Matthew T., Tao-Hsien Dolly King, and David C. Mauer, 2007, Growth Opportunities and the Choice of Leverage, Debt Maturity, and Covenants, *The Journal of Finance* 62, 697–730.

Dick-Nielsen, Jens, 2013, How to Clean Enhanced TRACE Data, *SSRN Electronic Journal* .

Kozora, Matthew, Bruce Mizrach, Matthew Peppe, Or Shachar, and Jonathan Sokobin, 2020, Alternative Trading Systems in the Corporate Bond Market, *SSRN Electronic Journal* .

Appendix A. Tables

Table I: Covenant Categories by the Type of Restricted Activity

Covenant Restrictions	
Payouts	
1	Dividend pmnt. restrs.
2	Share repurchase restrs
Financing Activities	
3	Funded debt restrs
4	Subordinate debt restrs
5	Senior debt restrs
6	Secured debt restrs
7	Total leverage test
8	Sale & leaseback
9	Stock issue restrs.
10	Rating & net wrth. trgs.
11	Cross-default provisions
12	Poison Put
Investments	
13	Asset sale clause
14	Invest. policy restrs.
15	Merger restrictions

The table lists the 15 major categories Billett et al. (2007) use to group the Mergent Fixed-Income Securitiies Dataset (FISD) covenant variables according to the type of activity they restrict.

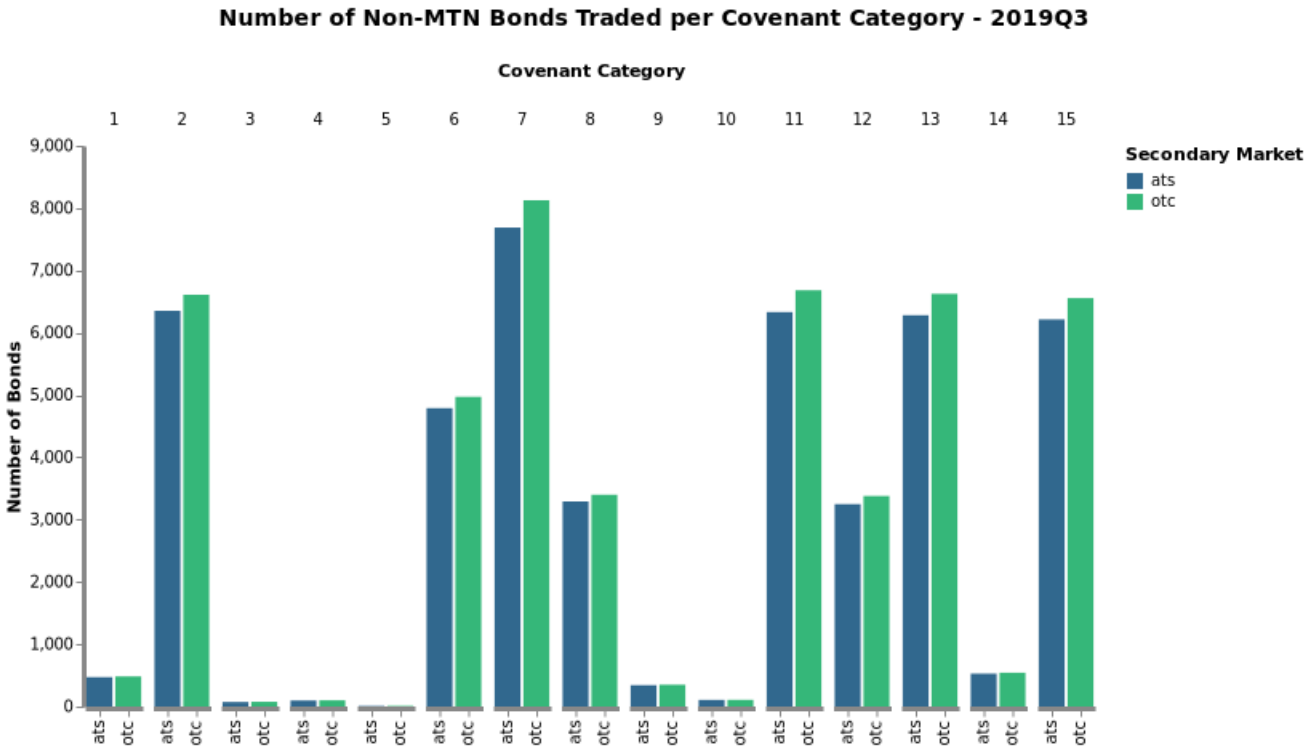
Appendix B. Plots

B.1 Covenant Categories

Variable	Rating	ATS	OTCS	Total	ATS/OTCS (%)	ATS/Total (%)	OTCS/Total (%)
Bond Count	IG	11,013	12,283	12,287	89.66	89.63	99.97
	HY	3,388	7,264	7,267	46.64	46.62	99.96
	All	14,375	19,492	19,499	73.75	73.72	99.96
Trade Count	IG	529,966	1,960,049	2,490,015	27.04	21.28	78.72
	HY	201,740	654,413	856,153	30.83	23.56	76.44
	All	731,706	2,614,462	3,346,168	27.99	21.87	78.13
Trade Volume	IG	55.32	932.76	988.08	5.93	5.60	94.40
	HY	21.87	322.29	344.16	6.79	6.35	93.65
	All	77.19	1255.05	1332.24	6.15	5.79	94.21

B.1.1 Bonds

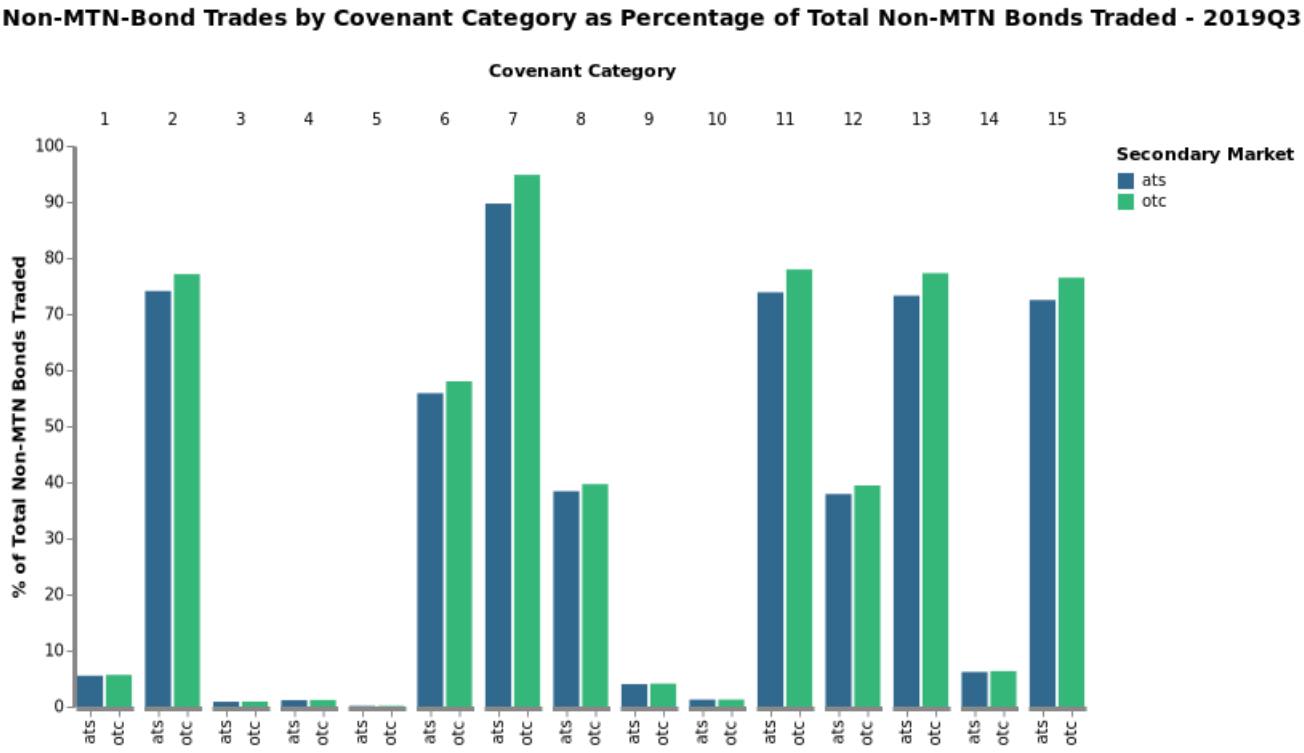
Figure 1. Number of Bonds traded by Covenant Categories and Secondary Trading System



The picture shows the number of corporate bonds, excluding medium-term notes (MTNs), in each covenant category that were traded (i) in Alternative Trading Systems (ATS) and (ii) via the voice over-the-counter systems (OTC) during 2019Q3. Notice covenant categories overlap, as bonds can have multiple covenants and thus belong to more than one group.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories are taken from Billett et al. (2007) and are reproduced in Table I in Appendix A.

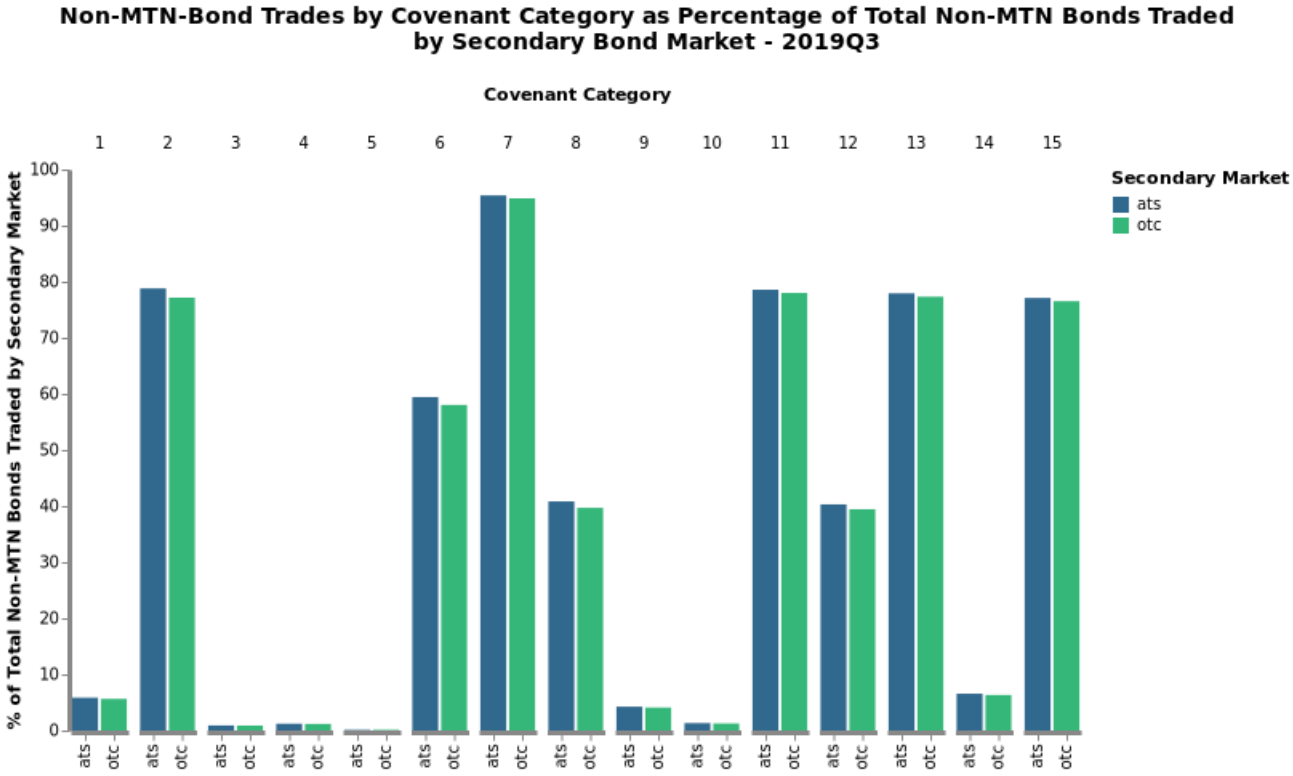
Figure 2. Bonds traded by Covenant Categories and Secondary Trading System as a Share of Bonds traded across Secondary Venues



The samples consists of all corporate bonds, excluding medium-term notes (MTNs), with at least one covenant that were traded in 2019Q3. The picture shows the share of bonds in each covenant category that were traded (i) in Alternative Trading Systems (ATS) and (ii) via the voice over-the-counter systems (OTC) during 2019Q3. Shares were computed as the ratio of bonds in covenant- and market-specific groups to the total number of bonds traded across secondary venues in the sample. Notice covenant categories overlap, as bonds can have multiple covenants and thus belong to more than one group.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories are taken from Billett et al. (2007) and are reproduced in Table I in Appendix A.

Figure 3. Non-MTN Corporate Bonds traded by Covenant Categories and Secondary Trading System as Share of All Non-MTN Corporate Bonds traded in each Secondary Venue

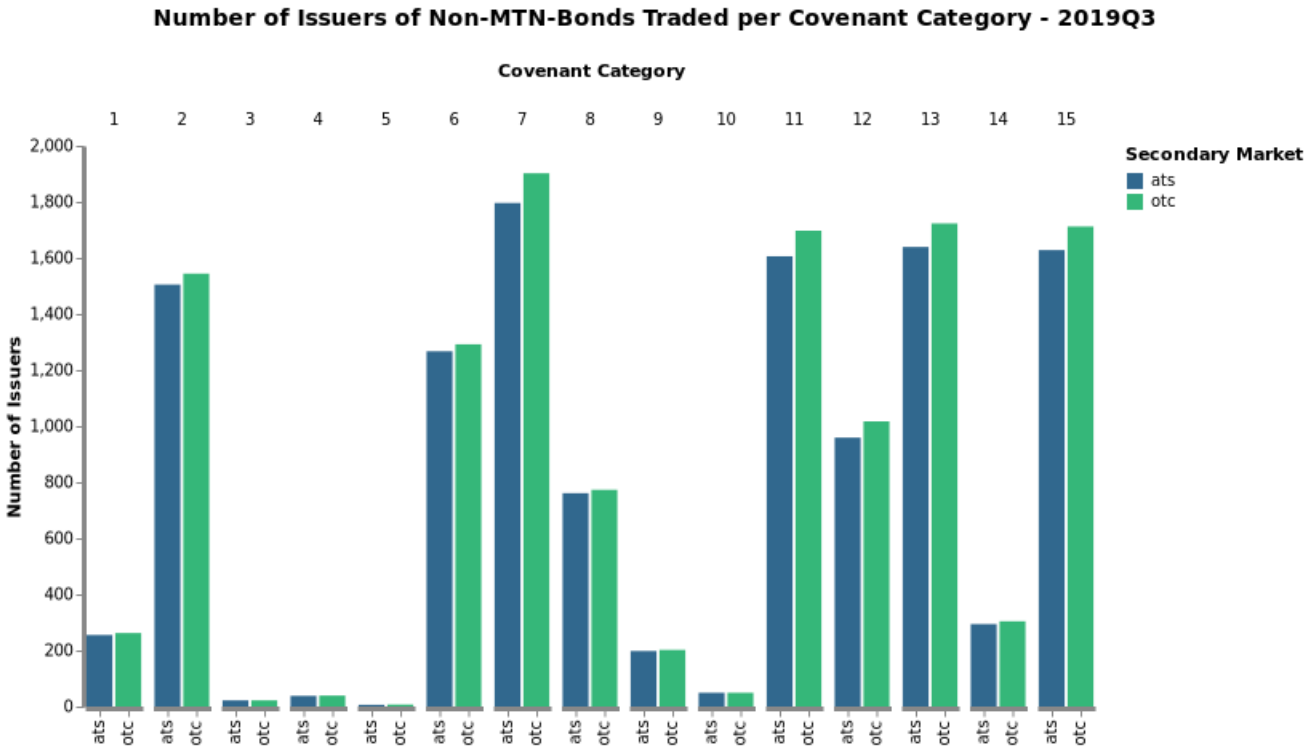


The picture shows the share of corporate bonds, excluding medium-term notes (MTNs), in each covenant category that were traded (i) in Alternative Trading Systems (ATS) and (ii) via the voice over-the-counter systems (OTC) during 2019Q3. Shares were computed as a percentage of the total number of corporate, non-MTN bonds with at least one covenant traded in each secondary venue. Notice covenant categories overlap, as bonds can have multiple covenants and thus belong to more than one group.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories are taken from Billett et al. (2007) and are reproduced in Table I in Appendix A.

B.1.2 Issuers

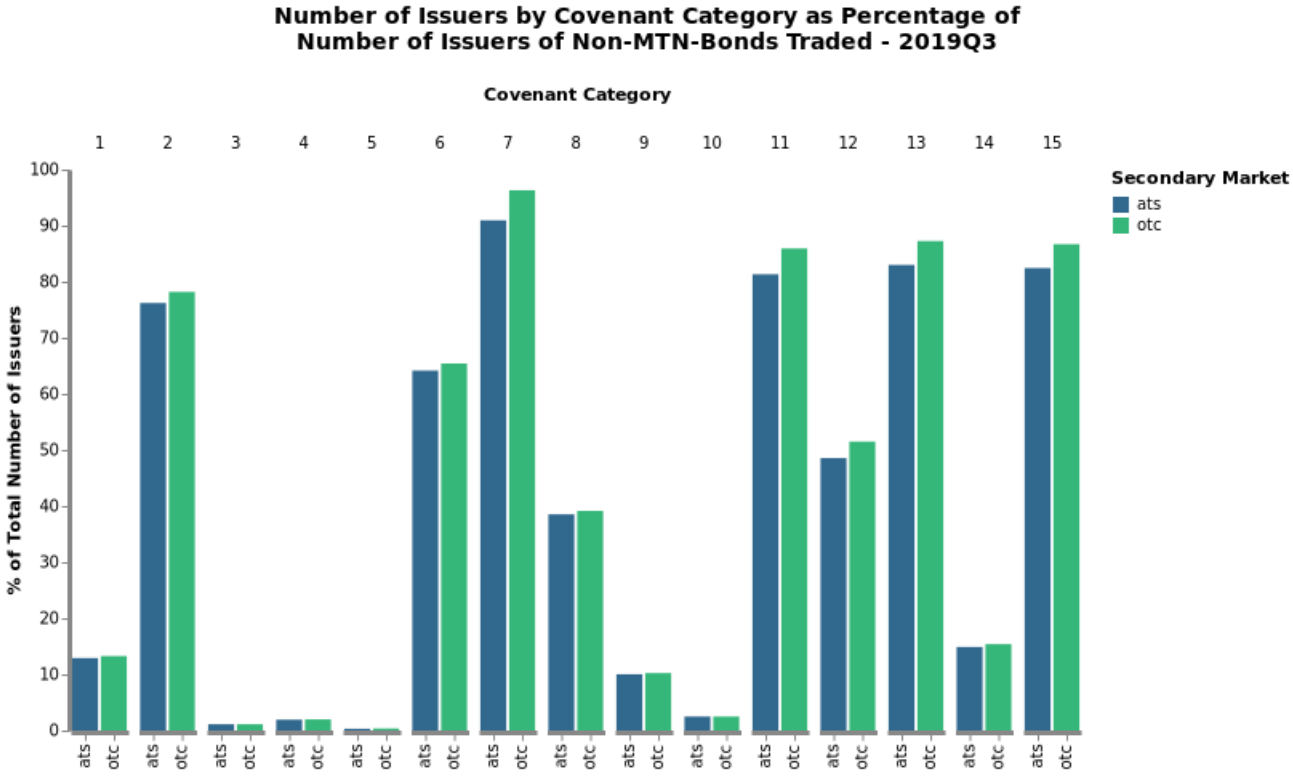
Figure 4. Number of Issuers by Covenant Categories and Secondary Trading System



The samples consists of all corporate bonds, excluding medium-term notes (MTNs), with at least one covenant that were traded in 2019Q3. For each secondary market and covenant category, I identify the bonds offering one or more covenants pertaining to the category in question. I then count the number of unique issuers among the selected bonds. Notice that a bond can have multiple covenants and thus belong to more than one group.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories are taken from Billett et al. (2007) and are reproduced in Table I in Appendix A.

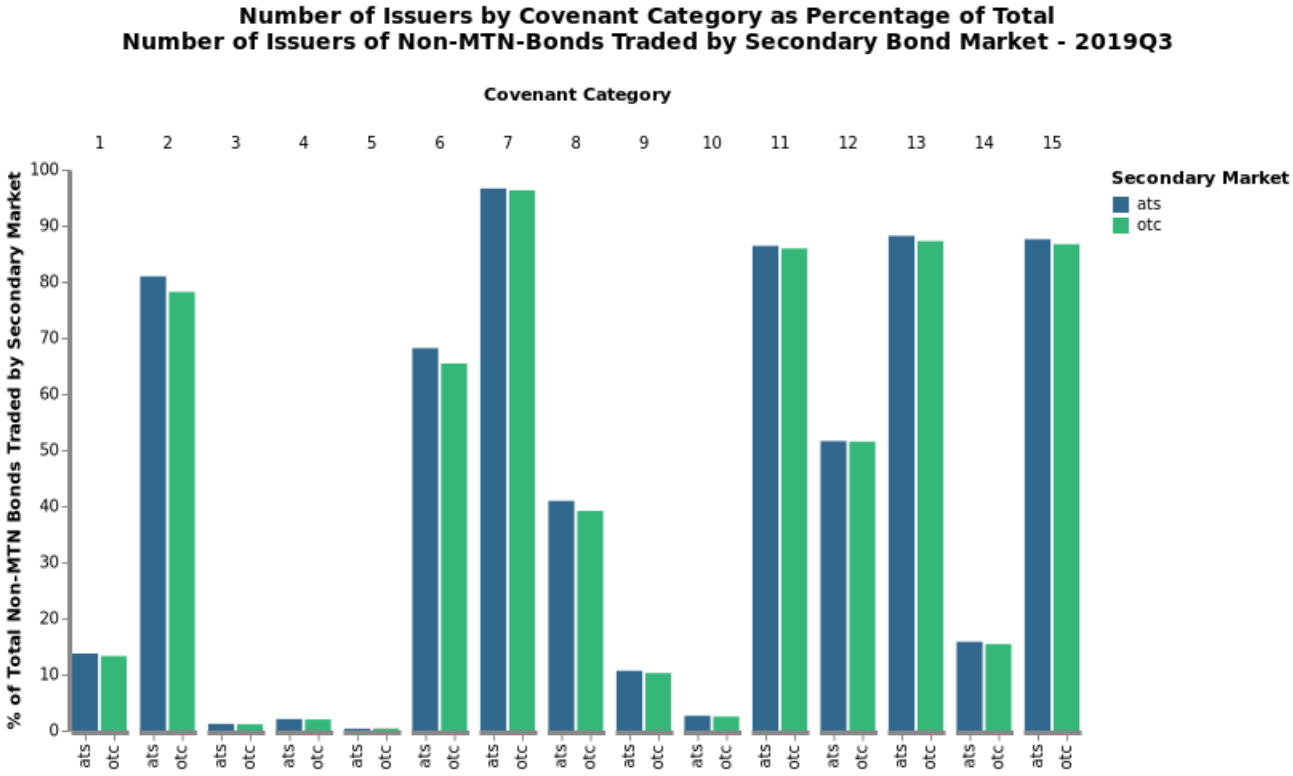
Figure 5. Number of Issuers by Covenant Categories and Secondary Trading System as a Share of All Issuers across Secondary Venues



The samples consists of all corporate bonds, excluding medium-term notes (MTNs), with at least one covenant that were traded in 2019Q3. For each trading system and covenant category, I identify the bonds offering one or more covenants pertaining to the category in question. I then count the number of unique issuers among the selected bonds. The picture shows the share of issuers in each covenant category by trading system. Category- and market-specific shares were computed as the ratio of the number of issuers of bonds belonging to a specific category in the trading system in question to the total number of issuers across secondary venues in the sample. Notice covenant categories overlap, as bonds can have multiple covenants and thus belong to more than one group.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories are taken from Billett et al. (2007) and are reproduced in Table I in Appendix A.

Figure 6. Number of Issuers by Covenant Categories and Secondary Trading System as Share of Market-Specific Issuers across Covenant Categories

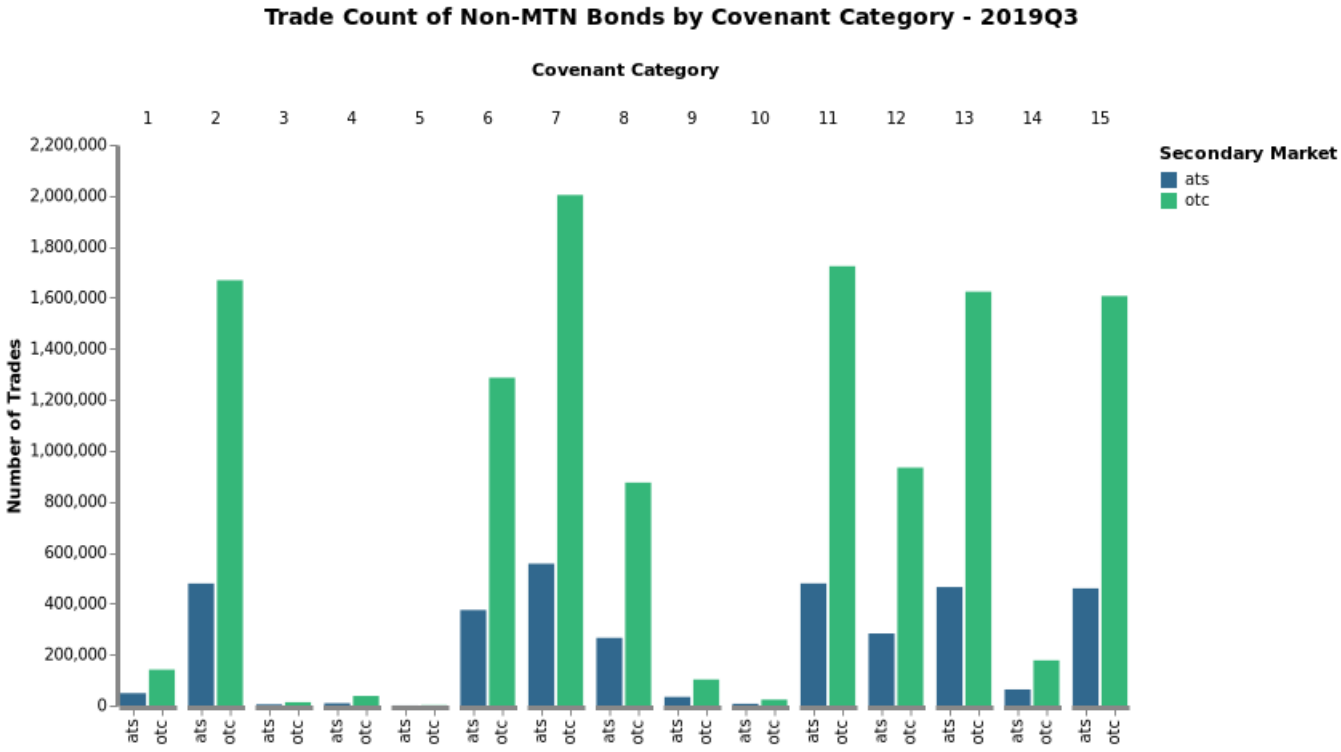


The sample consists of all corporate bonds, excluding medium-term notes (MTNs), with at least one covenant that were traded in 2019Q3. For each trading system and covenant category, I identify the bonds offering one or more covenants pertaining to the category in question. I then count the number of unique issuers among the selected bonds. The picture shows the share of issuers in each covenant category by trading system. Category- and market-specific shares were computed as the ratio of the number of issuers of bonds belonging to a specific category in the trading system in question to the total number of issuers in the same trading system found in the sample. Notice covenant categories overlap, as bonds can have multiple covenants and thus belong to more than one group.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories are taken from Billett et al. (2007) and are reproduced in Table I in Appendix A.

B.1.3 Trade Count

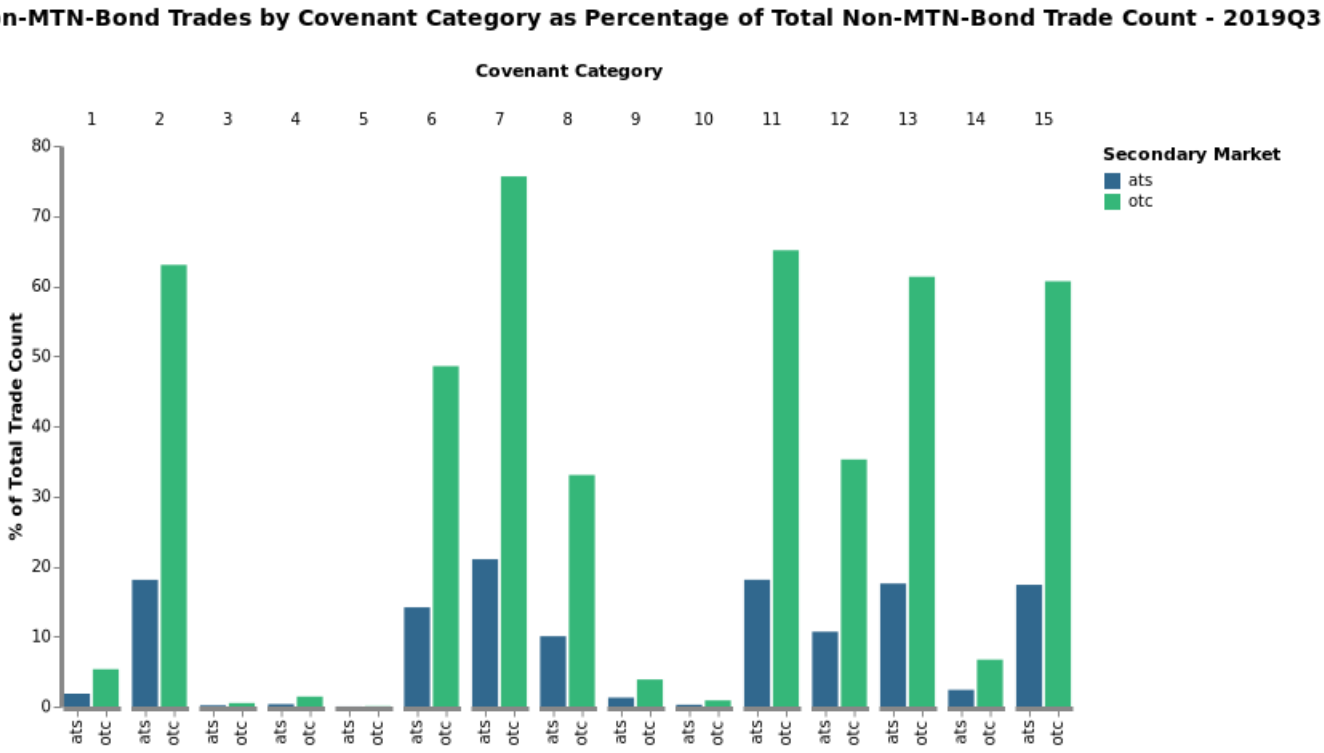
Figure 7. Non-MTN Corporate Bonds Trade Count by Covenant Categories and Secondary Trading System



The picture shows the trade count of corporate bonds, excluding medium-term notes (MTNs), by covenant category in (i) Alternative Trading Systems (ATS) and (ii) in the voice over-the-counter systems (OTC) during 2019Q3. Notice covenant categories overlap, as bonds can have multiple covenants and thus belong to more than one group, but trades are computed only once.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes (MTNs) are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories are taken from Billett et al. (2007) and are reproduced in Table I in Appendix A.

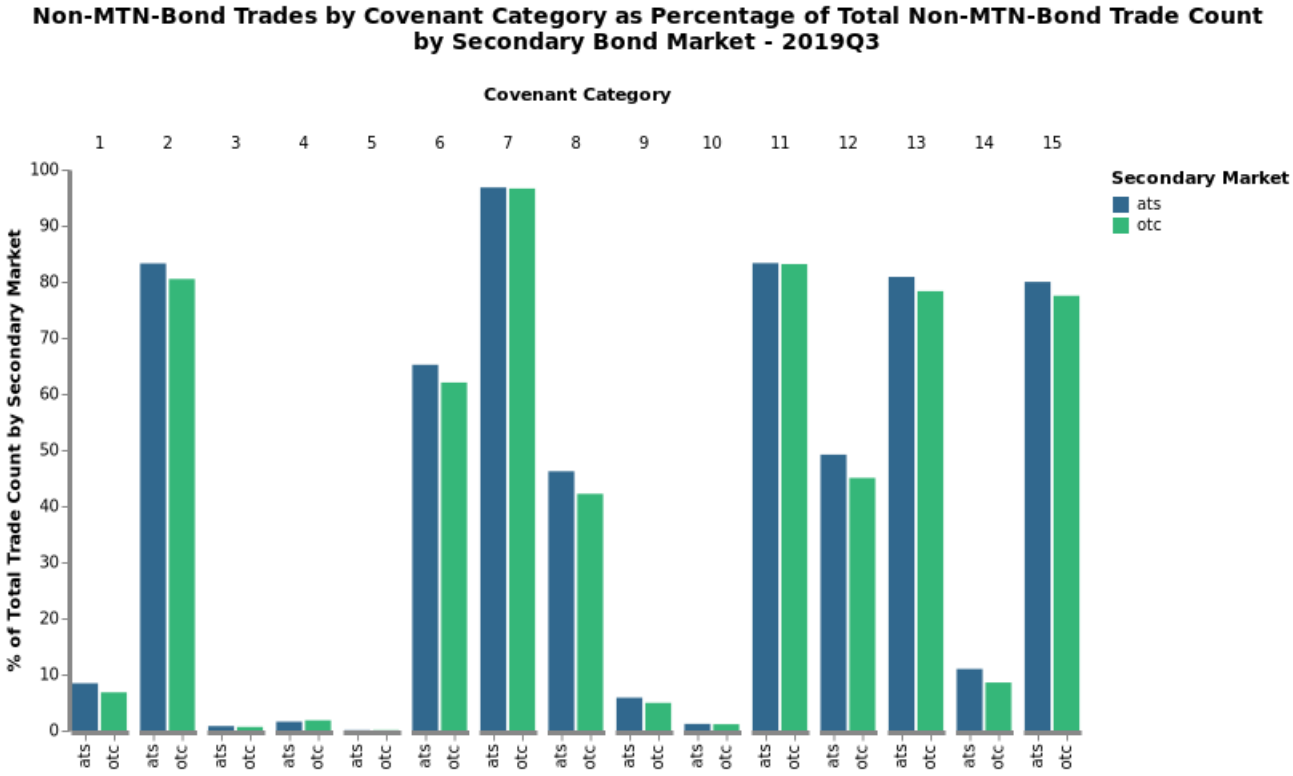
Figure 8. Trade Count by Covenant Categories and Secondary Trading System as Share of All Trades across Secondary Venues



The samples consists of all corporate bonds, excluding medium-term notes (MTNs), with at least one covenant that were traded in 2019Q3. The picture shows the share of trades in each covenant category by trading system. Category- and market-specific shares were computed as the ratio of the number of trades of bonds belonging to a specific category in the system in question to the total number of trades across secondary venues in the sample. Notice covenant categories overlap, as bonds can have multiple covenants and thus belong to more than one group, but trades are computed only once.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories are taken from Billett et al. (2007) and are reproduced in Table I in Appendix A.

Figure 9. Trade Count by Covenant Categories and Secondary Trading System as Share of Market-Specific Trades across Covenant Categories

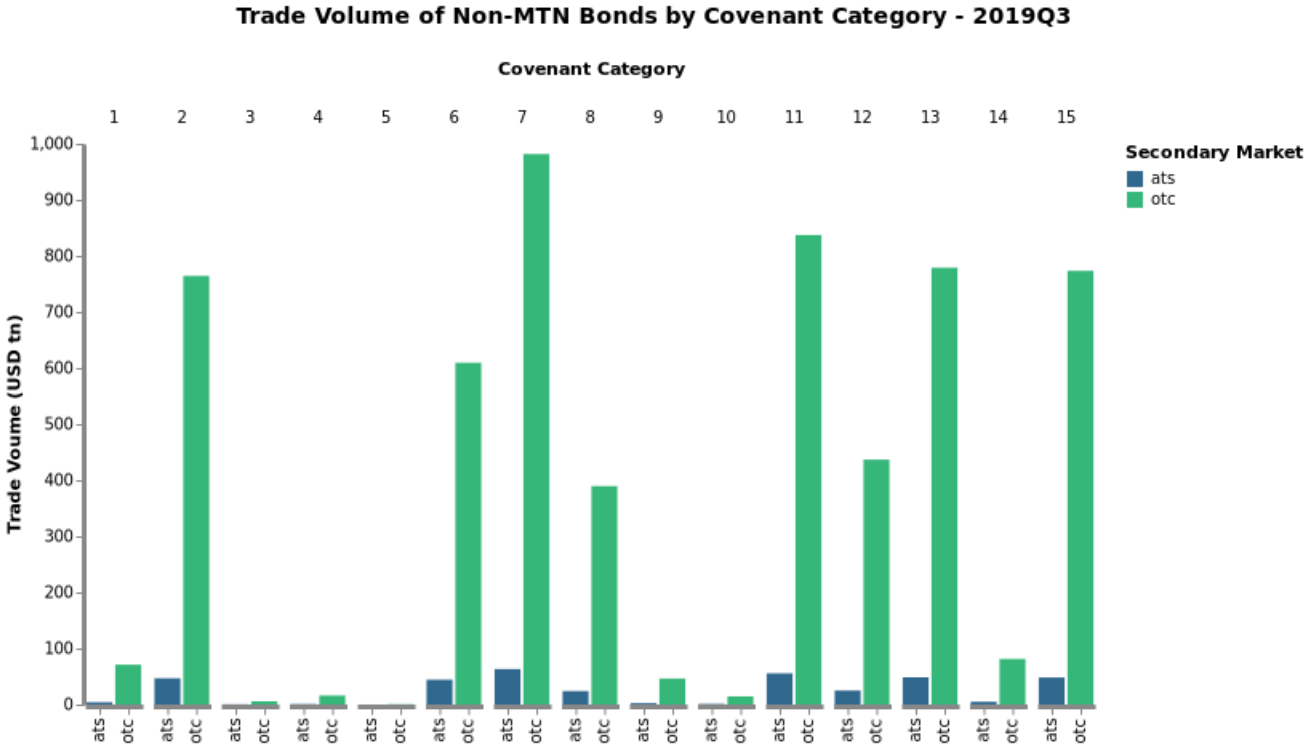


The samples consists of all corporate bonds, excluding medium-term notes (MTNs), with at least one covenant that were traded in 2019Q3. The picture shows the share of trades in each covenant category by trading system. Category- and market-specific shares were computed as the ratio of the number of trades of bonds belonging to a specific category in the system in question to the total number of trades across secondary venues in the same trading system. Notice covenant categories overlap, as bonds can have multiple covenants and thus belong to more than one group, but trades are computed only once.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories are taken from Billett et al. (2007) and are reproduced in Table I in Appendix A.

B.1.4 Volume

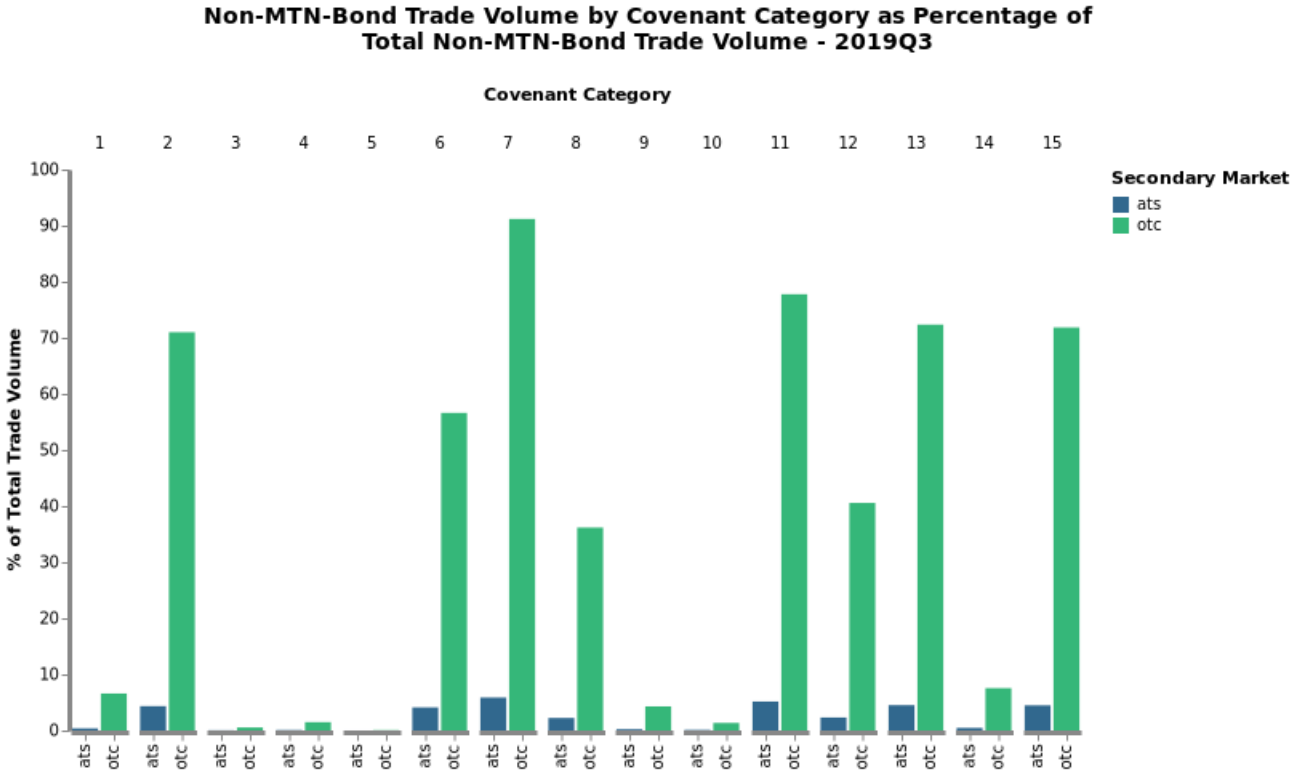
Figure 10. Trade Volume by Covenant Categories and Secondary Trading System



The picture shows the trade volume (in USD tn) of corporate bonds, excluding medium-term notes (MTNs), by covenant category in (i) Alternative Trading Systems (ATS) and (ii) in the voice over-the-counter systems (OTC) during 2019Q3. Notice covenant categories overlap, as bonds can have multiple covenants and thus belong to more than one group.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes (MTNs) are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories are taken from Billett et al. (2007) and are reproduced in Table I in Appendix A.

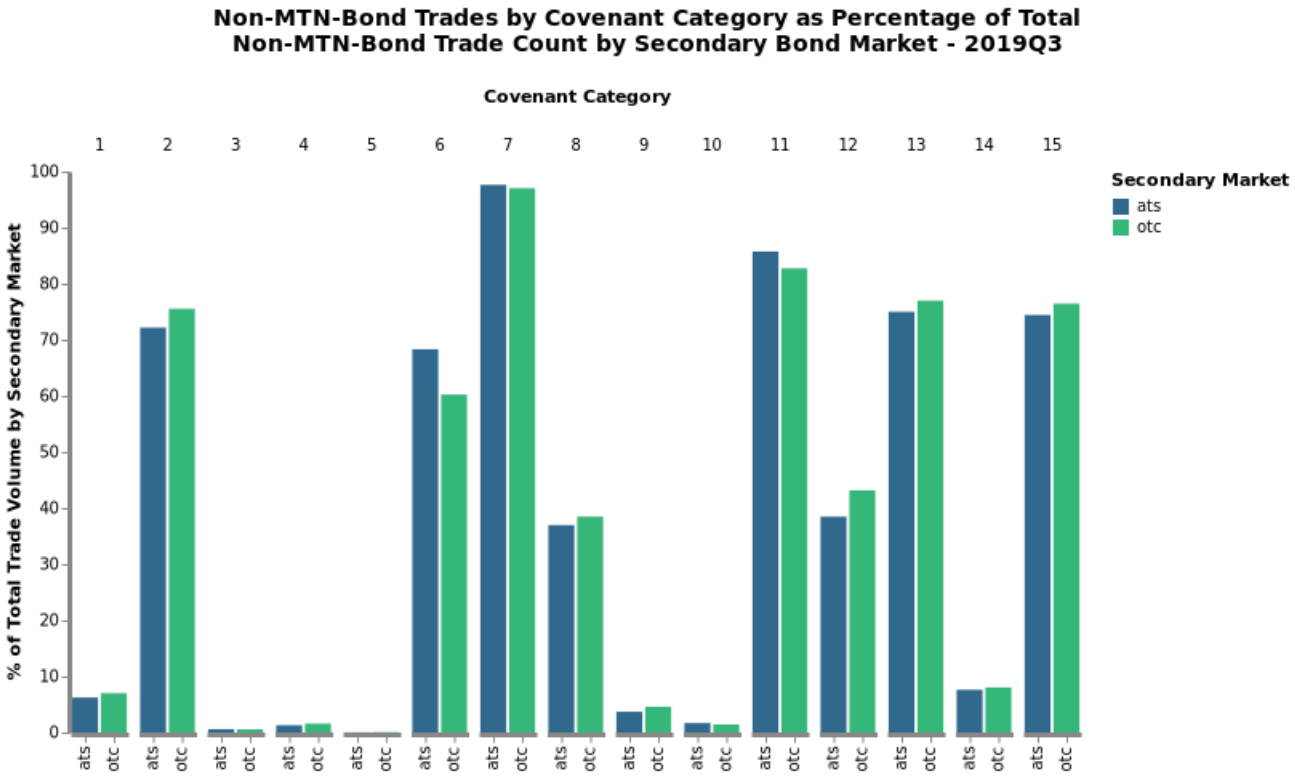
Figure 11. Trade Volume by Covenant Categories and Secondary Trading System as Share of All Trades across Secondary Venues



The sample consists of all corporate bonds, excluding medium-term notes (MTNs), with at least one covenant that were traded in 2019Q3. The picture shows the share of trades in each covenant category by trading system. Category- and market-specific shares were computed as the ratio of the total volume of trades of bonds belonging to a specific category in the system in question to the total volume of trades across secondary venues in the sample. Notice covenant categories overlap, as bonds can have multiple covenants and thus belong to more than one group.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories are taken from Billett et al. (2007) and are reproduced in Table I in Appendix A.

Figure 12. Trade Volume by Covenant Categories and Secondary Trading System as Share of Market-Specific Trade Volume across Covenant Categories



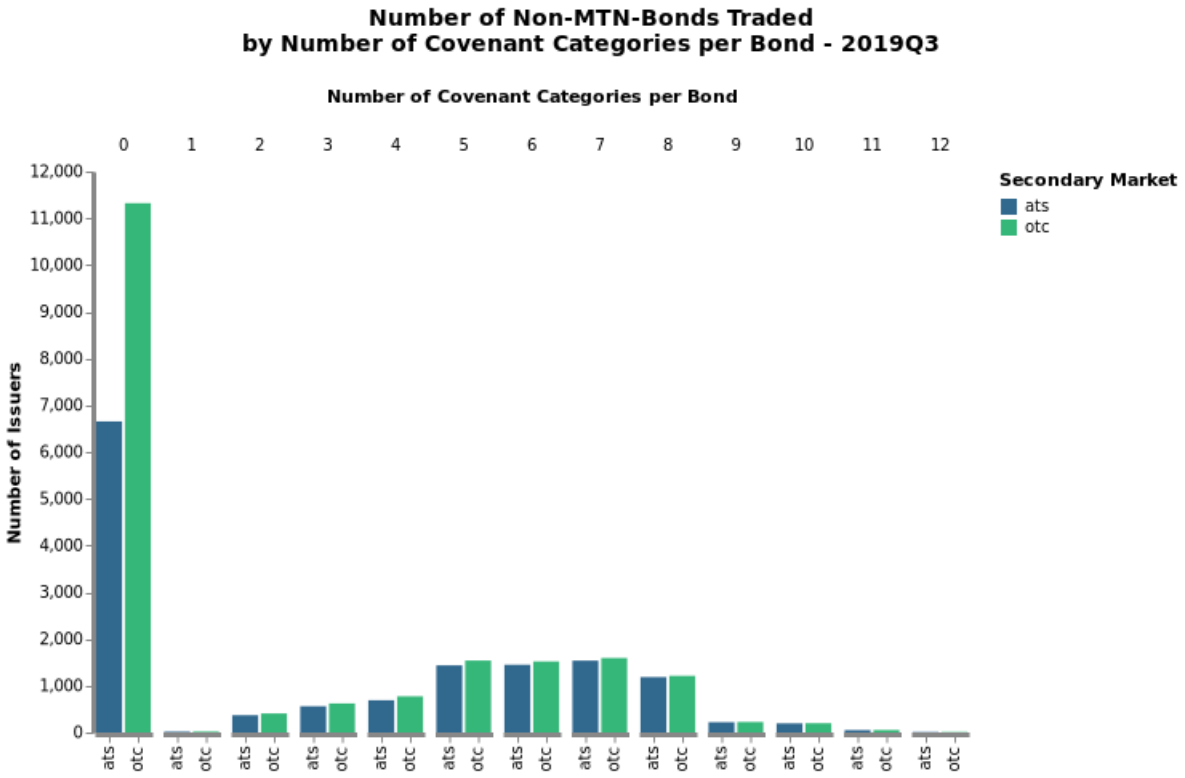
The samples consists of all corporate bonds, excluding medium-term notes (MTNs), with at least one covenant that were traded in 2019Q3. The picture shows the share of trading volume in each covenant category by trading system. Category- and market-specific shares were computed as the ratio of the trade volume of bonds belonging to a specific category in the system in question to the total volume of trades across secondary venues in the same trading system. Notice covenant categories overlap, as bonds can have multiple covenants and thus belong to more than one group.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories are taken from Billett et al. (2007) and are reproduced in Table I in Appendix A.

B.2 Covenant Categories per Bond

B.2.1 Bonds

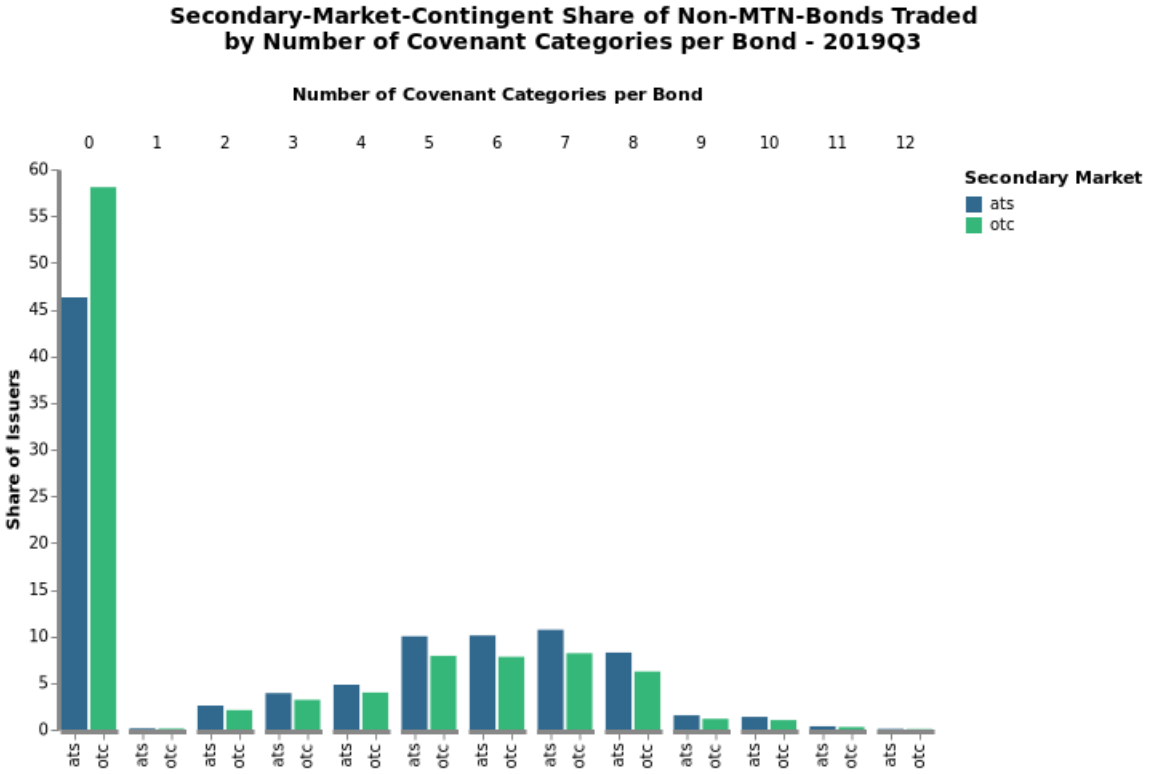
Figure 13. Number of Bonds by Covenant Category-Count and Secondary Trading System



The sample consists of all corporate bonds, excluding medium-term notes (MTNs), that were traded in 2019Q3. I assign each covenant in a bond to one of the categories taken from Billett et al. (2007). Next, for each bond I count the number of distinct categories among its covenants. I then split the sample into bonds that were traded in the Alternative Trading System (ATS) and bonds that were traded via the voice OTC system. Finally, in each sub-sample, I group the bonds by their number of distinct covenant categories. Notice that a bond that trades on both systems is counted among the ATS as well as the OTC sub-samples.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories taken from Billett et al. (2007) are reproduced in Table I in Appendix A.

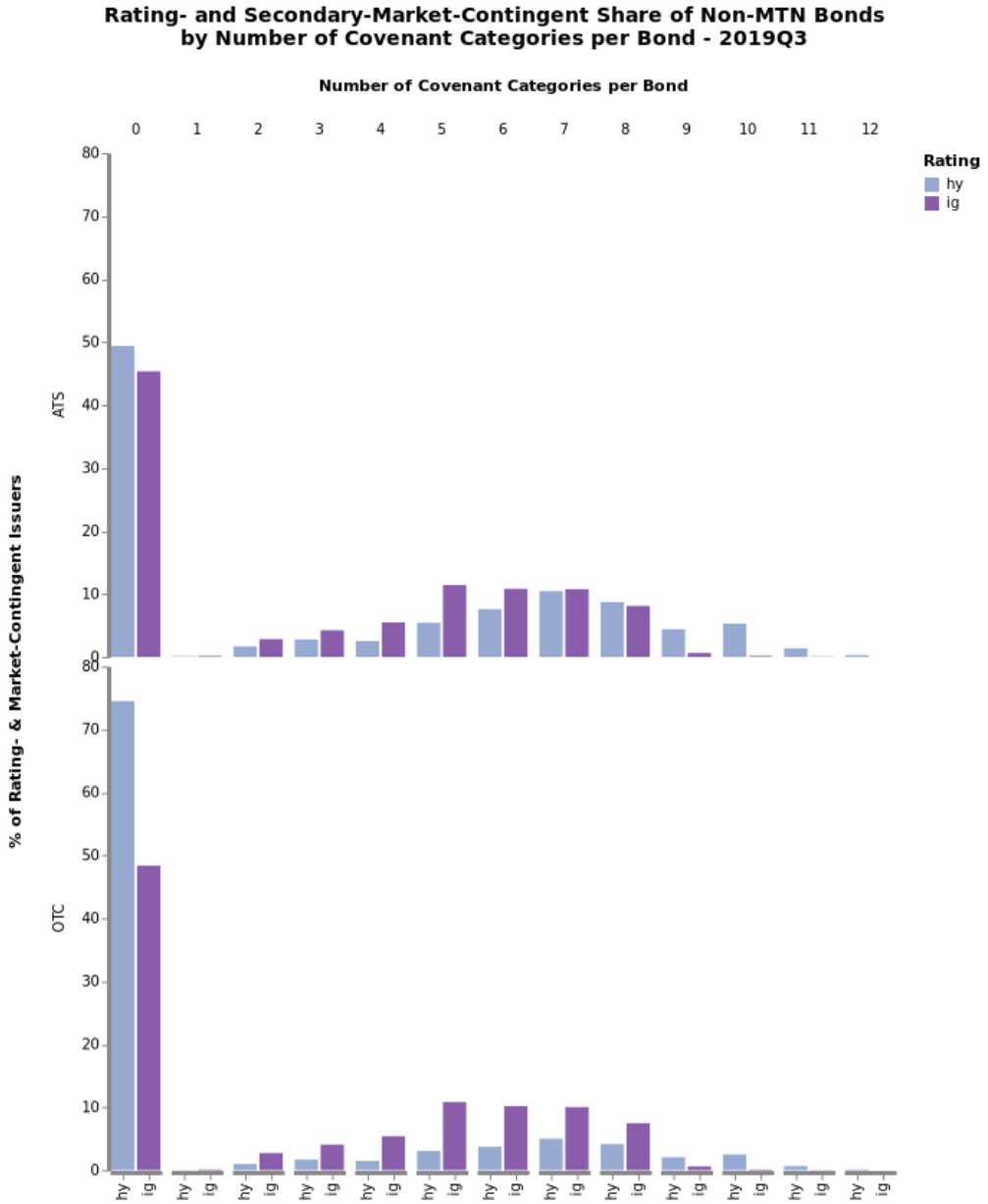
Figure 14. Share of Bonds by Covenant Category-Count and Secondary Trading System



The sample consists of all corporate bonds, excluding medium-term notes (MTNs), that were traded in 2019Q3. I assign each covenant in a bond to one of the categories taken from Billett et al. (2007). Next, for each bond I count the number of distinct categories among its covenants. I then split the sample into bonds that were traded in the Alternative Trading System (ATS) and bonds that were traded via the voice OTC system. Finally, in each sub-sample, I group the bonds by their number of distinct covenant categories and divide the number of bonds in each group by the total number of bonds traded in the sub-sample. Notice that a bond that trades on both systems is counted among the ATS as well as the OTC sub-samples.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories taken from Billett et al. (2007) are reproduced in Table I in Appendix A.

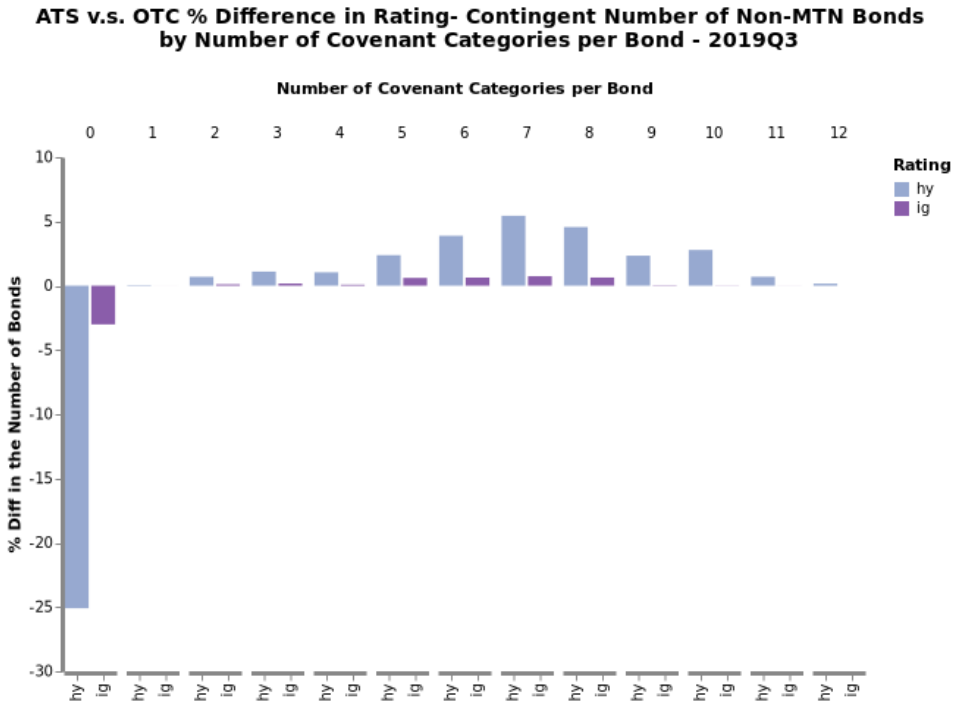
Figure 15. Trading-System Specific Share of Bonds by Covenant Category-Count and Credit Rating



The sample consists of all corporate bonds, excluding medium-term notes (MTNs), that were traded in 2019Q3. I assign each covenant in a bond to one of the categories taken from Billett et al. (2007). Next, for each bond I count the number of distinct categories among its covenants. I then split the sample into bonds that were traded in the Alternative Trading System (ATS) and bonds that were traded via the voice OTC system. In each sub-sample, I group the bonds by their number of distinct covenant categories and credit rating. Finally, I divide the number of bonds in each category-count and rating group by the total number of bonds traded in the same trading system and credit rating. Notice that a bond that trades on both systems is counted among the ATS as well as the OTC sub-samples.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories taken from Billett et al. (2007) are reproduced in Table I in Appendix A.

Figure 16. Trading-System Share Differential of Bonds by Covenant Category-Count and Credit Rating

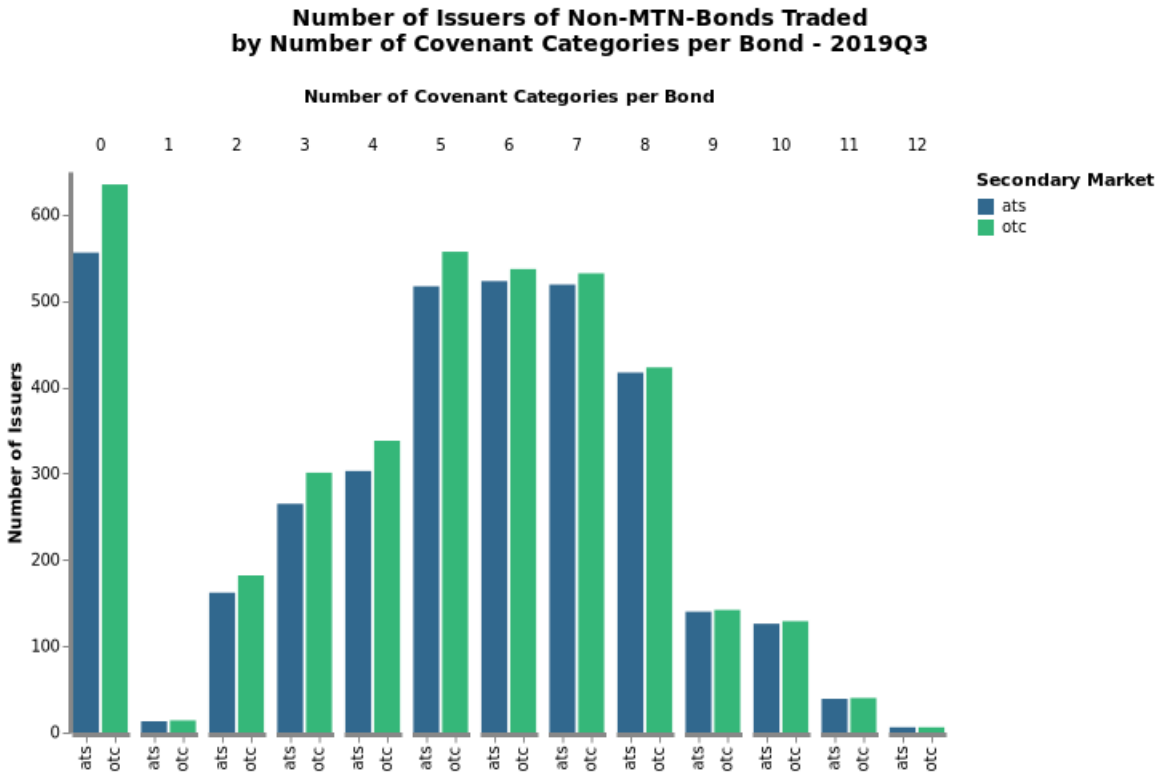


The sample consists of all corporate bonds, excluding medium-term notes (MTNs), that were traded in 2019Q3. I assign each covenant in a bond to one of the categories taken from Billett et al. (2007). Next, for each bond I count the number of distinct categories among its covenants. I then split the sample into bonds that were traded in the Alternative Trading System (ATS) and bonds that were traded via the voice OTC system. In each sub-sample, I group the bonds by their number of distinct covenant categories and credit rating. Next, I divide the number of bonds in each category-count and rating group by the total number of bonds traded in the same system and credit rating, as in figure 15. Finally, I take the difference between the ATS and OTC covenant-category-count and credit-rating-specific groups. Notice that a bond that trades on both systems is counted among the ATS as well as the OTC sub-samples.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories taken from Billett et al. (2007) are reproduced in Table I in Appendix A.

B.2.2 Issuers

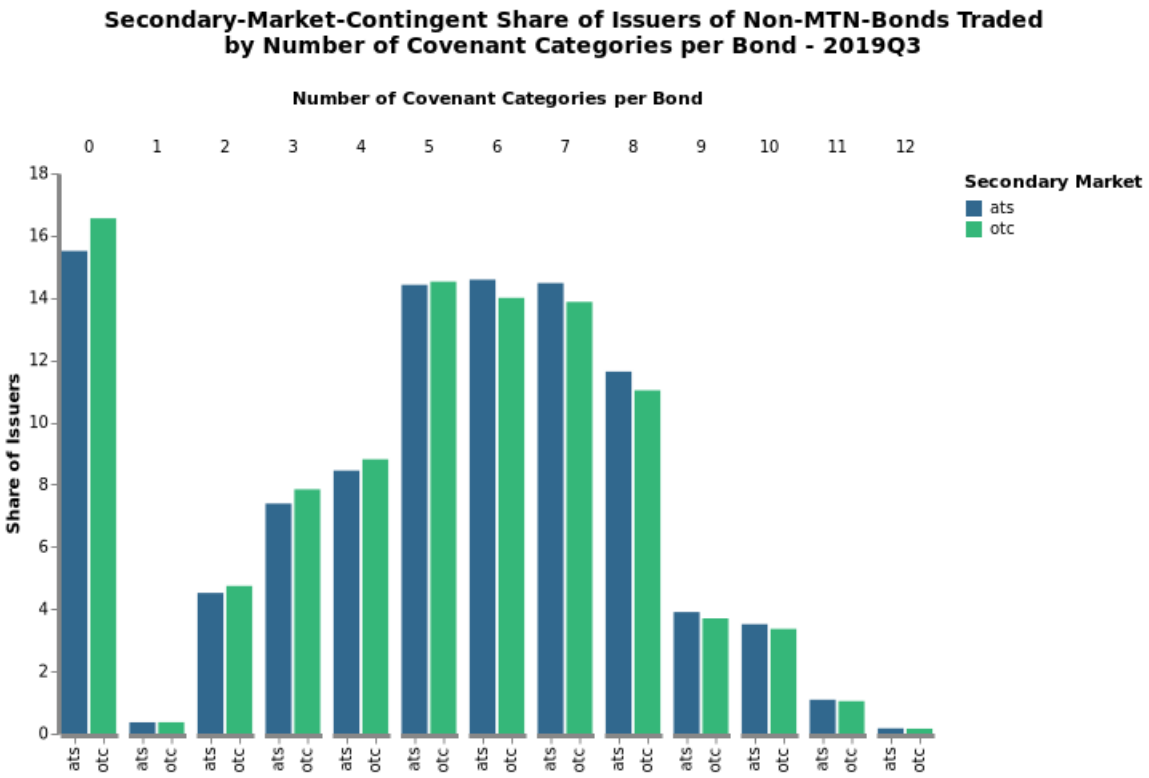
Figure 17. Number of Issuers by Covenant Category-Count and Secondary Trading System



The sample consists of all corporate bonds, excluding medium-term notes (MTNs), that were traded in 2019Q3. I assign each covenant in a bond to one of the categories taken from Billett et al. (2007). Next, for each bond I count the number of distinct categories among its covenants. I then split the sample into bonds that were traded in the Alternative Trading System (ATS) and bonds that were traded via the voice OTC system. Finally, in each sub-sample, I group the bonds by their number of distinct covenant categories and count the number of unique issuers within each group. Notice that a bond that trades on both systems is counted among the ATS as well as the OTC sub-samples.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories taken from Billett et al. (2007) are reproduced in Table I in Appendix A.

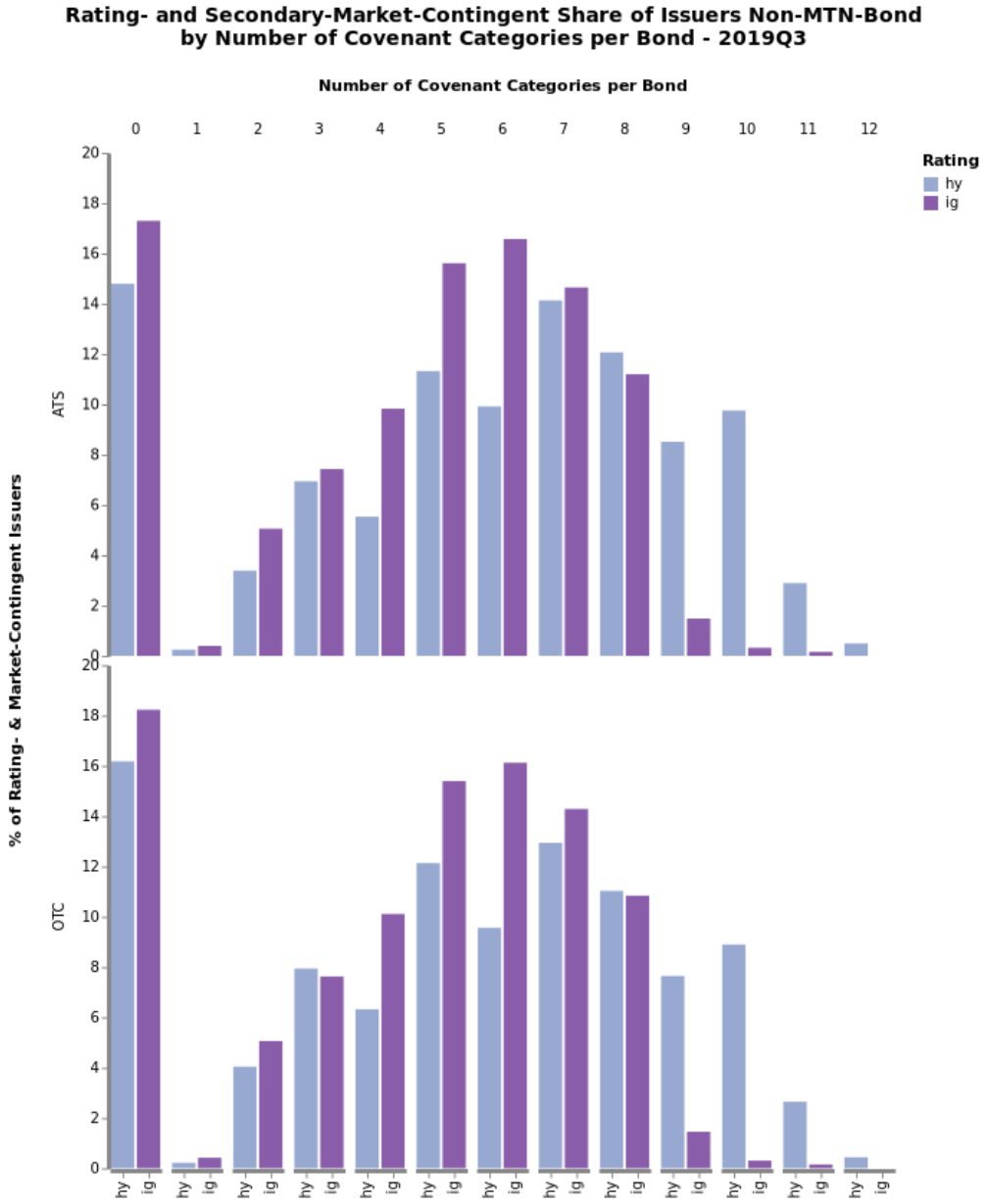
Figure 18. Share of Issuers by Covenant Category-Count and Secondary Trading System



The sample consists of all corporate bonds, excluding medium-term notes (MTNs), that were traded in 2019Q3. I assign each covenant in a bond to one of the categories taken from Billett et al. (2007). Next, for each bond I count the number of distinct categories among its covenants. I then split the sample into bonds that were traded in the Alternative Trading System (ATS) and bonds that were traded via the voice OTC system. Finally, in each sub-sample, I (i) group the bonds by their number of distinct covenant categories, (ii) count the number of unique issuers within each group, and (iii) divide it by the total count of issuers in the sub-sample. Notice that a bond that trades on both systems is counted among the ATS as well as the OTC sub-samples.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories taken from Billett et al. (2007) are reproduced in Table I in Appendix A.

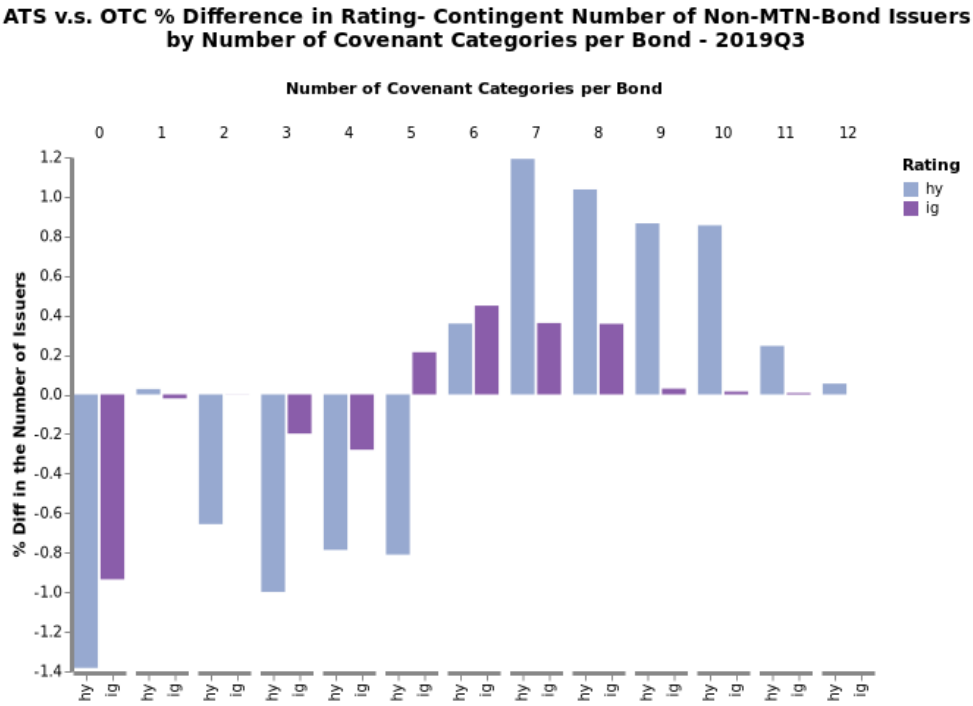
Figure 19. Trading-System Specific Share of Issuers by Covenant Category-Count and Credit Rating



The sample consists of all corporate bonds, excluding medium-term notes (MTNs), that were traded in 2019Q3. I assign each covenant in a bond to one of the categories taken from Billett et al. (2007). Next, for each bond I count the number of distinct categories among its covenants. I then split the sample into bonds that were traded in the Alternative Trading System (ATS) and bonds that were traded via the voice OTC system. In each sub-sample, I group the bonds by their number of distinct covenant categories and credit rating. Finally, I count the number of unique issuers within each group, and divide it by the total count of issuers in the same trading system and credit rating. Notice that a bond that trades on both systems is counted among the ATS as well as the OTC sub-samples.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories taken from Billett et al. (2007) are reproduced in Table I in Appendix A.

Figure 20. Trading-System Share of Issuers Differential by Covenant Category-Count and Credit Rating

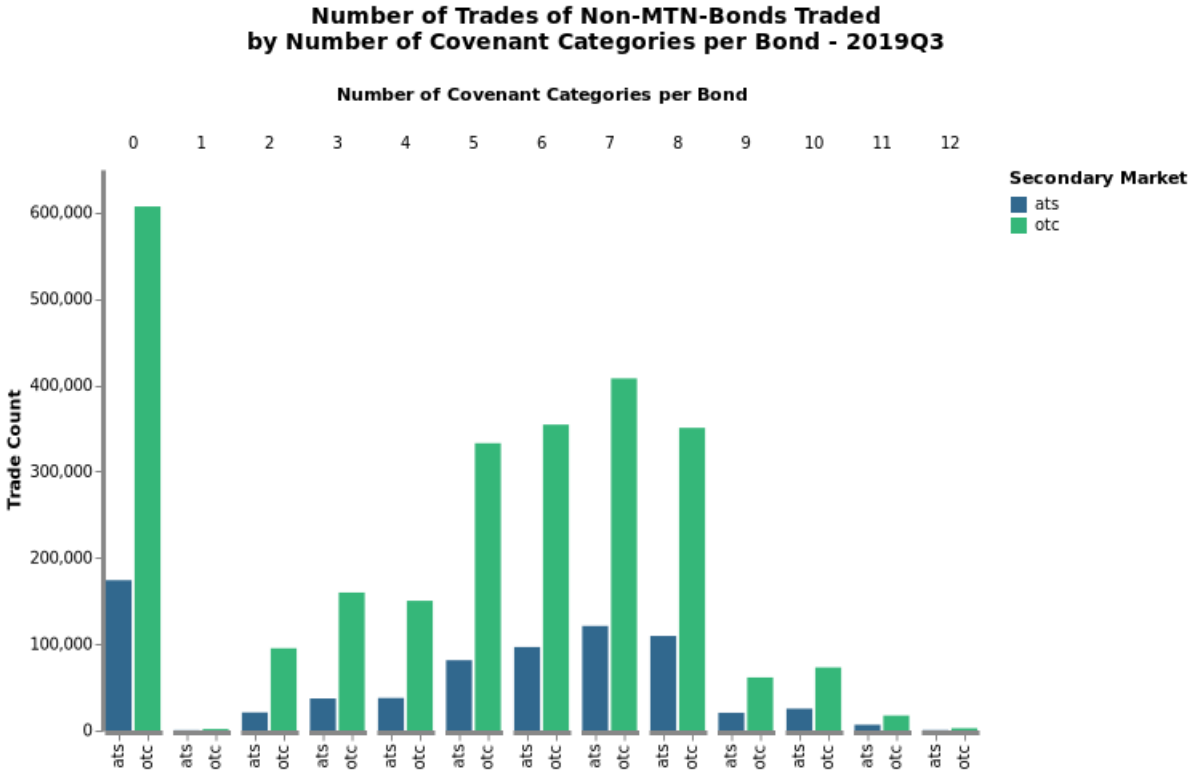


The sample consists of all corporate bonds, excluding medium-term notes (MTNs), that were traded in 2019Q3. I assign each covenant in a bond to one of the categories taken from Billett et al. (2007). For each bond I count the number of distinct categories among its covenants. I then split the sample into bonds that were traded in the Alternative Trading System (ATS) and bonds that were traded via the voice OTC system. In each sub-sample, I group the bonds by their number of distinct covenant categories and credit rating. Next, I count the number of unique issuers within each group, and divide it by the total count of issuers in the same trading system and credit rating, as in figure 19. Finally, I take the difference between the ATS and OTC covenant-category-count and credit-rating-specific groups. Notice that a bond that trades on both systems is counted among the ATS as well as the OTC sub-samples.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories taken from Billett et al. (2007) are reproduced in Table I in Appendix A.

B.2.3 Trade Count

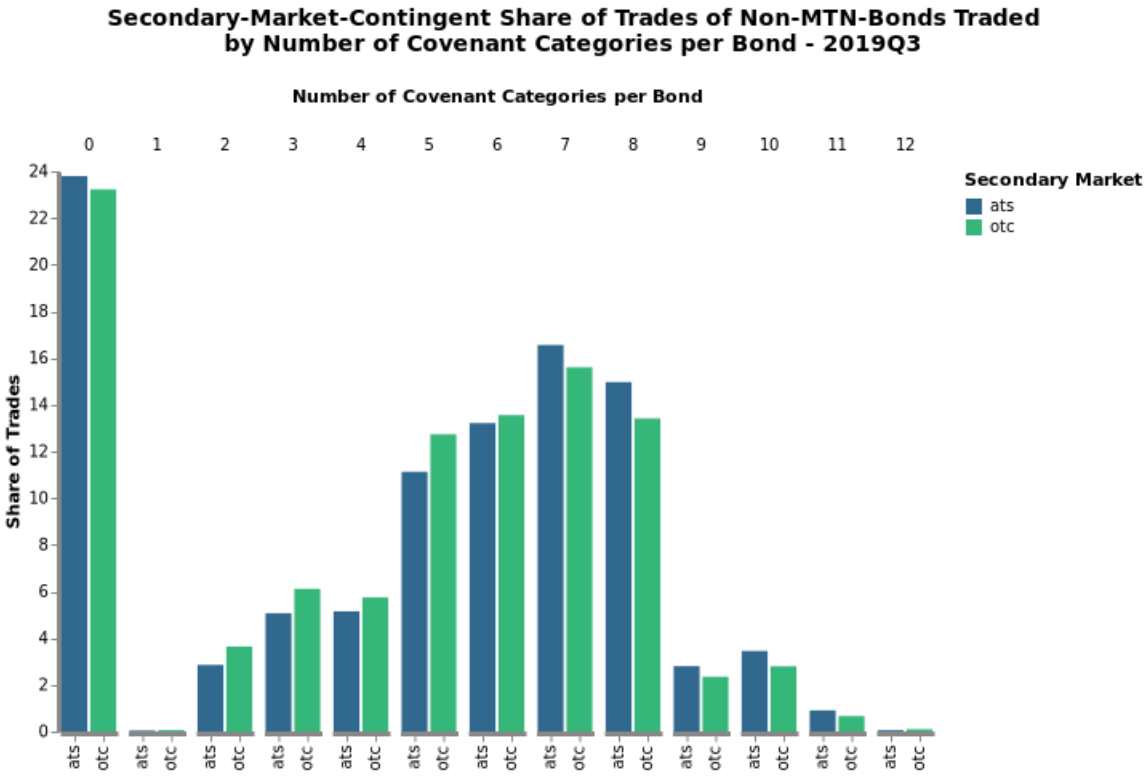
Figure 21. Trade Count by Covenant Category-Count and Secondary Trading System



The sample consists of all corporate bonds, excluding medium-term notes (MTNs), that were traded in 2019Q3. I assign each covenant in a bond to one of the categories taken from Billett et al. (2007). Next, for each bond I count the number of distinct categories among its covenants. I then split the sample into bonds that were traded in the Alternative Trading System (ATS) and bonds that were traded via the voice OTC system. Finally, in each sub-sample, I group the bonds by their number of distinct covenant categories and count the number of trades within each group. Notice that a bond that trades on both systems is present in both the ATS as well as the OTC sub-samples, but trades are computed only once.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories taken from Billett et al. (2007) are reproduced in Table I in Appendix A.

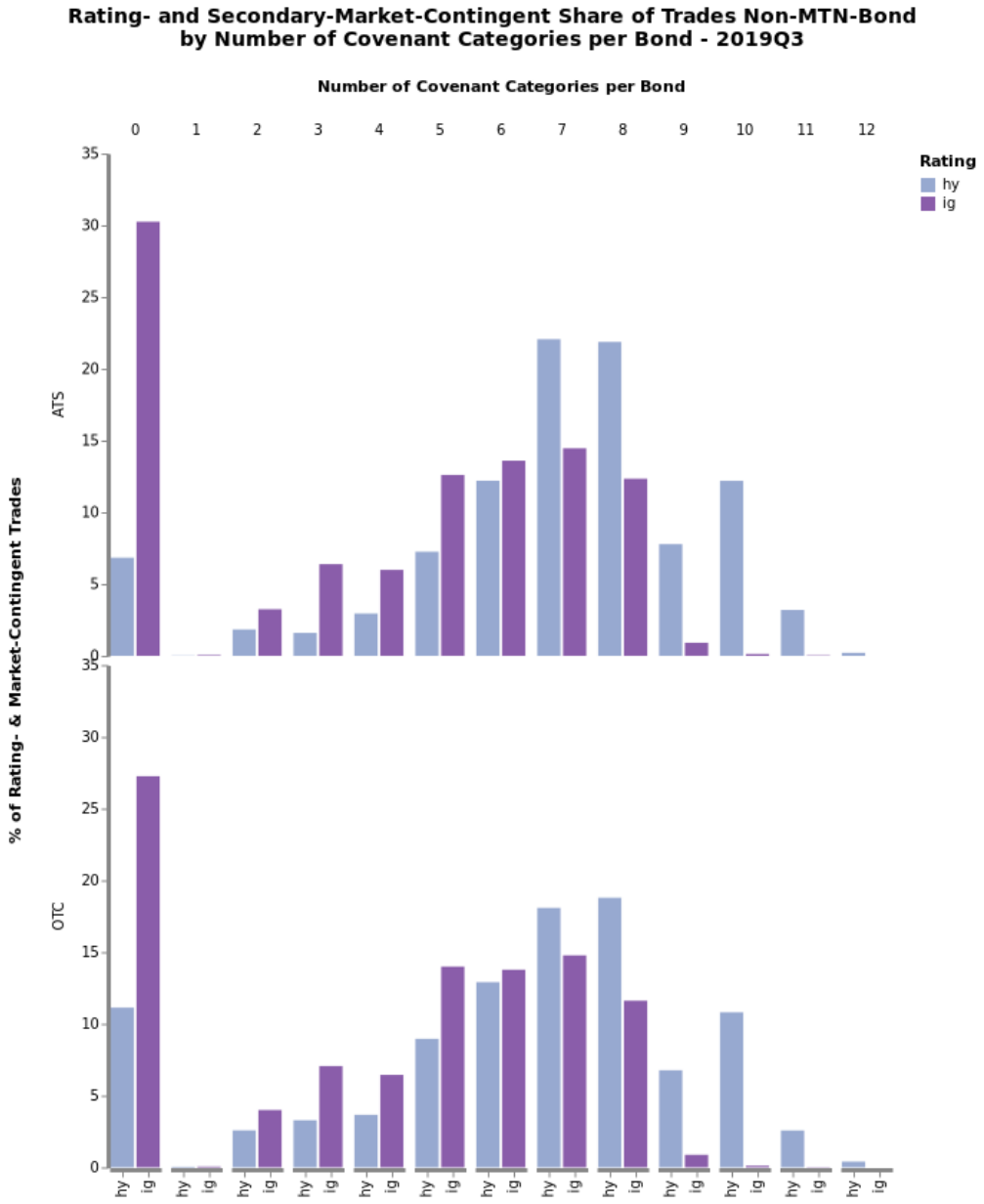
Figure 22. Share of Trades by Covenant Category-Count and Secondary Trading System



The sample consists of all corporate bonds, excluding medium-term notes (MTNs), that were traded in 2019Q3. I assign each covenant in a bond to one of the categories taken from Billett et al. (2007). Next, for each bond I count the number of distinct categories among its covenants. I then split the sample into bonds that were traded in the Alternative Trading System (ATS) and bonds that were traded via the voice OTC system. Finally, in each sub-sample, I (i) group the bonds by their number of distinct covenant categories, (ii) count the number of trades within each group, and (iii) divide it by the total number of trades in the sub-sample. Notice that a bond that trades on both systems is present in both the ATS as well as the OTC sub-samples, but trades are computed only once.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories taken from Billett et al. (2007) are reproduced in Table I in Appendix A.

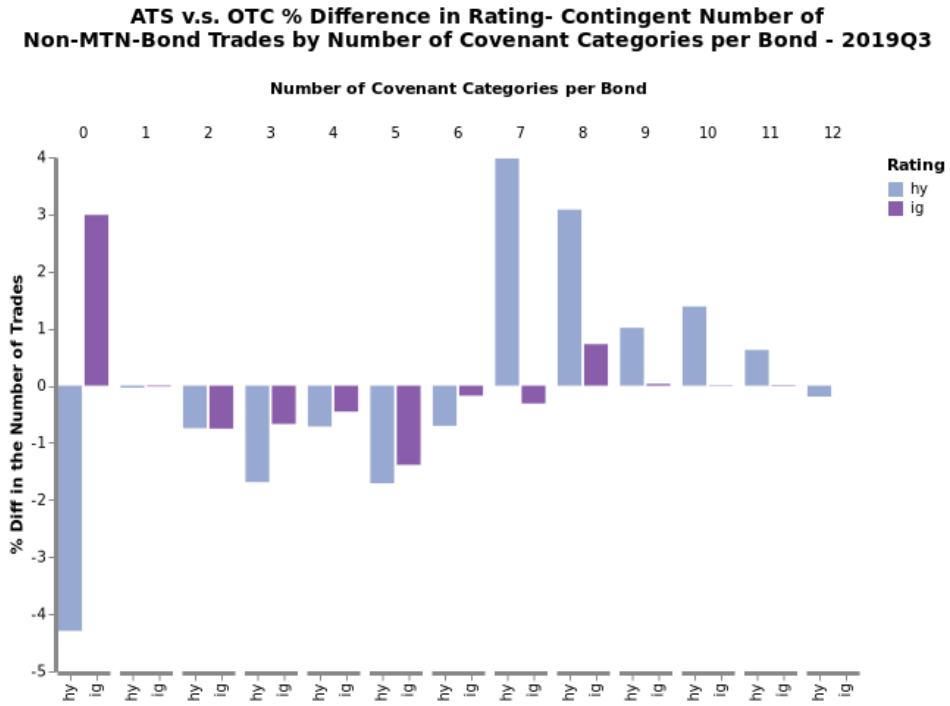
Figure 23. Trading-System Specific Share of Trades by Covenant Category-Count and Credit Rating



The sample consists of all corporate bonds, excluding medium-term notes (MTNs), that were traded in 2019Q3. I assign each covenant in a bond to one of the categories taken from Billett et al. (2007). Next, for each bond I count the number of distinct categories among its covenants. I then split the sample into bonds that were traded in the Alternative Trading System (ATS) and bonds that were traded via the voice OTC system. In each sub-sample, I group the bonds by their number of distinct covenant categories and credit rating. Finally, I count the trades each group, and divide it by the total number of trades in the same trading system and credit rating. Notice that a bond that trades on both systems is counted among the ATS as well as the OTC sub-samples, but trades are computed only once.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories taken from Billett et al. (2007) are reproduced in Table I in Appendix A.

Figure 24. Trading-System Trade Count Differential by Covenant Category-Count and Credit Rating

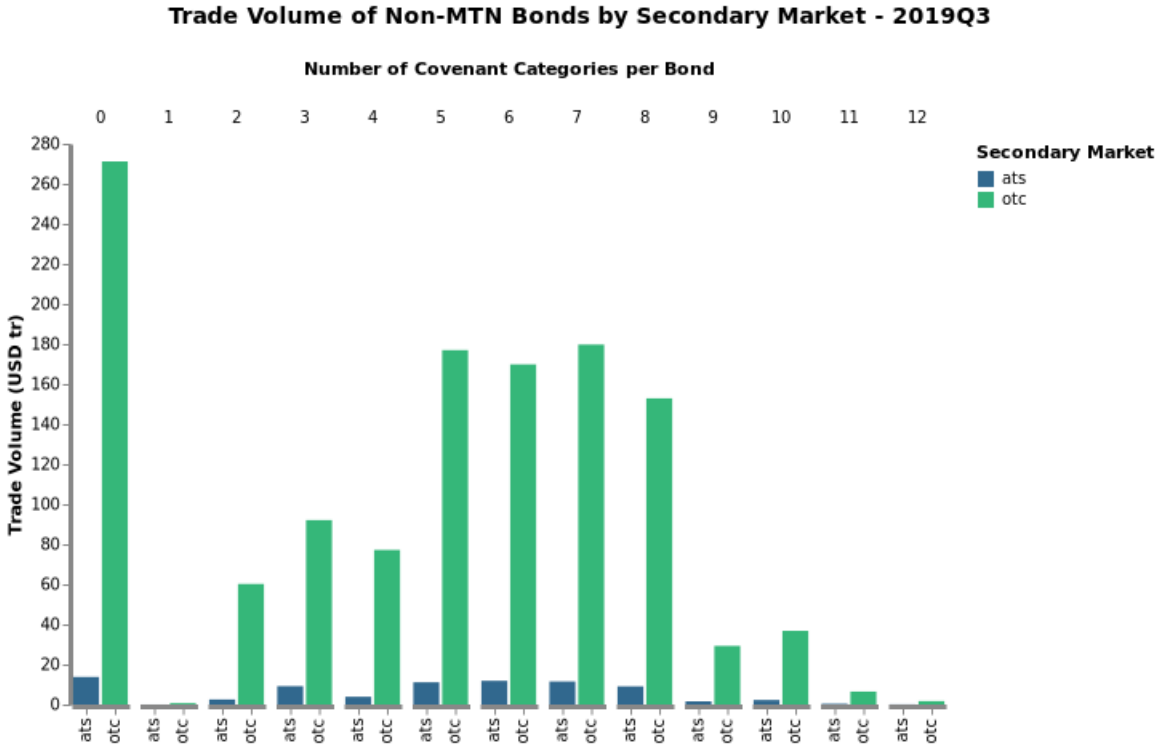


The sample consists of all corporate bonds, excluding medium-term notes (MTNs), that were traded in 2019Q3. I assign each covenant in a bond to one of the categories taken from Billett et al. (2007). For each bond I count the number of distinct categories among its covenants. I then split the sample into bonds that were traded in the Alternative Trading System (ATS) and bonds that were traded via the voice OTC system. In each sub-sample, I group the bonds by their number of distinct covenant categories and credit rating. Next, I count the trades within each group, and divide it by the total trade count in the same trading system and credit rating, as in figure 19. Finally, I take the difference between the ATS and OTC covenant-category-count and credit-rating-specific groups. Notice that a bond that trades on both systems is counted among the ATS as well as the OTC sub-samples, but trades are computed only once.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories taken from Billett et al. (2007) are reproduced in Table I in Appendix A.

B.2.4 Trade Volume

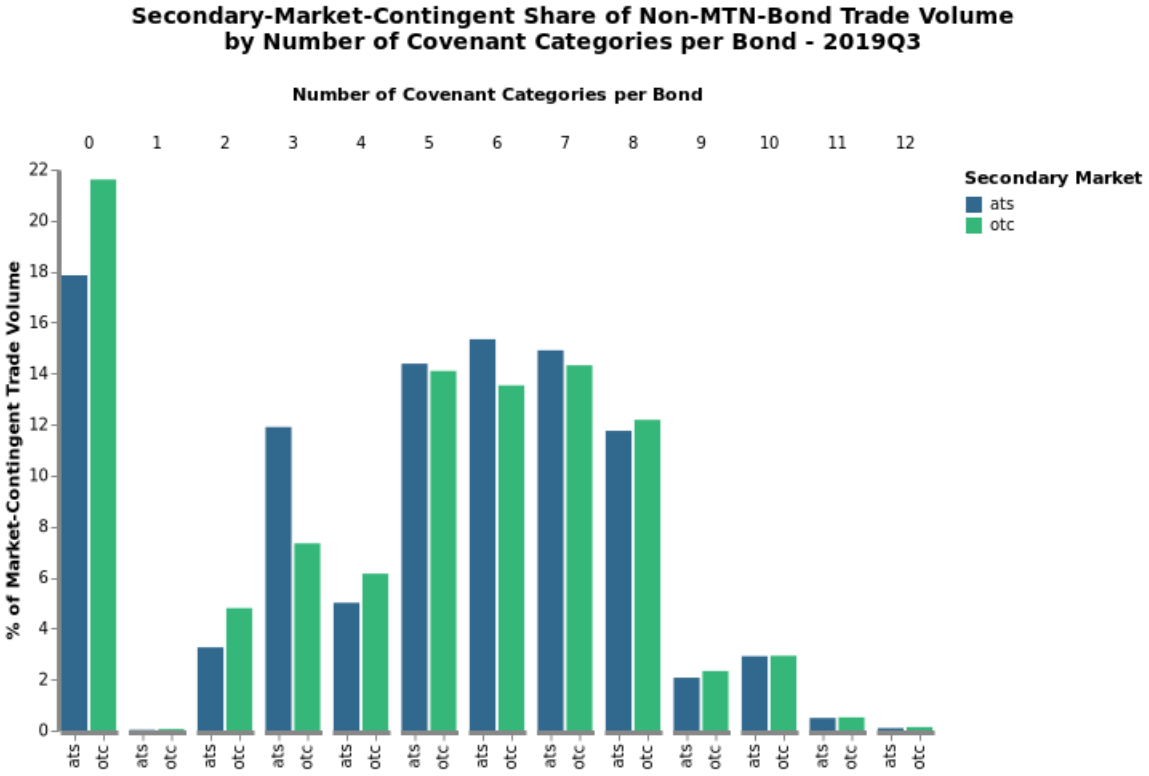
Figure 25. Trade Volume by Covenant Category-Count and Secondary Trading System



The sample consists of all corporate bonds, excluding medium-term notes (MTNs), that were traded in 2019Q3. I assign each covenant in a bond to one of the categories taken from Billett et al. (2007). Next, for each bond I count the number of distinct categories among its covenants. I then split the sample into bonds that were traded in the Alternative Trading System (ATS) and bonds that were traded via the voice OTC system. Finally, in each sub-sample, I group the bonds by their number of distinct covenant categories and compute the trade volume in USD tn within each group. Notice that a bond that trades on both systems is present in both the ATS as well as the OTC sub-samples, but trades are computed only once.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories taken from Billett et al. (2007) are reproduced in Table I in Appendix A.

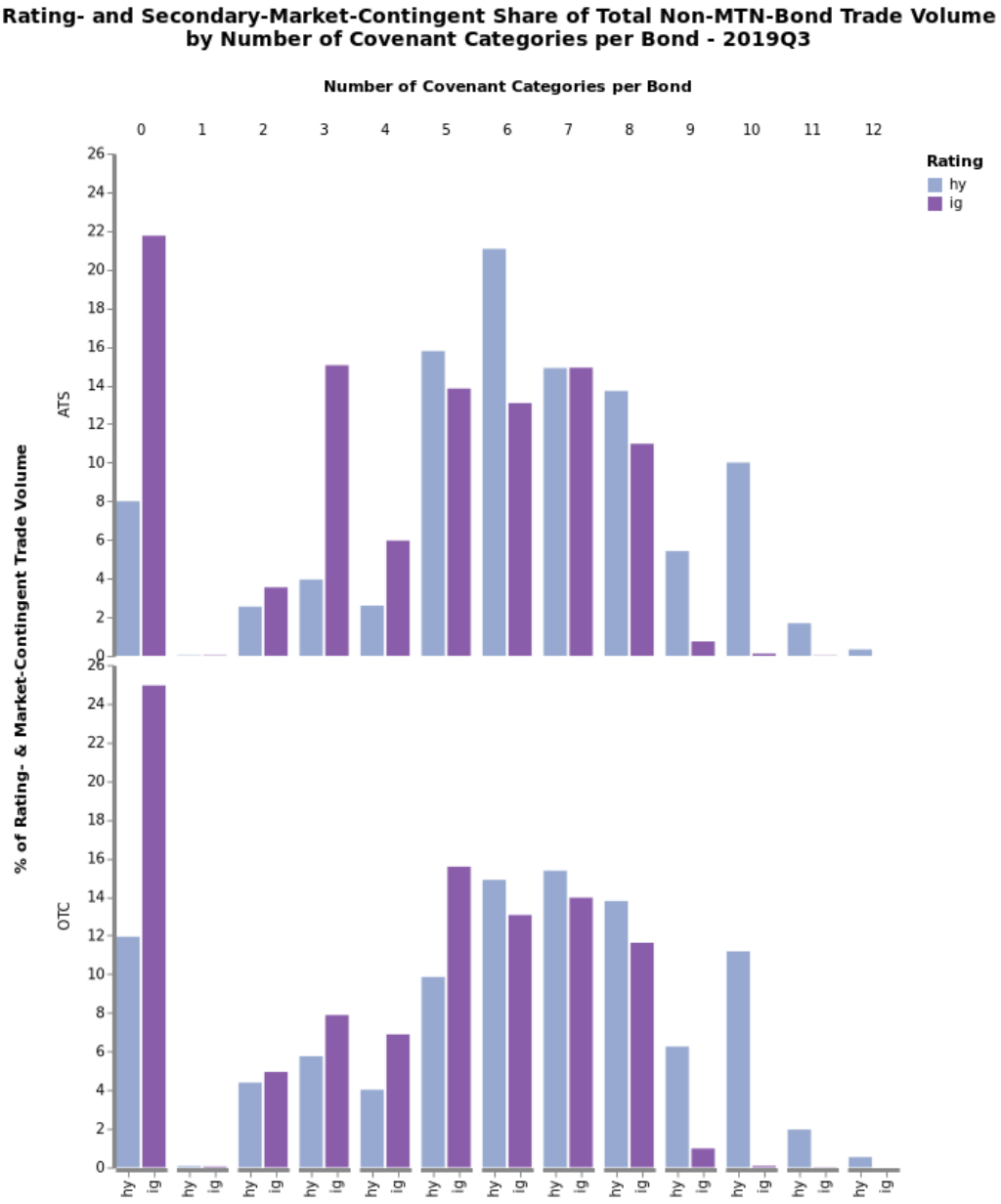
Figure 26. Trade Volume Share by Covenant Category-Count and Secondary Trading System



The sample consists of all corporate bonds, excluding medium-term notes (MTNs), that were traded in 2019Q3. I assign each covenant in a bond to one of the categories taken from Billett et al. (2007). Next, for each bond I count the number of distinct categories among its covenants. I then split the sample into bonds that were traded in the Alternative Trading System (ATS) and bonds that were traded via the voice OTC system. Finally, in each sub-sample, I (i) group the bonds by their number of distinct covenant categories, (ii) compute the trade volume within each group, and (iii) divide it by the total trade volume in the sub-sample. Notice that a bond that trades on both systems is present in both the ATS as well as the OTC sub-samples, but trades are computed only once.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories taken from Billett et al. (2007) are reproduced in Table I in Appendix A.

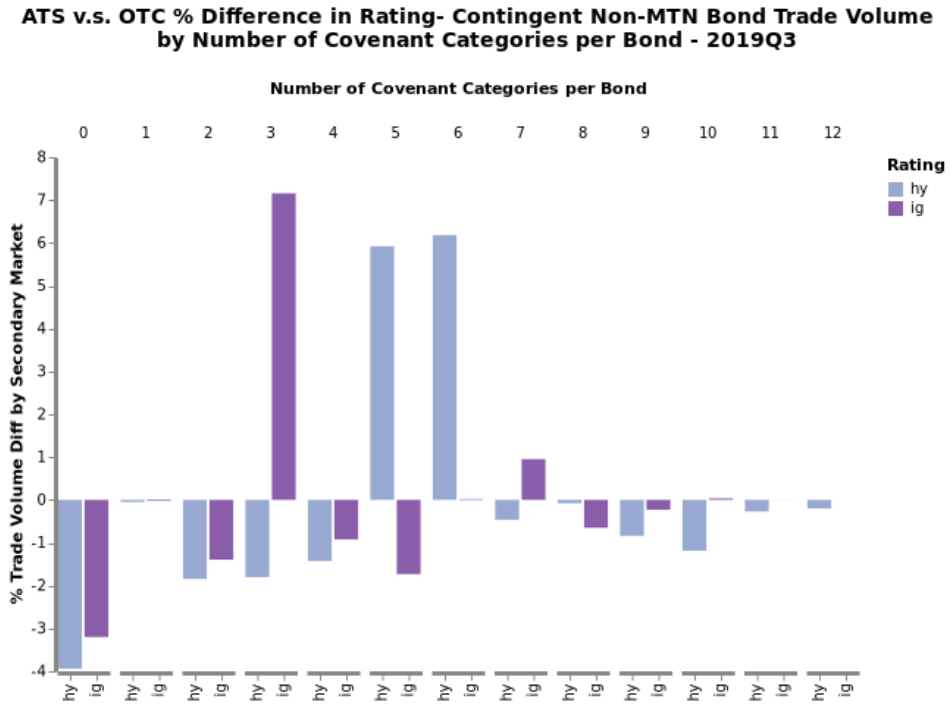
Figure 27. Trading-System Specific Trade Volume by Covenant Category-Count and Credit Rating



The sample consists of all corporate bonds, excluding medium-term notes (MTNs), that were traded in 2019Q3. I assign each covenant in a bond to one of the categories taken from Billett et al. (2007). Next, for each bond I count the number of distinct categories among its covenants. I then split the sample into bonds that were traded in the Alternative Trading System (ATS) and bonds that were traded via the voice OTC system. In each sub-sample, I group the bonds by their number of distinct covenant categories and credit rating. Finally, I compute the trade volume each group, and divide it by the total trade volume in the same trading system and credit rating. Notice that a bond that trades on both systems is counted among the ATS as well as the OTC sub-samples, but trades are computed only once.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories taken from Billett et al. (2007) are reproduced in Table I in Appendix A.

Figure 28. Trading-System Trade Trade Volume Differential by Covenant Category-Count and Credit Rating



The sample consists of all corporate bonds, excluding medium-term notes (MTNs), that were traded in 2019Q3. I assign each covenant in a bond to one of the categories taken from Billett et al. (2007). For each bond I count the number of distinct categories among its covenants. I then split the sample into bonds that were traded in the Alternative Trading System (ATS) and bonds that were traded via the voice OTC system. In each sub-sample, I group the bonds by their number of distinct covenant categories and credit rating. Next, I compute the trade volume within each group, and divide it by the total trade volume in the same trading system and credit rating, as in figure 19. Finally, I take the difference between the ATS and OTC covenant-category-count and credit-rating-specific groups. Notice that a bond that trades on both systems is counted among the ATS as well as the OTC sub-samples, but trades are computed only once.

The trading data comes from FINRA's TRACE-Enhanced dataset, while information on individual bonds is obtained from the MERGENT Fixed Investment Securities Database (FISD). Medium-term notes are excluded from the analysis since FISD does not record covenant information for MTNs (see section I.) The covenant categories taken from Billett et al. (2007) are reproduced in Table I in Appendix A.