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

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**Abstract**

This paper empirically investigates how restrictions on investor access to the corporate bond market affect the cost of debt for U.S. firms. Exploiting a quasi-natural experiment—the 2020 SEC reform that admitted previously excluded investors to the market for privately placed U.S. corporate bonds (Rule 144A)—we identify a causal link between investor access and corporate borrowing costs. Following the reform, the yield spread discount for privately placed bonds issued before the reform dropped by 18 basis points (relative to public placements), or 51% of the pre-reform level. Primary-market yield spread discount for newly issued privately placed bonds narrowed by 30-35 basis points. These effects are most pronounced for investment-grade issuers, pointing to the reduction in resale liquidity risk as the main channel for valuation improvements. The gap in trading volume between private and public placements also reduced by almost 30% post-reform. Investment-grade firms react to better borrowing terms by increasing leverage and shareholder payouts.

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## Introduction

Securities issuance represents one of the primary external financing channels for firms. Once issued, corporate securities trade in secondary markets characterized by various market frictions. In particular, regulators sometimes restrict investor access to securities markets, rendering them less liquid, which may lead to lower securities prices to compensate investors for bearing illiquidity risk. We study whether the effects of secondary-market access restrictions propagate to the primary-market cost of external financing and whether issuers benefit when their securities are traded in more-liquid markets with fewer frictions.

To analyze this relationship, we examine U.S. corporate bond markets and contrast empirically bond markets with unrestricted access (public placements) and restricted access (private placements, only available to sufficiently large and sophisticated investors) around a recent regulatory reform that lifts certain access restrictions, increasing the pool of potential buyers on the latter market. We find that as investor access to the private secondary market improves, primary market borrowing conditions also improve. We argue that the effect is causal and stems from reduced bond trading frictions.

Public corporate bond placements in the U.S. are subject to SEC registration requirements, which mandate extensive information disclosure for the issuer. Private bond placements are exempt from registration, resulting in reduced disclosure obligations. However, the primary market for private placements is restricted to large, sophisticated investors under SEC Regulation D. In principle, privately placed bonds cannot be resold in a public over-the-counter (OTC) secondary market. Yet, there is an exception under the SEC Rule 144A, which permits resale to qualified (institutional) buyers who must meet even stricter size and sophistication requirements than those for Reg D accredited investors.

In summer 2020, the SEC amended the definition of qualified buyers under Rule 144A, expanding market access to include sufficiently large family offices, limited liability companies (the standard incorporation form used by hedge fund managers), and regional investment advisors. This regulatory change enabled these new investor groups to participate in the secondary market for privately placed bonds ('R144A bonds' or 'R144As' in what follows).[1] We exploit the reform as a quasi-natural experiment, comparing bond yield spreads, trading activity, and transaction costs in affected (R144A) and non-affected (publicly placed) bonds before and after the policy change. We treat the reform as a unique demand and liquidity shock for R144A bonds, which is exogenous to the issuer's credit risk and information disclosures. The reform expanded the pool of eligible R144A investors and facilitated the counterparty search for re-trades of R144A bonds, without immediately affecting the issuing firm or the fundamental characteristics of affected securities, especially for *bonds issued before the reform*. Analyzing prices and trading activity of bonds issued before 2020 allows us to identify a causal link between the lifting of market access restrictions and firms' cost of debt.

Before the QIB reform, the secondary market yield spread differential between R144A and non-R144A bonds stood at around 35 bps (controlling for other factors of corporate yield spread). R144A bonds were cheaper; hence, the yield spread differential represents an 'R144A discount'. After the reform, the secondary market R144A discount for bonds issued before 2020 shrinks by 18 bps, or 51% of the pre-reform level (i.e., R144A bonds become more expensive). This represents a causal effect of lifting market access restrictions, and we show that it is robust to various time and industry sample splits. We consider two channels through which the effect may operate: changes in illiquidity risk compensation and persistent demand-driven price impact in partially segmented

[1] 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. Due to incomplete holdings data, it is difficult to assess the size of the group of investors newly admitted to the R144A market in 2020. A common perception is that it is small compared to core corporate bond investors: insurance companies, mutual funds, and pension funds.

markets. The former channel means that R144As used to be cheap because they were difficult to re-trade. The latter channel states that a former non-QIB investor, who values R144As differently from QIBs, becomes a marginal investor in a market previously inaccessible to her. We argue that the liquidity channel must be dominant for investment-grade (IG) issuers and bonds, whereas the segmentation channel may only play a role in the high-yield (HY) segment of the market, where R144As account for 80% of all debt issuance and effectively serve as the only sizeable market for trading HY corporate debt.

We find that the QIB reform reduces the secondary-market IG R144A discount by 35-60% (8-14 bps, including estimates for the subset of publicly traded firms), which we attribute to liquidity improvements due to easier counterparty search and matching. Relatedly, we show that the gap in trading volume between IG R144A and non-R144A bonds declines by almost 30% post-reform (pre-reform, monthly volumes were at 2% and 5% of the issue size, respectively). For HY issuers, we find similar trading volume effects. However, we also find that the secondary-market HY R144A yield spread discount *increases* from 25 to 78 bps post-reform: unlike IG bonds, previously issued HY R144A bonds become cheaper post-reform. We argue that this is consistent with newly admitted opportunistic investors taking short positions in HY corporate debt, something they effectively could not do without access to the R144A market. This aligns with the persistent market impact of new R144A investors following a period of market segmentation.

We also analyze how secondary-market effects propagate to the primary-market cost of newly issued debt. We find that the yield spread differential between newly issued R144A and publicly placed bonds narrows by 30-35 bps, which is 67-88% of the pre-reform primary-market R144A discount. The effect is equally pronounced among public issuers, suggesting that corporate information disclosures play little role in it. Also, the mix between publicly and privately placed bonds in new bond issuance does not change after the reform, suggesting that supply-side effects do not

drive the primary-market result either. As for the secondary market, we find that the reduction in the primary-market R144A discount is most pronounced among IG issuers, and we again attribute the effect to improvements in secondary-market liquidity. Primary market R144A investors are asking for lower compensation as the risk of resale illiquidity decreases following the QIB reform.

Next, we examine how firms respond to more favorable borrowing conditions following the reform. Investment-grade firms increase their leverage ratios while maintaining an unchanged public-private debt mix. In contrast, speculative-grade firms do not increase debt issuance, consistent with the reform having the opposite effect on HY bond yield spreads relative to IG issuers. Remarkably, investment-grade borrowers increase both leverage and shareholder payouts while keeping capital expenditures unchanged. This suggests that these firms use the improved financing conditions to optimize their capital structure and return cash to shareholders rather than to expand investment.

The literature on the link between securities liquidity and the cost of external financing (hence, firm value) is 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. Finding also that higher liquidity improves firm value, the equity literature mainly emphasizes the information, agency, and corporate governance aspects of the problem. Our results are complementary and focus on the impact of non-informational frictions in the secondary marketplace for corporate securities on firms' cost of borrowing. Exploiting a novel policy shock that has not been previously studied in the academic literature, we empirically link exogenous variation in the investors' access to the secondary OTC bond market to issuers' cost of debt. Our results thus relate to the 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) demonstrates that it is consistent with the cross-

section of corporate bond prices. For high-yield issuers, we also find that market access restrictions may be linked to market segmentation and, in turn, to permanent demand-driven price effects following improved market access for previously excluded investors. Thus, the paper links to both older literature on the effects of securities market liberalization (Domowitz et al. 1997, Bekaert and Harvey 2000, to name a few) and more recent literature on the demand-driven pricing implications of institutional bond ownership (for instance, Bretscher et al. 2026).

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 on bond yield spreads and transaction costs 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. are subject to mandatory registration with the SEC. The issuers of securities, as part of the registration process, must publicly disclose substantial amounts of information, which is intended 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.[2] 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 institutional buyers' (QIB), who are also defined as sufficiently wealthy and sophisticated. Before the security issuance, a possibility of resale under Rule 144A must be specified in the private placement memorandum (a counterpart of a public offering prospectus).

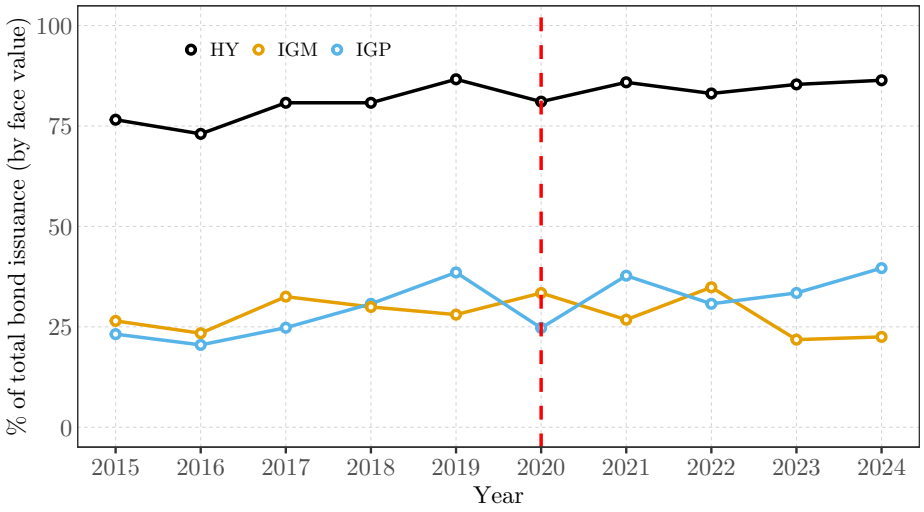


Figure 1: **Rule 144A bonds in new corporate bond issuance, by issuer credit class.** On the y-axis is the R144A bond issuance in percentage of all new corporate bond issuance (by dollar face value). The x-axis shows the issuance year. The sample consists of corporate debentures and corporate medium-term 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.

A substantial amount of corporate bonds issued in the U.S. are privately placed under Reg D. All of them, with only a few exceptions, are issued under Rule 144A.[3] 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

[2]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).

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

firms, the ratio is considerably higher, at around 80%. Livingston and Zhou (2002) and Huang and Ramírez (2010) previously documented such market segmentation, arguing also that R144A placement speeds up issuance for speculative grade firms. Sometimes, issuers register R144A bonds several years after initial placement (Han et al. 2022).[4]

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

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

The restrictions on access to the primary market for private placements (Reg D) and secondary market re-trade (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 substantial investor categories until recently. For example, limited liability companies (LLC, a legal structure popular among hedge funds and family offices) and regional investment advisors were de jure excluded from primary and secondary markets for privately placed securities. In 2020, the SEC addressed the issue and changed the definitions of AI and QIB in Reg D and Rule 144A.[5] Table 1 highlights the main changes in the definitions after the 2020 reform. As a result, more investors were admitted to the primary and secondary markets for privately placed securities after 2020.

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

[5]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.

## 1.2 Identification

The changing definitions of accredited investors and qualified institutional buyers provide a quasi-natural experiment to identify the causal effects of investor participation and investor demand 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 the demand for privately placed corporate bonds in the primary market, which must lead to lower corporate borrowing costs. To test for such an effect, we conduct the difference-in-difference analysis in the sample of newly issued bonds. The treated group consists of R144A (privately placed) 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:

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

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. Since the reform affects all bonds simultaneously, we can not include time fixed effects in model (1). Instead, we rely on Moody's monthly aggregate 10-year Baa spread to capture the fluctuations in the aggregate cost of corporate borrowing. Other control variables and fixed effects account for bond- and issuer-specific factors of the yield spread. We also perform tests both with and without data from year 2020 to limit the impact of COVID-related market abnormalities on our results.

We argue that $\hat{\beta}_3$ in (1) identifies the link between primary market bond demand and yield spread. To rule out the supply-side explanation (issuers change the mix of private and public placements following the reform), we refer again to Figure 1, which demonstrates that there is virtually as much private placement after the reform as before (relative to public issuance).

However, the question remains: what channels link investor access and the cost of corporate borrowing? We argue that the 2020 broadening of the QIB definition under Rule 144A improves secondary-market trading activity for privately placed bonds. The wider the pool of potential buyers, the easier it is to find a counterparty to trade with, and the lower the yield spread should be, as long as such OTC-frictions-induced illiquidity risk is priced in corporate bonds (Friewald and Nagler, 2019). We test for such an effect in a sample of secondary-market transactions involving privately and publicly placed bonds. 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 policies. In such a sample, we estimate the models for both bond yield spread and different metrics of trading activity and trading cost:

$$\text{Traded yield spread}_{i,t}[k] = \beta_1 \mathbf{1}_i^{\text{R144A}} + \beta_2 \mathbf{1}_t^{\text{Post-reform}} + \beta_3 \mathbf{1}_i^{\text{R144A}} \times \mathbf{1}_t^{\text{Post-reform}} + \cdots + \epsilon_{i,t}. \tag{2}$$

$$\text{Trading activity and cost}_{i,t}[k] = \beta_1 \mathbf{1}_i^{\text{R144A}} + \beta_2 \mathbf{1}_t^{\text{Post-reform}} + \beta_3 \mathbf{1}_i^{\text{R144A}} \times \mathbf{1}_t^{\text{Post-reform}} + \cdots + \epsilon_{i,t}, \tag{3}$$

where ... stands for additional controls and fixed effects similar to those in (1).

The diff-in-diff estimates $\hat{\beta}_3$ in (2) and (3) identify a causal link between broader access to the secondary market in R144A bonds and their yield spread and trading characteristics. This link suggests that at least part of the primary-market effect identified in (1) is attributable to improved

secondary-market trading. The borrowing cost changes post-reform not only because additional buyers enter the primary market but also because a marginal investor now values privately placed bonds more highly due to easier resale.

### 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.

**Primary market sample.** This sample consists of non-convertible, non-asset-backed, USD-denominated, fixed-coupon corporate debentures and medium-term notes (Mergent codes CDEB and CMTN) issued between 2015 and 2024 by public firms.[6] We restrict both the primary and the secondary market samples to bonds with maturities of at most 30 years to facilitate bond pricing (there are no liquid historical benchmarks of riskless borrowing costs for extra-long maturities). There are about 17k such bond issues by 3.2k unique issuers.

**Secondary market sample.** This sample consists of non-convertible, non-asset-backed, USD-denominated, fixed-coupon corporate debentures and medium-term notes issued by public firms not later than 2019. 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 (adopting the usual rule in the literature that the bond must be traded 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

[6] 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. Similarly, public firms account for about 90% of corporate bond issuance in the U.S. by notional outstanding amount.

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. The resulting secondary market sample comprises about 850k bond-month observations.

Table 2a summarizes the primary market sample. Of 17k bond issues in the sample, about 5.6k are R144A issues (33% of the sample). The average bond has a 7-year maturity, about $600 mn outstanding amount, and is rated BBB+ at issuance with a coupon rate close to 4.3% and the yield spread at 1.8%. About 88% of bonds in the sample are callable. The average issuer is a large, profitable public firm. As Figure 1 suggests, R144A bonds are 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, at issuance, R144A bonds have wider yield spreads. Therefore, we carefully account for the credit risk compensation in issuance yield spreads in the subsequent empirical analysis.

| | Mean | S.D. | 5th | 25th | Med. | 75th | 95th | N.Obs. |
|---|---|---|---|---|---|---|---|---|
| (A) Bond characteristics at issuance | | | | | | | | |
| Rule 144A (dummy) | 0.33 | 0.47 | 0.00 | 0.00 | 0.00 | 1.00 | 1.00 | 17080 |
| Size ($ bn) | 0.60 | 0.62 | 0.00 | 0.03 | 0.50 | 0.80 | 1.60 | 17080 |
| Rating (1–21) | 8.15 | 3.66 | 4.00 | 5.00 | 7.00 | 10.00 | 16.00 | 17080 |
| Coupon rate (%) | 4.33 | 2.10 | 1.25 | 2.88 | 4.40 | 5.50 | 7.75 | 17080 |
| Maturity (years) | 7.10 | 3.80 | 2.04 | 5.08 | 7.10 | 10.16 | 12.19 | 17080 |
| Callable (dummy) | 0.88 | 0.32 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 17080 |
| Issuance yield (%) | 4.30 | 2.30 | 1.27 | 2.86 | 4.37 | 5.41 | 7.60 | 17080 |
| Issuance yield spread (%) | 1.79 | 2.10 | 0.25 | 0.72 | 1.19 | 2.23 | 5.48 | 17080 |
| (B) Issuer's characteristics pre-issuance | | | | | | | | |
| Issuer's yield spread (%) | 1.58 | 2.39 | 0.30 | 0.67 | 1.07 | 1.73 | 4.67 | 12284 |
| Equity value ($ bn) | 106.95 | 170.78 | 1.73 | 11.39 | 43.90 | 127.37 | 431.24 | 11731 |
| Book leverage (% total assets) | 34.66 | 19.29 | 9.70 | 19.52 | 33.79 | 44.93 | 67.58 | 11700 |
| Equity volatility (annualized) | 0.32 | 0.16 | 0.16 | 0.22 | 0.27 | 0.35 | 0.64 | 11630 |
| Profit margin (%) | 12.34 | 16.73 | -6.20 | 5.92 | 12.07 | 20.97 | 36.78 | 11726 |

(a) **Primary market sample**

| | Mean | S.D. | 5th | 25th | Med. | 75th | 95th | N.Obs. |
|---|---|---|---|---|---|---|---|---|
| (A) Bond characteristics | | | | | | | | |
| Rule 144A (dummy) | 0.16 | 0.36 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 859978 |
| Size ($ bn) | 0.75 | 0.64 | 0.20 | 0.35 | 0.52 | 1.00 | 2.00 | 859978 |
| Rating (1–21) | 8.60 | 3.31 | 4.00 | 6.00 | 8.00 | 10.00 | 15.00 | 859978 |
| Coupon (%) | 4.71 | 1.74 | 2.25 | 3.46 | 4.45 | 5.88 | 7.88 | 859978 |
| Maturity (years) | 8.94 | 8.28 | 0.75 | 2.92 | 5.67 | 12.58 | 26.58 | 859978 |
| Age (years) | 6.19 | 5.65 | 0.61 | 2.50 | 4.67 | 7.86 | 19.24 | 859978 |
| Callable (dummy) | 0.89 | 0.32 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 859978 |
| Yield to maturity (%) | 4.31 | 4.97 | 1.10 | 2.57 | 3.81 | 5.15 | 7.72 | 859978 |
| Yield spread (%) | 1.93 | 2.77 | 0.25 | 0.71 | 1.22 | 2.14 | 5.67 | 859978 |
| Monthly trading volume (% size) | 4.82 | 5.77 | 0.18 | 1.19 | 2.95 | 6.12 | 16.25 | 859978 |
| No-trading days (per month) | 7.30 | 6.11 | 0.00 | 2.00 | 6.00 | 12.00 | 18.00 | 859978 |
| Average bid-ask (%) | 0.49 | 0.58 | 0.04 | 0.15 | 0.30 | 0.60 | 1.65 | 739927 |
| (B) Issuer's characteristics | | | | | | | | |
| Equity value ($ bn) | 77.28 | 169.28 | 1.52 | 10.44 | 31.65 | 82.15 | 267.23 | 656045 |
| Book leverage (% total assets) | 36.81 | 18.91 | 9.39 | 24.23 | 36.21 | 46.45 | 68.10 | 656045 |
| Equity volatility (annualized) | 0.31 | 0.17 | 0.15 | 0.20 | 0.26 | 0.36 | 0.64 | 656045 |

(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). 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 a realized stock return volatility in a backward-looking 250-day rolling window. Table A1 in the Appendix compares bond and issuer characteristics between R144A bonds and the rest in the primary market sample of part a) of this table. Table A2 compares characteristics at issuance between R144A bonds that are later re-traded (and constitute the sample in part (b) here) and those that are not.

In the secondary market sample (Table 2b), about 16% 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-limited 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 $750 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 are 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 not re-traded R144A bonds and finds that the only significant differences between the two are size and maturity (re-traded bond issues are larger and of longer maturity). This suggests that, in terms of credit quality, the set of R144A bonds in the secondary-market sample is representative of the primary-market population.

## 2 Primary market effects

In this section, we present the estimates from model (1) for bond yield spread at initial bond 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 relatively parsimonious yield spread models, which are nonetheless rich in their explanatory power with 73-74% of explained variation in the issuance yield spreads. The set of granular rating fixed effects absorbs cross-bond credit risk compensation, while the aggregate Baa spread captures its time-varying average level. The loading on the R144A dummy in model 1 suggests that R144A bonds were placed with an average discount of about 40 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 35 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). Controlling for bond issue size, maturity, and callability in model 2, the R144A discount stands at 45 bps pre-reform and shrinks by 33 bps (or 75% of the pre-reform level) post-reform. This is an improvement for issuers: privately placed bonds are worth more after the 2020 reform (relative to publicly placed bonds). We argue that this is caused by broader investor access to the private market.

Models 3 and 4 add the issuer's industry or issuer fixed effects, respectively. With richer sets of fixed effects, the loadings on other explanatory variables in yield spread regressions remain relatively stable (with the exception of the issue size in model 4, which shows that larger bond supply for a given issuer is associated with lower bond prices). Importantly, the estimates of the R144A pre-reform discount ($\hat{\beta}_1$) and its post-reform change ($\hat{\beta}_3$) are virtually the same at 45-46 bps and 30-32 bps, respectively. This implies that according to models 2–4, between 67% and 75% of the pre-reform private placement discount is eliminated by the reform.

Models 5–8 re-estimate equation (1) in the subset of public firms issuing R144A bonds. Beyond robustness, this allows us to control for time-varying firm-specific factors in the borrowing cost implied by structural credit risk models: the issuer's market cap, leverage, and stock return volatility (we also obtain quantitatively similar untabulated results by blending these factors into Merton's distance-to-default measure). Accounting for such firm-specific, time-varying variation in the credit risk premium in models 6–8, the drop in the R144A discount post-reform extends to almost 100% of the pre-reform level (which remains stable at 44-51 bps). In other words, for public firms, there is no premium or discount on R144A bonds issued after 2020 compared with non-R144A bonds.

| | Dependent variable: issuance yield spread (bps) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | All bond issuers | | | | Public firms | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Rule 144A × Post-Ref | −34.88*** | −32.61*** | −30.38*** | −32.33*** | −35.13*** | −45.39*** | −42.08*** | −49.69*** |
| | (7.38) | (7.12) | (7.18) | (9.03) | (11.50) | (11.82) | (11.78) | (15.13) |
| Rule 144A (dummy) | 39.90*** | 45.36*** | 44.81*** | 45.78*** | 45.11*** | 43.51*** | 44.76*** | 50.67*** |
| | (4.56) | (4.69) | (4.44) | (9.94) | (8.04) | (7.53) | (6.75) | (11.53) |
| Post-Ref (dummy) | 35.12*** | 34.39*** | 31.44*** | 28.94*** | 33.68*** | 14.60** | 15.41** | 17.11*** |
| | (7.12) | (7.17) | (6.93) | (6.73) | (7.76) | (6.88) | (6.65) | (5.90) |
| Baa 10Y spread (bps) | 0.72*** | 0.74*** | 0.76*** | 0.78*** | 0.78*** | 0.59*** | 0.64*** | 0.70*** |
| | (0.12) | (0.11) | (0.11) | (0.11) | (0.13) | (0.12) | (0.11) | (0.12) |
| Issue size ($ bn) | | −6.22*** | −1.77 | 8.41*** | −1.82 | −1.63 | 3.60* | 9.72*** |
| | | (2.26) | (2.09) | (1.84) | (2.44) | (2.35) | (2.14) | (2.11) |
| Bond maturity (years) | | 2.96*** | 3.23*** | 4.12*** | 3.18*** | 3.45*** | 3.58*** | 3.90*** |
| | | (0.38) | (0.34) | (0.33) | (0.42) | (0.41) | (0.37) | (0.34) |
| Callable (dummy) | | 17.17*** | 23.83*** | 34.99*** | 33.47*** | 32.83*** | 39.45*** | 41.81*** |
| | | (3.54) | (3.44) | (4.46) | (4.46) | (4.55) | (4.63) | (6.29) |
| Equity value ($ bn) | | | | | | −0.01 | −0.004 | 0.002 |
| | | | | | | (0.01) | (0.01) | (0.02) |
| Book leverage (%) | | | | | | −0.03 | 0.11 | 0.20 |
| | | | | | | (0.06) | (0.09) | (0.25) |
| Equity volatility (%) | | | | | | 1.62*** | 1.35*** | 0.85** |
| | | | | | | (0.36) | (0.33) | (0.42) |
| Rating FE | YES | YES | YES | YES | YES | YES | YES | YES |
| Industry FE | NO | NO | YES | NO | NO | NO | YES | NO |
| Issuer FE | NO | NO | NO | YES | NO | NO | NO | YES |
| Observations | 17,080 | 17,080 | 17,080 | 17,080 | 11,603 | 11,603 | 11,603 | 11,603 |
| Adjusted $R^2$ | 0.73 | 0.74 | 0.75 | 0.86 | 0.69 | 0.71 | 0.73 | 0.82 |
| *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-reg' (dummy) is 1 for issuances after Aug 2020, and 0 otherwise. 'Baa 10Y spread' is the Moody's monthly aggregate Baa-Treasury 10-year spread, in bps. Equity value, book leverage, and equity volatility are at the issuer level as of the month preceding the bond issuance. 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.

The fact that the pre-reform R144A discount is not smaller in the public firms subset of the data suggests that the discount is not due to higher information asymmetry about the R144A bond issuer in the first place. Public firms already disclose considerable amounts of information, and the marginal informational benefit of any new bond issuance – R144A or not – is likely small. If such an information-asymmetry-driven yield spread component was non-negligible for non-public firms, we would have seen a pronounced drop in $\hat{\beta}_1$ in models 5–8. We do not find this; hence, we

interpret the R144A discount as an investor's compensation for resale restrictions. R144A bond investors earn a higher expected return, accepting the risk of limited resale liquidity, and the resale risk premium declines after the reform as more investors gain access to the R144A market.

Figure 2 presents similar evidence and also graphically verifies the parallel-trends assumption underpinning the causal interpretation of the diff-in-diff estimates. There we plot year-by-year R144A discount from a model identical to model (2) of Table 3, where the post-reform dummy is replaced by the collection of issuance year dummies. In such a model, the R144A discount is significant at 25-65 bps for issuances in 2015-2020. For 2021, the estimated discount is below 25 bps, and it becomes insignificantly different from zero in 2023-2024. The elevated discount in 2022 likely relates to a concurrent debate over SEC Rule 15c2-11 (requiring broker-dealers to collect substantial information about investors in less-transparent stocks), which was suddenly feared to apply to R144A bonds following an unexpected announcement by the SEC in late 2021,[7] effectively creating a new trading friction in the secondary R144A market. After much industry debate,[8] the SEC explicitly exempted R144A bonds from the application of Rule 15c2-11,[9] first until 2025, and, in a later decision, indefinitely. This would explain why the impact of broader investor access to the R144A market on issuance yield spreads is most pronounced after 2022.

[7] See this communication by the SEC.
[8] See, for instance, this piece by SIFMA.
[9] See this amendment by the SEC.

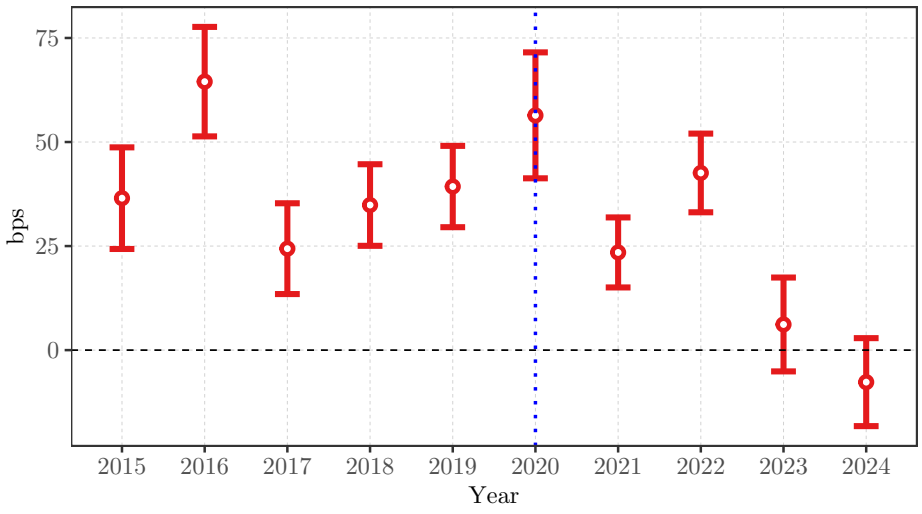


Figure 2: **Rule 144A primary market discount.**
On the y-axis are the loadings on year dummies interacted with the Rule 144A dummy in the regression for issuance yield spread identical to model (2) in Table 3, except for 'Post-Ref' dummy being replaced by a collection of year dummies. The x-axis shows the issuance year. The vertical dotted line is the Rule 144A reform. The confidence bands are 1.65 standard errors (clustered by issuance month) around the point regression estimates.

Table 4 provides robustness for the primary market results in bond subsamples. Model 1 excludes the year 2020 from the sample entirely, thereby limiting the potential effect of COVID-related bond market abnormalities on our estimates. Removing the COVID year, we still observe a statistically significant post-reform drop in the R144A discount of about 60% (27 bps) relative to the pre-reform level (46 bps). Models 2 and 3 in Table 4 show that the effect is present in both non-financial and financial firms and is comparable between the two subgroups. Finally, models 4 and 5 show that, after the reform, the private-placement discount drops by 39% relative to pre-2020 levels among investment-grade issuers, while the effect is statistically weaker and economically smaller for high-yield borrowers. In the next section, we show that the reform's differential effect on IG and HY bond yield spreads is even more pronounced in the secondary bond market.

| | Dependent variable: issuance yield spread (bps) | | | | |
|---|---|---|---|---|---|
| | Excl. 2020 | Non-Financ. | Financ. | Inv. Grade | High yield |
| | (1) | (2) | (3) | (4) | (5) |
| Rule 144A × Post-Ref | $-26.59^{***}$ | $-24.50^{**}$ | $-25.83^{***}$ | $-14.14^{***}$ | $-17.47$ |
| | (5.18) | (9.66) | (6.71) | (4.86) | (13.97) |
| Rule 144A (dummy) | $46.22^{***}$ | $42.42^{***}$ | $41.37^{***}$ | $36.16^{***}$ | $50.81^{***}$ |
| | (3.54) | (5.72) | (4.74) | (3.59) | (9.53) |
| Post-Ref (dummy) | $25.91^{***}$ | $26.70^{***}$ | $28.31^{***}$ | $25.00^{***}$ | $24.26^{*}$ |
| | (5.85) | (7.89) | (6.66) | (6.20) | (12.88) |
| Baa 10Y spread (bps) | $0.49^{***}$ | $0.96^{***}$ | $0.51^{***}$ | $0.59^{***}$ | $1.44^{***}$ |
| | (0.05) | (0.12) | (0.09) | (0.11) | (0.12) |
| Issue size ($ bn) | $-2.26$ | 5.32 | $-1.79$ | 2.30 | $-7.60$ |
| | (1.82) | (3.41) | (2.78) | (1.80) | (6.93) |
| Bond maturity (years) | $3.70^{***}$ | $1.61^{***}$ | $4.16^{***}$ | $4.71^{***}$ | $-20.18^{***}$ |
| | (0.30) | (0.55) | (0.39) | (0.28) | (1.89) |
| Callable (dummy) | $19.37^{***}$ | $-2.74$ | $26.00^{***}$ | $25.44^{***}$ | 1.00 |
| | (3.07) | (7.72) | (3.31) | (3.16) | (14.99) |
| Rating, Industry FEs | YES | YES | YES | YES | YES |
| Observations | 15,020 | 7,951 | 8,730 | 13,490 | 3,590 |
| Adjusted $R^2$ | 0.77 | 0.74 | 0.69 | 0.46 | 0.49 |
| *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 (3) from Table 3, but it is estimated on subsamples of the original primary market sample. Column (1) is for the sample that excludes all 2020 issuances. Columns (2) and (3) split the original sample into non-financial and financial issuing firms. Columns (4) and (5) split the sample into investment-grade and high-yield bond issues. 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 legacy Reg-D-accredited investors, and the only effect the reform has on these bonds is to make more investors eligible to buy and sell them on the secondary market (i.e., the total supply of such bonds is fixed). We hypothesize that this leads to higher trading activity and price appreciation in R144A bonds compared to non-R144A bonds in the sample.

| | Dependent variable: traded yield spread (bps) | | | | | | |
|---|---|---|---|---|---|---|---|
| | All bond issuers | | | | | Public firms | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Rule 144A × Post-Ref | −18.55** | −18.23** | −10.56*** | −13.52*** | −8.85*** | −8.34*** | −5.97* |
| | (8.92) | (9.03) | (2.42) | (2.44) | (1.97) | (2.82) | (3.12) |
| Rule 144A × Post-Ref × HY | | | 52.49*** | 49.49*** | 73.42*** | 75.87*** | 88.44*** |
| | | | (9.18) | (7.71) | (6.51) | (7.76) | (8.76) |
| Rule 144A (dummy) | 34.39*** | 34.94*** | 29.74*** | 41.45*** | 24.43*** | 22.58*** | 10.36*** |
| | (4.38) | (4.56) | (1.36) | (6.47) | (2.93) | (4.80) | (2.90) |
| Rule 144A × HY | | | −4.23 | −10.29 | −28.96*** | −6.18 | −26.86*** |
| | | | (11.02) | (9.78) | (7.96) | (11.10) | (9.36) |
| Post-Ref (dummy) | 17.82*** | 18.53*** | 29.58*** | 27.65*** | 22.86*** | −9.80 | −3.58 |
| | (4.84) | (4.92) | (6.89) | (6.78) | (4.90) | (6.68) | (4.14) |
| Post-Ref × HY | | | −90.53*** | −63.70*** | −47.11*** | −73.60*** | −49.48*** |
| | | | (21.13) | (22.06) | (11.03) | (24.54) | (12.00) |
| Outstanding amount ($ bn) | 0.25 | −3.10*** | −3.24*** | 2.19*** | 2.91*** | 0.69 | 1.88*** |
| | (0.86) | (0.80) | (0.82) | (0.49) | (0.45) | (0.56) | (0.47) |
| Maturity (years) | 2.47*** | 2.59*** | 2.61*** | 3.31*** | 3.46*** | 3.28*** | 3.46*** |
| | (0.10) | (0.10) | (0.10) | (0.11) | (0.07) | (0.11) | (0.07) |
| Coupon rate (bps) | 0.23*** | 0.21*** | 0.21*** | 0.12*** | 0.11*** | 0.12*** | 0.11*** |
| | (0.01) | (0.01) | (0.01) | (0.004) | (0.003) | (0.005) | (0.003) |
| Baa 10Y spread (bps) | 1.20*** | 1.19*** | 1.20*** | 1.14*** | 0.92*** | 0.82*** | 0.75*** |
| | (0.09) | (0.09) | (0.09) | (0.11) | (0.07) | (0.09) | (0.06) |
| Callable (dummy) | 9.61*** | 16.70*** | 14.31*** | 8.16*** | 7.25*** | 5.92*** | 5.31*** |
| | (1.90) | (1.60) | (1.59) | (0.74) | (0.72) | (0.96) | (0.86) |
| On-the-run (dummy) | −13.42*** | −13.78*** | −13.43*** | −22.29*** | −16.40*** | −13.90*** | −12.68*** |
| | (1.60) | (1.53) | (1.42) | (2.45) | (1.06) | (1.57) | (0.79) |
| Equity value ($ bn) | | | | | | 0.01 | 0.01 |
| | | | | | | (0.01) | (0.01) |
| Book leverage (%) | | | | | | 0.03*** | 0.02*** |
| | | | | | | (0.004) | (0.01) |
| Equity volatility (%) | | | | | | 0.21 | 0.32* |
| | | | | | | (0.18) | (0.17) |
| Rating FE | YES | YES | YES | YES | YES | YES | YES |
| Industry FE | NO | YES | YES | NO | NO | NO | NO |
| Issuer FE | NO | NO | NO | YES | YES | YES | YES |
| Excl. 2020 | NO | NO | NO | NO | YES | NO | YES |
| Observations | 859,978 | 859,978 | 859,978 | 859,978 | 763,069 | 656,045 | 577,408 |
| Adjusted $R^2$ | 0.59 | 0.61 | 0.61 | 0.72 | 0.76 | 0.71 | 0.75 |
| *Note:* | *p<0.1; **p<0.05; ***p<0.01 | | | | | | |

Table 5: **Traded 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. 'Coupon rate' is the bond coupon rate at issuance, in bps per annum. The 'On-the-run' dummy takes the value 1 if the bond was issued less than 1 year ago as of the transaction month, and 0 otherwise. Other variables and fixed effects are defined as in the primary market sample. The standard errors (in parentheses) are clustered by transaction month.

Table 5 estimates the yield-spread model (2) in a bond-month panel of spreads and bond characteristics. Models 1 and 2 are analogous to models 1–3 in Table 3; the only differences are the addition of the on-the-run dummy (for trades in newly issued bonds) and the bond coupon rate. In models 1-2 in Table 5, the pre-reform R144A discount $\hat{\beta}_1$ is at 34-35 bps, somewhat smaller than in the primary market sample. 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 models 1-2 is 18-19 bps, or 53-54% of the pre-reform level, which is also a bit smaller than the primary-market estimates.

However, there are considerable differences in $\hat{\beta}_3$ between investment-grade (75% of the secondary market sample) and high-yield (the remaining 25%) R144A bonds in the secondary-market sample, as model 3 in Table 5 suggests. While the R144A discount is close for IG and HY bonds pre-reform (controlling for credit risk), the gap opens up post-reform. IG bonds see the R144A discount shrink by 11 bps (about 37% of the pre-reform level), while for HY bonds it increases by almost 53 bps (about 200% of the pre-reform level). In other words, other things equal, the IG R144A bonds become more expensive after the reform, while the HY R144A bonds become considerably cheaper. One explanation for this result is that hedge funds and other opportunistic investors, newly admitted to the R144A market after the reform, begin short-selling high-yield bonds. 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 has limited reach. The effect is akin to short-sellers flooding the CDS market in Oehmke and Zawadowski (2017). In other words, we suggest that prior to 2020, HY R144A bonds were overpriced due to public-private market segmentation. For IG bonds, the only plausible re-valuation channel is the reduction in resale liquidity risk.[10]

[10]Given a sizeable and relatively more liquid non-R144A IG bond market, legacy QIBs could easily correct any mispricing in IG R144A bonds by taking long R144A positions and hedging with non-R144A IG bonds. For the HY segment, there is no 'hedge market' as the HY non-R144A segment is marginal.

Models 4 and 5 in Table 5 replace the issuer's industry with issuer fixed effects and exclude year 2020 from the sample to highlight the robustness of the main result. In those models, the post-reform drop in the R144A discount for IG bonds remains in the range of 34-37% of the pre-reform level (9-14 bps drop from 24-41 bps), while the post-reform increase in the HY R144A discount reaches 73 bps. Other yield-spread factors exhibit similar loadings across models 1-5 (except for the issue size, which flips sign when issuer FEs are added, as in Table 3), suggesting a well-specified set of models. Building on this, models 6 and 7 in Table 5 re-estimate equation (2) in the subset of public firms, controlling for type-varying firm-level credit risk factors. The estimates in models 6 and 7 point in the same direction: the IG R144A discount shrank by 35-60% of the pre-reform level (which is somewhat lower for public firms at 10-23 bps), while the HY R144A discount increased considerably.

Table 6 provides further evidence by estimating equation (3) and linking the QIB reform to secondary market trading activity and transaction costs. We keep the right-hand side of the estimated equation identical to that in model 3 of Table 5 (our preferred specification with rating and industry FEs) and replace the left-hand side. We first consider two metrics of trading activity: monthly trading volume (including dealer-to-customer and inter-dealer trades) and the number of zero-trading days per month (Lesmond et al. 1999 show that the latter is a reasonable liquidity metric for rarely-traded securities, and Ivashchenko 2025 adapts it to corporate bonds). Unconditional average monthly trading volume is considerably lower for R144A than for non-R144A bonds in the secondary market sample: the former stands at 2.8% (of the issue outstanding amount), the latter – at 5.2%. After controlling for other factors of trading volume (model 1 in Table 6), the pre-reform R144A trading volume gap is even wider, at 4.8%. This again illustrates that trading activity in R144A bonds is lower, consistent with restricted market access. Post-reform, the gap in monthly trading volume between R144A bonds and the rest of the sample shrinks by 1.2% of

issue size (25% of the pre-reform gap), i.e., privately-placed bonds start trading more actively. Model 2 further shows that trading volume increases for both IG and HY R144A bonds (relative to non-R144A bonds), with the effect stronger for the latter.

Models 3 and 4 further demonstrate that the increase in R144A trading volume is not accompanied by an increase in non-zero trading days, at least for IG bonds. The average monthly number of zero-trading days in the sample is 6.6 and 10.9 (days) for non-R144As and R144As, respectively. For IG bonds, the number of zero-trading days remains unchanged post-reform. For HY bonds, an additional trading day is observed (0.84 days in model 4 of Table 6). On balance, models 1–4 indicate that trading activity in R144A bonds increases after the reform relative to non-R144A bonds, and the effect is most pronounced for bonds issued by high-yield borrowers.

| | *Dependent variable:* | | | | | |
|---|---|---|---|---|---|---|
| | Volume | | Zero days | | Avg bid-ask | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Rule 144A × Post-Ref | 1.19*** | 1.05*** | −0.11 | 0.14 | 23.82*** | 21.04*** |
| | (0.08) | (0.08) | (0.09) | (0.10) | (1.54) | (1.49) |
| Rule 144A × Post-Ref × HY | | 0.88*** | | −0.84*** | | 10.07*** |
| | | (0.21) | | (0.19) | | (1.33) |
| Rule 144A (dummy) | −4.81*** | −3.76*** | 6.01*** | 7.20*** | −47.79*** | −36.04*** |
| | (0.08) | (0.07) | (0.04) | (0.04) | (1.51) | (1.38) |
| Rule 144A × HY | | −2.76*** | | −2.96*** | | −25.91*** |
| | | (0.10) | | (0.10) | | (1.04) |
| Post-Ref (dummy) | −0.40*** | −0.24** | −0.72*** | −0.68*** | −17.56*** | −16.23*** |
| | (0.12) | (0.12) | (0.17) | (0.18) | (1.75) | (1.80) |
| Post-Ref × HY | | −1.00*** | | 0.12 | | −7.44*** |
| | | (0.23) | | (0.12) | | (1.39) |
| Outstanding amount ($ bn) | 1.14*** | 1.15*** | −4.11*** | −4.09*** | −14.03*** | −13.98*** |
| | (0.04) | (0.04) | (0.04) | (0.04) | (0.39) | (0.39) |
| Maturity (years) | 0.01** | 0.01** | 0.08*** | 0.08*** | 1.77*** | 1.76*** |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.06) | (0.06) |
| Coupon rate (%) | −0.50*** | −0.48*** | 0.72*** | 0.75*** | 3.51*** | 3.67*** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.11) | (0.11) |
| Baa 10Y spread (%) | 0.16 | 0.15 | 0.56*** | 0.55*** | 22.17*** | 22.10*** |
| | (0.16) | (0.17) | (0.18) | (0.18) | (2.86) | (2.88) |
| Callable (dummy) | 0.27*** | 0.41*** | −1.81*** | −1.61*** | −11.29*** | −9.96*** |
| | (0.03) | (0.03) | (0.04) | (0.04) | (0.68) | (0.66) |
| On-the-run (dummy) | 3.70*** | 3.76*** | −1.23*** | −1.16*** | −11.92*** | −11.49*** |
| | (0.09) | (0.09) | (0.05) | (0.05) | (0.65) | (0.66) |
| Rating, Industry FEs | YES | YES | YES | YES | YES | YES |
| Observations | 859,978 | 859,978 | 859,978 | 859,978 | 739,927 | 739,927 |
| Adjusted $R^2$ | 0.21 | 0.21 | 0.44 | 0.45 | 0.30 | 0.31 |
| *Note:* | *p<0.1; **p<0.05; ***p<0.01 | | | | | |

Table 6: **Bond trading activity and liquidity, and the reform of Rule 144A**
The dependent variables are bond monthly trading volume (% of issue size), number of no-trading days per month, and average realized bond bid-ask spread (in bps), as defined in Table 2b. Otherwise, the models are identical to model 3 of Table 5. The standard errors (in parentheses) are clustered by transaction month.

In models 5 and 6 of Table 6, we turn to the analysis of bond transaction costs (T-costs), using the average realized bond bid-ask spread (daily difference between volume-weighted average buy and sell prices in dealer-to-customer trades, further averaged across trading days in the month) as the preferred T-cost metric.[11] In models 5–8, R144A bonds appear cheaper to trade pre-reform. An intuitive explanation is that R144A re-trades are likely pre-arranged transactions ('riskless principal trades', RPTs) that often appear cheaper to execute in the data (Harris 2015). Relatedly, the

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

average bid-ask spread in the sample is around 22 bps for R144A bonds and 58 bps for non-R144A bonds (the latter is in line with results reported in the literature, as reviewed in Bessembinder et al. 2020). Post-reform, the difference in the average bid-ask spread between R144As and non-R144As *increases* by almost 24 bps (model 5), and the effect is even stronger for HY R144As (model 6). This may seem counterintuitive, given that the reform increases trading activity. However, if the reform increases the probability of informed trading by admitting hedge funds to the previously restricted-access market, and/or if the share of RPTs in R144A bonds decreases post-reform, one would indeed expect the bid-ask to increase post-reform to compensate dealers for inventory or information risks. Han et al. (2022) find that R144As transaction costs decrease following SEC registration (exchange for an identical SEC-registered issue after an initial lock-up period), attributing this to the positive effect of information disclosure and a reduction in information asymmetry. Our alleged channel is different: potentially informed investors gain access to the market and increase the level of information asymmetry as perceived by bond dealers; hence, different findings.

## 4 Implication 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 bonds relatively more expensive, except for re-traded HY bonds. 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 A3 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:

$$Y_{k,t} = \text{Post-ref}_t + \text{Post-ref}_t \times \text{R144A}^{\%}_{\text{pre-2020},k} + \{\text{Controls and Issuer FEs}\} + \epsilon_{k,t}, \tag{4}$$

where $Y_{k,t}$ is a characteristic of firm $k$ in year-quarter $t$, $\text{Post-ref}_t$ 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 (4) 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 7.[12] The first four columns of the table refer to the models for firm leverage, the rest – to payout models. All models include speculative-grade dummy (HY), 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.[13] Additional controls in Table 7 are as in Graham et al. (2015).

We find that firms that are more exposed to the R144A change increase leverage post-reform the most, but it only applies to investment-grade borrowers. In models 2 and 4 in Table 7, the loadings on $\text{Post-ref} \times \text{R144A}^{\%}_{\text{pre-2020}}$ are around 3 (percentage points), which suggests that an investment-grade issuer with $\text{R144A}^{\%}_{\text{pre-2020}} = 0.3$ increases leverage by almost 1 percentage point after 2020 as compared to a firm with no R144A debt pre-reform. There is no such effect for speculative-grade issuers, as the loadings on $\text{Post-ref}_t \times \text{R144A}^{\%}_{\text{pre-2020}}$ and $\text{Post-ref} \times \text{R144A}^{\%}_{\text{pre-2020}} \times \text{HY}$ roughly cancel each other. This result aligns with speculative-grade borrowers being more leveraged already before the reform (by 5–8 percentage points, as suggested by the estimates in Table 7), and having lower residual borrowing capacity.

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

[13] 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.

| | *Dependent variable:* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Book leverage | | Market leverage | | Dividend payout | | Total payout | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Post-Ref (dummy) | $1.07^{**}$ | $-0.17$ | $2.12^{***}$ | $0.40$ | $-1.32^{**}$ | $-1.31^{*}$ | $-3.92^{***}$ | $-4.08^{***}$ |
| | (0.45) | (0.41) | (0.55) | (0.51) | (0.65) | (0.69) | (1.21) | (1.28) |
| High Yield (dummy) | $5.29^{***}$ | $4.57^{***}$ | $7.90^{***}$ | $7.64^{***}$ | $-1.03$ | $-0.86$ | $-3.63$ | $-2.56$ |
| | (0.72) | (0.63) | (0.93) | (0.85) | (1.30) | (1.30) | (2.24) | (2.22) |
| Post × $\text{R144A}^{\%}_{\text{pre-2020}}$ | 1.82 | $3.14^{*}$ | 3.43 | $3.21^{*}$ | $6.24^{***}$ | $6.36^{***}$ | $11.98^{***}$ | $12.11^{***}$ |
| | (1.91) | (1.64) | (2.11) | (1.92) | (2.41) | (2.41) | (3.74) | (3.76) |
| Post × $\text{R144A}^{\%}_{\text{pre-2020}}$ × HY | $-2.54$ | $-3.32^{**}$ | $-5.80^{***}$ | $-5.21^{***}$ | $-5.50^{**}$ | $-5.68^{**}$ | $-6.36$ | $-6.70^{*}$ |
| | (1.90) | (1.65) | (2.11) | (1.93) | (2.38) | (2.37) | (3.89) | (3.89) |
| Firm size | | $1.77^{**}$ | | $7.50^{***}$ | | $-0.43$ | | $0.79$ |
| | | (0.73) | | (0.82) | | (0.88) | | (1.66) |
| Asset tangibility | | $0.14^{***}$ | | $0.34^{***}$ | | $0.03$ | | $0.06$ |
| | | (0.04) | | (0.05) | | (0.05) | | (0.09) |
| Market-to-book | | $0.82^{***}$ | | $-0.40^{***}$ | | $0.08$ | | $-0.002$ |
| | | (0.03) | | (0.05) | | (0.06) | | (0.13) |
| EBIT ratio | | $-0.36^{***}$ | | $-0.68^{***}$ | | $0.10^{**}$ | | $0.35^{***}$ |
| | | (0.03) | | (0.05) | | (0.04) | | (0.08) |
| Issuer 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 $R^2$ | 0.79 | 0.84 | 0.79 | 0.82 | 0.22 | 0.22 | 0.17 | 0.17 |
| *Note:* | $^{*}$p<0.1; $^{**}$p<0.05; $^{***}$p<0.01 | | | | | | | |

Table 7: **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 A3. 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. $\text{R144A}^{\%}_{\text{pre-2020}}$ (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 level and the standard errors 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 7 implies that a $\text{R144A}^{\%}_{\text{pre-2020}} = 0.3$ borrower increases dividend payout by almost 2 percentage points (6.36×0.3), which is about 26% of the average level of the dividend payout rate in the sample. The total payout for the same borrower increases by about 3.5 percentage points (12.11×0.3), which is 22% of the sample average. Again, the result is concentrated among investment-grade borrowers as

the loadings on Post-ref$_t \times$R144A$^{\%}_{\text{pre-2020}}$ and Post-ref$\times$R144A$^{\%}_{\text{pre-2020}}\times$HY are of similar magnitude but opposite signs in models 5-6, and are also partly-offsetting in models 7-8 in Table 7. Taking stock, the estimates in Table 7 suggest that investment-grade firms react to exogenously improving borrowing conditions by leveraging up and paying out more to shareholders, while speculative-grade borrowers, which are likely more leverage-constrained, do not change their financing policy after the 2020 Reg D and Rule 144A reforms.

## 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 market for privately placed bonds without affecting the public bond market, we find that post-reform the valuation gap between privately and publicly placed bonds shrinks by 18 bps, or about 51% of the pre-reform level. As the gap in secondary market trading volume between private and public placements also shrinks by some 30% post-reform, we argue that the valuation effect is due to improved resale liquidity for privately placed securities.

Documented liquidity improvements propagate to the primary market. Following the reform, the yield spread differential at issuance between private and public placements shrinks by 30–35 bps, or 67-88% of the primary-market pre-reform discount for R144A bonds. While the bond issuance mix (public vs private) remains stable post-reform, indicating no significant supply-side shifts, firms respond to improved financing conditions by increasing leverage and payouts, particularly among investment-grade issuers. Overall, we highlight the broader implications of investor access to OTC markets and demonstrate that improved secondary market liquidity can meaningfully lower the cost of external financing for firms.

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# Appendix A Additional Figures and Tables

| | R144A | Rest | Diff |
|---|---|---|---|
| (A) Bond characteristics at issuance | | | |
| Size ($ bn) | 0.76 | 0.52 | -0.25*** |
| Rating (1–21) | 10.80 | 6.87 | -3.93** |
| Coupon rate (%) | 5.21 | 3.91 | -1.31*** |
| Maturity (years) | 7.18 | 7.06 | -0.12 |
| Callable (dummy) | 0.79 | 0.93 | 0.13* |
| Issuance yield (%) | 5.19 | 3.86 | -1.33*** |
| Issuance yield spread (%) | 3.10 | 1.17 | -1.93*** |
| (B) Issuer's characteristics pre-issuance | | | |
| Issuer's yield spread (%) | 3.11 | 1.16 | -1.95 |
| Equity value ($ bn) | 22.61 | 127.60 | 104.99* |
| Book leverage (% total assets) | 44.33 | 32.28 | -12.05 |
| Equity volatility (annualized) | 0.43 | 0.29 | -0.15* |
| Profit margin (%) | 2.25 | 14.81 | 12.55*** |

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) | 119.75*** | 0.02 | −0.02 | 1.09*** | 0.08 |
| | (20.16) | (0.06) | (0.05) | (0.29) | (0.06) |
| Issuer, Year FEs | YES | YES | YES | YES | YES |
| Observations | 6,837 | 6,835 | 6,837 | 6,837 | 6,837 |
| Adjusted $R^2$ | 0.45 | 0.66 | 0.84 | 0.28 | 0.93 |
| *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.

| | 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 | 19.72 | 17.38 | 24.53 | 32.77 | 45.36 | 76.57 | 33048 |
| Equity value ($ bn) | 31.42 | 118.91 | 0.24 | 1.96 | 6.60 | 22.19 | 130.15 | 33048 |
| Market to book | 4.38 | 6.65 | 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) | 7.85 | 7.47 | -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) | 7.50 | 22.13 | -7.47 | 0.00 | 4.42 | 12.28 | 33.32 | 33048 |
| Total payout (% net income) | 16.44 | 41.78 | -18.55 | 0.36 | 13.51 | 25.40 | 65.94 | 33048 |

Table A3: **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.