Restricted Investor Access and the Cost of Debt: The Case of Privately Placed Bonds*

Tanja Artiga González[1], Alexey Ivashchenko[†1], Herbert Rijken[1] and Marc Schauten[1]

[1]VU Amsterdam

November 2026

Abstract

This paper studies how restricting investor access to the corporate bond market affects U.S. firms' cost of debt. Exploiting the 2020 SEC reform that opened the Rule 144A market for privately placed bonds to previously excluded investors, we find that the yield spread gap between privately and publicly placed bonds at issuance narrows by 18 basis points after the reform. This reduction is concentrated in investment-grade bonds and extends to secondary market bond prices, in line with lower compensation for resale risk in private bonds. For speculative-grade bonds, private-public yield spread gap at the secondary market widens by 30 basis points after the reform. Changes in speculative-grade bonds' ownership and trading activity link the effect to the correction of pre-reform mispricing in a previously segmented market. Investment-grade firms respond to improved borrowing terms by increasing leverage and shareholder payouts. Speculative-grade firms experience no significant improvement in issuance costs or corresponding change in financing policy.

Keywords: privately placed bonds, Rule 144A, restricted access securities, market segmentation, over-the-counter markets, liquidity
JEL Classification: G12, G14, G32

*We are indebted to Stas Nikolova for a thorough discussion of an early version of the paper. We also thank Nan Qin, Adam Zawadowski, seminar attendees at VU Amsterdam, and conference participants (FMA Europe 2026) for valuable comments. An earlier draft of the paper was circulated under the title 'Secondary Market Liquidity and the Cost of Debt: The Case of Privately Placed Bonds'.

[†]Corresponding author. Mail: Alexey.Ivashchenko@vu.nl

Introduction

Free access to securities markets is not a given. Examples of access restrictions are numerous, ranging from complicated instruments inaccessible to retail investors to local stock markets closed to foreign investors. We study whether the effects of access restrictions propagate to the cost of external financing for firms whose securities trade in restricted-access markets, and whether the issuers benefit from the relaxation of access restrictions.

We compare and contrast U.S. corporate bonds with and without investor restrictions. The former trade in the market for privately placed bonds, which allows only sufficiently large and sophisticated investors. The latter trade in the regular market for publicly placed bonds. A recent regulatory reform lifted certain access restrictions, increasing the pool of potential buyers in the market for privately placed bonds. We find that broader investor access has different effects across credit classes. Investment-grade firms benefit from lower borrowing costs, while speculative-grade firms see no significant improvement. In the secondary market, existing speculative-grade private bonds trade at an even wider discount to comparable public bonds after the reform. These findings suggest that market liberalization does not uniformly benefit issuers or existing bondholders.

The private placement market in question is subject to SEC Regulation D and Rule 144A. Reg D restricts access to the primary private placement market (only large and sophisticated investors are allowed), while Rule 144A regulates the secondary market (resale is only allowed to the largest of Reg D-eligible investors).[1] Reg D/Rule 144A bonds account for 30% of bond issuance among investment-grade (IG) firms and 80% among speculative-grade (high-yield, HY) ones since 2015. In summer 2020, the SEC amended the definition of eligible buyers under Reg D and Rule

[1] Public placements in the U.S. are subject to SEC registration requirements, which impose extensive information disclosure on the issuer. Private bond placements under Reg D are exempt from registration, resulting in less mandatory disclosure. Access restrictions are thus motivated by relative informational opacity and riskiness of privately placed bonds.

144A, formally granting market access to large family offices, registered investment advisors, and limited liability companies (a popular incorporation form among hedge fund managers).[2] We exploit the reform as a quasi-natural experiment, comparing bond yield spreads, ownership, and trading activity in affected (R144A) and non-affected (publicly placed) bonds before and after the policy change. We treat the reform as a unique investor participation shock, which is exogenous to the issuers' pre-reform characteristics.

We study the effects of the reform both in primary and secondary bond markets. In the primary market, controlling for a wide range of confounding factors, we find a pre-reform yield spread gap between privately and publicly placed bonds of 42 basis points (bps), which shrinks by 18 bps (or 43% of the pre-reform level) post-reform. Privately placed bonds are traded at a discount to publicly placed ones, but less so after 2020. This drop in the private-placement discount is driven primarily by IG issuers. The reform does not affect HY borrowers: they place new private bonds after 2020 at the same discount to public ones as before 2020.

Primary-market evidence is, in principle, subject to endogeneity concerns, as the reform may change firms' incentives to place bonds privately. To address this concern, we study how the reform affects secondary-market prices of R144A bonds issued *before the reform*, as compared to non-R144A bonds, which we believe identifies the causal effect of market liberalization. In the sample of monthly prices of bonds issued before 2020, we find the average pre-reform private-public yield spread gap of 28 bps, which shrinks by the same 18 bps post-2020. However, the difference between IG and HY bonds is striking. While the IG private-public gap drops significantly to around 30% of its pre-reform level, the HY gap increases by at least 30 bps. The latter effect is the strongest

[2]Gaps in bond holdings data, uncodified interpretations of pre-reform access restrictions, and no reporting requirement for Reg D/Rule 144A eligibility on the investor side make it difficult to assess the size of the group of investors newly admitted to the private bond market, as the SEC states itself in the analysis of anticipated effects of the reform (see Section 6.B here). A common perception is that the expansion of the investor base was 'modest' (see, for instance, this comment from the legal community).

for bonds issued by non-financial firms and for those whose issuers lack an actively traded CDS contract.

To investigate the mechanisms that may explain shifts in the private-placement discount, we analyze changes in bond ownership and trading activity around the reform. In particular, we examine *residual bond ownership*: the portion of a bond's outstanding amount not accounted for in reported holdings of core bond investors (pension funds, insurance companies, and mutual funds). We assume that this proxy correlates with ownership by newly admitted investors.[3] We find that the residual ownership is greater for R144A bonds pre-reform in both primary and secondary-market samples. For IG bonds, such private-public gap in residual ownership decreases after 2020. Post-reform, core investors allocate more to R144A bonds (relative to non-R144As), consistent with easier re-trading and a compressed illiquidity risk premium, which aligns with the narrowing of the IG private placement yield-spread discount. Evidently, investors who did not face access restrictions before the reform are the ones participating more actively in the IG R144A market after the reform.

For HY bonds, conversely, the private-public residual ownership gap increases substantially (in the secondary market sample only, null effect at issuance): from about 6.5% of the bond outstanding amount pre-reform to 8% post-reform. The fact that private placements become cheaper and residual ownership increases in the segment of more informationally opaque and hard-to-arbitrage bonds (HY ones, without liquid CDS contracts on the bond issuer) and only in the secondary market suggests that market segmentation rather than resale liquidity is the mechanism at play here. New investors entering the market effectively reprice HY debt post-reform, something they could not easily do before 2020 because of the scarcity of non-R144A HY debt. The dynamics of HY R144A trading activity and liquidity metrics align with this mechanism. HY R144A bonds

[3]Insurers, pension funds, and mutual funds were predominantly allowed in the R144A market before the reform.

trade more actively post-2020 (compared to the respective change in non-R144A bonds), but at higher realized bid-ask spreads and with higher return volatility: a pattern consistent with greater participation by information-sensitive rather than liquidity-driven investors.

We also examine how firms respond to changing borrowing conditions following the reform. Investment-grade firms, the main beneficiaries of the R144A change, increase leverage, especially if they had a larger share of private bonds in total debt outstanding pre-reform. In contrast, speculative-grade firms do not increase leverage, consistent with their borrowing conditions not improving amid R144A market liberalization. Investment-grade borrowers with larger reform exposure also increase shareholder payouts more, while keeping capital expenditures unchanged. This suggests these firms use improved financing conditions to optimize their capital structure and return cash to shareholders rather than expand investment.

Our results contribute, on the one hand, to the literature on the effects of securities market liberalization, and, on the other hand, to the studies of the link between securities market liquidity and the cost of external financing. The former literature, long-established, has focused primarily on cross-border restrictions on stock market investments, providing both market-wide (for instance, Henry 2000, Bekaert and Harvey 2000, Kim and Singal (2000)) and firm-level (for instance, Stulz and Wasserfallen 1995, Domowitz et al. 1997, Chari and Henry 2004) evidence. The consensus in this literature is that liberalization typically raises asset prices by reducing market segmentation and improving risk-sharing. Our contribution is an arguably clean identification of the effect of changing access restrictions beyond cross-border rules (which typically coincide with substantial macroeconomic shifts and are, thus, foreseen by security issuers). In contrast to the previous literature, we find that liberalization does not necessarily raise asset prices, as high-yield bond issuers mostly see their borrowing conditions deteriorate after the opening of the R144A market. Consistent with the literature, we attribute this effect to pre-liberalization market segmentation,

which in our setting allows less information-sensitive investors to drive up prices in a restricted market.

The literature on the link between securities liquidity and the cost of external financing (hence, firm value) is likewise extensive and long-standing. It largely focuses on the relation between stock liquidity and firm value, with theoretical foundations laid out, among others, in Diamond and Verrecchia (1991) and Holmstrom and Tirole (2001), while Amihud and Mendelson (1986), Fang et al. (2009), and Cheung et al. (2015) provide empirical results. The equity literature finds that greater liquidity improves firm value, but it mainly emphasizes the information, agency, and corporate governance aspects of the problem. Our results complement the literature by focusing on how non-informational trading frictions affect firms' borrowing costs. Exploiting a novel policy shock that has not been previously studied in the academic literature, we empirically link exogenous variation in investors' access to the secondary OTC bond market to issuers' cost of debt. As the relaxation of access restrictions to R144A bonds arguably facilitates trading counterparty search and matching, our results also relate to studies of search costs in OTC markets and their implications for bond prices (Duffie et al. 2005 and Duffie et al. 2007 develop the theory, while Friewald and Nagler 2019 shows it is consistent with the cross-section of corporate bond prices). In addition, our results on the permanent pricing effects of changes in the R144A bond investor pool and holdings connect our findings to the literature on demand-driven implications of institutional bond ownership (for instance, Koijen and Yogo 2023 and Bretscher et al. 2026).

A growing literature examines pricing and ownership patterns specifically for privately placed bonds. Livingston and Zhou (2002) evaluate the private placement discount in R144A bonds and link it to a mix of liquidity and informational factors. Huang and Ramírez (2010) establish the superior role of private placements for speculative-grade firms valuing the speed of bond issuance. Han et al. (2022) discuss reduced information asymmetry when existing privately placed bonds

are registered and thus become public placements, with corresponding liquidity benefits. Choi et al. (2025) find that searching-for-yield mutual funds tend to allocate to privately placed bonds, attracted by the private-placement discount. We contribute to this literature by linking the private-placement discount to ownership changes amid an exogenous market-access shock.

This paper is organized as follows. Section 1 discusses the institutional details of the R144A market, our identification approach, and the data used. Sections 2 and 3 present empirical results in the primary and secondary markets, respectively. Section 4 discusses how firms adjust their policies following market access changes under Rule 144A and Reg D. Section 5 concludes.

1 Research design

1.1 SEC-regulated private debt placement and re-trade

According to the Securities Act of 1933, primary market offerings of securities in the U.S. must be registered with the SEC. Security issuers, as part of the registration process, have to disclose a lot of information about the firm, which is meant to protect prospective investors from securities fraud. Most stock and corporate bond offerings in the U.S. are thus SEC-registered.

There are exemptions from the Securities Act of 1933. Several regulations relax the information disclosure requirement by restricting access to primary and secondary securities markets to sufficiently qualified investors. In particular, under Rule 506(b) of the SEC Regulation D, newly issued securities can be sold to 'accredited investors' (AI, individuals and entities satisfying net worth and sophistication requirements) without SEC registration.[4] Such issues are known as 'private placements'. Being protected offerings, Reg-D securities can not, in principle, be resold on the secondary market. However, SEC Rule 144A enables the resale of privately placed securities to 'qualified in-

[4]Registration exemptions are discussed in Section 4(a)(2) of the Securities Act of 1933, and Rule 506(b) of Reg D was introduced to provide a 'safe harbor' for the implementation of Section 4(a)(2).

stitutional buyers' (QIB), who are also required to be sufficiently wealthy and sophisticated. A possibility of resale under Rule 144A must be specified in the private placement memorandum (a counterpart of a public offering prospectus) filed at issuance.

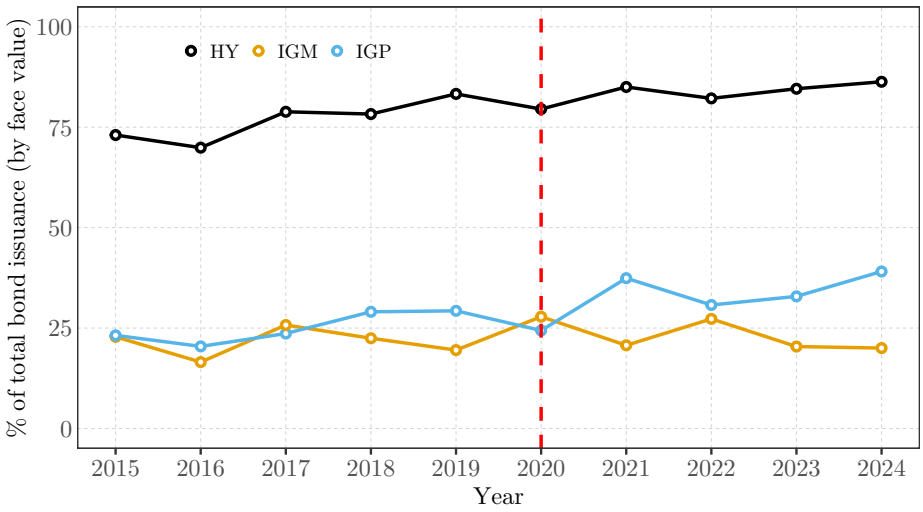


Figure 1: **Rule 144A bonds in new corporate bond issuance, by issuer credit class.** On the y-axis is the R144A bond issuance in percentage of all new corporate bond issuance (by dollar face value). The x-axis shows the issuance year. The sample consists of corporate debentures and corporate medium-term notes. The lines correspond to credit classes: IGP is bonds rated between AAA and A, IGM is BBB, and HY is below BBB. The vertical dashed line is the time of the Rule 144A reform.

Many U.S. corporate bonds are issued under Reg D. All of them, with only a few exceptions, are issued under Rule 144A.[5] Figure 1 plots the percentage of R144A bonds in new issuances between 2015 and 2024. For investment-grade borrowers, about 30% of the dollar amount of new issuance is in privately placed bonds. For speculative-grade firms, the ratio is considerably higher, at around 80%. Livingston and Zhou (2002) and Huang and Ramírez (2010) documented such market segmentation, arguing also that R144A placement speeds up issuance for HY firms. Sometimes, issuers register R144A bonds several years after initial placement (Han et al. 2022).[6]

[5]Less than 4% of private bond placements in the Mergent FISD dataset are not R144A. Hence, we will interchangeably use 'Rule 144A bond' (or 'R144A bond') and 'privately placed bond'.

[6]Technically, it means that a privately-placed bond is exchanged for the SEC-registered one (with a new CUSIP number).

	Before 2020	Added in 2020
Accredited investor (Reg D)	Individuals with net worth >$1mn Some institutions with >$5mn in AUM (banks, insurers, investment companies, trusts)	+ LLCs (explicitly) + family offices with >$5mn + registered investment advisors + "knowledgeable employees" of private funds
Qualified inst. buyer (R144A)	Some institutions with >$100mn in AUM Large broker-dealers	+ all those added to Reg D, if >$100 mn AUM

Table 1: **Changing definitions of accredited investor and qualified institutional buyer**

Access restrictions in the primary market for private placements (under Reg D) and secondary market re-trade (under Rule 144A) are not identical. The QIB under R144A is a more restrictive category than the AI under Reg D: the former must have a higher net worth. Both legal definitions, though, had not mentioned several investor categories until recently. For example, limited liability companies (LLC, a legal structure popular among hedge funds and family offices) and registered investment advisors were de jure excluded from primary and secondary markets for privately placed securities. Some investors, regardless of their investment sophistication, were also excluded from private placement markets because of relatively low assets under management. In 2020, the SEC addressed the issue and changed the definitions of AI and QIB in Reg D and Rule 144A.[7]

Table 1 highlights the main changes in the AI and QIB definitions after the 2020 reform. The reform admitted more investors to the primary and secondary markets for privately placed securities, both adding certain types of sufficiently large entities (LLCs, family offices, registered investment advisors)[8] and applying knowledge-based criteria to individual employees of financial institutions ("knowledgeable employees" of private funds). Because qualification as an AI/QIB has never been a reporting requirement for financial institutions, the SEC could not estimate in the economic analysis of the reform proposal how large the newly admitted group of investors was. Yet, it an-

[7]The proposal for new AI and QIB definitions was first circulated at the end of 2019. The new definitions were accepted, with changes, in late August 2020 and became effective as of the end of 2020. The vote on the amendments was split, with proposals adopted by a 3–2 vote.

[8]There is anecdotal evidence that many hedge funds structured as LP/LLC hybrids (limited partnership, LP, for the fund itself and LLC for the fund management company) were still participating in the R144A market before the reform, but had to bear a cost of complying with the regulation by masking the involvement of the LLCs. For such hybrid funds, the reform exogenously reduced the compliance costs.

ticipated that *"the final amendments may, in certain circumstances, reduce the costs of finding investors (i.e., search costs) for issuers in private offerings, as well as reduce their transactions costs* $< \cdots >$ *and cost of capital, thereby facilitating capital formation in those circumstances"*.[9] Our paper effectively evaluates whether that is indeed the case.

1.2 Identification

The changing definitions of accredited investors and qualified institutional buyers provide a quasi-natural experiment to identify the causal effects of restricted investor access on the cost of corporate borrowing. In this section, we elaborate on our identification approach.

More investors are admitted to the market for privately placed corporate bonds after 2020. We first hypothesize that the reform exogenously increases demand for privately placed corporate bonds in the primary market, which should lower corporate borrowing costs. To test this effect, we run a difference-in-differences analysis on newly issued bonds. The treated group consists of R144A bonds. The control group is public (SEC-registered) bond placements. The treatment is the 2020 reform that broadens investor access to private placements. In the sample of bonds i issued by firms k at times t, we estimate the models for bond yield spread at issuance:

$$\begin{aligned}\text{Issuance yield spread}_i[k,t] =& \beta_1 \mathbf{1}_i^{\text{R144A}} + \beta_2 \mathbf{1}_t^{\text{Post-reform}} + \beta_3 \mathbf{1}_i^{\text{R144A}} \times \mathbf{1}_t^{\text{Post-reform}} + \\ &+ \{\text{Controls and FEs}\} + \epsilon_i, \end{aligned} \tag{1}$$

where $\mathbf{1}^{\text{R144A}}$ takes the value of 1 for bonds privately placed under Rule 144A (0 otherwise) and $\mathbf{1}^{\text{Post-reform}}$ is 1 for placements from Sep 2020 onwards. $\hat{\beta}_3$ is the diff-in-diff estimator of interest: it evaluates the additional premium or discount in private bond placements following the 2020 reform (we also call $\hat{\beta}_3$ the 'private-public yield spread gap').

[9] See Section 6.A here.

We carefully select controls and fixed effects in (1) to account for confounding factors of yield spreads. Our controls include diverse issuer- and bond-specific characteristics capturing exposure to credit, interest rate, and prepayment risks (granular credit rating, issue size, maturity, embedded call options and, in extended specifications, time-varying issuer characteristics or fixed effects at the industry or issuer levels). To account for fluctuations in the average yield spread, which are particularly pronounced during the COVID pandemic, we include time fixed effects at the year-month level in all baseline models. The stimulus package put together by the Federal Reserve during COVID (primary and secondary market corporate credit facilities, PMCCF and SMCCF) affected yield spreads differently across bond credit classes (Xu and Pennacchi 2023, Gilchrist et al. 2024). To account for such time-varying differences in yield spreads among bonds of different credit quality, we also estimate specifications with *rating*×*year-month* fixed effects. This rich set of fixed effects not only accounts for the differential impact of PMCCF/SMCCF on bond prices but also absorbs differences in post-COVID corporate bond price recovery between investment-grade and speculative-grade issuers.

We argue that $\hat{\beta}_3$ in (1) identifies a causal link between market access restrictions and the cost of debt for issuing firms. To further rule out the supply-side explanation – the reform affects the incentives of issuers and, hence, changes the mix of private and public placements[10] – we test for the effect of the R144A reform also in the sample of secondary-market transactions. We limit the sample to bonds issued *prior to 2020* to focus specifically on bonds initially placed to a narrower pre-reform set of investors and thus not directly affected by post-reform changes in firms' issuance

[10] Figure 1 already eases such concerns, showing that there is virtually as much private placement after the reform as before (relative to public issuance).

policies. In such a bond-month sample of traded yield spreads, we estimate the models as

$$\begin{aligned}\text{Traded yield spread}_{i,t}[k] =&\beta_1 \mathbf{1}_i^{\text{R144A}} + \beta_2 \mathbf{1}_t^{\text{Post-reform}} + \beta_3 \mathbf{1}_i^{\text{R144A}} \times \mathbf{1}_t^{\text{Post-reform}} + \\ &+ \{\text{Controls and FEs}\} + \epsilon_i, \end{aligned} \tag{2}$$

which are similar to those for the issuance yield spread, but with some additional independent variables (like bond coupon rate and age).

Another identification challenge for models (1) and (2) is the impact of SEC regulation contemporaneous to the R144A reform. In particular, in 2021-2022, there was a debate over the implementation of SEC Rule 15c2-11, requiring broker-dealers to collect and verify a lot of information about issuers of securities they trade. The rule was suddenly feared to apply not only to stocks but also to fixed-income instruments following an unexpected announcement by the SEC in late 2021, effectively creating an additional trading friction in the corporate bond market. The debate was largely settled by the end of 2022.[11] Since Rule 15c2-11 must have primarily affected trading in bonds issued by non-public firms, and mostly on the secondary market (public firms disclose the necessary information anyway, so do non-public firms at initial bond placement), we also estimate models for yield spreads separately for public and non-public firms to rule out the confounding effect of Rule 15c2-11.

The question remains: what channels link restricted investor access and the cost of corporate borrowing? We consider two main alternatives: resale illiquidity risk and market segmentation. The former channel means that investors ask for extra compensation when holding bonds that are hard to resell due to restrictions on the pool of eligible investors. As restrictions are relaxed, the

[11] See this communication by the SEC for the initial confusing statement and, for instance, this statement by SIFMA for the industry response. In November 2020, the SEC explicitly exempted fixed income instruments from the application of Rule 15c2-11 (see this amendment by the SEC) first until 2025, and, in a later decision, indefinitely.

compensation (illiquidity risk premium) decreases. The latter channel means that a newly admitted investor, possibly becoming a new marginal investor with preferences different from those of core bond investors, has a permanent impact on prices. To distinguish the two channels, we estimate models similar to (1) and (2) but with metrics of investor participation and bond ownership as dependent variables. In particular, we study 'residual bond ownership' – the part of the outstanding bond amount not accounted for in the visible holdings of pension funds, insurance companies, and bond mutual funds – which correlates with market participation of newly-admitted investors. We argue that an increase in newly-admitted investor participation, especially in bonds that are otherwise hard to arbitrage (speculative-grade bonds and issuers without a liquid CDS contract), is evidence in favor of the segmentation channel. Conversely, an increase in core investor participation, especially in less informationally opaque bonds, points to the liquidity risk premium channel. We complement such analysis with the study of trading activity and realized transaction costs in private and public bonds before and after the reform.

1.3 Sample

We obtain bond characteristics from Mergent FISD, issuer characteristics – from Compustat and CRSP, and bond transaction prices – from TRACE. We conduct our analysis separately in the primary and secondary market bond samples. Both samples consist of non-convertible, non-asset-backed, USD-denominated, fixed-coupon corporate debentures and medium-term notes (Mergent codes CDEB and CMTN).[12]

Primary market sample. This sample contains bond issuances between 2015 and 2024 (i.e., there is one observation per bond). We restrict the primary market sample to bonds with maturities

[12]Debentures and medium-term notes constitute about 97% of total debt issuance by outstanding amount. Other types of bonds (retail notes, commercial paper, bank notes, etc.), though numerous in the number of issues, constitute only a tiny fraction of the dollar amount of issuance. To account for the differences in prices between debentures and notes before and after the R144A reform, which may bias β_3 in (1) and (2) if omitted, we include a pair of dummy variables MTN (1 if the bond is MTN) and MTN×Post-reform in all our regression models.

of at most 30 years to facilitate bond pricing since there are no liquid historical benchmarks of riskless borrowing costs for extra-long maturities. We further exclude bonds that did not obtain a credit rating from one of the major credit rating agencies within 90 days after issuance.[13] Finally, we remove several hundred R144A bonds with 'registration rights' (according to the respective flag in the Mergent FISD dataset) – such bonds are often exchanged into standard public issues (Han et al. 2022), and their inclusion in the sample would introduce a bias into the estimation of private-placement discount. The resulting primary market sample consists of about 16.5k bonds issued by about 3.2k unique issuers.

Secondary market sample. This sample consists of bonds issued not later than 2019, i.e., *prior* to the 2020 reform. We begin building the sample by collecting all secondary-market trades in eligible R144A bonds in TRACE between 2015 (a year after the launch of comprehensive coverage of R144A trading in TRACE) and 2024. For each re-traded R144A bond, we evaluate end-of-month pricing characteristics and monthly trading-activity metrics (using the standard literature rule that the bond must trade in the last 5 business days of the month to be included in the sample, e.g., Dickerson et al. 2026). We then complement the sample with bond-month pricing and trading characteristics of all non-R144A bonds that are issued in the same range of dates as bonds in the R144A part of the sample and maturing not earlier than 2015. We exclude bonds issued prior to 2006, both privately and publicly placed, to limit the impact of deep off-the-run issues on our results.[14] As in the primary-market sample, we also exclude non-rated bonds. The resulting secondary market sample comprises about 800k bond-month observations.

[13] We thus exclude about 11k bond issues. More than 10k of those were never rated, even after 90 days post-issuance.

[14] There are about 30k bond-month observations between 2015 and 2024 for bonds issued prior to 2006, which is less than 4% of our final secondary-market sample. Monthly prices of such bonds are noisy due to very thin liquidity.

	Mean	S.D.	5th	25th	Med.	75th	95th	N.Obs.
(A) Bond characteristics at issuance								
Rule 144A (dummy)	0.30	0.46	0.00	0.00	0.00	1.00	1.00	16467
Size ($ bn)	0.58	0.62	0.00	0.03	0.50	0.80	1.50	16467
Rating (1–21)	8.04	3.64	4.00	5.00	7.00	10.00	15.00	16467
Coupon rate (%)	4.30	1.97	1.25	2.85	4.38	5.50	7.62	16467
Maturity (years)	7.07	3.81	2.04	5.08	6.19	10.16	12.19	16467
Callable (dummy)	0.88	0.33	0.00	1.00	1.00	1.00	1.00	16467
MTN (medium-term note, dummy)	0.38	0.48	0.00	0.00	0.00	1.00	1.00	16467
Issuance yield (%)	4.27	2.19	1.23	2.83	4.33	5.41	7.58	16467
Issuance yield spread (%)	1.75	1.98	0.24	0.71	1.17	2.10	5.41	16467
Residual ownership (% size)	55.94	19.95	26.21	41.30	53.98	69.74	92.54	9761
No. unique eMAXX investors	150.52	106.76	12.00	78.00	130.00	199.00	349.00	9761
No. unqiue primary-market trades	26.17	15.17	5.00	18.00	24.00	32.00	52.00	15781
(B) Issuer's characteristics pre-issuance								
Public firm (dummy)	0.86	0.35	0.00	1.00	1.00	1.00	1.00	16467
Issuer's yield spread (%)	1.44	2.12	0.26	0.65	1.02	1.55	4.35	11407
Issuer's CDS spread (%)	1.06	1.20	0.28	0.51	0.66	1.02	3.33	6638
Equity value ($ bn)	109.96	173.19	1.84	12.31	45.90	131.74	447.09	11258
Book leverage (% total assets)	34.29	19.06	9.70	18.91	33.23	44.38	66.59	11226
Equity volatility (annualized)	0.31	0.16	0.16	0.22	0.27	0.35	0.64	11168
Profit margin (%)	12.75	15.83	-6.20	5.99	12.43	20.97	36.95	11253

(a) **Primary market sample**

	Mean	S.D.	5th	25th	Med.	75th	95th	N.Obs.
(A) Bond characteristics								
Rule 144A (dummy)	0.17	0.38	0.00	0.00	0.00	0.00	1.00	796405
Size ($ bn)	0.79	0.65	0.25	0.40	0.60	1.00	2.00	796405
Rating (1–21)	8.60	3.33	4.00	6.00	8.00	10.00	15.00	796405
Coupon (%)	4.49	1.64	2.15	3.38	4.25	5.45	7.50	796405
Maturity (years)	8.87	8.50	0.75	2.83	5.42	11.67	26.83	796405
Age (years)	4.85	3.30	0.57	2.32	4.29	6.83	10.67	796405
Callable (dummy)	0.91	0.29	0.00	1.00	1.00	1.00	1.00	796405
MTN (medium-term note, dummy)	0.09	0.28	0.00	0.00	0.00	0.00	1.00	796405
Yield to maturity (%)	4.25	4.90	1.06	2.51	3.73	5.12	7.66	796405
Yield spread (%)	1.90	2.78	0.24	0.69	1.18	2.08	5.67	796405
Residual ownership (% size)	45.92	19.16	15.33	32.12	45.18	58.85	79.59	605103
Monthly trading volume (% size)	5.59	6.70	0.24	1.43	3.47	7.09	18.53	796405
No-trading days (per month)	6.95	6.03	0.00	1.00	6.00	12.00	18.00	796405
Average bid-ask (%)	0.45	0.52	0.03	0.15	0.29	0.56	1.45	692207
(B) Issuer's characteristics								
Equity value ($ bn)	77.18	174.37	1.48	10.11	30.99	80.20	267.72	603450
Book leverage (% total assets)	37.00	19.08	9.46	24.29	36.46	46.59	68.64	603450
Equity volatility (annualized)	0.31	0.17	0.15	0.20	0.26	0.36	0.64	603450

(b) **Secondary market sample**

Table 2: **Summary statistics.**
Part (a) is for the sample of bonds issued between 2015 and 2024 (a unit observation is a bond issuance). Part (b) is for monthly secondary market bond prices between 2015 and 2024 in bonds issued not later than 2019 (a unit observation is a bond-month). Size is the notional outstanding amount. Rating is on a conventional numerical scale from 1 (AAA) to 21 (C). The yield spread is relative to a synthetic riskless bond with the same cash flows, as in Gilchrist and Zakrajšek (2012). 'Residual ownership' is the % of the outstanding amount that is *not* held by eMAXX investors one year after the observation (issuance – in part (a), trading – in part (b)), and 'No. unique eMAXX investors' is the respective number of unique bond-holders in eMAXX. 'No. unique primary market trades' is the count of P1 trades in TRACE. Trading volume includes both dealer-to-client and inter-dealer trades. No-trading days are the number of business days without any trading recorded in TRACE for a given bond and month. Average bid-ask is the percentage difference between average volume-weighted buy and sell prices (available only if there are both buys and sells on a given day), in % of the daily volume-weighted average price. In part (a), issuer's characteristics are as of the month preceding the bond issuance; in part (b), as of the transaction month. The issuer's yield spread is size-weighted across all bonds of a given issuer. Equity volatility is the realized stock return volatility in a backward-looking 250-day rolling window.

Table 2a summarizes the primary market sample. Of 16.5k bond issues in the sample, about 4.9k are R144A bonds (30% of the sample). The average bond has a 7-year maturity, an outstanding amount of about $580 mn, and is rated BBB+ at issuance, with a coupon rate close to 4.3% and a yield spread of 1.75%. About 88% of bonds in the sample are callable. The average issuer is a large, profitable public firm. About 14% of sample bonds are issued by non-public firms. As Figure 1 suggests, R144A bonds are much more likely to be issued by speculative-grade issuers. Table A1 in the Appendix (comparing bond and issuer characteristics between R144A and non-R144A bonds in the primary market sample) confirms that R144A bonds are issued by smaller, riskier firms with more volatile stock prices and lower profit margins. Consequently, R144A bonds have wider yield spreads at issuance. Therefore, we carefully account for the credit risk compensation in issuance yield spreads in the subsequent empirical analysis. The credit-quality imbalance between R144A and non-R144A bonds is also the main reason we exclude non-rated bonds from the sample: keeping them as a separate category would introduce substantial noise in estimating the private-placement discount.

In the secondary market sample (Table 2b), about 17% of bond-month observations are for Rule 144A bonds (or 22% by unique bond count). The lower percentage of R144A observations in the secondary market sample than in the primary one is consistent with regulation-constrained R144A re-trading, which induces buy-and-hold ownership. The average bond in the secondary market sample has about 9 years left to maturity; its notional outstanding amount is about $790 mn, and it is rated BBB. The yield spread for such a bond is about 1.9%. Importantly, only 44% of R144A bonds due to mature in 2015–2024 were re-traded and appeared in TRACE. In other words, more than half of R144A bonds were never re-traded. Do re-traded bonds differ at issuance from the rest of the R144A universe that is not part of Table 2b? Table A2 in the Appendix compares issuance characteristics between re-traded and non-re-traded R144A bonds and finds that the former are

of slightly higher credit quality than the latter (as evidenced in about a 40 bps yield spread and coupon rate difference, and $\frac{1}{10}$-th of a rating notch difference). This suggests that the set of R144A bonds in the secondary-market sample is likely also of slightly higher credit quality than in the primary-market sample.

2 Primary market effects

We discuss first the results for the primary market sample. We start with the pricing results (corporate bond yield spreads at issuance) and then turn to the underlying mechanism (investor participation in the primary market).

2.1 Issuance yield spreads

In this section, we present estimates from model (1) for the bond yield spread at initial placement. We aim to identify the impact of broader investor access to the private placement market on the corporate cost of debt, $\hat{\beta}_3$. Table 3 presents regression estimates.

Models 1 and 2 in Table 3 are baseline models with strong explanatory power (explaining 77-78% of the variation in issuance yield spreads). They only differ in the level of fixed effects: model 1 includes rating and issuance year-month FEs, while model 2 has rating $\times$ issuance year-month FEs, effectively absorbing time-series variation in average credit risk premia within credit rating bins. The loading on the R144A dummy in both models is strongly significant and suggests that R144A bonds were placed with an average discount of about 42-47 bps to analogous publicly placed bonds prior to the 2020 reform. This result is in line with prior estimates in the literature (Livingston and Zhou 2002). About 13-18 bps of this private-placement discount disappears after the reform, as gauged by the loading on the interaction of R144A and post-reform dummies (the diff-in-diff estimate of interest). Therefore, the reform erases 28-43% of the pre-reform private-placement

discount. This is an improvement for issuers: privately placed bonds are worth more after the 2020 reform, relative to publicly placed bonds – and we argue that this is caused by the reform itself.

Model 3 in Table 3 contrasts the reform's effect between investment-grade and high-yield bonds by estimating $\hat{\beta}_1$ and $\hat{\beta}_3$ in model (1) separately for IG and HY bonds with the help of respective dummy variables.[15] The key result here is that the primary market effect comes mainly from investment-grade bonds. For them, the pre-reform R144A discount of 42 bps shrinks by about a third (14 bps) after the reform. For high-yield borrowers, there is no such effect. Their pre-reform private-placement discount of 63 bps is statistically unaffected by the reform. We elaborate on the underlying mechanisms behind the gap between IG and HY firms in reform impact later in Section 2.2.

Models 4–6 in Table 3 are identical to models 1–3, except that the former include issuer industry FEs. Controlling for differences in issuance yield spreads across industries, the effect of the R144A reform on the private-placement discount remains unchanged at 24-45% of the pre-reform level (which, itself, is robust at 42-45 bps). Again, investment-grade debt drives the effect, with the private-placement discount falling from 37 to about 27 bps. Models 1–6 also exhibit rather stable loadings on other factors of primary market yield spreads: average term premium of about 3-4 bps per year remaining to maturity, 8-16 bps value of the embedded call option (broadly in line with King 2002), and a premium for notes placement, part of which reverses after 2020.[16]

[15] Post-ref × IG or HY interaction does not need to be included in the model since rating × year-month FEs already account for time-varying credit risk premia in issuance yield spreads.

[16] None of the paper's results on private placement discounts are sensitive to the inclusion of MTN and MTN×Post-reform factors to the empirical models, but notes do carry a time-varying premium to debentures.

	Dependent variable: issuance yield spread (bps)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rule 144A × Post-Ref	−18.00***	−13.01**		−18.99***	−11.34**		−23.86***	−10.04**
	(6.31)	(5.05)		(6.49)	(4.70)		(7.76)	(4.20)
Rule 144A × Post-Ref × IG			−13.46***			−10.01**		
			(4.95)			(4.79)		
Rule 144A × Post-Ref × HY			5.04			0.17		
			(17.29)			(15.62)		
Rule 144A (dummy)	42.33***	47.31***		41.80***	45.22***		54.27***	47.57***
	(3.85)	(3.68)		(3.86)	(3.59)		(9.90)	(7.26)
Rule 144A × IG			41.61***			37.38***		
			(4.08)			(3.76)		
Rule 144A × HY			63.42***			67.03***		
			(9.20)			(8.49)		
MTN (dummy)	−19.61***	−20.02***	−20.08***	−29.22***	−28.84***	−28.74***	−23.53***	−17.63***
	(3.57)	(3.64)	(3.63)	(4.01)	(3.99)	(3.95)	(4.43)	(4.91)
Post-Ref × MTN	33.24***	21.80***	21.39***	30.56***	18.03***	17.70***	30.39***	16.14***
	(4.44)	(4.68)	(4.65)	(4.58)	(4.53)	(4.52)	(5.46)	(4.95)
Outstanding amount ($ bn)	−1.65	−3.92*	−3.50	−0.21	−3.24	−2.83	10.73***	10.46***
	(2.10)	(2.22)	(2.21)	(2.17)	(2.32)	(2.32)	(1.43)	(1.54)
Maturity (years)	3.54***	3.62***	3.64***	3.68***	3.77***	3.79***	4.52***	4.81***
	(0.34)	(0.31)	(0.31)	(0.30)	(0.27)	(0.28)	(0.29)	(0.28)
Callable (dummy)	7.97***	11.93***	9.97***	11.97***	16.24***	14.00***	27.05***	28.66***
	(2.99)	(3.02)	(3.10)	(2.80)	(2.75)	(2.76)	(3.24)	(3.21)
Rating, year-month FE	YES	NO	NO	YES	NO	NO	YES	NO
Rating×year-month FE	NO	YES	YES	NO	YES	YES	NO	YES
Industry FE	NO	NO	NO	YES	YES	YES	NO	NO
Issuer FE	NO	NO	NO	NO	NO	NO	YES	YES
Observations	16,467	16,467	16,467	16,467	16,467	16,467	16,467	16,467
Adjusted R^2	0.77	0.78	0.78	0.79	0.79	0.79	0.89	0.92
Note:	*p<0.1; **p<0.05; ***p<0.01							

Table 3: **Bond yield spread at issuance and the reform of Rule 144A.**
The dependent variable is bond yield spread at issuance, in bps, for individual bonds issued between 2015 and 2024. 'Rule 144A' (dummy) is 1 if the issue is privately placed under Rule 144A, and 0 otherwise. 'Post-Ref' (dummy) is 1 for issuances after Aug 2020, and 0 otherwise. IG (dummy) is 1 for investment-grade bonds and 0 for speculative-grade ones. Conversely, HY (dummy) is 1 for speculative-grade bonds. 'MTN' (dummy) is 1 for medium-term notes and 0 for corporate debentures. Bond outstanding amount at issuance is in $ bn, bond maturity – in years. Callable (dummy) is 1 if the bond issuer is allowed to redeem the bond before maturity. Rating fixed effects are at the sub-notch level (numerical scale from 1/AAA, 2/AA+, etc., to 21/C). Industry fixed effects are at the first two digits of the SIC code. The standard errors (in parentheses) are clustered by issuance month.

Finally, models 7 and 8 in Table 3 add issuer fixed effects (replacing industry FEs); these are the richest statistical models in terms of the explained part of yield spread variation. In these models, the pre-reform private-placement discount is slightly higher at 48-54 bps and drops by 10-

24 bps post-reform. At 21-44% (of the pre-reform discount level), the reform's economic significance remains broadly in line with earlier results.[17]

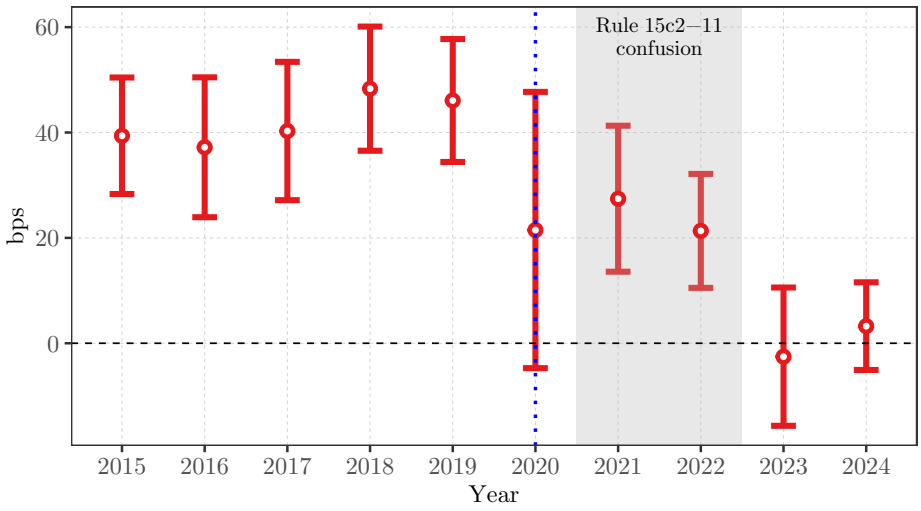


Figure 2: **Rule 144A primary-market discount.**
On the y-axis are the loadings on year dummies interacted with the Rule 144A dummy in the regression for issuance yield spread similar to model (2) in Table 3 with year×rating fixed effects. The x-axis shows the issuance year. The vertical dotted line is the Rule 144A reform. The shaded area denotes the time of concurrent discussion about the implementation of Rule 15c2-11 for fixed income securities (see Section 1.2). The confidence bands are 1.65 standard errors (clustered by issuance month) around point regression estimates.

To visually inspect whether there is a pre-reform trend in private-placement discount, we plot in Figure 2 the estimates from a model similar to model (2) of Table 3, with rating × issuance year-month FEs, where the interaction of the Rule 144A dummy with issuance year dummies replaces the Post-reform × Rule 144A interaction variable. The figure shows that the R144A discount is stable in 2015-2019 at around 40 bps (if anything, it rises slightly but not significantly in 2018), indicating no pre-trend in the reform impact. After 2020, it takes several years for the market to fully price in the reform impact. The muted reaction in 2021 and 2022 reflects confounding regulation (Rule 15c2-11, as discussed in Section 1.2). Once fixed income securities are formally and indefinitely exempt from Rule 15c2-11, the private-placement discount shrinks effectively to

[17] Albeit outside the main focus of the paper, the bond outstanding amount becomes a factor of the issuance yield spread *within* a given borrower. Increasing the issue size by $200 mn pulls the spread up by about 2 bps.

zero in 2023 and 2024. Therefore, the average post-reform effects discussed in Table 3 appear even stronger in the later part of the sample, suggesting the R144A reform has even greater economic significance.

Table 4 provides robustness checks for the primary-market yield-spread effects in bond subsamples. Excluding year 2020 from the sample entirely, thereby limiting the potential effect of COVID-related bond market abnormalities on our estimates, yields a reform impact of 42%: post-2020, the R144A discount drops by 18 bps from the pre-reform level of 43 bps. Splitting the sample into financial and non-financial issuing firms, we find that the effect is statistically and economically stronger for the former, though the point estimates for the latter are only marginally different – the results just appear noisier for non-financial borrowers. We then split the sample into public and privately owned firms. Studying public firms separately helps because the confounding Rule 15c2-11 has minimal impact on them (they already disclose a lot of information as publicly traded stock issuers), and we can also control for time-varying issuer characteristics in regressions for issuance yield spreads. Adding such firm-level factors of credit spreads suggested by structural credit risk models (equity volatility, equity value, and leverage), we find an even larger and still significant reduction in the R144A discount: from 39 bps pre-reform to around 12 bps post-reform (i.e., 69% of the discount is erased by the reform). In a (small) subset of private bond issuers, the effect appears even stronger. Finally, Table 4 shows that the effect is the strongest in the subset of issuers with a liquid single-name CDS contract (as proxied by the existence of a CDS spread on the bond issuer in the Markit CDS dataset as of the issuance month), which is another reflection of the IG/HY split in the R144A reform impact.

	Dependent variable: issuance yield spread (bps)							
	Excl.	Industry		Ownership			Liquid CDS	
	2020	Non-fin.	Fin.	Public	Public	Private	Yes	No
Rule 144A × Post-Ref	−17.64***	−14.46	−19.50***	−10.60	−27.32**	−27.65**	−38.01***	−3.49
	(5.31)	(9.17)	(6.16)	(7.73)	(10.84)	(13.48)	(13.24)	(7.56)
Rule 144A (dummy)	43.01***	43.95***	38.78***	34.89***	39.29***	30.91***	53.02***	27.89***
	(3.07)	(5.47)	(3.98)	(4.87)	(6.97)	(9.35)	(5.15)	(5.81)
MTN (dummy)	−19.44***	−4.89	−30.50***	−19.14***	−27.77***	−22.83***	−14.88***	−16.91***
	(2.92)	(7.64)	(4.41)	(3.99)	(4.30)	(6.86)	(5.03)	(3.69)
Post-Ref × MTN	30.64***	5.58	24.60***	36.08***	39.62***	30.94***	37.24***	25.47***
	(4.04)	(10.75)	(5.57)	(4.61)	(5.31)	(10.07)	(5.85)	(4.87)
Outstanding amount ($ bn)	−2.67	2.30	−0.20	2.27	2.72	−19.96***	5.64*	−7.46***
	(1.66)	(2.81)	(2.47)	(2.12)	(2.16)	(4.55)	(2.92)	(2.54)
Maturity (years)	4.28***	1.82***	4.74***	3.77***	4.21***	1.17*	3.99***	3.34***
	(0.26)	(0.57)	(0.33)	(0.35)	(0.33)	(0.69)	(0.40)	(0.34)
Callable (dummy)	7.43**	−12.40*	16.80***	12.34***	23.06***	0.80	12.55***	6.44*
	(3.07)	(6.64)	(2.80)	(3.02)	(3.57)	(6.63)	(4.47)	(3.60)
Equity volatility (%)					2.64***			
					(0.28)			
Equity value ($ bn)					−0.01			
					(0.01)			
Book leverage (% assets)					0.04			
					(0.06)			
Rating, year-month FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	14,488	7,454	8,626	14,170	11,141	2,297	6,638	9,829
Adjusted R^2	0.79	0.75	0.76	0.76	0.77	0.81	0.77	0.78
Note:	*p<0.1; **p<0.05; ***p<0.01							

Table 4: **Rule 144A primary-market discount in subsamples.**
The regression model here is model (1) from Table 3, but it is estimated on subsamples of the original primary-market sample. The first column is for the sample that excludes all issuances in 2020. The next two columns split the original sample into financial and non-financial firms. The next split separates public and private firms. For public issuers with CRSP stock prices, we additionally control for stock return volatility (in %, annualized), market value of equity (in $ bn), and book leverage (current and long-term liabilities in % of total assets). The last two columns split the sample into issuers with an actively traded CDS contract (as proxied by the availability of par spread for the issuance month in the Markit CDS dataset) and without such a contract. The standard errors (in parentheses) are clustered by issuance month.

2.2 Market participation

We now turn to possible mechanisms behind the primary market pricing effects presented in Section 2.1. This section focuses on market participation, i.e., whether the R144A reform changes ownership of privately placed bonds. We do not claim ex ante that ownership changes are necessary or sufficient for pricing effects. Prices might change, in theory, without changes in ownership (as after the revelation of public news amid little disagreement about the news content – here, the reduction in illiquidity premia in R144A bonds after the reform, which compresses yield spreads

irrespective of any post-reform trading). Likewise, ownership changes do not necessarily need to have permanent market impact. If they do, it might suggest some degree of market segmentation prior to trading – in our case, due to restricted market access. So, we treat changes in market participation as evidence of a possible mechanism through which the reform affects bond prices rather than a test of reform success.

Corporate bond holdings are best accounted for for sizeable institutional investors like pension funds, insurance companies, and bond mutual funds. These investors are, predominantly, accredited investors and qualified institutional buyers for the purpose of Reg D and Rule 144A. Their holdings are well covered by the eMAXX dataset. For each newly issued bond in the primary market sample, we calculate the percentage of the issue amount that is *not* visible in eMAXX holdings one year after issuance[18] and call it 'residual bond ownership'. We use residual ownership as a proxy for aggregate bond holdings of smaller investors, some of which are newly admitted to the R144A market after the 2020 reform.[19] We then run the same regression models for residual ownership as those for issuance yield spreads.

Table 5 presents the estimates from models for residual ownership. Models 1–2 show that, prior to the reform, the residual ownership for R144A bonds is around 9-10 percentage points (pps) higher than for comparable non-R144As. After the reform, such private-public residual ownership gap shrinks by 6-7 pps (60-70% of the pre-reform level). In other words, after the reform, eMAXX investors participate more actively in private placements, crowding out non-eMAXX investors – as compared to participation in public placements. Models 4-8 show that the reduction in non-eMAXX ownership post-2020 is generally robust to the inclusion of industry and issuer fixed effects.

[18] Some eMAXX investors report annually, hence holdings data less than a year after issuance are incomplete by construction.

[19] It is, obviously, a noisy proxy for bond holdings of newly admitted investors. As Table 2 shows, we observe only about half of the bond outstanding amount in the eMAXX holdings data. Newly designated accredited investors and qualified institutional buyers likely account for a much smaller part of bond ownership than 50%, but their holdings are not observed directly.

	Dependent variable: resdiual ownership (%)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rule 144A × Post-Ref	−7.09***	−5.56***		−6.58***	−4.84***		−4.04***	−1.48
	(1.12)	(1.38)		(1.08)	(1.34)		(0.74)	(0.91)
Rule 144A × Post-Ref × IG			−5.63***			−4.92***		
			(1.50)			(1.42)		
Rule 144A × Post-Ref × HY			−4.02			−3.44		
			(2.53)			(2.51)		
Rule 144A (dummy)	10.05***	9.38***		10.35***	9.52***		5.92***	5.49***
	(0.69)	(0.72)		(0.68)	(0.70)		(1.42)	(1.54)
Rule 144A × IG			8.47***			8.65***		
			(0.78)			(0.74)		
Rule 144A × HY			11.82***			11.74***		
			(1.48)			(1.48)		
MTN (dummy)	3.73***	4.56***	4.58***	2.66***	3.51***	3.53***	8.01***	8.88***
	(0.99)	(0.96)	(0.96)	(0.92)	(0.90)	(0.90)	(1.52)	(1.61)
Post-Ref × MTN	7.35***	6.58***	6.51***	5.63***	5.04***	4.96***	5.03***	3.74***
	(1.66)	(1.65)	(1.65)	(1.55)	(1.54)	(1.54)	(1.16)	(1.32)
Outstanding amount ($ bn)	0.05	0.33	0.35	−1.00**	−0.71*	−0.69*	−2.59***	−2.74***
	(0.39)	(0.40)	(0.40)	(0.41)	(0.41)	(0.40)	(0.43)	(0.43)
Maturity (years)	−0.97***	−0.97***	−0.96***	−0.92***	−0.92***	−0.92***	−0.86***	−0.84***
	(0.10)	(0.10)	(0.10)	(0.10)	(0.09)	(0.09)	(0.08)	(0.08)
Callable (dummy)	−7.72***	−8.28***	−8.61***	−6.69***	−7.10***	−7.40***	−1.70*	−1.87*
	(0.84)	(0.83)	(0.84)	(0.84)	(0.83)	(0.84)	(0.91)	(0.96)
Rating, year-month FE	YES	NO	NO	YES	NO	NO	YES	NO
Rating×year-month FE	NO	YES	YES	NO	YES	YES	NO	YES
Industry FE	NO	NO	NO	YES	YES	YES	NO	NO
Issuer FE	NO	NO	NO	NO	NO	NO	YES	YES
Observations	9,761	9,761	9,761	9,761	9,761	9,761	9,761	9,761
Adjusted R^2	0.35	0.36	0.36	0.38	0.39	0.39	0.65	0.66
Note:	*p<0.1; **p<0.05; ***p<0.01							

Table 5: **Residual bond ownership after issuance and the reform of Rule 144A.** The dependent variable is the % of the outstanding amount that is *not* held by eMAXX investors one year after issuance. Otherwise, the models and the definitions of independent variables are identical to those in Table 3. The standard errors (in parentheses) are clustered by issuance month.

This is a peculiar effect of the reform: even though access restrictions are lifted for a subset of non-eMAXX investors, it's the eMAXX investors who own an even larger fraction of newly issued R144A bonds post-2020. One explanation is that eMAXX investors are attracted by reduced resale liquidity risk. If they need to liquidate R144A bond positions after 2020, they are selling to a larger investor pool. Consistent with this liquidity-risk-premium explanation, Model 3 in Table 5 shows that the residual ownership gap changes most for investment-grade bonds—precisely where primary-market pricing effects are strongest. Since the pricing effect of the reform appears rather permanent in Figure 2, we do not link the reduction in private-placement discount to a temporary

market impact of higher private-placement participation of eMAXX investors. We also do not think that market segmentation plays a substantial role in the primary-market effects for R144A investment-grade bonds: an eMAXX investor is even more likely to be a marginal R144A investor after the reform, and she had no access restrictions prior to it.

The question remains whether higher investor participation in investment-grade R144A bonds post-2020 is due to new investors entering the market or core bond investors receiving larger allocations. Table A3 in the Appendix estimates models similar to those in Table 5, but with the number of unique eMAXX investors as the dependent variable, and confirms the former. Investment-grade R144A bonds have 47 fewer unique investors than non-R144A IG bonds prior to the reform (compared to non-R144A IG bonds), but only 32 after (i.e., the gap shrinks by 32%).

Related, we also investigate the number of unique primary-market trades in TRACE. For each bond in the primary market sample, we count the number of primary market trades (labeled as `P1` trades in TRACE) within one calendar month of the issue date. Such trades are bond sales by underwriting dealers to end investors. We observe at least one such trade for most bonds in the primary market sample, with the average number of trades at around 26. Under the assumption that each investor gets her target primary market allocation in one trade,[20] the number of `P1` trades proxies for the number of unique investors buying a bond at issuance. In Table 6, we report the estimates from the models similar to a baseline model (1) but with the number of primary market trades as the dependent variable. In our preferred specification with rating, year-month, and industry fixed effects (column 3 in Table 6), there are about 5 fewer primary market trades per R144A bond prior to 2020 compared to public issues. After the reform, this public-private gap in the number of `P1` trades shrinks, on average, by one trade (or 20% of the pre-reform gap). These

[20] Several primary market dealers reporting to TRACE confirmed to us informally that this is a standard practice.

results suggest, again, that investor participation in the primary market for R144A bonds increases after the 2020 reform.

	Dep. var.: no. primary-market trades			
	(1)	(2)	(3)	(4)
Rule 144A × Post-Ref	1.91**	0.63	1.05**	1.05**
	(0.74)	(0.54)	(0.51)	(0.50)
Rule 144A (dummy)	−6.73***	−5.16***	−4.80***	−1.04
	(0.40)	(0.38)	(0.38)	(0.75)
MTN (dummy)		2.96***	1.55**	0.12
		(0.65)	(0.64)	(0.92)
Post-Ref × MTN		2.58***	1.40	0.26
		(0.96)	(0.95)	(1.02)
Outstanding amount ($ bn)		9.99***	9.89***	9.55***
		(0.39)	(0.42)	(0.45)
Maturity (years)		−0.30***	−0.31***	−0.43***
		(0.07)	(0.07)	(0.08)
Callable (dummy)		5.10***	5.38***	4.53***
		(0.58)	(0.58)	(0.97)
Coupon (%)		0.12	0.19	1.00***
		(0.13)	(0.13)	(0.27)
Public firm (dummy)		2.25***	2.32***	10.11***
		(0.42)	(0.43)	(3.00)
Rating, year-month FE	YES	YES	YES	YES
Industry FE	NO	NO	YES	NO
Issuer FE	NO	NO	NO	YES
Observations	15,781	15,781	15,781	15,781
Adjusted R^2	0.06	0.18	0.19	0.23
Note:	*p<0.1; **p<0.05; ***p<0.01			

Table 6: **Number of primary-market trades in TRACE and the reform of Rule 144A.** The sample here is still the primary-market sample (unit observation is the bond issuance), but the dependent variable is the number of unique transactions marked as primary market trades ($P1$ trading market indicator) in TRACE in one calendar month following the bond offering date. Variable and fixed effects definitions are identical to those in Table 3. In addition, 'Coupon' is the bond annual coupon (in %) and 'Public firm' (dummy) is one for listed firms. The standard errors (in parentheses) are clustered by issuance month.

3 Secondary market effects

We now turn to the analysis of secondary market implications of the Rule 144A reform. Our focus is on R144A bonds issued prior to the reform (before 2020): they were initially placed with core Reg-D-accredited investors, and the only immediate implication of the reform for these bonds is an increase in the pool of eligible secondary market investors. Hence, the outstanding amount of

bonds in our secondary market sample is not increasing[21] after the reform, and the primary driver of pricing and liquidity effects must be coming from the demand side.

3.1 Traded yield spreads

Table 7 estimates the yield-spread model (2) in a bond-month panel of spreads and bond characteristics. Compared to the models estimated on the primary-market bond sample, we add an on-the-run dummy (to capture a premium or discount in newly issued bonds) and the bond coupon rate. In model (1) of Table 7, the pre-reform R144A discount $\hat{\beta}_1$ is at 28 bps, somewhat smaller than in the primary market sample (42 bps, model (1) of Table 3). One way to rationalize this is to assume that a secondary-market R144A investor is more likely to hold the bond until maturity; hence, her exposure to resale liquidity risks is lower. The post-reform drop in the R144A discount, $\hat{\beta}_3$, in model (1) is 18 bps, which is identical to the baseline primary-market estimate in absolute value. On average, after the reform, R144A bonds issued prior to 2020 become more expensive on the secondary market than comparable publicly placed bonds.

[21] It may decrease for callable bonds in case of partial calls.

	Dependent variable: traded yield spread (bps)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rule 144A × Post-Ref	−18.08**						
	(8.89)						
Rule 144A × Post-Ref × IG		−8.99***	−11.17***	−11.37***	−6.51***	−8.62***	−9.25***
		(2.15)	(2.37)	(2.04)	(1.83)	(2.01)	(1.79)
Rule 144A × Post-Ref × HY		34.43***	42.81***	39.40***	64.54***	70.80***	65.42***
		(9.52)	(9.52)	(8.04)	(8.96)	(9.37)	(10.40)
Rule 144A (dummy)	28.33***						
	(4.02)						
Rule 144A × IG		30.32***	27.37***	35.48***	28.83***	25.96***	35.28***
		(1.59)	(1.39)	(6.04)	(1.37)	(1.14)	(3.26)
Rule 144A × HY		9.41	17.06	20.99	11.25	18.83***	8.12
		(11.31)	(11.16)	(14.62)	(7.49)	(6.77)	(5.72)
Post-Ref × IG		−13.01***	−12.43***	−2.42			
		(3.83)	(3.96)	(5.08)			
Post-Ref × HY		−94.89***	−100.09***	−55.69***			
		(17.60)	(17.89)	(17.21)			
MTN (dummy)	3.36*	6.84***	9.11***	8.94***	8.11***	10.37***	9.73***
	(1.90)	(0.77)	(1.03)	(1.40)	(0.59)	(0.94)	(1.37)
Post-Ref × MTN	4.92	−5.69**	−8.12***	−5.53**	−10.02***	−12.38***	−10.76***
	(5.96)	(2.41)	(2.40)	(2.23)	(1.32)	(1.48)	(1.30)
Outstanding amount ($ bn)	−1.44	−1.40	−4.00***	2.91***	−1.33	−4.27***	2.15***
	(0.88)	(0.88)	(0.90)	(0.53)	(0.83)	(0.87)	(0.43)
Maturity (years)	2.12***	2.14***	2.26***	3.24***	2.19***	2.30***	3.21***
	(0.10)	(0.10)	(0.11)	(0.10)	(0.12)	(0.12)	(0.09)
Coupon rate (bps)	0.26***	0.26***	0.24***	0.12***	0.25***	0.24***	0.12***
	(0.01)	(0.01)	(0.01)	(0.005)	(0.01)	(0.01)	(0.01)
Callable (dummy)	−2.51**	−2.14	5.28***	5.29***	−2.94***	4.95***	5.13***
	(1.26)	(1.38)	(1.25)	(0.81)	(1.06)	(0.83)	(0.56)
On-the-run (dummy)	−7.52***	−6.89***	−7.33***	−13.76***	−5.90***	−6.51***	−12.73***
	(1.36)	(1.11)	(0.99)	(1.01)	(1.02)	(0.91)	(0.87)
Rating, year-month FE	YES	YES	YES	YES	NO	NO	NO
Rating×year-month FE	NO	NO	NO	NO	YES	YES	YES
Industry FE	NO	NO	YES	NO	NO	YES	NO
Issuer FE	NO	NO	NO	YES	NO	NO	YES
Observations	796,405	796,405	796,405	796,405	796,405	796,405	796,405
Adjusted R^2	0.60	0.60	0.62	0.73	0.71	0.73	0.82
Note:	*p<0.1; **p<0.05; ***p<0.01						

Table 7: **Secondary-market yield spread and the reform of Rule 144A.**
The sample here comprises secondary-market bond-month observations between 2015 and 2024 in both R144A and non-R144A bonds issued prior to 2020 (the sample is summarized in Table 2b). The dependent variable is the yield spread (in bps) derived from the volume-weighted average transaction price in TRACE in the last five business days of the month. Independent variables and fixed effects are defined as in the primary market sample except for the bond outstanding amount (in $ bn), which is as of the transaction month rather than at issuance. Bond coupon rate is in bps per annum. 'On-the-run' dummy takes the value 1 if the bond was issued less than a year prior to the transaction month, and 0 otherwise. The standard errors (in parentheses) are clustered by transaction month.

However, there are considerable differences in $\hat{\beta}_3$ between investment-grade and high-yield R144A bonds in the secondary-market sample – much stronger than in the primary-market one. As model (2) in Table 7 suggests, the investment-grade R144A secondary-market discount pre-reform is at 30 bps, and it shrinks by 9 bps (30%) post-reform. For high-yield bonds, the discount is statistically insignificant pre-reform, but it opens up and jumps by 35 bps post-reform. Models (3)–(7) confirm the robustness of the result, extending the empirical model with richer sets of fixed effects. In particular, models (3) and (4) add industry and issuer fixed effects on top of the baseline specification with rating and year-month FEs. In these models, the IG private-public discount drops by 11 bps post-reform, while the HY discount increases by 40-43 bps. Models (5)-(7) use rating×year-month FEs: such a specification accounts for rating-specific yield spread dynamics, absorbing a differential price impact of post-Covid market support programs (such as SMCCF) across the credit quality spectrum. In such models, the IG private-public discount drops by 7-9 bps post-reform (24-35% of the pre-reform discount), while the HY discount jumps by 65-71 bps. Therefore, after the reform, HY R144A bonds issued prior to 2020 become cheaper on the secondary market than comparable publicly placed HY bonds.

Table 8 evaluates the differences between IG and HY private-public discounts in secondary market subsamples, using the model with rating×year-month FEs. The first model in Table 8 shows that, excluding 2020, the IG discount drops by about 15% of the pre-reform level. The HY discount, by contrast, increases by about 70 bps. The next two columns in Table 8 show that the jump in the HY discount is driven entirely by non-financial firms (for financial firms, the discount drops by 29 bps, or 54% of the pre-reform level). The effect is equally present in private and public firms, and is not explained away by time-varying firm characteristics for the latter.[22] Importantly, the last

[22]Notice that the effect of the reform on IG R144A bonds is much weaker for non-public than for public firms. This is likely the impact of confusing implementation of Rule 15c2-11 around 2021 and 2022, which primarily affected bonds issued by non-public firms. For IG bonds issued by public firms, the private-public yield spread gap drops by almost 30% of the pre-reform level (from 82 to 58 bps).

two columns of Table 8 show that the jump in the HY discount is significantly more pronounced among issuers without an actively traded CDS contract (no CDS quotation in the Markit dataset in the trading month).

	Dependent variable: traded yield spread (bps)							
	Excl.	Industry		Ownership			Liquid CDS	
	2020	Non-fin.	Fin	Public	Public	Private	Yes	No
Rule 144A × Post-Ref × IG	-4.44^{***}	-8.56^{***}	-3.50^{*}	-8.93^{***}	-23.28^{***}	-2.20	-10.85^{***}	-0.36
	(1.62)	(2.02)	(1.90)	(1.76)	(3.15)	(1.67)	(2.65)	(1.37)
Rule 144A × Post-Ref × HY	70.22^{***}	77.08^{***}	-29.02^{***}	65.74^{***}	81.49^{***}	100.92^{***}	24.40^{***}	74.26^{***}
	(8.20)	(10.32)	(9.33)	(9.35)	(9.63)	(22.90)	(8.47)	(9.70)
Rule 144A × IG	27.35^{***}	32.88^{***}	23.02^{***}	25.43^{***}	18.21^{***}	19.40^{***}	34.47^{***}	21.57^{***}
	(1.09)	(1.65)	(1.17)	(1.08)	(1.05)	(1.41)	(1.79)	(0.98)
Rule 144A × HY	16.02^{**}	5.96	53.35^{***}	3.08	12.20^{**}	-15.07	38.94^{***}	-2.07
	(7.39)	(8.82)	(6.48)	(7.72)	(5.82)	(20.65)	(5.90)	(8.43)
MTN (dummy)	7.87^{***}	-3.07^{***}	1.56^{***}	8.30^{***}	1.63^{*}	1.43	6.03^{***}	10.62^{***}
	(0.52)	(1.02)	(0.59)	(0.57)	(0.91)	(2.58)	(0.61)	(0.89)
Post-Ref × MTN	-8.97^{***}	0.85	-6.07^{***}	-8.13^{***}	-11.12^{***}	-6.48	-9.85^{***}	-8.27^{***}
	(1.16)	(1.52)	(1.19)	(1.18)	(1.89)	(4.61)	(1.30)	(1.68)
Outstanding amount ($ bn)	0.78^{*}	-0.50	-2.57^{***}	-0.61	-2.51^{***}	-8.55^{***}	-0.83	-1.99^{**}
	(0.42)	(0.89)	(0.71)	(0.84)	(0.74)	(1.58)	(0.78)	(0.90)
Maturity (years)	2.40^{***}	2.26^{***}	2.24^{***}	2.35^{***}	2.57^{***}	1.06^{***}	2.49^{***}	1.97^{***}
	(0.06)	(0.13)	(0.10)	(0.12)	(0.11)	(0.32)	(0.10)	(0.15)
Coupon rate (bps)	0.23^{***}	0.27^{***}	0.18^{***}	0.24^{***}	0.20^{***}	0.35^{***}	0.20^{***}	0.31^{***}
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.04)	(0.01)	(0.01)
Callable (dummy)	-3.69^{***}	-6.59^{***}	1.70^{**}	-4.03^{***}	5.62^{***}	7.72^{***}	-6.83^{***}	2.91^{*}
	(1.00)	(1.96)	(0.83)	(1.13)	(1.21)	(1.56)	(0.86)	(1.50)
On-the-run (dummy)	-6.25^{***}	-11.66^{***}	4.34^{***}	-5.89^{***}	-6.74^{***}	-12.43^{***}	-6.70^{***}	-8.28^{***}
	(1.05)	(1.36)	(0.68)	(1.10)	(0.96)	(3.91)	(0.89)	(2.03)
Equity volatility (%)					4.11^{***}			
					(0.44)			
Equity value ($ bn)					-0.01^{***}			
					(0.004)			
Book leverage (% assets)					0.17^{***}			
					(0.03)			
Rating×year-month FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	705,167	580,328	216,077	692,756	603,450	103,649	405,306	391,099
Adjusted R^2	0.72	0.72	0.73	0.72	0.76	0.70	0.71	0.72
Note:	*p<0.1; **p<0.05; ***p<0.01							

Table 8: **Rule 144A secondary market discount in subsamples.**
The regression model here is model (5) from Table 7, but it is estimated on subsamples of the original secondary-market sample. The first column is for the sample that excludes all issuances in 2020. The next two columns split the original sample into financial and non-financial firms. The next split separates public and private firms. For public issuers with CRSP stock prices, we additionally control for stock return volatility (in %, annualized), market value of equity (in $ bn), and book leverage (current and long-term liabilities in % of total assets). The last two columns split the sample into issuers with an actively traded CDS contract (as proxied by the availability of par spread for the issuance month in the Markit CDS dataset) and without such a contract. The standard errors (in parentheses) are clustered by issuance month.

One explanation is that hedge funds and other opportunistic investors, newly admitted to the R144A market after the reform, begin short-selling high-yield bonds.[23] Since R144A bonds represent 80% of high-yield corporate borrowing (Figure 1), short-selling HY corporate debt in the unrestricted-access part of the market (non-R144A bonds) has limited reach. When the CDS contract on the HY debt issuer is not available, one simply needs to trade cash R144A bonds to take short positions in HY corporate debt. So, we think, do newly-admitted investors in the R144A market after 2020. In other words, we suggest that prior to 2020, HY R144A bonds were overpriced due to public-private market segmentation. For IG R144A bonds, in contrast, the only plausible re-valuation channel is the reduction in resale liquidity risk.[24]

3.2 Secondary market participation and liquidity

In this section, we relate the pricing results from the previous section to the evidence on secondary market participation and liquidity. Table 9 explicitly tests whether non-eMAXX ownership of R144A bonds changes after the reform. The table estimates the same models as in Table 7, in the same order, but uses residual ownership as the dependent variable instead of the traded yield spread. For an average bond in the secondary market sample (just as for the average primary market sample bond), we find a decrease in R144A ownership by non-eMAXX investors post-2020. Before the reform, the residual R144A ownership was 7.5 pps higher than for public bonds. After the reform, such R144A residual ownership gap drops by 0.6 pps (8% of the pre-reform level), as model (1) of Table 9 shows.

However, models (2)-(7) in Table 9 highlight that changes in the R144A ownership gap are of the opposite sign for IG and HY bonds (just as the effects of the reform on traded yield spreads are).

[23] The effect is akin to short-sellers flooding the CDS market in Oehmke and Zawadowski (2017).

[24] Given a sizeable and relatively more liquid non-R144A IG bond market, core bond investors could easily correct any mispricing in IG R144A bonds by taking long R144A positions and hedging with non-R144A IG bonds or CDSs. For the HY segment, especially when the CDS contract is not available, there is no 'hedge market' as the HY non-R144A segment is marginal.

For instance, model (2) in Table 9 shows that the ownership gap drops by 0.5 pps after 2020 for IG bonds, while it increases by almost 1.6 pps for HY bonds (pre-reform R144A residual ownership gaps are comparable for IG and HY bonds at 7.9 and 6.7 pps). Such a 24% increase (from 6.7 to 8.3 pps) in the relative ownership gap for HY bonds issued prior to the reform is remarkable because it is the only analyzed market segment (among primary and secondary markets and IG and HY bonds) where the QIB reform actually increases market participation by targeted investors, as proxied by non-eMAXX residual ownership. Curiously, it is exactly the segment where the R144A yield spread discount increases after the reform. Taken together, we believe this is strong evidence of market segmentation in HY privately placed bonds before 2020, which the QIB liberalization in 2020 has partly alleviated. But since newly admitted investors allegedly value privately placed HY corporate debt lower than core bond investors, the private placement discount increases in the secondary market after market liberalization.[25] Columns (3)-(7) in Table 9 qualitatively confirm a differential dynamic of the ownership gap between IG and IG bonds with richer sets of fixed effects, absorbing rating×year-month, industry-, and issuer-driven variation in residual ownership.

[25] Contemporaneous primary market effects for HY bonds are weaker because one cannot short bonds in the primary market.

	Dependent variable: residual ownership (% of bond size)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rule 144A × Post-Ref	−0.60*						
	(0.34)						
Rule 144A × Post-Ref × IG		−0.45**	−0.39*	−0.51***	−0.22	−0.22	−0.40***
		(0.22)	(0.21)	(0.15)	(0.21)	(0.21)	(0.15)
Rule 144A × Post-Ref × HY		1.58***	1.88***	1.99***	1.84***	2.01***	1.20***
		(0.49)	(0.47)	(0.24)	(0.63)	(0.60)	(0.28)
Rule 144A (dummy)	7.54***						
	(0.12)						
Rule 144A × IG		7.86***	7.97***	3.13***	7.81***	7.89***	2.83***
		(0.14)	(0.13)	(0.24)	(0.13)	(0.13)	(0.24)
Rule 144A × HY		6.65***	6.79***	1.94***	6.70***	6.87***	1.72***
		(0.20)	(0.19)	(0.42)	(0.21)	(0.20)	(0.41)
Post-Ref × IG		−0.60***	−1.27***	−0.45***			
		(0.10)	(0.10)	(0.12)			
Post-Ref × HY		−3.64***	−4.51***	−2.92***			
		(0.23)	(0.25)	(0.37)			
MTN (dummy)	4.00***	4.08***	3.17***	0.29*	4.21***	3.31***	0.47***
	(0.09)	(0.09)	(0.11)	(0.16)	(0.10)	(0.12)	(0.17)
Post-Ref × MTN	−0.33**	−0.69***	−0.75***	−0.89***	−0.98***	−1.11***	−1.37***
	(0.13)	(0.16)	(0.16)	(0.13)	(0.17)	(0.17)	(0.13)
Outstanding amount ($ bn)	4.72***	4.72***	3.95***	2.16***	4.73***	3.95***	2.14***
	(0.07)	(0.07)	(0.06)	(0.11)	(0.07)	(0.06)	(0.11)
Maturity (years)	0.10***	0.10***	0.14***	0.22***	0.10***	0.14***	0.22***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Coupon rate (bps)	−0.02***	−0.02***	−0.02***	−0.03***	−0.02***	−0.02***	−0.03***
	(0.001)	(0.001)	(0.001)	(0.0004)	(0.001)	(0.001)	(0.0004)
Callable (dummy)	−9.90***	−9.85***	−7.89***	−0.59***	−9.83***	−7.86***	−0.57***
	(0.16)	(0.16)	(0.13)	(0.09)	(0.16)	(0.13)	(0.09)
On-the-run (dummy)	5.65***	5.67***	5.41***	3.83***	5.69***	5.42***	3.85***
	(0.23)	(0.23)	(0.22)	(0.19)	(0.23)	(0.23)	(0.19)
Rating, year-month FE	YES	YES	YES	YES	NO	NO	NO
Rating×year-month FE	NO	NO	NO	NO	YES	YES	YES
Industry FE	NO	NO	YES	NO	NO	YES	NO
Issuer FE	NO	NO	NO	YES	NO	NO	YES
Observations	605,103	605,103	605,103	605,103	605,103	605,103	605,103
Adjusted R^2	0.21	0.21	0.24	0.55	0.21	0.24	0.56
Note:	*p<0.1; **p<0.05; ***p<0.01						

Table 9: **Residual ownership and the reform of Rule 144A: secondary-market sample.** The dependent variable is the % of the bond outstanding amount that is *not* held by eMAXX investors one year after the observation month. The sample, the models, and the definitions of independent variables are identical to those in Table 7. The standard errors (in parentheses) are clustered at the transaction-month level.

Table 10 provides further evidence by linking the QIB reform to secondary market trading activity and transaction costs (T-costs). We keep the right-hand side of the estimated equation identical to that in model (5) of Table 7 (the specification with rating×year-month FEs) and replace the

left-hand side. We first consider two metrics of trading activity: the number of zero-trading days per month[26] and monthly trading volume. For both metrics, we find the sign difference in the R144A reform impact between IG and HY bonds. The private-public gap in the number of zero-trading days drops for HY R144A bonds by 0.23 days post-reform (5% of the pre-reform level), i.e., such bonds trade relatively more frequently after 2020. Conversely, the number of zero-trading days increases for IG bonds by the same 0.23 days (3.2% of the pre-reform level): investment-grade bonds trade less frequently. Likewise, monthly trading volume for IG R144As decreases, while it does not decrease for HY R144As.

The last two columns in Table 10 focus on T-cost metrics. We find that the intra-day return volatility gap between private and public bonds increases by 7.4 bps after the QIB reform for HY R144As and only by 3.9 bps for IG R144As, controlling for maturity, coupon rate, and rating×year-month FEs. Related, we find that realized bid-ask spreads increase more strongly for HY R144As.[27] The results for HY bonds (higher trading activity amid higher T-costs) are consistent with higher market participation of information-driven investors post-2020 – in line with an increase in non-eMAXX ownership (among eMAXX investors, pension funds and life insurers are notorious liquidity, or non-information-driven, traders) and widening of the R144A discount. For IG bonds, the QIB reform reduces observed trading activity and increases realized T-costs, pointing to exacerbated search and matching frictions amid increased eMAXX ownership (which makes a reduction in the (il)liquidity premium in yield spreads – a forward-looking metric – even more remarkable). Importantly, despite different mechanisms at play, transaction costs do not decrease for either IG or HY R144A bonds after the reform, one of the goals of which was to liberalize trading in privately placed bonds.

[26] Lesmond et al. 1999 show that the latter is also a reasonable liquidity metric for rarely-traded securities, and Ivashchenko 2025 adapts it to corporate bond.

[27] We obtain similar results for alternative T-costs metrics from Schestag et al. (2016).

	Dependent variable:			
	Zero days	Volume	Volatility	Avg Bid-Ask
Rule 144A × Post-Ref × IG	0.23^{*}	-0.25^{***}	3.89^{***}	17.90^{***}
	(0.12)	(0.09)	(0.69)	(1.48)
Rule 144A × Post-Ref × HY	-0.23^{**}	0.17	7.36^{***}	25.14^{***}
	(0.11)	(0.21)	(2.38)	(2.15)
Rule 144A × IG	7.26^{***}	-1.01^{***}	-0.45	-31.89^{***}
	(0.08)	(0.07)	(0.58)	(1.28)
Rule 144A × HY	4.68^{***}	-1.83^{***}	-19.79^{***}	-54.33^{***}
	(0.07)	(0.11)	(1.62)	(1.88)
MTN (dummy)	-0.09^{***}	0.50^{***}	0.34	2.72^{***}
	(0.03)	(0.04)	(0.56)	(0.31)
Post-Ref × MTN	0.33^{***}	-0.09	-0.81	1.77^{***}
	(0.06)	(0.06)	(1.32)	(0.46)
Outstanding amount ($ bn)	-4.16^{***}	1.22^{***}	-16.04^{***}	-9.73^{***}
	(0.04)	(0.05)	(0.53)	(0.22)
Maturity (years)	0.10^{***}	0.01^{**}	3.86^{***}	1.70^{***}
	(0.004)	(0.005)	(0.14)	(0.06)
Coupon rate (bps)	0.01^{***}	-0.005^{***}	0.03^{***}	0.02^{***}
	(0.0001)	(0.0002)	(0.002)	(0.001)
Callable (dummy)	-1.13^{***}	0.39^{***}	-3.09^{***}	-0.25
	(0.03)	(0.04)	(0.30)	(0.30)
On-the-run (dummy)	-1.53^{***}	5.18^{***}	-8.36^{***}	-11.21^{***}
	(0.05)	(0.13)	(0.41)	(0.49)
Rating×year-month FE	YES	YES	YES	YES
Observations	796,405	796,405	724,855	692,207
Adjusted R^2	0.43	0.20	0.56	0.32
Note:	*p<0.1; **p<0.05; ***p<0.01			

Table 10: **Bond secondary market trading activity, liquidity, and Rule 144A reform.** The dependent variables are the number of no-trading days in a month ('Zero days' column), monthly trading volume ('Volume', % of the outstanding amount, including dealer-to-customer and inter-dealer trades), intra-day bond return volatility (in bps, not annualized, only calculated for days with at least 5 trades in TRACE), and average realized bond bid-ask spread (in bps, only calculated for days with at least 1 customer buy and sell trades in TRACE), as defined in Table 2b. Otherwise, the sample and the models are identical to model (5) of Table 7. The standard errors (in parentheses) are clustered by transaction month.

4 Implications for firm policies

We have established that the changes to Reg D and Rule 144A in 2020 made newly issued and re-traded privately placed investment-grade bonds relatively more expensive. Privately placed high-yield bonds, however, became cheaper on the secondary market and were left unaffected by the reform in the primary market. Did firms change their financing and investment policies in response

to this? We turn to a standard Compustat firm-quarter sample covering 2015–2024 to answer this question. We assume that firms with a higher percentage of outstanding corporate debt in privately placed bonds are more exposed to the 2020 reform, and we hypothesize that they are more likely to change their policies. Table A4 in the Appendix summarizes our Compustat sample. The average firm in the sample has about 35% of debt in privately placed bonds pre-reform ($\text{R144A}^{\%}_{\text{pre-2020}}$), consistent with an almost equal split of the sample between investment- and speculative-grade firms. To investigate changing firm policies, we are estimating models such as:

$$Y_{k,t} = \text{Post-ref}_t + \text{Post-ref}_t \times \text{R144A}^{\%}_{\text{pre-2020},k} + \{\text{Controls and Issuer FEs}\} + \epsilon_{k,t}, \tag{3}$$

where $Y_{k,t}$ is a characteristic of firm k in year-quarter t, Post-ref_t is the dummy that takes the value of 1 after 2020, and $\text{R144A}^{\%}_{\text{pre-2020}}$ is the exposure of firm k to the R144A change.

We have estimated model (3) for a wide range of firm characteristics Y related to leverage, investments, sales, profitability, financing, and payout. We found the most robust and significant results for leverage and payout, which we report in Table 11.[28] The first four columns of the table refer to the models for firm leverage, the rest – to payout models. All models include a HY dummy, which also interacts with the post-2020 dummy, to capture the differences between high- and low-credit-risk borrowers before and after the reform. We also include firm fixed effects.[29] Additional controls in Table 11 are as in Graham et al. (2015).

We find that investment-grade firms more exposed to the R144A change increase leverage the most post-reform. In models 2 and 4 in Table 11, the loadings on Post-ref $\times$ $\text{R144A}^{\%}_{\text{pre-2020}}$ are around 3 pps, which suggests that an investment-grade issuer with $\text{R144A}^{\%}_{\text{pre-2020}} = 0.3$ increases leverage by almost 1 pp after 2020 as compared to a firm with no R144A debt pre-reform. There

[28] We did not find any significant reform impact of firm sales, investments, or profitability.

[29] We can not include the level of $\text{R144A}^{\%}_{\text{pre-2020}}$ in the models because it is collinear with the set of issuer dummies.

is no such effect for speculative-grade issuers, as the loadings on Post-ref$_t$ × R144A$^{\%}_{\text{pre-2020}}$ and Post-ref × R144A$^{\%}_{\text{pre-2020}}$ × HY roughly cancel each other. This result aligns with HY borrowers not receiving much benefit from the QIB reform: if anything, their debt became cheaper on the secondary market after the reform.

	Dependent variable:							
	Book leverage		Market leverage		Dividend payout		Total payout	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-Ref (dummy)	−3.86	−0.62	2.60	9.27**	10.52	10.24	15.91	14.91
	(4.17)	(4.49)	(5.95)	(4.12)	(9.74)	(9.83)	(15.69)	(16.31)
High Yield (dummy)	5.11***	4.53***	7.63***	7.24***	−0.94	−0.82	−3.32	−2.51
	(0.73)	(0.63)	(0.89)	(0.81)	(1.31)	(1.31)	(2.24)	(2.22)
Post × R144A$^{\%}_{\text{pre-2020}}$	1.95	3.20*	3.78*	3.43*	6.15**	6.27***	11.67***	11.83***
	(1.90)	(1.64)	(2.10)	(1.90)	(2.41)	(2.41)	(3.74)	(3.74)
Post × R144A$^{\%}_{\text{pre-2020}}$ × HY	−2.71	−3.37**	−5.53***	−4.92**	−5.35**	−5.53**	−5.94	−6.39*
	(1.89)	(1.65)	(2.10)	(1.91)	(2.38)	(2.37)	(3.89)	(3.87)
Firm size		1.94**		6.26***		−0.54		0.18
		(0.78)		(0.87)		(0.88)		(1.71)
Asset tangibility		0.14***		0.29***		0.03		0.09
		(0.04)		(0.05)		(0.05)		(0.09)
Market-to-book		0.83***		−0.35***		0.08		0.01
		(0.03)		(0.05)		(0.06)		(0.13)
EBIT ratio		−0.36***		−0.68***		0.08**		0.30***
		(0.03)		(0.05)		(0.04)		(0.08)
Issuer, year-quarter FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	33,048	33,048	33,048	33,048	33,048	33,048	33,048	33,048
Adjusted R^2	0.80	0.84	0.81	0.84	0.22	0.22	0.17	0.17
Note:	*p<0.1; **p<0.05; ***p<0.01							

Table 11: **Corporate policies and exposure to R144A shock.**
The sample is at the firm-year-quarter level and spans years from 2015 to 2024. Summary statistics for the sample are in Table A4. Book leverage (%) is the ratio of total book liabilities to total book assets. Market leverage (%) is current and long-term liabilities to the sum of market equity value, current and long-term liabilities, and preferred stock value. The dividend payout ratio (%) is the total dividend payment to net income. The total payout ratio (%) is the sum of dividend payments and share repurchases to net income. The post-reform dummy takes the value of 1 after Aug 2020. R144A$^{\%}_{\text{pre-2020}}$ (on the scale from 0 to 1) is the fraction of the issuer's total public debt outstanding that is in Rule 144A bonds *before the reform (the average in 2017–2019)*. High-yield (HY) is the credit rating dummy that takes the value of 1 for bonds rated BB+ or below. The controls in models 2, 4, 6, and 8 correspond to those in Graham et al. (2015). The firm size is the log of sales. Asset tangibility (%) is property, plants, and equipment to total assets. EBIT ratio (%) is EBIT to total assets. The fixed effects are at the issuer and calendar year-quarter level. The standard errors (in parentheses) are clustered by issuer.

What do investment-grade firms that are more exposed to the reform do amid increases in leverage? They do not invest more. However, they do increase payouts. For instance, model 6 in Table 11 implies that a $\text{R144A}^{\%}_{\text{pre-2020}} = 0.3$ borrower increases dividend payout by almost 2 pps (6.27×0.3), which is about 25% of the average level of the dividend payout rate in the sample. The total payout for the same borrower increases by about 3.5 pps (11.83×0.3), which is 22% of the sample average. Again, the result is concentrated among investment-grade borrowers, as the loadings on Post-ref × $\text{R144A}^{\%}_{\text{pre-2020}}$ × HY are significantly negative and cancel out the effects observed for IG firms. Taken together, the estimates in Table 11 suggest that investment-grade firms respond to exogenously improving borrowing conditions by leveraging up and paying out more to shareholders, while speculative-grade borrowers, which do not receive economic benefits from the reform, do not change their financing policy.

Conclusion

We document a causal relationship between investor access to secondary bond markets and firms' cost of external financing. Using the 2020 SEC reform of Rule 144A as a quasi-natural experiment that expanded investor access to the privately placed bond market, we find that the valuation gap between newly issued privately and publicly placed bonds shrinks by 18 bps post-reform, or about 43% of the pre-reform level. The aggregate effect on the secondary market for bonds issued before the reform is the same in absolute terms: the private-public yield spread gap shrinks by 18 bps. However, we find a substantial difference between investment-grade and high-yield borrowers. For the former, both primary and secondary market R144A yield spreads narrow (bond prices increase). For the latter, primary market spreads are unaffected, while secondary market yield spreads widen (bond prices drop).

To establish the mechanism behind valuation changes, we study changes in bond ownership and liquidity. We find that, after the reform, traditional long-only investors (pension funds, insurance companies, and bond mutual funds), who had always enjoyed access to the R144A market, increase their ownership of privately placed bonds (both newly- and earlier-issued). Yet, for HY issuers, the participation by smaller investors, some of whom likely gained access to the private-placement market only due to the reform, increases considerably. We hypothesize that such newly participating investors in fact actively short earlier-issued HY bonds (hence the drop in secondary market valuations post-reform and the absence of primary-market effect where shorting is not feasible). In line with such a hypothesis, we find that the increase in HY bond ownership among smaller investors is the strongest for issuers without an actively traded CDS contract, and that the secondary-market trading activity in HY R144A bonds improves amid an increase in transaction costs (as it should be, theoretically, when the ratio of information- to liquidity-driven traders in the market goes up).

While the bond issuance mix (public vs private) remains stable post-reform, indicating no significant supply-side shifts, investment-grade firms respond to improved financing conditions by increasing leverage and payouts. There is no such effect for speculative-grade borrowers whose borrowing conditions either remain unchanged or deteriorate after the reform. Overall, we highlight the broader implications of investor access to OTC markets and demonstrate that market liberalization does not necessarily translate to a lower cost of external financing for firms.

References

Amihud, Yakov, and Haim Mendelson, 1986, Asset pricing and the bid-ask spread, *Journal of Financial Economics* 17, 223–249.

Bekaert, Geert, and Campbell R. Harvey, 2000, Foreign speculators and emerging equity markets, *The Journal of Finance* 55, 565–613.

Bretscher, Lorenzo, Lukas Schmid, Ishita Sen, and Varun Sharma, 2026, Institutional corporate bond pricing, *The Review of Financial Studies* 39, 605–660.

Chari, Anusha, and Peter Blair Henry, 2004, Risk sharing and asset prices: Evidence from a natural experiment, *The Journal of Finance* 59, 1295–1324.

Cheung, William Mingyan, Richard Chung, and Scott Fung, 2015, The effects of stock liquidity on firm value and corporate governance: Endogeneity and the REIT experiment, *Journal of Corporate Finance* 35, 211–231.

Choi, Jaewon, Nan Qin, and Qifei Zhu, 2025, Private investments by fixed income mutual funds, SSRN Working Paper No. 5134832, Available at SSRN.

Diamond, Douglas W., and Robert E. Verrecchia, 1991, Disclosure, liquidity, and the cost of capital, *The Journal of Finance* 46, 1325–1359.

Dickerson, Alexander, Cesare Robotti, and Giulio Rossetti, 2026, The corporate bond factor replication crisis, Working paper, available at SSRN: https://ssrn.com/abstract=6088966.

Domowitz, Ian, Jack Glen, and Ananth Madhavan, 1997, Market segmentation and stock prices: Evidence from an emerging market, *The Journal of Finance* 52, 1059–1085.

Duffie, Darrell, Nicolae Gârleanu, and Lasse Heje Pedersen, 2005, Over-the-counter markets, *Econometrica* 73, 1815–1847.

Duffie, Darrell, Nicolae Gârleanu, and Lasse Heje Pedersen, 2007, Valuation in over-the-counter markets, *The Review of Financial Studies* 20, 1865–1900.

Fang, Vivian W., Thomas H. Noe, and Sheri Tice, 2009, Stock market liquidity and firm value, *Journal of Financial Economics* 94, 150–169.

Friewald, Nils, and Florian Nagler, 2019, Over-the-counter market frictions and yield spread changes, *The Journal of Finance* 74, 3217–3257.

Gilchrist, Simon, Bin Wei, Vivian Z. Yue, and Egon Zakrajšek, 2024, The Fed takes on corporate credit risk: An analysis of the efficacy of the smccf, *Journal of Monetary Economics* 146, 103573.

Gilchrist, Simon, and Egon Zakrajšek, 2012, Credit spreads and business cycle fluctuations, *American Economic Review* 102, 1692–1720.

Graham, John R., Mark T. Leary, and Michael R. Roberts, 2015, A century of capital structure: The leveraging of corporate america, *Journal of Financial Economics* 118, 658–683.

Han, Song, Alan Guoming Huang, Madhu Kalimipalli, and Ke Wang, 2022, Information and liquidity of over-the-counter securities: Evidence from public registration of rule 144A bonds, *Journal of Financial Markets* 59, 100655.

Henry, Peter Blair, 2000, Stock market liberalization, economic reform, and emerging market equity prices, *The Journal of Finance* 55, 529–564.

Holmstrom, Bengt, and Jean Tirole, 2001, LAPM: A liquidity-based asset pricing model, *The Journal of Finance* 56, 1837–1867.

Huang, Rongbing, and Gabriel G. Ramírez, 2010, Speed of issuance, lender specialization, and the rise of the 144A debt market, *Financial Management* 39, 643–673.

Ivashchenko, Alexey, 2025, (In)frequently traded corporate bonds and pricing implications of liquidity dry-ups, *Finance Research Letters* 75, 106880.

Kim, E. Han, and Vijay Singal, 2000, Stock market openings: Experience of emerging economies, *The Journal of Business* 73, 25–66.

King, Tao-Hsien Dolly, 2002, An empirical examination of call option values implicit in U.S. corporate bonds, *Journal of Financial and Quantitative Analysis* 37, 693–721.

Koijen, Ralph S. J., and Motohiro Yogo, 2023, Understanding the ownership structure of corporate bonds, *American Economic Review: Insights* 5, 73–92.

Lesmond, David A., Joseph P. Ogden, and Charles A. Trzcinka, 1999, A new estimate of transaction costs, *The Review of Financial Studies* 12, 1113–1141.

Livingston, Miles, and Lei Zhou, 2002, The impact of Rule 144A debt offerings upon bond yields and underwriter fees, *Financial Management* 31, 5–27.

Oehmke, Martin, and Adam Zawadowski, 2017, The anatomy of the CDS market, *The Review of Financial Studies* 30, 80–119.

Schestag, Raphael, Philipp Schuster, and Marliese Uhrig-Homburg, 2016, Measuring liquidity in bond markets, *The Review of Financial Studies* 29, 1170–1219.

Stulz, Rene M., and Walter Wasserfallen, 1995, Foreign equity investment restrictions, capital flight, and shareholder wealth maximization: Theory and evidence, *The Review of Financial Studies* 8, 1019–1057.

Xu, Hui, and George G. Pennacchi, 2023, Benchmarking the effects of the Fed's secondary market corporate credit facility using yankee bonds, *Journal of Financial Markets* 64, 100805.

Appendix A Additional Figures and Tables

	R144A	Rest	Diff
(A) Bond characteristics at issuance			
Size ($ bn)	0.74	0.52	-0.23**
Rating (1–21)	10.76	6.87	-3.89***
Coupon rate (%)	5.22	3.91	-1.32***
Maturity (years)	7.09	7.06	-0.03
Callable (dummy)	0.77	0.93	0.15*
MTN (dummy)	0.18	0.46	0.29
Issuance yield (%)	5.21	3.86	-1.35***
Issuance yield spread (%)	3.11	1.17	-1.95***
Residual ownership (% size)	57.92	54.59	-3.33*
(B) Issuer's characteristics pre-issuance			
Issuer's yield spread (%)	2.98	1.08	-1.90
Issuer's CDS spread (%)	1.65	0.87	-0.79**
Equity value ($ bn)	19.31	127.61	108.30
Book leverage (% total assets)	44.57	32.28	-12.29
Equity volatility (annualized)	0.45	0.29	-0.16**
Profit margin (%)	2.08	14.83	12.75***

Table A1: **Difference between R144A bonds and the rest (primary market sample)**
The sample here is identical to part a) of Table 2. The first two columns are the pooled sample averages for non-R144A and R144A issues, respectively. The third column is the difference in these averages. p-values are from each characteristic's fixed effects regressions (with issuer, month FEs, and issuer-clustered standard errors) on the Rule 144A dummy.
Significance codes: *** – 0.01, ** – 0.05, * – 0.1.

	Dependent variable:				
	Size	Yield	Coupon	Maturity	Rating
	(1)	(2)	(3)	(4)	(5)
Re-traded (dummy)	−118.74	−0.40**	−0.37*	−0.39	−0.13**
	(100.45)	(0.17)	(0.17)	(1.12)	(0.06)
Issuer, Year FEs	YES	YES	YES	YES	YES
Observations	6,096	6,093	6,096	6,096	6,096
Adjusted R^2	0.51	0.81	0.82	0.20	0.95
Note:	*p<0.1; **p<0.05; ***p<0.01				

Table A2: **Difference at issuance between later re-traded R144A bonds and the rest**
The sample here consists of R144A bonds maturing not earlier than 2015 and issued not later than 2019. Unit observation is bond issuance. 'Re-traded' dummy takes the value of 1 if the bond is re-traded at least once in 2015–2024. The columns show bond characteristics at issuance. Size is the outstanding amount, in $ mn. Yield is the yield to maturity, in %. Coupon is the annual coupon rate, in %. Maturity is the maturity at issuance, in years. Rating is on a conventional numerical scale from 1 (AAA) to 21 (C). Each of the columns represents a regression model for a respective left-hand-side variable. Each model contains issuer and year FEs; the standard errors (in parentheses) are clustered at the year level.

	Dependent variable: no. unique eMAXX investors							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rule 144A × Post-Ref	26.36***	13.15***		24.65***	11.38***		21.52***	4.90
	(4.03)	(3.91)		(4.12)	(4.26)		(3.36)	(3.86)
Rule 144A × Post-Ref × IG			15.13***			13.13***		
			(4.04)			(4.01)		
Rule 144A × Post-Ref × HY			7.34			7.17		
			(14.22)			(14.37)		
Rule 144A (dummy)	−51.22***	−44.92***		−51.93***	−45.37***		−20.04***	−19.00***
	(2.46)	(2.47)		(2.47)	(2.55)		(6.57)	(7.08)
Rule 144A × IG			−46.96***			−48.01***		
			(3.05)			(2.97)		
Rule 144A × HY			−39.37***			−38.36***		
			(4.91)			(4.90)		
MTN (dummy)	−3.01	−6.56*	−6.44*	2.29	−0.97	−0.85	−10.49*	−15.47**
	(3.88)	(3.48)	(3.48)	(3.91)	(3.44)	(3.42)	(5.74)	(6.28)
Post-Ref × MTN	−20.76***	−15.00***	−15.21***	−16.23***	−11.30**	−11.58**	−23.05***	−12.35***
	(5.58)	(5.40)	(5.40)	(5.07)	(4.84)	(4.83)	(3.35)	(3.58)
Outstanding amount ($ bn)	115.70***	116.10***	116.11***	116.63***	117.20***	117.24***	108.50***	109.61***
	(4.75)	(4.25)	(4.26)	(5.10)	(4.50)	(4.51)	(4.29)	(4.57)
Maturity (years)	1.39***	1.43***	1.43***	1.13***	1.15***	1.16***	0.57***	0.52**
	(0.27)	(0.25)	(0.25)	(0.27)	(0.24)	(0.24)	(0.21)	(0.21)
Callable (dummy)	31.01***	34.03***	33.55***	24.21***	26.49***	25.81***	11.28***	11.91***
	(2.90)	(2.80)	(2.87)	(2.67)	(2.54)	(2.64)	(3.56)	(3.70)
Rating, year-month FE	YES	NO	NO	YES	NO	NO	YES	NO
Rating×year-month FE	NO	YES	YES	NO	YES	YES	NO	YES
Industry FE	NO	NO	NO	YES	YES	YES	NO	NO
Issuer FE	NO	NO	NO	NO	NO	NO	YES	YES
Observations	9,761	9,761	9,761	9,761	9,761	9,761	9,761	9,761
Adjusted R^2	0.64	0.65	0.65	0.65	0.66	0.66	0.82	0.83
Note:	*p<0.1; **p<0.05; ***p<0.01							

Table A3: **Investor participation in new bond issues and the reform of Rule 144A.** The dependent variable is the number of unique eMAXX investors one year after bond issuance. Otherwise, the models and the definitions of independent variables are identical to those in Table 5. The standard errors (in parentheses) are clustered by issuance month.

	Mean	S.D.	5th	25th	Med.	75th	95th	N.Obs.
$\text{R144A}^{\%}_{\text{pre-2020}}$ $(0-1)$	0.35	0.36	0.00	0.00	0.23	0.59	1.00	33048
High-yield (dummy)	0.51	0.50	0.00	0.00	1.00	1.00	1.00	33048
Equity volatility (% annualized)	37.85	19.71	17.38	24.53	32.77	45.37	76.57	33048
Equity value ($ bn)	31.42	118.91	0.24	1.96	6.60	22.19	130.15	33048
Market to book	4.37	6.64	0.35	1.27	2.30	4.40	15.30	33048
Book leverage (%)	64.34	16.17	37.93	53.15	64.51	75.49	91.53	33048
Market leverage (%)	34.74	22.48	6.90	17.02	29.98	48.20	80.26	33048
PPE (% assets)	34.76	27.00	3.48	11.23	25.94	57.12	84.70	33048
Capex (% assets)	5.00	5.68	0.66	1.75	3.38	6.27	14.36	33048
EBIT (% assets)	7.84	7.48	-2.00	4.46	7.34	11.30	19.89	33048
Profit margin (%)	3.31	118.05	-20.18	1.53	6.31	12.08	26.97	33048
ROE (%)	13.21	54.93	-40.40	3.53	11.89	23.14	66.17	33048
Dividend payout (% net income)	7.49	22.17	-7.47	0.00	4.42	12.28	33.32	33048
Total payout (% net income)	16.41	41.76	-18.55	0.36	13.51	25.40	65.94	33048

Table A4: **Summary statistics in the Compustat sample of firms**
The sample consists of firm-year-quarter Compustat observations between 2017 and 2023. '$\text{R144A}^{\%}_{\text{pre-2020}}$', a measure of exposure to the policy shock, is the fraction of R144A bonds in the firm's total bonds outstanding (0 – none, 1 – all bonds outstanding are R144A bonds). 'High-yield' dummy is 1 if the issuer's credit rating is speculative-grade in a given quarter and 0 otherwise. Distance to default, equity volatility, and equity value are as in Table 2. 'Market to book' is the ratio of the market to the book value of equity. Book leverage is total book liabilities, in % of book assets. Market leverage is the short- and long-term debt, as % of the sum of the market value of common and preferred stock and total debt outstanding. 'PPE' is property, plants, and equipment. 'EBIT' is earnings before interest and tax. Profit margin is net income as % of sales, and return on equity (ROE) is net income as % of shareholders' equity. Total payout differs from dividend payout in the amount of common stock repurchased.