Market Value of U.S. Universities

Benjamin Bennett Jaewon Choi Chanik Jo Yoshio Nozawa*

January 12, 2026

Abstract

We estimate the market value of "equities" of U.S. private universities by applying a structural credit risk model to the observed credit spreads of their bonds. We find that Yale University is at the top of the ranking, valued at $181 billion, followed by Harvard and Stanford. Should they be listed, their values would be comparable to McDonald's and Intel. Taking advantage of our panel data on the monthly market value of universities, we conduct a difference-in-differences analysis to assess the impact of recent policy changes on university values. The student debt relief announced in March 2020 increased the market value by 14.7%, while the research funding freeze in March 2025 decreased it by 11.2%.

JEL Classification: G12, G13

Keywords: Municipal Bonds, Nonprofits, Structural Model of Debt, Merton Model

*Benjamin Bennett is at Texas Christian University, email: ben.bennett@tcu.edu, Jaewon Choi is at the Seoul National University, email: jaewchoi1203@gmail.com, Chanik Jo is at the Chinese University of Hong Kong, email: chanikjo@cuhk.edu.hk, and Yoshio Nozawa is at the University of Toronto, email: yoshio.nozawa@rotman.utoronto.ca.

1 Introduction

What is the market value of universities? As nonprofit organizations, they do not issue equity. But if they did, how much would investors pay to receive those contingent claims on future cash flows generated from the universities' operations, grants, and donations? Addressing this question is necessary to assess recent policy changes in the education sector. The book value of equity does not react to government policy, but the market value would.

We define equity as a claim on universities' future cash flows after subtracting the expenses necessary for their operations. As an example, Figure 1 below depicts the income statement of the average university in our sample, whose revenue is $678 million and whose expenses before interest payments are $609 million. The remaining $69 million is available for the university to repay debt to creditors. If cash remains after debt repayment, it is available for other stakeholders, such as faculty and students, as well as for future investment projects. If, however, there were a claim on these future cash flows, such a claim would constitute a valuable financial asset with a price, which we aim to estimate in this paper.

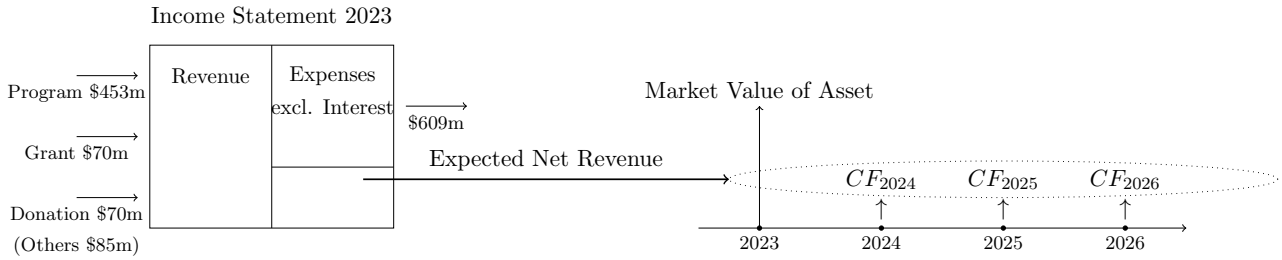


Figure 1: Income Statement of the Average University and Its Market Value

To price this hypothetical claim, we need to know investors' expectations for the growth rates and returns to discount the universities' cash flows—a difficult task to accomplish. However, structural credit risk models stemming from Merton (1974) allow us to bypass this estimation procedure and infer these parameters from the observed prices of assets traded in the financial market. Our key observation is that, while universities do not issue stocks, they issue publicly traded bonds backed by the cash flows of their operations. Thus, we can infer investors' expectations from these bond prices.

Specifically, we hypothesize that investors discount their expected cash flows from universities to arrive at the market value of the universities' assets. Then, they split the pie into the market value of debt and the remainder, which we term the "equity" of the university. That is, our equity is the expected discounted value of future cash flows after paying out to debt holders.

Based on this idea, we reverse the usual procedure of backing out credit spreads from observed stock prices and stock volatility (e.g., Jones et al. 1984). Instead, we back out the theoretical values of stock prices from observed credit spreads and bond volatility. This idea is similar to reverse-engineering the Black-Scholes model. Based on the observed price of a put option (i.e., a defaultable bond), a strike price, and a volatility, one can infer the market price of the underlying asset and thus the value of a call option (i.e., an equity).

Importantly, our procedure is valid even if universities are not maximizing their market value of equity. In reality, they maximize the utility of society by providing education and cutting-edge research to the broader population, which does not appear as cash flows to the university. By design, our market value estimate does not aim to capture such externalities. Instead, we take the financial investors' (more specifically, debt investors') perspective and calculate the present value of the expected cash flows. Thus, while it does not capture the societal value of the university, to the extent that donors appreciate its activities and contribute to the university, this effect is reflected in our market value estimate.

In this paper, we apply the stochastic volatility model of Du et al. (2019) to the observed credit spreads and bond volatility. This model has the advantage of successfully pricing corporate bonds in a way consistent with the value of the issuer's equity. It works because it explicitly accounts for the difference between upside risk and downside risk. As the issuer's asset value declines, its volatility increases, which effectively magnifies the left tail of the distribution. Investors are willing to pay to protect themselves from this risk, which is captured as the (negative) price of variance risk in the model.

To estimate the equity value, we construct a monthly panel dataset of nonprofit, private U.S. universities that issue bonds, spanning 416 schools from July 2011 to June 2025. The bond data are merged with financial statement data, including total assets, liabilities, and revenues, which

universities must file with the Internal Revenue Service as nonprofit, tax-exempt organizations. This data set allows us to estimate the market value of equity for each university at the monthly frequency.

Our estimates indicate that the market value of private universities is substantial. Ranking universities based on their market value over the last five years in the sample, Yale University is listed as the largest university with a market capitalization of $181 billion, comparable to McDonald's Corporation and Intel Corporation, and would be ranked as the 40th largest among listed public corporations. Harvard University ($172 billion) and Stanford University ($152 billion) rank second and third, respectively. Importantly, these rankings are not a mechanical reflection of their balance sheet size. The market-to-book ratio of Yale is estimated at 4.90, higher than that of Harvard (3.20) and Stanford (3.40).

We examine the aggregate university index, defined as the sum of all universities' total market value. From 2011 to 2021, it moved in lockstep with the CRSP aggregate stock index, with a similar growth rate and a sharp, short-lived decline in March 2020. During this period, the ratio of the university index to the CRSP stock market index ranges between 2% and 4%, a ratio comparable to that of the real estate or utility sector in the S&P 500 index. However, after 2022, the university index appears to underperform, registering negative returns.

We next study the determinants of universities' equity market-to-book ratios. A panel regression with month and university fixed effects reveals that the revenue growth rate—particularly that driven by growth in donations—and ROE positively influence market value, while the ratio of salaries to total expenses is negatively associated with market value. The most significant determinant is the level of liabilities, accounting for 46% of the variation in the ratios. This could indicate that universities with higher debt have greater operational scale, which generates stronger cash flow growth. Alternatively, favorable financing conditions might simultaneously increase equity valuations and encourage more borrowing. In sum, investors appear to expect higher future cash flows and lower risk from universities that demonstrate strong revenue growth, lower fixed costs, and high profitability, which is reflected in a higher valuation.

The availability of monthly market prices allows us to identify the impact of policy changes

on the valuation of universities using a standard difference-in-differences method. This approach takes advantage of the fact that some universities are more exposed than others to policy shocks, and bond credit spreads react immediately to policy announcements. Thus, a regression of the log market value on a dummy variable indicating the period after policy announcements, and its interaction with a dummy for highly exposed universities, allows us to identify the causal impact on university value.

As a first example, we study the impact of the federal research funding freeze that began in March 2025, initially targeting a few highly reputed universities, such as Columbia University, and later extending to other top institutions. Our regression indicates that this policy reduced, on average, the market value of universities by 11.2%, with a pronounced impact on those with Ivy League status and high exposure to government grants.

The second example of our policy analysis concerns the impact of the federal student loan payment pause introduced in March 2020. This policy, backed by the CARES Act, reduced the debt burden of students and thus potentially increased the revenue flows to universities that depend on tuition financed by student loans. Using the top quartile of universities in terms of the percentage of undergraduate students awarded federal loans as the treated group, we find that the policy increased market value by as much as 14.7%, or $171 million per university.

As the third example, we examine the impact of the intensified visa restrictions and deportations affecting Chinese international students that gained significant attention in April 2024. This policy, amid escalating US-China tensions, may have raised concerns about disruption to enrollment and reduced tuition revenue for universities heavily dependent on tuition from Chinese international students. Using universities in the top quartile of both the share of international students and the share of Asian students as the treated group, we find that the policy decreased market value by 19.6%, with a pronounced impact on larger universities in terms of total assets. These tests highlight the importance of our estimates, as they allow researchers to quantify policy impacts on the education sector in dollar terms.

The heart of our argument lies in the assumption that the prices of bonds issued by universities reflect investors' expectations of default risk, or the probability of a downside scenario for their

cash flow projections. To support this argument, we present several case studies on bonds that defaulted in our sample. We show that in five out of the six default cases we identify, the borrowing universities filed for bankruptcy protection and eventually liquidated their assets, including real estate and endowment funds, to pay their creditors. Importantly, bond investors anticipated such actions, and bond prices declined sharply around default events. This observation underscores our assumption that university bond prices reflect investors' expected cash flows and risk premiums.

This paper contributes to the literature on finance and universities, many of which focus on the role of endowments. This body of research highlights their central role in mediating financial strategy, governance, and educational outcomes. Studies show that payout rules, liquidity constraints, and investment choices jointly shape institutional risk-taking and long-run stability (Gilbert and Hrdlicka 2015; Dimmock et al. 2024; Brown et al. 2014). Managerial expertise and responsible investment policies influence asset allocation, fundraising, and volatility, though effects on net performance are mixed (Aragon et al. 2025; Binfarè and Harris 2025; Binfarè et al. 2022). Expansions in student credit markets raise tuition and alter pricing incentives (Lucca et al. 2018), while endowment size and prestige reinforce competitive hierarchies and student sorting across universities (Avery et al. 2012). Most closely related to our paper is Binfarè and Zimmerschied (2024), who describe the usage of debt by universities.

Nonprofit organizations play a distinctive role in the economy, providing essential services while operating under governance structures distinct from for-profit firms. Recent research reveals that despite their non-distributive nature, these entities exhibit sophisticated financial behavior. Leone and Van Horn (2005) and Eldenburg, Gunny, Hee, and Soderstrom (2011) show that nonprofit hospitals engage in both accrual-based and real activities management to meet financial and reputational goals, while Krishnan, Yetman, and Yetman (2006) find that governance quality critically shapes reporting accuracy. In capital allocation, Adelino, Lewellen, and Sundaram (2015) demonstrate that nonprofits invest rationally yet remain constrained by internal liquidity and mission considerations. Complementing this empirical evidence, economic theory provides a rationale for nonprofit forms: Glaeser and Shleifer (2001) argue they mitigate trust and contract enforcement problems; Besley and Ghatak (2005) propose a motivated-agent model highlighting mission align-

ment; and Lakdawalla and Philipson (2006) offer evidence that nonprofit entry can enhance market efficiency. Together, these studies portray nonprofits as mission-oriented yet financially responsive organizations that strategically navigate constraints similar to their for-profit counterparts.

Donor and executive behavior further illustrate the interplay between mission and financial discipline. Andreoni and Payne (2011) find that public funding can crowd out private donations by diminishing fundraising incentives, while Balsam and Harris (2014) show that excessive CEO pay erodes donor trust. On the governance side, Babenko, Bennett, and Sen (2025) document that the New York Nonprofit Revitalization Act reduced CEO pay, underscoring the role of regulation, and Lewellen (2020) finds that hospitals led by women achieve superior outcomes without sacrificing efficiency. Even within religious institutions, Hartzell, Parsons, and Yermack (2010) reveal that compensation links to organizational performance, suggesting the persistence of incentive mechanisms across contexts.

This paper also contributes to the extensive literature on the structural model of debt. Starting from Huang and Huang (2012), many studies explore the ability of the model to accurately describe observed credit spreads. Examples include Cremers, Driessen, and Maenhout (2008), Bao (2009), Chen, Collin-Dufresne, and Goldstein (2009), Bhamra, Kuehn, and Strebulaev (2010), Chen (2010), Gourio (2013), Kuehn and Schmid (2014), Christoffersen, Du, and Elkamhi (2017), McQuade (2018), Du, Elkamhi, and Ericsson (2019), and Shi (2019). In contrast, He and Milbradt (2014) and Chen et al. (2018) incorporate OTC market search frictions into structural models to capture the noncredit component of yield spreads.

While previous research has been somewhat skeptical about the ability of the structural models to price bonds, more recent research provides a more positive assessment of their ability. Feldhütter and Schaefer (2018, 2023) report that the BC model for zero-coupon bonds performs well in matching the average IG bond spreads over swap rates. Bai et al. (2020) argue that by incorporating jump risk, the performance of the model improves significantly.

The rest of the paper is organized as follows: In Section 2, we describe our data. In Section 3, we present a structural model of default risk. In Section 4, we present the main results on the estimated market value of universities. Section 5 provides a concluding remark.

2 Data

2.1 Data Sources

Nonprofit organizations such as universities are required to file IRS Form 990, 'Return of Organization Exempt from Income Tax', which includes the financial statements. We download this information from the National Center for Charitable Statistics website.[1] We select a sample of universities by narrowing down to entities that file Schedule E, 'Schools'. The website provides the data from fiscal years 2008 to 2024. However, we start our sample in 2010 because the coverage in 2008 and 2009 is poor. Unlike for-profit organizations, this information is filed within five months after the end of the fiscal year, but is released with a long lag time. For example, information from the fiscal year ending in June 2023 is released after June 2024. As Form 990 is mandatory only for nonprofit organizations, our sample excludes public universities and for-profit institutions.

The Integrated Postsecondary Education Data System (IPEDS), administered by the National Center for Education Statistics (NCES), is a comprehensive annual census of U.S. postsecondary institutions that participate in federal student financial aid programs under Title IV of the Higher Education Act. Starting in 1986, data are collected directly from institutions through a series of interrelated survey components covering enrollment, completions, graduation rates, finances, human resources, student aid, and institutional characteristics. Because reporting is mandatory for Title IV institutions, IPEDS data encompass virtually the entire population of accredited U.S. colleges and universities rather than a sample.

For bond data, we use transaction information from the Municipal Securities Rulemaking Board (MSRB), obtained through WRDS. This database records the prices and volumes of municipal bond transactions reported by dealers, including bonds of nonprofit organizations such as universities. We create a monthly panel data on bond prices as follows: First, following Schwert (2017), we calculate the daily mid price of a bond by averaging the lowest bid price and the highest ask price on the same day. If we do not find bid and ask prices on the same day, we calculate the volume-weighted average interdealer price of the bond and use it as the mid price. If we do not find a

[1] https://nccs.urban.org/

transaction that satisfies either condition, we treat the bond price on that day as missing. Second, we use the last trade date for each bond to create a monthly panel data at the bond-month level.

We use the Mergent Municipal Bond Securities Data (Mergent) to obtain the bond characteristics, such as issue dates, maturity dates, issue amounts, and call and put provisions. Throughout the paper, we use the minimum of the maturity, first call, and mandatory put dates, referring to it as the maturity date. When we compute a bond's yield, we use this minimum date and refer to it as the yield-to-worst. We make this choice because nearly all bonds are called after the initial call date. This happens because, for tax reasons,[2] nonprofit bonds are mostly issued with original issue premiums (i.e., an offering price above par) by setting a high coupon rate. Since call prices are typically set at par, these bonds are called as soon as possible. To compute credit spreads, we also obtain the Treasury yield data of Gürkaynak et al. (2006) from the Federal Reserve's website.

We merge the financial statement data with the monthly bond panel data based on the bonds' CUSIP. Specifically, each issuer lists some of their bond issues in Schedule K, 'Supplemental Information on Tax-Exempt Bonds', which includes the bonds' CUSIP.[3] While this list is not exhaustive, it allows us to establish the link between the issuer's employer identification number (EIN) in Form 990 and CUSIP. Then, based on the CUSIP, we search for the bonds' information in Mergent to find the issuer name. Lastly, we identify all bonds in Mergent with the same issuer name and associate them with the EIN.

We merge the university-level information from IPEDS to the panel data based on EIN. However, there are erroneous entries of EIN in IPEDS. Therefore, we manually corrected these entries to be consistent with the EIN in Form 990, and listed those EINs in the Internet Appendix A5.

Bond prices reflect the information available to investors. Since universities' financials become available to investors with a long lag, we take a conservative approach to map the yearly financial statement information to the monthly bond panel. In particular, we merge the financial statements ending in year y to the bond prices from July $y+1$ to June $y+2$. Since the statement data starts

[2]See Ang et al. (2010) for details.

[3]In Schedule K, there are two EINs, one corresponding to the ultimate debt borrower and the one corresponding to the issuer, or the financial conduit that issues tax-exempt bonds on behalf of multiple borrowers. We only use the EIN of the ultimate borrower of the bond because the payments to the bondholders are backed solely by the cash flows of the ultimate borrower.

in 2010 and ends in 2023, our monthly sample starts in July 2011 and ends in June 2025 after the merge.

Lastly, we convert the bond-month-level panel data into firm-month-level data by creating a synthetic five-year bond for each issuer. For this purpose, we narrow our sample to the bonds with a time to maturity between two and eight years. For each issuer and month, we identify a bond with a maturity below 5 years and another with a maturity above 5 years. If multiple issues satisfy the criteria, we select the one that has a maturity closest to 5 years. We then linearly interpolate these two bonds to obtain the yield to worst of the issuer. If we do not find a bond with a maturity below or above 5 years, we use the bond closest to 5 years.

We merge and select the sample in the following steps.[4] We start with a list of CUSIPs that are identified as bonds issued by universities, spanning 41,881 bonds issued by 777 issuers. After merging this list with the MSRB and selecting only those with valid monthly prices, the number of CUSIPs declines to 28,899. Next, we require that the bond have a fixed coupon rate, trade at least 10 times in the sample, have a credit spread between 0 and 1,000 basis points, and have a time to maturity between 2 and 8 years. These requirements reduce the number of CUSIPs to 11,752. Finally, we require that each observation have valid financial statement information, including total assets, total liabilities, and free cash flow to the firm. After imposing all these requirements, the final sample consists of 25,183 issuer-months for 4,991 bonds issued by 416 schools.

Figure 2 plots the percentage share of the universities in our sample relative to the total universe of the nonprofit private universities in the IPEDS data. It shows that the share after 2013 is relatively stable: in terms of revenue or total assets, our sample represents 60 to 75% of the universe; in terms of the number of students, our sample represents 40 to 45%. Thus, while not all private universities issue bonds, our sample provides a reasonable coverage of the sector.

[4] Table A1 in the Internet Appendix provides more details on the changes in the number of observations in each step.

2.2 Case Study on Bond Defaults

As qualified charitable organizations, nonprofit universities issue "municipal" tax-exempt bonds.[5] These bonds are issued via financial conduits in each state. For example, a tax-exempt bond of Yale University is issued by the State of Connecticut Health and Educational Facilities Authority. Nonetheless, the repayment for the bond comes only from the issuing institution (in this case, Yale University), and the bond's prospectus explicitly states that the State of Connecticut has no legal or moral obligations to pay the debt. Thus, when the issuer does not repay the debt, the creditors suffer from losses.

To quantify the impact of default, we conduct a case study on defaulted bonds by examining how their prices change before and after default. The goal of this exercise is to demonstrate that bondholders are indeed concerned about defaults and can lose substantially from a bond investment if the issuing university defaults.

To identify defaults, we use FISD to find the list of defaulted bonds and narrow down to those with payment default rather than covenant default. Then, we merge the issuer with bond prices in MSRB. To measure the potential loss experienced by the investors, for each defaulted bond, we compute the average daily price over the one-year period before the default date, and the average over the one-year period on and after the default date. Then we take the average across bonds at the issuer level and report it in Table 2.

In FISD, we find seven universities that missed payments, and are able to find bond prices for six of them, spanning the event from April 2014 to May 2021.[6] One year before default, the average price ranges from 78.1 to 99.5% of par, but it falls to a range of 13.1 to 87.7% after the default. The average post-default price of the six universities is 63.7% of par, implying the loss given default of around 36%. Figure 3 plots the daily bond prices of the six universities. In all six cases, the bond prices decline significantly upon the default announcement. After the announcement, the price appears to drift down over the following few years, eventually reaching near zero.

In this small set of defaulted universities, all but one (Tompkins Cortland Community College)

[5] See IRS publications 4077 for details.

[6] The default of another university, Alderson Broaddus College, is recorded in FISD, but we do not find the bond prices in MSRB.

filed for bankruptcy and ceased their operations. Just like a bankruptcy of a private sector firm, a committee of creditors is appointed, and a liquidation plan is submitted to a bankruptcy court to be approved. This often involves the payments to the creditors out of the endowment and the sales of the university's real estate.[7] Four universities filed for Chapter 11 bankruptcy (i.e., reorganization), although they were eventually liquidated.

Looking at the credit rating in Table 2, four issuers were rated by either Moody's or S&P, and their original rating at issuance ranges from BBB- (10) to B+ (14). The rating agencies recognized their increased risk before default, so that the rating one month before default ranges from BB+ (11) to CC (20).

Finally, we investigate the fundamentals of these issuers. Figure 4 plots the average revenue and EBITDA for the defaulted seven universities, centered around the default year and setting two years before default as a reference year. The plot exhibits a notable decline in EBITDA three years before the default year, while the revenue is relatively constant. After default, these universities move toward closure, resulting in a rapid decline in revenue.

2.3 Liquidity Analysis

One potential concern regarding the application of structural models to the municipal bond market is liquidity. Municipal bonds are generally viewed as less liquid than corporate bonds (e.g., Chakravarty and Sarkar, 1999; Chernenko and Sunderam, 2020), which could imply that their yields contain a significant liquidity premium that might distort the equity values inferred from our model. To test whether this is the case, we compare the liquidity of the university bonds in our sample against a benchmark of U.S. corporate bonds during the same sample period.

We measure liquidity using bond turnover, defined as the ratio of monthly trading volume to the bond's amount outstanding. We categorize bonds into five credit rating groups—AAA, AA, A,

[7] Mid-Continent College is closed in June 2014, two months after its default in April 2014. It sold the campus to a private sector firm in January 2017 for $1.8 million. Dowling College sold its real estate to pay debt, with an article citing "Bondholders, meanwhile, are likely to be reimbursed largely due to the beautiful campus, but for the moment, they're waiting for the last chapter to end long after the last students left." The College of New Rochelle defaulted in July 2017 and closed at the end of the summer session in 2019. It sold its campus in November 2019. As of October 2025, Ohio Valley University is in the process of selling its campus to pay its bondholders. Judson College is in the process of liquidating its assets, releasing its endowments to pay its creditors.

BBB, and High Yield (HY)—and compute the average monthly turnover for both university and corporate bonds.

Table 3 presents the results. In contrast to the illiquidity of the broader municipal market, the university bonds in our sample are more liquid than corporate bonds. For AAA-rated issuers, the average monthly turnover for university bonds is 8.18%, compared to 5.41% for corporate bonds. This difference of 2.77 percentage points is statistically significant. Similarly, university bonds exhibit significantly higher turnover ratios in the AA, A, and BBB categories.

Corporate bonds exhibit higher liquidity only in the High Yield category, where turnover is 10.24% compared to 6.63% for university bonds. However, high-yield bonds account for less than 1% of our total university bond sample. Therefore, the vast majority of university bonds in our dataset are more liquid than comparable corporate bonds. This suggests that the credit spreads observed in our sample are not driven primarily by a liquidity premium, supporting the validity of applying a structural model to these assets.

3 Structural Model of Credit Spreads, Stochastic Volatility Model

In this section, we apply the stochastic volatility model of Du et al. (2019) to the observed credit spreads of university bonds.

3.1 Model

Let a bond issuer i's asset value X and its variance V follow the dynamics under the physical probability measure

$$\frac{dX_{i,t}}{X_{i,t}} = (\mu^P_{i,t} - q_i)dt + \sqrt{V_{i,t}}(\rho dW_{2,i,t} + \sqrt{1-\rho^2}dW_{1,i,t}), \tag{1}$$

$$dV_{i,t} = \kappa(\theta - V_{i,t})dt + \sigma\sqrt{V_{i,t}}dW_{2,i,t}, \tag{2}$$

where $\mu^P_{i,t}$ is the expected return on the asset, q_i is the asset's payout rate, ρ is the correlation between shocks to the asset and the variance, $dW_{\cdot,i,t}$ is an independent Wiener process. The

dynamics under the risk-neutral measure are obtained by replacing $\mu_{i,t}^P$ by the risk-free rate r, κ by $\kappa^* = \kappa + \sigma\lambda_V$, and θ by $\theta^* = \frac{\kappa}{\kappa^*}\theta$. The key parameters include λ_V, the price of variance risk, and λ_D, the price of asset risk. While these prices are held constant, the risk premium on assets (and thus bonds) varies depending on the level of variance $V_{i,t}$.

In the model, the issuer defaults when its asset value $X_{i,t}$ first hits the default boundary defined by $X_D F_i$, where F_i is the face value of the borrower's debt. The parameter X_D depends on the borrower's strategic motive to default and the non-debt liabilities (such as pension liabilities) that influence the borrower's decision to default.

Let t^* denote the default time. Indexing time as $t_k = \{t_0(\equiv t), t_1, \ldots, t_K(\equiv T)\}$, the time-$t$ value of a coupon bond for issuer i with a semi-annual coupon c and time to maturity $\tau = T - t$ is

$$\begin{aligned} B_{i,t} = \frac{c}{2}\sum_{k=1}^{K} e^{-r(t_k - t)} Q(t^* > t_k; \Lambda_{i,t}, \Theta) \\ + (1 - LGD)\sum_{k=1}^{K} e^{-r(t_k - t)} Q(t^* > t_{k-1}; \Lambda_{i,t}, \Theta) q(t^* = t_k; \Lambda_{i,t}, \Theta) \\ + e^{-r\tau} Q(t^* > T; \Lambda_{i,t}, \Theta) \end{aligned} \tag{3}$$

where $Q(t^* > t_k; \Lambda_{i,t}, \Theta)$ is the risk-neutral survival probability as of time t_k, $q(t^* = t_k; \Lambda_{i,t}, \Theta)$ is the conditional probability of default in time t_k, $\Lambda_{i,t} = (X_{i,t}, V_{i,t}, c_{i,t}, \tau_{i,t}, q_{i,t}, F_{i,t})$ is the issuer-specific time-varying model parameters, and $\Theta = (X_D, LGD, \rho, \kappa, \theta, \sigma, \lambda_D, \lambda_V)$ is time-invariant global model parameters. The first term in (3) represents the present value of coupon payments. We assume that coupons have zero recovery upon default, and their payments stop upon default. The second term is the present value of the principal payment upon default with a loss given default, LGD, while the third term is the principal value when there is no default. We compute the yield to maturity of the bond in (3) as well as the risk-free bond that has the same cash flow as the defaultable bond, and the difference in yield is the credit spread, $s_{i,t}$.

The model also generates a bond's instantaneous volatility

$$\sigma_{i,t}^{B} = \sqrt{\left(\left(\frac{X_{i,t}}{B_{i,t}}\frac{\partial B_{i,t}}{\partial X_{i,t}}\right)^2 + \left(\frac{\sigma}{B_{i,t}}\frac{\partial B_{i,t}}{\partial V_{i,t}}\right)^2 + 2\rho\sigma\frac{X_{i,t}}{B_{i,t}^2}\frac{\partial B_{i,t}}{\partial X_{i,t}}\frac{\partial B_{i,t}}{\partial V_{i,t}}\right)V_{i,t}}. \tag{4}$$

The market value of asset $X_{i,t}$ and its variance $V_{i,t}$ are not observable to econometricians. However, we observe credit spreads and bond volatility for issuer i in month t. Thus, for each i and t, we solve for the system of two equations with two unknowns,

$$s_{i,t} = s(X_{i,t}, V_{i,t}, c_{i,t}, \tau_{i,t}, q_{i,t}, F_{i,t}; \Theta), \qquad \sigma_{i,t}^{B} = \sigma(X_{i,t}, V_{i,t}, c_{i,t}, \tau_{i,t}, q_{i,t}, F_{i,t}; \Theta), \tag{5}$$

taking given the coupon $c_{i,t}$ and time to maturity $\tau_{i,t}$ of the borrower's representative bond.

Given the knowledge of $X_{i,t}$ and $V_{i,t}$, we compute the value of equity as

$$S_{i,t} = X_{i,t} - F_{i,t}\left(PVB_{i,t} + DWL_{i,t}\right), \tag{6}$$

where

$$PVB_{i,t} = (1 - LGD)\sum_{k=1}^{K} e^{-r(t_k - t)}Q(t^* > t_{k-1}; \Lambda_{i,t}, \Theta)q(t^* = t_k; \Lambda_{i,t}, \Theta) + e^{-r\tau}Q(t^* > T; \Lambda_{i,t}, \Theta),$$
$$DWL_{i,t} = LGD\sum_{k=1}^{K} e^{-r(t_k - t)}Q(t^* > t_{k-1}; \Lambda_{i,t}, \Theta)q(t^* = t_k; \Lambda_{i,t}, \Theta). \tag{7}$$

The first equation in (7) captures the present value of the principal payment, and the second equation captures the dead-weight loss arising from the bankruptcy cost.

Table 4 lists the global parameters Θ. In our calibration, we mostly use the parameters of Du et al. (2019) except the default boundary parameter X_D and the price of risk parameters, λ_V and λ_D. Given that university bonds such as Harvard and Yale are AAA-rated and regarded as very safe, we recalibrate these to maximize the fit to the two AAA corporate credits during our sample period: Microsoft and Johnson & Johnson. The calibration consists of two steps. First,

we calibrate the optimal value of X_D that minimizes the distance between the model's default probability under the physical measure and Moody's historical default probability for AAA-rated borrowers. Second, we calibrate the price of risk parameters λ_V and λ_D to minimize the pricing errors of long-term corporate bonds issued by these two firms, while keeping the asset's Sharpe ratio constant. The calibration results are presented in Internet Appendix I. In particular, we show that using corporate bonds, the model is able to generate sizable credit spreads that match the data while exactly matching observed stock prices using the model counterpart in (6).

We solve the system of equations (5) numerically by simulating the path of $X_{i,t}$ and $V_{i,t}$ 10,000 times. To calculate the bond volatility in (4), we compute the derivative $\partial B_{i,t}/\partial X_{i,t}$ and $\partial B_{i,t}/\partial V_{i,t}$ numerically.

Figure 5 depicts the relationship between credit spreads and the equity market-to-book ratio, $S_{i,t}/S^B_{i,t}$ in the model. It shows that the market value of equity is a decreasing function of credit spreads. Conditional on credit spread, an issuer with a high book leverage has a higher market-to-book ratio. This is because a high book leverage indicates a higher risk of the issuer. Thus, to keep the credit spreads constant, the market value of the asset must increase to offset the risk, resulting in a higher stock value.

3.2 Model Inputs

The most important input to the model is the borrowers' credit spreads. Since the bonds in our sample are tax-exempt, we convert their yield-to-worst to a taxable basis. Specifically, given the tax-exempt yield of bond j in month t, $y^*_{j,t}$, we calculate the tax-equivalent yield,

$$y_{j,t} = \frac{y^*_{j,t}}{(1-\zeta_{t,\text{Federal}})(1-\zeta_{j,t,\text{State}})}, \tag{8}$$

where $\zeta_{t,\text{Federal}}$ is the marginal federal income tax rate for the highest income bracket in month t, and $\zeta_{j,t,\text{State}}$ is the corresponding state tax rate for bond j in month t. To compute credit spreads, we take the difference between the tax-equivalent yield of the university bond and the U.S. Treasury yield, which is interpolated to match the maturity of the bond. This method differs from Schwert

(2017), who use the swap rate as a benchmark. Since we are interested in highly rated and liquid bonds issued by universities such as Harvard and Yale (both of which are AAA-rated), we would end up with negative credit spreads if we used the swap rate as a benchmark. Since structural models of credit spreads cannot generate negative credit spreads, this creates a technical difficulty when we back out the equity value. Thus, we use the Treasury yield to calibrate and estimate the model.

Another key input to the estimation process is a bond's volatility. Estimating it using MSRB data is a challenge since we observe prices only on days when transactions occur. To tackle this problem, we use the daily price data and compute the scaled log return using two dates, d_1 and d_2,

$$r_{j,d_1,d_2} = \frac{p_{j,d_2} - p_{j,d_1}}{\sqrt{d_2 - d_1}}, \tag{9}$$

and estimate the volatility using the rolling 12-month window,

$$\sigma_{j,t} = \sqrt{\frac{252}{N_{j,t} - 1} \sum_{d_2 \in [t-11,t]} (r_{j,d_1,d_2} - \bar{r}_{j,d_1,d_2})^2}. \tag{10}$$

We require at least 10 return observations ($N_{j,t} \geq 10$) for each estimate. If not, the volatility in the month is treated as missing. Finally, we interpolate the bond-level volatility estimates at the 5-year maturity as we do for the credit spreads to obtain the volatility of the issuer's representative bond.

To measure the borrower's leverage, F_i, we follow Feldhütter and Schaefer (2018) and use the borrower's liability. A book value of equity is defined as the difference between the total assets and total liabilities.

To estimate the payout rate of an asset, $q_{i,t}$, we calculate the free cash flow to the firm as a proxy. Technically, this differs from the practice in the literature (see, for example, Feldhütter and Schaefer 2018), which computes the payout as the sum of dividends and interest payments. However, we cannot apply this method because universities do not pay dividends. Therefore, we compute free cash flow to the firm as a proxy for potential payments: these cash flows are available

for payment to outside stakeholders if needed. Specifically, we calculate the free cash flow to the borrower in year y as

$$FCFF_{j,y} = \text{Revenue}_{j,y} - (\text{Total Expense}_{j,y} - \text{Interest Paid}_{j,y}) + \text{Depreciation}_{j,y} - \text{Capex}_{j,y}, \quad (11)$$

and the payout rate is $FCFF_{j,y}/Asset_{j,y}$.

Panel A of Table 1 presents the summary statistics of the panel data. The average bond has a credit spread of 331 bps, a coupon rate of 4.68%, bond volatility of 11% per year, the issuer's free cash flow of $73 million, total assets of $3,354 million, and total liabilities of $914 million.

4 Main Results

4.1 Overview

We start by presenting the summary statistics of the estimated market values of assets and equities, $X_{i,t}$ and $S_{i,t}$. Panel B of Table 1 presents the results. We find that on average, the market values of assets and equities are $8.4 billion and $7.6 billion, respectively, while the corresponding median values are $1.2 billion and $1.0 billion. The average equity market-to-book ratio is 6.73 while that of median is 1.78. Since the average exceeds median, estimated market values are highly right-skewed. The average market leverage $F/X_{i,t}$ is 22% while the average variance of assets is 0.34.

Table 5 presents the top 50 universities in terms of their equity market value averaged over the last five years of our sample period (July 2020 – June 2025). We relegate the ranking of all universities in the Internet Appendix Table A4. Yale University is ranked first with a market value of $181 billion. Should it be listed on a stock exchange, it will be ranked around #40 in terms of market capitalization. For comparison, the market capitalization averaged over the same period for McDonald's Corp is $189 billion, and that for Intel Inc. is $168 billion. Harvard University and Stanford University, ranked #2 and #3 according to our metric, have the market value of $172 and $153 billion, respectively. Note that our ranking is not a mechanical reflection of the size of the

university's balance sheet. The market-to-book ratio of Yale is, on average, 4.9 over this period, which exceeds that of Harvard (3.2). Therefore, Harvard exceeds Yale in terms of the book value, but Yale's market value is higher than Harvard's. As discussed in Section 3.1, each university has different leverage, and as a result, our rankings are not simply a ranking of credit spreads (reported in the third column), either.

Our ranking of private universities appears to be only weakly correlated with the standard rankings from U.S. News, reported in the last column of Table 5, which includes both public and private universities. For example, New York University is ranked #35 in the U.S. News ranking, while it is ranked #5 in terms of its equity market value, one notch above Princeton (ranked #1 in the U.S. News ranking).

Just like the S&P500 index, the distribution of the market value is highly right-skewed. Yale's market cap is 3.5 times as large as Columbia University (ranked #10) and 13.7 times as large as Northeastern University (ranked #30).

Next, we study the time trend of the aggregate portfolio of university equities. Each month, we aggregate the market value of university equities, create the "university equity index", and plot it in Figure 6, Panel A. The figure also shows the total market capitalization of the CRSP aggregate market portfolio. Since our estimates rely on a particular sector of the economy with large outliers, the university stock index is more volatile than the aggregate stock market. Nonetheless, they share several key features between 2011 and 2021: they both exhibit an upward trend with an important decline during the COVID-19 period in 2020. However, after 2023, the trend appears to diverge. While the university index stops the growth with an increased volatility, the aggregate stock index steadily increases. At the end of our sample period, the university index represents 2% of the aggregate stock market.

Since our estimates of equity value derive from the credit spreads, we compare the university index with the average university credit spreads, as plotted in Figure 6, Panel B. For comparison, we add the BBB corporate credit spreads to the plot. The average university credit spreads exhibit a downward trend from 2011 to 2021, with a notable spike in March 2020, where they reach nearly 500 basis points. After 2022, the credit spreads remain between 300 and 400 basis points. BBB

corporate credit spreads are generally lower, but share a similar trend of slowly decreasing from 2011 to 2021, with a similar spike in 2020. However, the two series appear to diverge after the inflation shock in 2022. While corporate credit spreads recover from the shock soon in 2023 and 2024, the university credit spreads remain high. Notably, the university spread increased from 310 basis points in February 2025 to 362 and 436 basis points in March and April, respectively, possibly reflecting a series of new policies announced then. As of June 2025, the university credit spreads remain at a level similar to March 2020, while the corporate credit spreads are at the lowest level since 2011. This divergence explains why our university equity index appears to perform worse than the CRSP aggregate index after 2022.

4.2 Determinants of the equity market-to-book ratio

4.2.1 Analysis with university fixed effects

In this section, we take advantage of the university-month level panel data and examine the determinants of the equity market-to-book ratio. We categorize potential determinants into five groups: (1) fixed effects and monthly financial market variables; (2) contribution-related variables; (3) income statement-related variables; (4) balance sheet-related variables; and (5) other university characteristics. After identifying important variables from each category, we run a horse-race regression to determine the most important determinants of the equity market-to-book ratio. To facilitate interpretation, we standardize all variables, except for dummy variables, to have a mean of zero and a standard deviation of one. Given the extreme values of the equity market-to-book ratio, we use the natural logarithm of the ratio.[8] Instead of winsorizing the variable, we adopt this logarithmic transformation for ease of interpretation of magnitudes. We run the following panel regression for university i and month t:

$$\log(S_{i,t}/S^B_{i,t}) = \beta \mathbf{X}_{i,t} + \theta_t + \psi_i + \epsilon_{i,t}, \tag{12}$$

[8] 209 observations are excluded in our analysis due to negative equity market-to-book ratios.

where $\log(S_{i,t}/S^B_{i,t})$ is the log of the market-to-book ratio, $\mathbf{X}_{i,t}$ is a potential determinant of the ratio, θ_t denotes time fixed effects, and ψ_i denotes university fixed effects. We double-cluster standard errors at the university and year levels.

Table 6 presents the estimates of β. Panel A presents several benchmark regressions using a set of control variables. Column (1) shows that university fixed effects alone explain 65% of the variation in the market-to-book ratio, whereas column (2) shows that year-month fixed effects account for only 8.1% of the variation, implying large heterogeneity across universities. Column (4) shows that adding rating dummies increases R-squared only negligibly. Columns from (5) to (7) show that consistent with the structural risk model employed in this paper, asset variance exhibits a positive association with the market-to-book ratio, while credit spread shows a negative association, both with high statistical significance. A one-standard-deviation increase in asset variance and credit spread is associated with a 26 percent increase and 48 percent decrease in the equity M/B ratio, respectively, exhibiting a larger magnitude for credit spread than that for asset variance. Column (7) shows that in total, the set of control variables explains 88% of the variation in the market-to-book ratio.

Panel B examines total contributions, which account for 13% of the university's total revenue on average, and the two largest sources of the total contributions: donations and government grants.[9] Specifically, we compute the shares of donations, government grants, and total contributions in the university's total revenue, as reported in the IRS Form 990. The results show positive associations between both donations and total contributions and the market-to-book ratio. Specifically, a one-standard-deviation increase in donations and contributions corresponds to increases of 1.3% ($t = 6.80$) and 1.2% ($t = 5.70$) in the market-to-book ratio, respectively. These magnitudes are economically small given that the standard deviation of log market-to-book ratio is 0.95. The positive relationship between these variables and the market-to-book ratio suggests that higher levels of donations and contributions strengthen cash flows, which in turn elevate valuations. Surprisingly, however, government grants exhibit a negative association with the ratio. A one-standard-deviation increase in government grants corresponds to a 5.1% ($t = -2.93$) decrease in the ratio, which is the

[9]Total contributions include donations, government grants, and other sources such as contributions from related organizations and fundraising events. See Table A3 for more details.

largest magnitude out of contribution-related variables. This may stem from excessive reliance on government funding, which can introduce greater cash flow volatility due to political uncertainty and weaken stable cash flow. When both donations and government grants are included simultaneously in column (3), the estimated coefficient on donations rises from 0.013 to 0.197, while the negative coefficient on government grants becomes more pronounced, from -0.051 to -0.075. Moreover, the positive and significant coefficients on donation growth and contribution growth suggest that investors consider not only the levels of these variables but also their growth rates when assessing valuations.

Panel C examines income statement-related variables. Specifically, we examine the three largest components of the total revenue, other than contributions, as reported in the IRS Form 990: program service revenue, investment income, and income from asset sales. Since the program service item includes miscellaneous revenue sources beyond tuition, such as student housing, bookstore sales, and parking fees, we also separately examine tuition revenue and other program service that excludes tuition. Both the shares of program service revenue (73% on average) and tuition revenue (58% on average) show negative associations with the market-to-book ratio. This finding may indicate that excessive dependence on the primary income source may depress valuations. Conversely, investment income share, revenue growth, and ROE exhibit significant positive associations with the market-to-book ratio at the 1% level. Among all the variables, ROE exhibits the largest magnitude among all variables examined – a one-standard-deviation increase in ROE corresponds to a 16.4% ($t = 15.83$) increase in the market-to-book ratio. In contrast, income from sales of assets is negatively linked to the ratio, as universities often generate such income during periods of financial distress. In column (7), which includes the shares of program service revenue, investment income, and income from asset sales, only the share of program service revenue remains significant. Moreover, the shares of total salary, faculty salary, and non-faculty salary in total expenses show negative associations with valuations with large economic magnitudes of -0.125, -0.172, and -0.106, respectively. These findings suggest that higher labor cost shares negatively affect university free cash flows and valuations, reflecting universities' limited flexibility in adjusting their workforce. In column (14), which includes the most economically and statistically significant variables, ROE

emerges as the most important variable with the largest magnitude of 0.246.

Panel D examines balance sheet-related variables. Liabilities are positively associated with the market-to-book ratio, with the largest economic magnitude among all the variables considered as potential determinants of the ratio – a one-standard-deviation increase in the log of liabilities corresponds to a 121 percent ($t = 14.77$) increase in the ratio.[10] This strong relationship could indicate that universities with higher liabilities tend to have greater operational scale, which generates stronger cash flow growth and, in turn, amplifies the market valuation of equity relative to book value. Another possibility is that favorable financing conditions might simultaneously increase equity valuations and encourage more borrowing. In contrast, capital expenditures (CAPEX) — defined as the net value of land, buildings, and equipment at the end of the year minus the net value at the beginning of the year plus depreciation, depletion, and amortization — are negatively associated with the ratio. This may suggest that investments in new buildings and university equipment are highly costly and do not generate sufficient investment returns, thereby depressing university valuations. Given the time lag in CAPEX measurement, this result aligns with Fama and French (2015), who document a negative relationship between investment and future stock returns. Endowment levels also show a negative association with the market-to-book ratio. This seemingly counterintuitive finding may reflect diminishing returns as endowments grow large relative to institutional size, with universities potentially facing constraints in deploying substantial endowment assets toward high-return investments. Consistent with our previous findings, growth rates of assets, liabilities, and endowments all demonstrate positive associations with the market-to-book ratio. Among these, liability growth exhibits the largest magnitude (column 9). When both liability levels and growth are included simultaneously (column 10), the liability level emerges as the dominant determinant of the market-to-book ratio.

Panel E examines other university characteristics as potential determinants of the market-to-book ratio. Most university characteristics show no significant association with the ratio, likely due to their limited time variation and the inclusion of university fixed effects, which absorb cross-

[10] In untabulated results, we find that regressing the log of equity market-to-book ratio on the log of liabilities (without standardization) produces a coefficient of 0.859 ($t = 14.77$), indicating that a one percent increase in liabilities corresponds to a 0.86 percent increase in the equity market-to-book ratio.

sectional variation. Notably, the percentage of international students in the total number of students is positively associated with the ratio – a one-standard-deviation increase in the ratio is associated with a 12.2% ($t = 2.27$) increase in the market-to-book ratio. This suggests that a higher share of international students enhances valuations, possibly due to increased tuition revenues or greater global prestige. Additionally, the acceptance rate, defined as the ratio of admitted students to applicants, is negatively associated with the ratio. This implies that universities with lower acceptance rates tend to have higher valuations – a one-standard-deviation increase in the acceptance rate is associated with an 18.6% ($t = 2.45$) increase in the market-to-book ratio. In column (10), which includes the share of international students and the acceptance rate, the acceptance rate shows the largest economic magnitude.

Panel F presents a horse-race regression by incorporating the most significant variables from each category. Columns (1) through (4) reproduce previous results for comparison. Column (5) shows that when all key variables compete simultaneously, the level of liabilities emerges as the dominant determinant, followed by ROE, with other variables losing statistical significance. The variance decomposition analysis, reported in square brackets in column (5), quantifies each variable's contribution to explaining market-to-book variation. This decomposition is calculated as $\beta_x \frac{cov(y,x)}{var(y)}$ where β_x is the OLS coefficient for variable x, $cov(y, x)$ denotes the covariance, and $var(y)$ denotes the variance. The variance decomposition shows that liabilities account for 46% of the variation in equity market-to-book ratios, while ROE explains 3.21%. Figure 7 plots the mean and median of the market-to-book ratio together with those of the log of liabilities. The aggregate patterns of these two variables exhibit modest correlations, consistent with our findings based on panel regressions with fixed effects.

In summary, the analysis demonstrates that time-invariant university characteristics, captured by university fixed effects, account for most of the variation in the market-to-book ratio. Additionally, among all potential determinants, ROE and the level of liabilities are the most important determinants of the market-to-book ratio. Moreover, university characteristics do not show a significant relationship with the ratio.

4.2.2 Analysis without university fixed effects

To explore university characteristics that exhibit limited time variation, we re-estimate equation (12) without university fixed effects, allowing us to identify cross-sectional determinants of the equity market-to-book ratio that were previously absorbed by the fixed effects.

Table 7 shows several significant relationships. Universities with higher loan-to-tuition ratios exhibit higher valuations, though only significant at the 10% level. Athletic performance, measured through football rankings, exhibits a negative correlation with valuations. The percentage of tenured faculty shows a strong negative relationship with valuations at the 1% significance level, potentially reflecting the market's perception of tenure as creating inflexibility in labor cost structures. Both the enrollment-to-admission ratio and the admission-to-application ratio positively correlate with valuations. Universities offering medical degrees command 47% higher valuations, and those granting PhD degrees show 53% higher valuations compared to institutions without these programs. These premiums likely reflect the research intensity and prestige associated with graduate professional programs. Conversely, religious affiliation corresponds to 23% lower valuations, possibly due to perceived constraints on operational flexibility or limited donor bases. Higher SAT 75th-percentile verbal scores correlate with lower valuations, which may be confounded with other institutional characteristics. When all significant variables are included simultaneously in column (14), PhD-granting status emerges as the most economically and statistically significant predictor, followed by religious affiliation and medical degree offerings.

Overall, these cross-sectional results highlight that institutional characteristics, particularly those related to research capacity and degree offerings, serve as significant determinants of university valuations.

4.3 Assessments of Policy Impacts on Market Values

Utilizing our market value estimates, we examine how government policies regarding universities affect the implied equity values of universities. Book values of equities remain constant over short event windows and therefore cannot capture policy effects. In contrast, market values derived from bond prices reflect real-time investor assessments of future cash flows, risk, and institutional

stability. This approach allows us to quantify policy impacts through changes in the dollar value of equity. We examine whether and to what extent two notable policies affect the equity value of universities.

4.3.1 Federal research funding freezes in March 2025

We first focus on the federal research funding freezes that began in March 2025. On March 7, the federal government announced the immediate cancellation of approximately $400 million in federal grants and contracts to Columbia University due to alleged inaction on campus anti-semitism incidents. This was followed by the Department of Education's Office for Civil Rights (OCR) warnings to 60 institutions on March 10 and an audit of Harvard's $8.7 billion in grants on March 31, escalating tensions over federal oversight and threatening cash flows for top universities. Concurrently, policy discussions in March 2025 included proposals for increased endowment taxes, such as the Woke Endowment Security Tax (WEST) Act of 2025 (S.936) introduced on March 11, which proposed a one-time 6% excise tax on endowments exceeding specified thresholds (e.g., $11.9 billion for secular private institutions). These developments further intensified financial pressures on universities with large endowments. To assess whether and to what extent this event affected top universities, we employ a difference-in-differences (DiD) research design. Specifically, we estimate the following DiD regression for university i and month t:

$$\log S_{i,t} = \beta Post_t \times Treat_i + \gamma' \mathbf{X}_{i,t} + \psi_i + \theta_t + \epsilon_{i,t}, \tag{13}$$

where $\log S_{i,t}$ is the natural logarithm of the equity value of university i at month t, *Post* is an indicator variable for the period from March 2025 to June 2025, *Treat* denotes universities in the top quintile of average total revenue over the 2011–2024 period, and $\mathbf{X}_{i,t}$ is a vector of university-month-level control variables, including asset variance, credit spreads, and dummies for credit ratings. The sample period spans November 2024 to June 2025, and standard errors are clustered at the university level.

Table 8 presents the results. Column (1) indicates that the equity value of top universities

decreased significantly by 11.2% relative to non-top universities from March 2025 to June 2025. To explore heterogeneity in these effects, we examine whether impacts are stronger for universities with larger endowments, Ivy League status, higher exposure to government grants, higher tuition, and a higher share of international students. We create five indicator variables: (1) Ivy League universities, universities in the top decile of (2) endowment size, (3) government grants as a share of total revenue, (4) tuition, and (5) the share of international students in the total number of students. To measure the endowment size, government grants, tuition, and total revenue, we use the IRS Form 990. For the share of international students, the IPEDS data is used. In doing so, to avoid look-ahead bias, we use observations available to investors in 2024. We interact each indicator with the DiD term in equation (13) to conduct triple DiD analyses. Columns (2) to (4) present these results. The negative impacts on top universities are driven by those with Ivy League status, large endowments, high government grant dependency, high tuition, and a high share of international students. For example, column (2) shows that within the treatment group, Ivy League universities experienced an economically significant additional 26% market value decrease relative to non-Ivy League universities. With Ivy League universities averaging \$74.8 billion in equity value as of February 2025, this translates to an equity value loss of \$25.23 billion, on average, for Ivy League schools compared to non-top universities (calculated as \$74.8 billion $\times$ (0.08 + 0.257)).

These triple DiD results indicate that institutions most exposed to funding freezes and proposed endowment taxes experienced disproportionately severe policy impacts.

Figure 8 presents the dynamic effects of the policies on top universities relative to others, using February 2025 as the benchmark. The market reacted immediately to the policy announcements in March 2025, with a drop of around 10% in equity value. This decline continued in April and May with the magnitudes of around 20%. Overall, these findings indicate that our measure of university equity values reasonably captures the heightened financial risks these institutions face due to policy changes in a timely manner.

4.3.2 Federal student loan payment pause in March 2020

Next, we examine the federal student loan payment pause, which was initiated administratively on March 13, 2020, following the national emergency declaration, and subsequently enacted into law on March 27, 2020, through the CARES Act—with the suspension made retroactive to March 13. This policy suspended payments and interest accrual on most federal student loans amid the COVID-19 pandemic, offering borrowers immediate liquidity relief. It aimed to alleviate economic distress by enabling borrowers to redirect funds toward essential consumption or other debts, which could indirectly support university enrollment and tuition revenues by improving students' financial stability.

To identify universities with high exposure to student loans, we create two variables using the IPEDS database: (1) the percentage of undergraduate students awarded federal student loans; (2) the ratio of the total amount of federal student loans for undergraduate students to the university's tuition and fees revenue, after deducting discounts and allowances. To avoid look-ahead bias, we use the observations of these two variables available to investors in 2019. We then define two treatment groups as universities in the top quartile of either variable and run the same DiD regression as in equation (13) using the sample from November 2019 to June 2020.

Column (1) of Table 9 indicates that universities in the top quartile for the percentage of students with federal loans experienced a statistically significant 14.7% rise in equity value compared to others. Given that the average equity value for universities in the treatment group was $1,164 million as of February 2020, this increase translates to a gain of $171 million in equity value for treated universities relative to non-treated ones. Column (2) shows a similar result using the loan-to-tuition ratio. Smaller institutions are more likely to rely on student tuition. Moreover, given the unprecedented macro-level event in March 2020 amid COVID-19, one might suspect that our results are driven by systematic risk exposure, associated with university size, rather than federal student loan exposure. To address this concern, we interact the DiD term with a dummy for universities in the bottom decile of total revenue. Column (3) shows that, within universities in the top quartile for the percentage of students with federal loans, smaller institutions experienced a larger increase in the market value of equity.

Importantly, both columns (3) and (4) show that the main DiD effects are not driven by smaller institutions, as the DiD terms remain statistically significant with similar magnitudes. This suggests that our results are not merely artifacts of the size effect in March 2020.

Figure 9 presents the dynamic effects of the policy on universities in the top quartile based on the percentage of students with federal student loans (Panel A) and the loan-to-tuition ratio (Panel B). For both treatment groups, the effects appear pronounced starting in March 2020 and persist until June 2020.

4.3.3 Visa Scrutiny and Deportations of Chinese International Students

Our third policy analysis focuses on the intensified visa restrictions and deportations affecting Chinese international students that gained significant attention in April 2024. Amid escalating US-China tensions, Chinese Foreign Ministry spokesperson Mao Ning openly condemned the United States for canceling visas and deporting Chinese students and academics without substantive proof.[11] She accused Washington of overstretching national security concepts and creating obstacles for cultural exchanges. News articles and social media from that period reported extensive airport interrogations where Chinese nationals endured prolonged detentions and saw immediate visa cancellations on the spot despite possessing valid documentation.[12] These incidents and widespread media coverage likely captured investors' attention, raising concerns about potential impacts on university fundamentals through declining Chinese student enrollment and the consequent loss of tuition revenue for institutions heavily dependent on Chinese students.

To identify universities that heavily rely on Chinese international students, we define the treated group as institutions in the top quartile for both the share of international students and the share of Asian students (representing 15% of the sample). We employ this proxy because IPEDS data do not provide a detailed breakdown of Asian students or international students by nationality. As in prior analyses, we use observations of these variables available to investors in 2023 to avoid look-ahead bias. We estimate the same difference-in-differences regression as in equation (13), using

[11] https://www.globaltimes.cn/page/202404/1310190.shtml

[12] https://www.theguardian.com/us-news/2024/apr/20/chinese-students-in-us-tell-of-chilling-interrogations-and-deportations

the sample period from December 2023 to July 2024.

As reported in Column (1) of Table 10, universities with high exposure to Chinese international students experienced a statistically significant 19.6% decline in equity value relative to other universities. Given that the treated group averaged $58.5 billion in equity value as of March 2024, this corresponds to an average equity loss of $11.5 billion for the treated group compared to the control group. We further explore triple-difference specifications to assess whether the effect is amplified for three subgroups: (1) universities with a high share of foreign Asian faculty, defined as those in the top quartile for both the share of foreign faculty and the share of Asian faculty (5% of the sample); (2) universities with a high share of government grants in total revenues; and (3) universities with high total assets. The results are not stronger for universities with a high share of Asian faculty or those heavily dependent on government grants. However, large universities show a more pronounced effect, as indicated in Column (4). This pattern suggests that the impact primarily arises from large universities that rely on Chinese international students for cash flows.

Figure 10 illustrates the dynamic effects of the April 2024 event on universities with high exposure to Chinese international students relative to others. Although the equity values of treated universities showed no immediate reaction in April 2024, these values became significantly lower than those of other universities from May to July, indicating a prolonged impact on equity values.

In summary, our empirical analyses document the directions and magnitudes of the effects from the Trump administration's policies in March 2025, the federal student loan payment pause in March 2020, and the visa scrutiny and deportations of Chinese international students in April 2024. These analyses demonstrate that our measure enables real-time assessment of risks and cash flows. Unlike book values of equity, our measure reflects policy impacts in a timely manner and allows us to quantify these impacts. This is important as the magnitudes of impacts provide valuable information for policymakers, enabling them to evaluate the financial consequences of government policies and make more informed decisions about regulatory changes affecting the higher education sector. Appendix Tables A11, A12, and A13 show that our difference-in-differences results for the three events remain robust when using the log of the market value of assets, rather than the log of the market value of equities, as the outcome variable.

5 Conclusion

This paper proposes and implements a novel approach to estimating the market value of nonprofit universities by inferring investors' expectations from the observed prices and volatilities of their publicly traded bonds. Using a structural model of default risk with stochastic volatility, we reverse-engineer the implied equity value of universities—the residual claim on discounted future cash flows after debt service—from the perspective of debt investors. This framework allows us to quantify the market capitalization of nonprofit universities even in the absence of traded equity securities.

Our estimates reveal that the market value of private universities constitutes a nontrivial portion of the U.S. economy. The aggregate market capitalization of universities represents approximately two to four percent of the total stock market capitalization during the sample period, comparable to the real estate or utilities sectors in the S&P 500 index. At the institution level, Yale, Harvard, and Stanford emerge as the largest universities by market value, with magnitudes rivaling those of major publicly listed corporations. Importantly, these rankings are not mechanical reflections of balance sheet size: market-to-book ratios vary widely, reflecting heterogeneity in expected growth, operational flexibility, and financial management. Higher donation growth and lower labor cost shares are associated with greater market-to-book ratios, while greater reliance on government grants and higher capital expenditures are associated with lower valuations.

Beyond providing new valuation estimates, our analysis exploits high-frequency variation in bond prices and quantifies the causal impact of policy shocks on university valuations. The federal research funding freeze of March 2025 led to an average decline of approximately 11% in market value for top universities, with more severe effects among Ivy League institutions and those highly dependent on federal grants. Conversely, the federal student loan payment pause in March 2020 raised market valuations by roughly 15% among universities with high exposure to student loan financing. Additionally, the intensified visa restrictions on Chinese international students in April 2024 triggered an average market value reduction of approximately 20% for institutions with high shares of international and Asian enrollment. These findings demonstrate that our measure of

market-based equity value quickly reacts to policy news and offers a tool to assess the impact of policy changes on universities.

Overall, our results bridge the literature on structural models of credit risk and the emerging research on the financial behavior of nonprofit institutions. By translating bond prices into implied equity valuations, we provide a framework for quantifying the financial market value of organizations that lack traded equity. While our approach intentionally abstracts from the broader social returns to education and research, it provides a transparent, empirically grounded measure of financial value from the perspective of market participants.

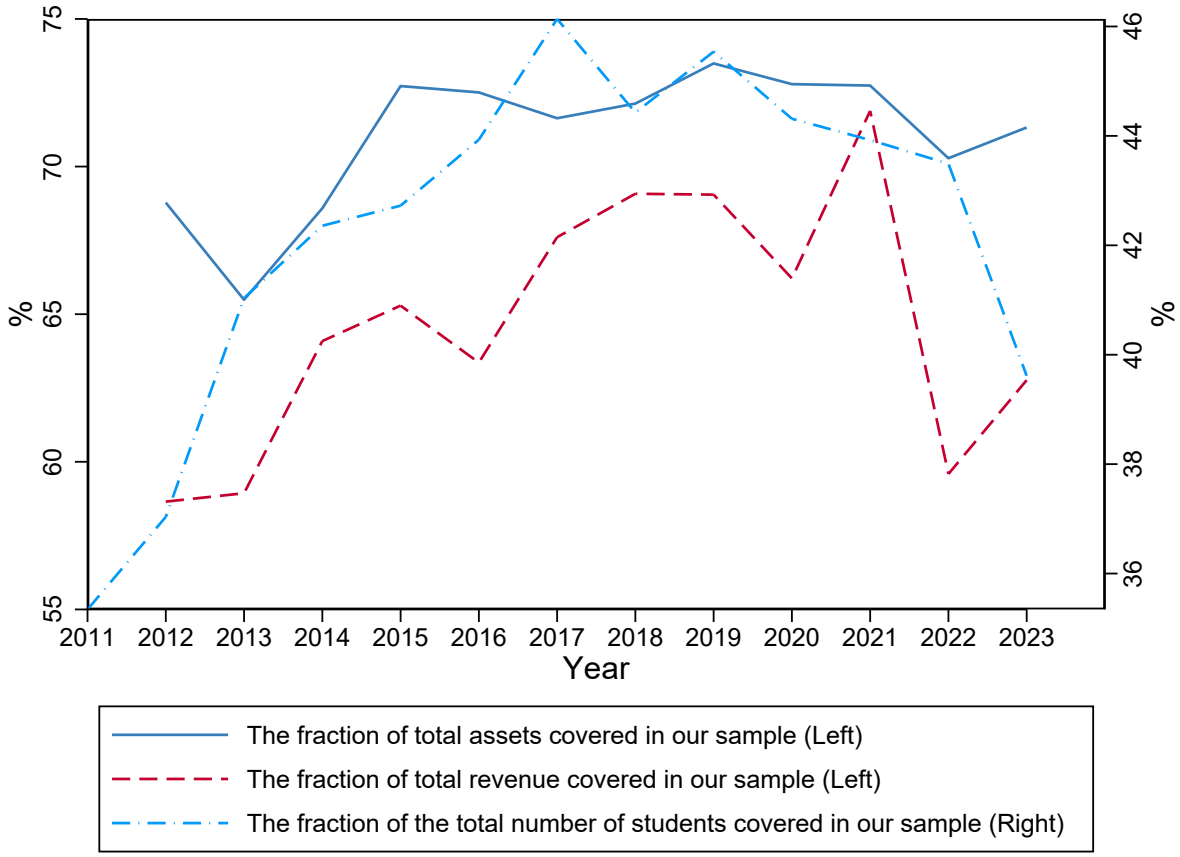


Figure 2: Data Coverage

This figure plots the fractions of total assets, total revenue, and student enrollment of private nonprofit universities in the IPEDS database that are covered in our sample. For total assets and total revenue, years represent fiscal years, while for student enrollment, years represent academic years. Our bond sample covers the period from June 2011 through June 2025. For fiscal year measures, the figure begins with fiscal year 2012 (July 2011–June 2012), as June 2011 is the only month in our sample that falls within fiscal year 2011. For the student enrollment measure, the figure begins with academic year 2011 (August 2011–July 2012), as only June and July 2011 from our sample fall within academic year 2010. The figure ends in 2023, which is the most recent year of available IPEDS data as of October 2025.

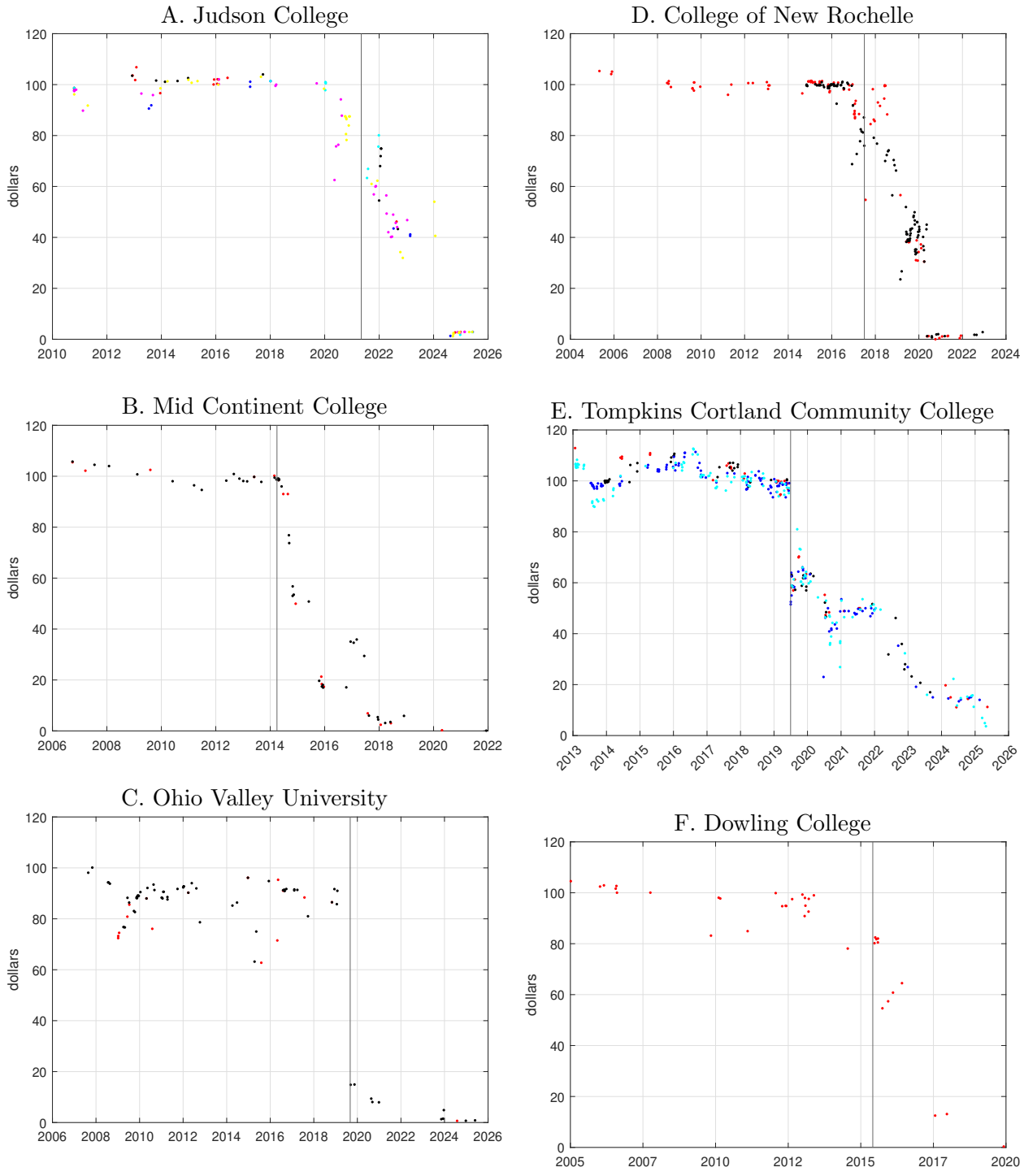


Figure 3: Bond Prices of Defaulted Universities

The figure plots the daily bond prices of defaulted universities in the sample. We select the sample of universities that experienced payment defaults during the sample period. The daily price is constructed as the average of the highest ask price and the lowest bid price on a day. If either of these prices is missing, we use the average of the average interdealer price. The vertical line indicates the first default date. The dots with a different color correspond to a different bond issued by the same issuer.

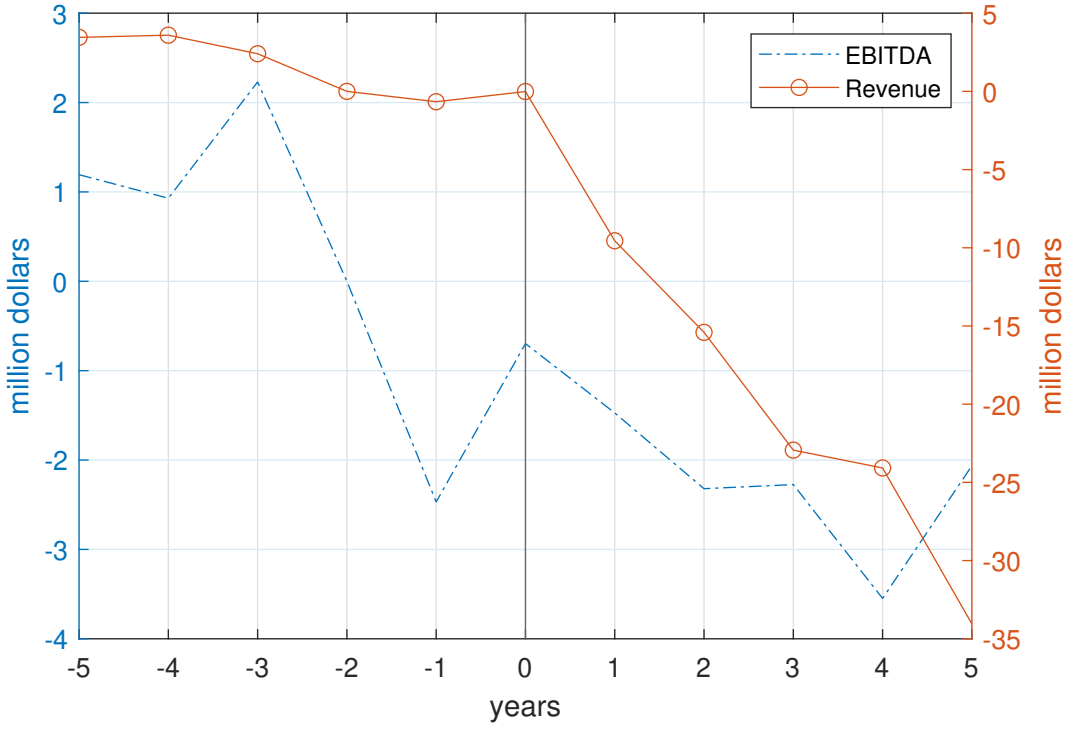


Figure 4: Financial Statements of Defaulted Universities

The figure plots the revenue and EBITDA in million dollars, averaged across seven universities that default in our sample. For each university, we find the default year and use it as year 0. Then, we set year -2 as a reference point and compute the difference in revenue and EBITDA for the surrounding years. We take the average across universities and plot it as a function of the year relative to the default year.

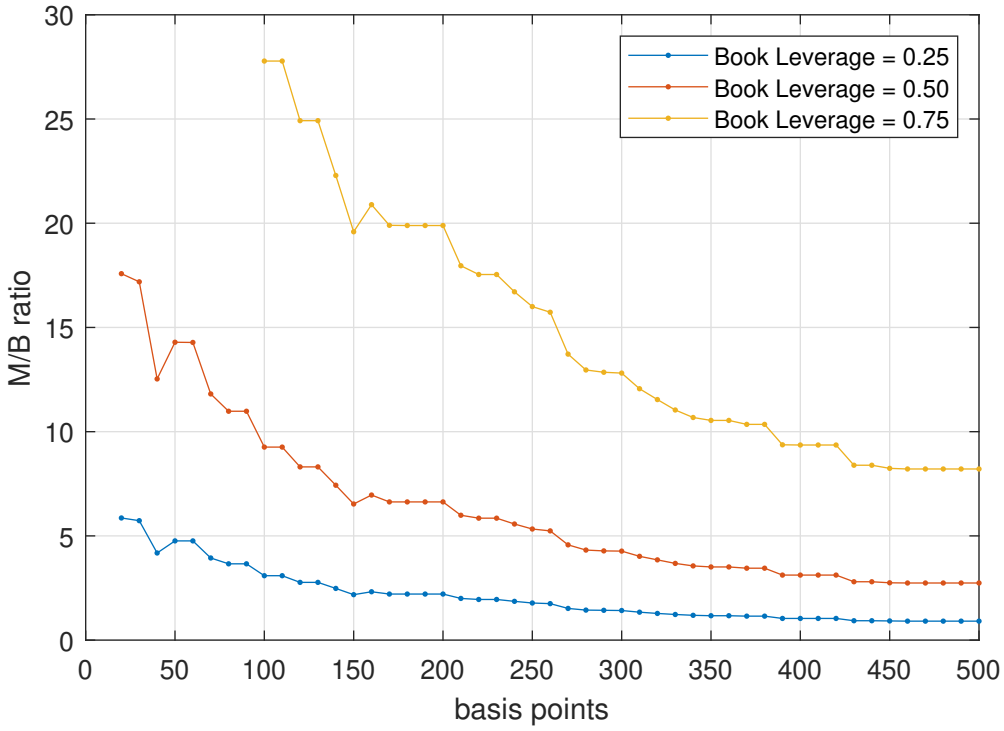


Figure 5: Relationship Between Credit Spreads, Market-to-Book Ratio, and Book Leverage

This figure plots the credit spreads (x-axis, in basis points) and the equity market-to-book ratio (y-axis) using the Du et al. (2019) model. We use the parameters described in Table 4 and let the input credit spreads vary, while bond volatility is fixed at the sample average of 11.12%. For each set of inputs, we solve the system of two equations with two unknowns in Eq. (5) and back out the market-to-book ratio. Book leverage is defined as the ratio of the book value of liabilities to the book value of total assets.

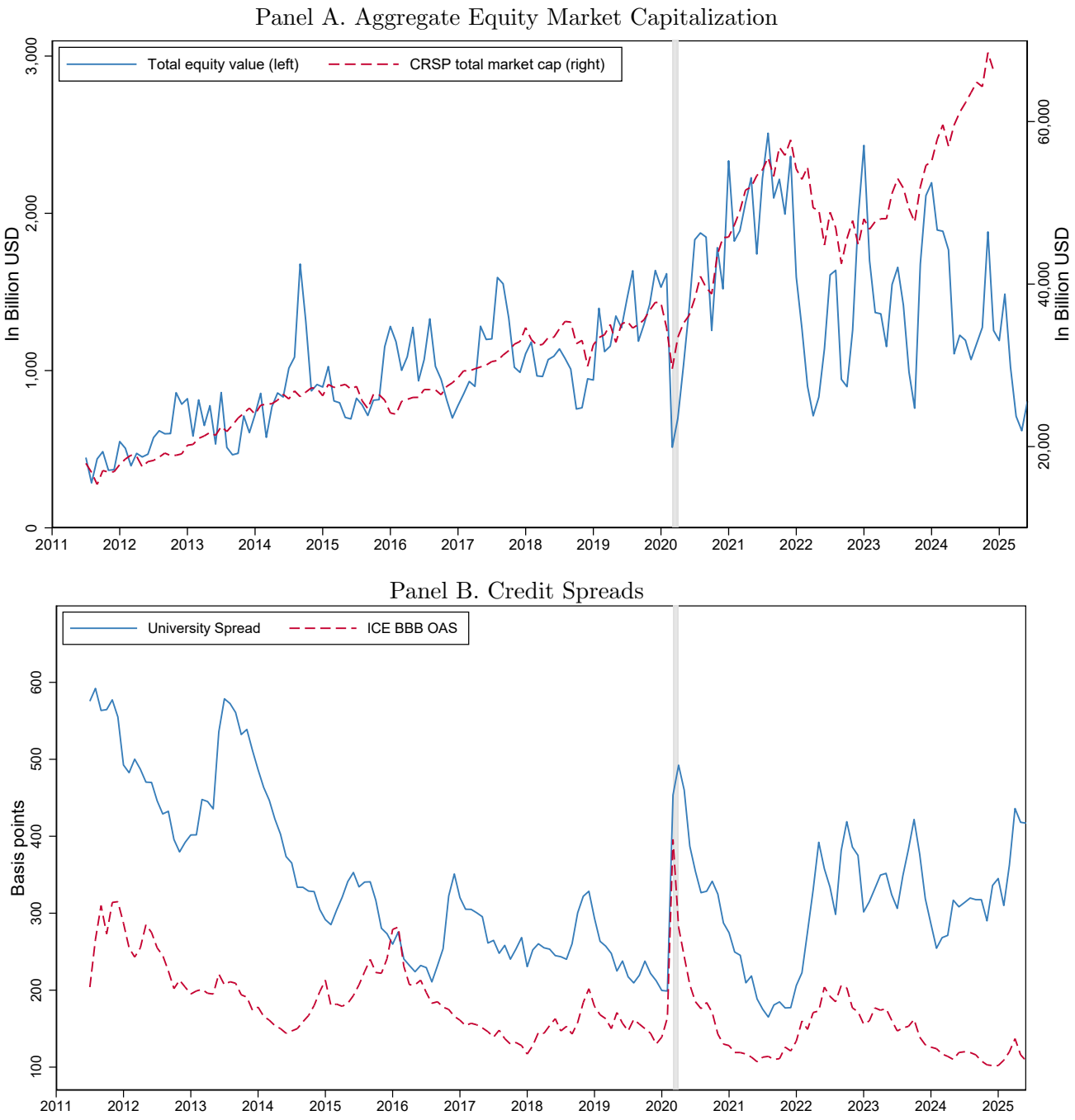


Figure 6: Comparison Between the University and Corporations

Panel A plots the total equity value of universities and the total market capitalization (in billion dollars) of the CRSP equity universe from NYSE/NASDAQ/AMEX from July 2011 to June 2025. The total equity value of universities is calculated by summing the equity values across all universities in our sample for each month. Panel B plots the average credit spread of universities and the ICE BofA BBB US Corporate Index Option-Adjusted Spread in basis points. The shaded area denotes the NBER recession from March 2020 to April 2020.

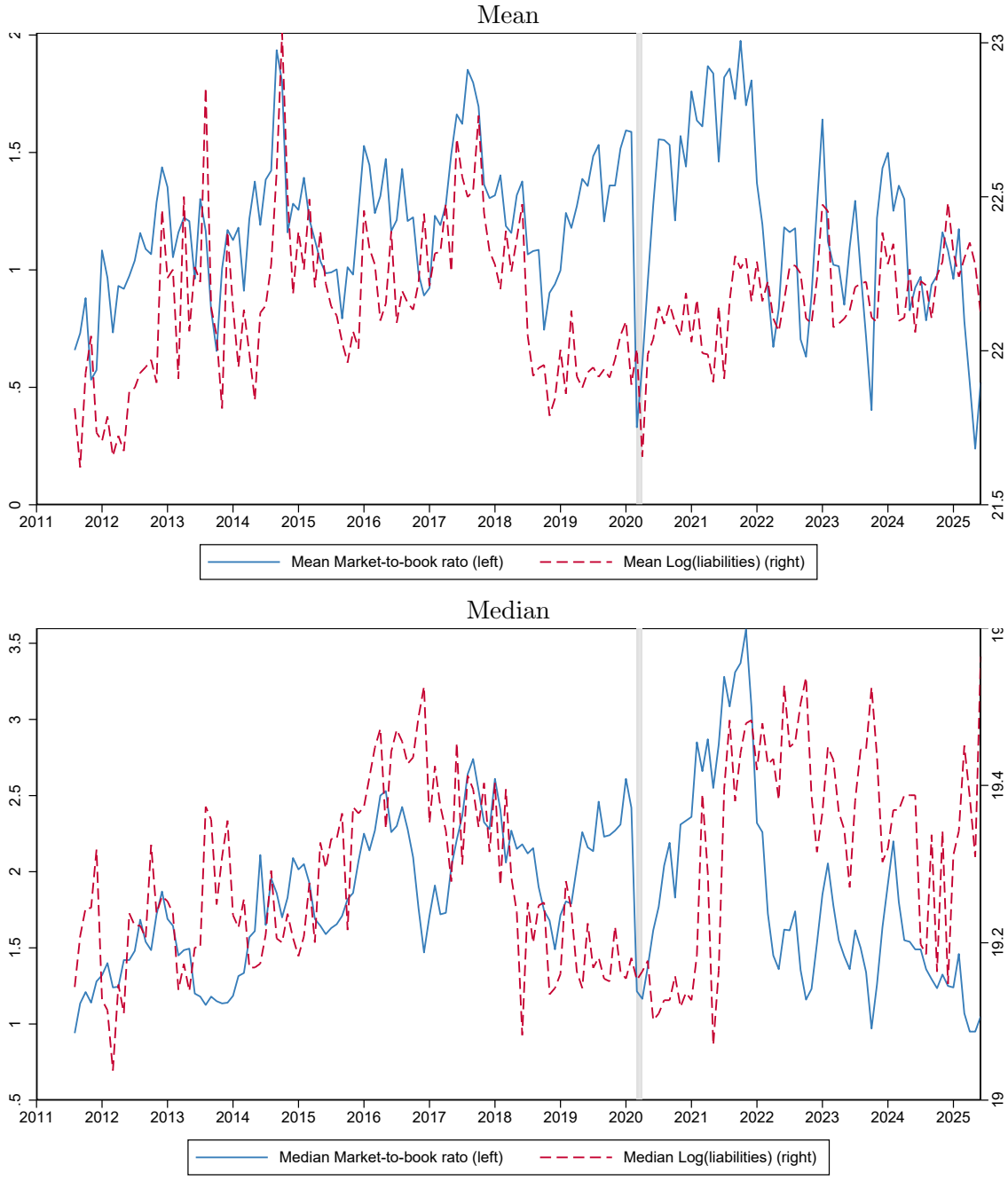


Figure 7: Equity Market-to-Book Ratio and Log of Liabilities

The left figure plots the value-weighted mean of the log of equity market-to-book ratios (Left) and the value-weighted mean of the log of total liabilities (Right), where the weight is the equity value of the previous month for each university. The right figure plots the median of the equity market-to-book ratios (Left) and the median of the log of total liabilities (Right). We use the log of the equity market-to-book ratio only for the mean in the left panel to avoid the influence of outliers. The shaded area denotes the NBER recession from March 2020 to April 2020. The sample period is from August 2011 to June 2025.

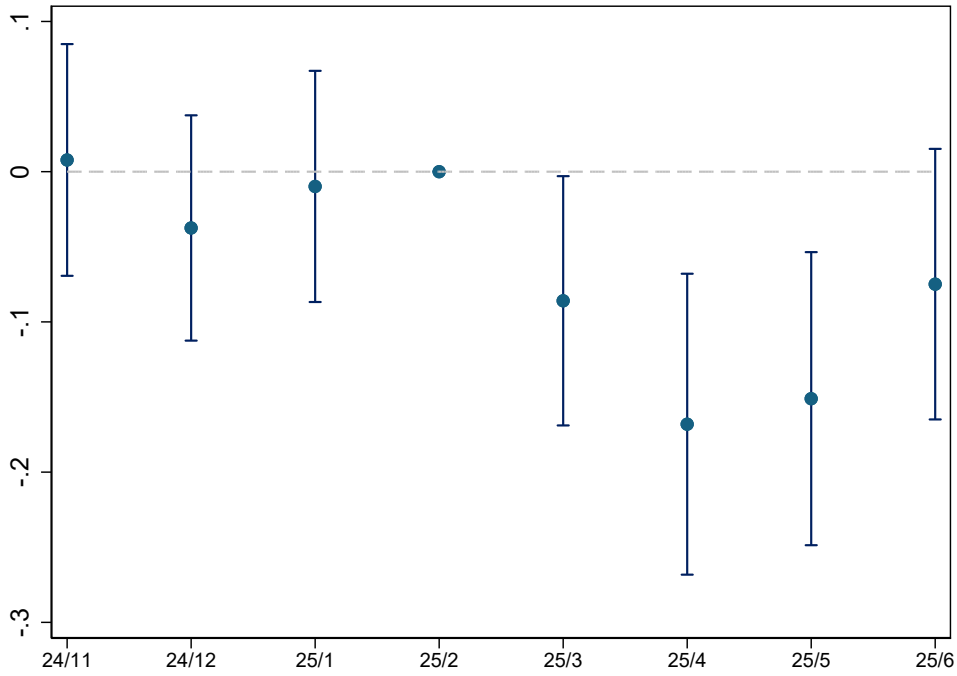
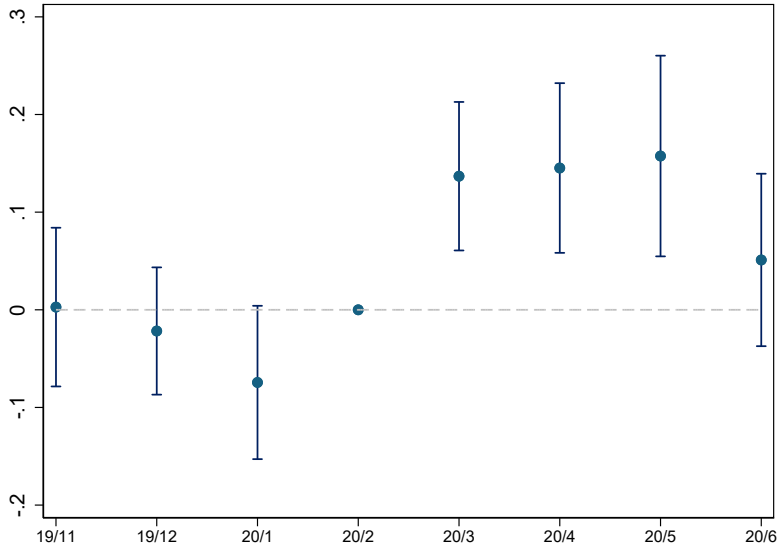


Figure 8: Effects of Policies against Top Universities in March 2025

This figure displays point estimates and 95% confidence intervals for the relative differences in log equity value between top universities and others from November 2024 to June 2025, with February 2025 as the benchmark period. Top universities are those in the top quartile based on average total revenue from 2011 to 2024. The dependent variable is log equity value, and the plotted coefficients represent estimated coefficients on interactions between monthly dummies and the top university indicator. Controls include asset variance, credit spread, rating dummies, university fixed effects, and time fixed effects. Standard errors are clustered at the university level.

Panel A: High loan share



Panel B: High loan-to-tuition

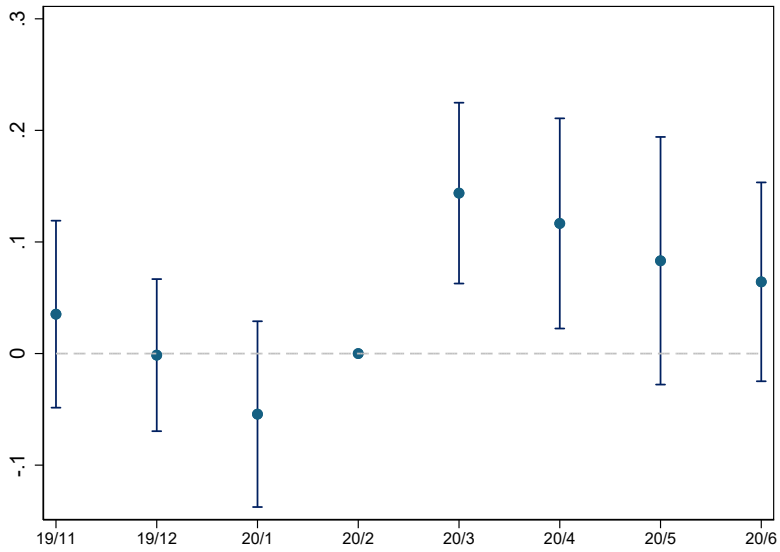


Figure 9: Effects of Federal Student Loan Payment Pause in March 2020

This figure displays point estimates and 95% confidence intervals for the relative differences in log equity value between high student loan exposure universities and others from November 2019 to June 2020, with February 2020 as the benchmark period. In Panel A, the treated group consists of universities in the top quartile of the percent of undergraduate students awarded federal student loans. In Panel B, the treated group consists of universities in the top quartile of the ratio of the total amount of federal student loans awarded to undergraduate students to tuition and fees, after deducting discounts and allowances. The dependent variable is log equity value, and the plotted coefficients represent estimated coefficients on interactions between monthly dummies and the treated group universities indicator. Controls include asset variance, credit spread, rating dummies, university fixed effects, and time fixed effects. Standard errors are clustered at the university level.

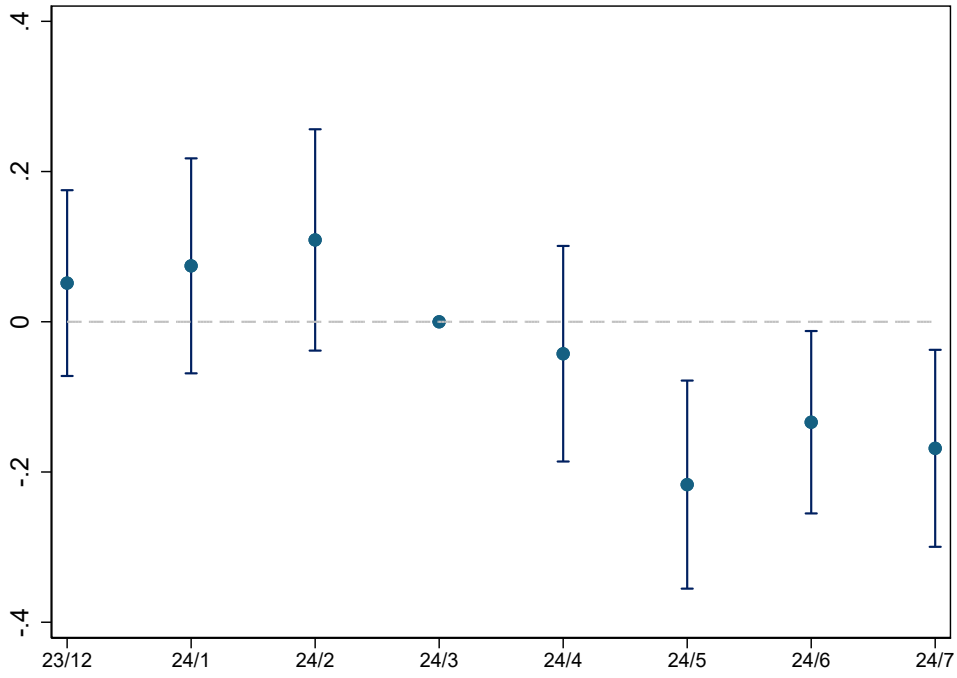


Figure 10: Effects of Visa Scrutiny and Deportations of Chinese International Students in April 2024

This figure displays point estimates and 95% confidence intervals for the relative differences in log equity value between universities with a high share of Chinese international students and others from December 2023 to July 2024, with March 2024 as the benchmark period. Universities with a high share of Chinese international students are those in the top quartile of the share of international students and in the top quartile of the share of Asian students (15% of the sample). The dependent variable is log equity value, and the plotted coefficients represent estimated coefficients on interactions between monthly dummies and the treated group universities indicator. Controls include asset variance, credit spread, rating dummies, university fixed effects, and time fixed effects. Standard errors are clustered at the university level.

Table 1: Summary Statistics

	N	Mean	SD	Min	p1	p10	p50	p90	p99	Max
Panel A: Input variables										
Spread	25,183	330.96	211.47	0.21	27.61	94.35	288.67	640.15	922.48	1000.00
Coupon	25,183	4.68	0.66	1.11	3.00	4.00	5.00	5.14	6.13	7.75
Matched Treasury yield	25,183	2.08	1.27	0.11	0.22	0.60	1.74	4.14	4.70	5.08
Time to worst	25,183	4.89	1.38	2.00	2.09	2.88	5.00	6.89	7.86	8.00
BondVOL	25,183	0.11	0.07	0.01	0.03	0.05	0.10	0.18	0.36	1.81
FCFF	25,183	73	274	-1,487	-161	-18	13	162	1,210	4,006
Asset book	25,183	3,354	8,168	0	47	180	850	7,991	46,370	75,288
Liability book	25,183	914	2,215	0	20	66	242	2,440	9,879	35,024
Panel B: Output variables										
Equity Market	25,180	7,620	27,978	-25	46	155	956	15,293	126,088	884,221
EquityMB	25,180	6.73	170.63	-1,797	0.11	0.62	1.78	5.75	31.97	9,041.04
Log(EquityMB)	24,971	0.64	0.95	-5	-1.35	-0.45	0.59	1.75	3.47	9.11
Asset Market	25,180	8,449	29,639	0	75	224	1,193	17,715	134,508	916,305
AssetMB	25,180	1.97	1.86	0.00	0.36	0.71	1.51	3.65	8.73	110.37
MarketLev	25,180	0.22	0.11	0.00	0.04	0.10	0.20	0.38	0.55	1.14
AssetVAR	25,180	0.34	0.37	0.00	0.03	0.07	0.22	0.74	1.74	10.55
Panel C: Month-level variables										
Aggregate Equity	168	1,142	495	286	366	549	1,070	1,882	2,432	2,509
Median Equity	168	1,005	322	451	457	593	972	1,398	1,916	2,177
Median EquityMB	168	1.83	0.54	0.94	0.95	1.18	1.72	2.53	3.37	3.59
Value-weighted Return	167	0.04	0.26	-0.70	-0.41	-0.28	0.01	0.38	0.62	1.25
Equal-weighted Return	167	0.13	0.15	-0.47	-0.18	-0.04	0.12	0.30	0.65	0.68
Ratio	162	0.03	0.01	0.01	0.02	0.02	0.03	0.05	0.05	0.06
Median spread	168	311.73	117.43	134.94	136.90	189.15	284.32	499.27	615.12	620.09

Spread: credit spread in basis points. *Coupon*: coupon rate in percent. *Matched to Treasury yield*: treasury yield in percent, matched to each bond's maturity. *Time to worst*: time to worst in years. *BondVOL*: annualized bond volatility. *FCFF*: free cash flow to firm in million USD. *Asset book*: book value of assets in million USD. *Liability book*: book value of liabilities in million USD. *Equity Market*: market value of equity in million USD. *EquityMB*: market value of equity divided by book value of equity. *Log(EquityMB)*: natural logarithm of EquityMB. *Asset Market*: market value of assets in million USD. *AssetMB*: market value of assets divided by book value of assets. *MarketLev*: book value of liabilities divided by market value of assets. *AssetVAR*: asset variance. *Aggregate Equity*: aggregate market capitalization of universities. *Median Equity*: cross-sectional median equity value. *Median EquityMB*: cross-sectional median equity market-to-book ratio. *Value-weighted Return*: value-weighted mean of individual university equity returns. *Equal-weighted Return*: equal-weighted mean of individual university equity returns. *Ratio*: ratio of aggregate market capitalization of universities to aggregate CRSP NYSE-NASDAQ-AMEX market capitalization (sample period ending in December 2024). *Median spread*: cross-sectional median credit spread.

Table 2: List of Universities Defaulted

Name	Default Date	Event	Bond Prices		Credit Rating		Outcome
			Before Default	After Default	Original	Before Default	
Mid Continent College	20140401	MPP	99.5	87.7			Ch. 11 bankruptcy in Sep 2014.
Dowling College	20150601	BKLE	78.1	72.5	14	20	Ch. 11 bankruptcy in 2016.
The College Of New Rochelle	20170701	MPP	89.8	82.5	10	11	Ch. 11 bankruptcy in Sep 2019.
Tompkins Cortland Community College	20190701	MIP	98.8	62.2	10	15	Continues its operation as of Oct 2025.
Ohio Valley University Inc	20190903	MIP	87.6	13.1			Ch. 7 bankruptcy in Feb. 2022
Judson College	20210506	MPP	82.2	64.0	10	12	Ch. 11 bankruptcy in 2021.
(Average)			89.3	63.7			

The table lists the payment defaults that are recorded in the merged sample of FISD and MFRB. MPP is missed principal payments, MIP is missed interest payments, and BKLE is bankruptcy. Price before default is the average of the daily prices over the one-year period before the default date, expressed as a percentage of the par value, and Price after default is the average over the one-year period on and after the default date. Original credit rating is a credit rating assigned to the issue when they are issued, averaged across bonds for each university. Rating before refers to the credit rating one month before default, also averaged across bonds. Numerical values are assigned to a rating such that AAA=1, AA+=2, ..., C=21.

Table 3: Comparison of Turnover Ratios between University and Corporate Bonds by Credit Rating

	AAA	AA	A	BBB	HY
			Panel A: University bonds		
Turnover (%)	8.18	7.76	9.91	10.55	6.63
S.E.	(0.24)	(0.15)	(0.21)	(0.33)	(0.73)
Obs.	16,075	47,847	41,641	15,990	1,222
			Panel B: Corporate bonds		
Turnover (%)	5.41	7.31	6.70	6.83	10.24
S.E.	(0.23)	(0.17)	(0.07)	(0.06)	(0.13)
Obs.	8,812	65,315	401,926	509,863	145,910
			Panel C: Difference between the two groups		
Difference	2.77***	0.46**	3.21***	3.71***	-3.61***
S.E.	(0.33)	(0.22)	(0.22)	(0.34)	(0.74)

This table compares the liquidity of university bonds and corporate bonds across five credit rating categories: AAA, AA, A, BBB, and High Yield (HY). Liquidity is measured by turnover, defined as the ratio of monthly trading volume to the bond's amount outstanding, in percentage terms. Panel A reports the average turnover for university bonds, Panel B reports the average turnover for corporate bonds, and Panel C reports the difference between the two groups. Turnover values are winsorized by each month to mitigate the impact of outliers. Standard errors are clustered by bond. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4: Parameters of the Du et al. (2019) Model

Parameters	Interpretation	Value	Source
Asset Value Dynamics			
λ_D	Price of asset risk	-0.355	Matched to the Sharpe Ratio of 0.22
λ_V	Price of variance risk	-7.400	Estimated from AAA corporates
ρ	Correlation between asset and variance	-0.150	Du et al. (2019) Table 1
Variance Dynamics			
θ	Mean of variance	0.084	Du et al. (2019) Table 1
κ	Speed of mean-reversion	4.000	Du et al. (2019) Table 1
σ	Volatility of variance shock	0.300	Du et al. (2019) Table 1
Default Parameter			
X_D	Default boundary	1.090	Estimated from AAA default rates
LGD	Loss given default	0.550	Du et al. (2019)

This table reports the model parameters used to calibrate the stochastic volatility model of Du et al. (2019), where asset X and variance V follow the following equations,

$$\frac{dX_t}{X_t} = (\mu_X^P - q)dt + \sqrt{V_t}(\rho dW_{2,t} + \sqrt{1-\rho^2}dW_{1,t}), \tag{14}$$

$$dV_t = \kappa(\theta - V_t)dt + \sigma\sqrt{V_t}dW_{2,t}, \tag{15}$$

and the risk-neutral parameters are obtained using the equations $\mu_X^P = r + (\sqrt{1-\rho^2}\lambda_D + \rho\lambda_V)V_t$ and $\kappa^* = \kappa + \sigma\lambda_V$. Based on the model, we calibrate the price of risk parameter λ_V to minimize the pricing error of AAA corporate credit spreads. Then, λ_D is set to match the target long-run Sharpe ratio,

$$SR = (\sqrt{1-\rho^2}\lambda_D + \rho\lambda_V)\sqrt{\theta} = 0.22.$$

Table 5: Top 50 Universities by Equity Value

Rank	Name	Equity value (Million $)	Equity M/B	Credit spread (%)	US News rank
1	Yale University	181,697	4.90	0.70	5
2	Harvard University	171,955	3.20	0.62	3
3	Stanford University	152,672	3.40	0.63	3
4	Massachusetts Institute of Technology	85,377	2.99	0.65	2
5	New York University	74,916	11.73	1.63	35
6	Princeton University	63,852	1.95	0.91	1
7	University of Pennsylvania	57,466	2.89	1.86	6
8	Cornell University	55,422	4.77	0.78	12
9	Emory University	54,630	4.30	1.13	24
10	Columbia University in the City of New York	51,674	2.94	0.86	12
11	University of Southern California	49,358	5.38	0.68	28
12	Duke University	47,996	3.68	1.23	7
13	University of Notre Dame	46,528	2.83	0.73	20
14	Dartmouth College	39,703	5.16	0.64	18
15	University of Chicago	35,503	4.34	2.62	12
16	Northwestern University	30,815	2.16	1.03	9
17	Boston University	27,914	5.83	1.42	43
18	Johns Hopkins University	26,532	2.92	1.68	9
19	University of Pittsburgh-Pittsburgh Campus	25,057	4.51	1.02	67
20	Washington University in St Louis	22,056	1.83	3.16	24
21	Carnegie Mellon University	21,591	5.11	0.72	24
22	University of Rochester	19,614	5.04	2.47	47
23	University of Miami	17,938	5.83	2.51	67
24	Boston College	17,776	4.32	1.35	39
25	Brown University	17,496	2.65	1.21	9
26	University of Delaware	16,526	6.06	0.95	76
27	Thomas Jefferson University	15,418	20.71	2.42	142
28	Georgetown University	15,189	7.98	1.98	22
29	Vanderbilt University	13,840	1.90	1.89	18
30	Northeastern University	13,246	4.60	2.05	53
31	Syracuse University	9,983	3.82	1.27	67
32	Rockefeller University	9,554	3.58	1.90	
33	Southern New Hampshire University	8,975	13.28	0.72	
34	Temple University	8,908	3.42	1.28	89
35	Case Western Reserve University	8,393	3.06	1.55	53
36	Baylor University	7,921	3.21	2.12	93
37	Williams College	7,043	1.93	1.87	
38	Baylor College of Medicine	6,629	4.57	2.64	
39	Wesleyan University	6,066	3.33	0.87	
40	Southern Methodist University	5,965	2.19	1.82	89
41	Drexel University	5,726	4.58	2.43	98
42	Wake Forest University	5,610	3.57	2.02	47
43	Texas Christian University	5,379	2.00	3.35	98
44	Pepperdine University	5,284	3.53	1.19	76
45	Tufts University	5,175	1.79	2.90	40
46	Swarthmore College	5,053	1.90	1.40	
47	St John's University-New York	4,654	4.67	1.95	
48	Midwestern University-Glendale	4,481	3.15	1.32	
49	Pomona College	4,286	1.37	1.12	
50	Nova Southeastern University	4,261	4.27	2.71	

This table presents the top 50 universities by average equity value over the 5-year period from July 2020 to June 2025, which is the last month of our sample period. Equity value is expressed in millions of USD. The US News rank is based on 2024. The sample excludes public universities that are not required to file IRS Form 990.

Table 6: Determinants of Equity Market-to-Book ratio

	Dep. Var = Log(Equity M/B ratio)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Fixed effects and monthly financial market variables							
Asset variance					0.262***		0.260***
					(25.57)		(40.96)
Credit spread						-0.477***	-0.482***
						(-32.27)	(-39.28)
Rating control				✓			✓
University FEs	✓		✓	✓	✓	✓	✓
Time FEs		✓	✓	✓	✓	✓	✓
Adj. R^2	0.653	0.081	0.726	0.729	0.789	0.815	0.882
Obs.	24,961	24,971	24,961	24,961	24,961	24,961	24,961

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel B: Contribution-related variables								
Donation	0.013***		0.197***					
	(6.80)		(3.12)					
Govt grant		-0.051**	-0.078***					
		(-2.93)	(-3.71)					
Contribution				0.012***				
				(5.70)				
Donation growth					0.028***		0.032***	
					(5.64)		(5.75)	
Govt grant growth						-0.002	-0.004	
						(-0.31)	(-0.48)	
Contribution growth								0.034***
								(6.86)
Controls	✓	✓	✓	✓	✓	✓	✓	✓
University FEs	✓	✓	✓	✓	✓	✓	✓	✓
Time FEs	✓	✓	✓	✓	✓	✓	✓	✓
Adj. R^2	0.886	0.880	0.881	0.889	0.888	0.880	0.880	0.890
Obs.	24,308	24,036	23,478	24,935	22,094	22,140	21,110	23,211

Table 6 – continued from the previous page

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Panel C: Income statement-related variables														
Program service	-0.153*						-0.103***							0.028
	(-2.11)						(-3.46)							(0.66)
Tuition		-0.161***		-0.163***										
		(-3.96)		(-3.70)										
Other Program service			0.006	-0.011										
			(0.15)	(-0.33)										
Investment income					0.011***		-0.034							
					(5.09)		(-0.60)							
Income from asset sales						-0.008**	-0.044							
						(-2.24)	(-0.82)							
Revenue growth								0.063***						0.034**
								(3.80)						(2.37)
Salary total									-0.125**					-0.094***
									(-2.34)					(-5.09)
Salary faculty										-0.172*		-0.521		
										(-1.82)		(-1.22)		
Salary non-faculty											-0.106***	0.343		
											(-3.04)	(0.99)		
ROE													0.164***	0.246**
													(15.83)	(2.44)
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
University FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Time FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Adj. R^2	0.885	0.879	0.875	0.879	0.889	0.882	0.890	0.893	0.880	0.884	0.880	0.883	0.899	0.897
Obs.	24,961	21,724	21,724	21,724	24,949	24,816	24,804	23,347	22,895	24,723	22,858	22,858	24,961	21,315

Table 6 – continued from the previous page

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
					Panel D: Balance sheet-related variables					
Log(Assets)	0.440									
	(1.35)									
Log(Liabilities)		1.206***			1.441***					1.232***
		(14.77)			(27.56)					(14.79)
Log(Endowment)			-0.486***		-0.763***					
			(-3.84)		(-8.61)					
CAPEX				-0.494***	-0.584***					
				(-5.58)	(-24.81)					
Asset growth						0.056***			-0.009	
						(3.33)			(-0.36)	
Liability growth							0.049***		0.046***	-0.015
							(5.47)		(3.80)	(-1.42)
Endowment growth								0.045***	0.033***	
								(3.58)	(3.67)	
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
University FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Time FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Adj. R^2	0.883	0.905	0.890	0.893	0.932	0.890	0.891	0.888	0.889	0.911
Obs.	24,961	24,961	23,354	24,961	23,354	23,347	23,335	21,686	21,686	23,335

Table 6 – continued from the previous page

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel E: University characteristics										
Student-to-faculty	-0.004									
	(-0.32)									
% of student loan		0.091								
		(1.47)								
Loan-to-tuition			0.207							
			(1.54)							
Rank				-0.101						
				(-1.67)						
Not ranked				0.131						
				(0.85)						
Football rank					-0.008					
					(-0.56)					
Football not ranked					0.097					
					(1.30)					
% of international students						0.122**				0.092*
						(2.27)				(1.82)
% of tenured faculty							0.012			
							(0.41)			
Enrollment/Admission								-0.004		
								(-0.10)		
Admission/Application								-0.186**		-0.168**
								(-2.45)		(-2.60)
SAT verbal 75th									-0.098	
									(-1.62)	
SAT math 75th									0.214	
									(1.63)	
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Time FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
University FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Adj. R^2	0.883	0.879	0.881	0.883	0.882	0.882	0.883	0.887	0.885	0.887
Obs.	22,857	22,364	22,758	24,961	24,961	24,723	22,857	23,688	20,038	23,688

Table 6 – continued from the previous page

	(1)	(2)	(3)	(4)	(5)
	Panel F: Horse-race regression				
Donation	0.197***				-0.125*
	(3.12)				(-2.06)
					[0.44]
Govt grant	-0.078***				0.013
	(-3.71)				(0.54)
					[0.33]
ROE		0.164***			0.317***
		(15.83)			(9.92)
					[3.21]
Log(Liabilities)			1.206***		1.050***
			(14.77)		(16.80)
					[46.01]
Admission/Application				-0.184**	-0.022
				(-2.70)	(-0.71)
					[0.16]
Controls	✓	✓	✓	✓	✓
Time FEs	✓	✓	✓	✓	✓
University FEs	✓	✓	✓	✓	✓
Adj. R^2	0.881	0.899	0.905	0.887	0.915
Obs.	23,478	24,961	24,961	23,688	22,348

This table presents the determinants of the equity market-to-book ratio. *Asset variance*: model-implied asset variance, *credit spread*: credit spread, where the Treasury yield data is from Gürkaynak et al. (2006). *Rating*: a numeric credit rating converted from letter grades. *Donation*: the sum of all other contributions, gifts, grants, and similar amounts and noncash contributions, divided by total revenue. *Govt grant*: Government grants divided by total revenue. *Contribution*: Total contributions divided by total revenue. *'variable' growth* is the log growth of the variable. *Controls*: asset variance, credit spread, rating controls. *Program service*: Program service revenue total divided by total revenue. *Investment income*: Investment income divided by total revenue. *Income from asset sales*: Net income from sales of assets divided by total revenue. *Tuition*: Tuition and fees, after deducting discounts and allowances divided by total revenue. *Salary total*: total salary divided by total expenses. *Salary faculty*: Salary outlays of full-time instructional faculty divided by total expenses. *Gross profit*: Total revenue minus total expenses divided by total revenue. *ROA*: Total revenue minus total expenses divided by total assets. *ROE*: Total revenue minus total expenses divided by total book value of equity, which is total assets minus total liabilities. *Assets*: Total book value of assets. *Liabilities*: Total book value of liabilities. *Endowment*: the sum of Investments—publicly traded securities and Investments—other securities divided by total revenue. *CAPEX*: Land, buildings, and equipment, net at the end of the year minus Land, buildings, and equipment, net at the beginning of the year plus depreciation, depletion, and amortization divided by total assets. *Student-to-faculty*: The ratio of the total

number of students to the total number of faculty. *% of student loan*: The percent of undergraduate students awarded federal student loans *Loan-to-tuition*: The ratio of the total amount of federal student loans awarded to undergraduate students to tuition and fees, after deducting discounts and allowances. *Rank*: US NEWS rank. A higher value indicates a better rank. *Not ranked*: an indicator for the rank variable being missing. *% of international students*: Percentage of international students in the total number of students. *% of tenured faculty*: Percentage of tenured faculty members in the total number of faculty. *Enrollment/Admission*: The ratio of the number of enrolled students to the number of admitted students. *Admission/Application*: The ratio of the number of admitted students to the number of applicants. *SAT verbal 75th*: SAT verbal 75th percentile score. *SAT math 75th*: SAT Math 75th percentile score. All explanatory variables, except for *Not ranked*, are standardized to have a mean of zero and a standard deviation of one. Control variables include asset variance, credit spreads, and dummies for credit ratings. t-statistics based on standard errors are in parentheses. In Panel A, standard errors are clustered by university. From Panels B to E, standard errors are clustered by university and year, because explanatory variables are yearly frequency, while the M/B ratio is monthly frequency. Values in square brackets in Column (5) of Panel F denote the variance decomposition in percentage terms, defined as $\beta_x \frac{cov(y,x)}{var(y)}$ where β_x is an OLS coefficient for a variable x from the regression in column (5). ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7: Determinants of Equity Market-to-Book ratio without University Fixed Effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Student-to-faculty	0.112													
	(1.70)													
% of student loan		0.027												
		(0.58)												
Loan-to-tuition			0.198*											0.245*
			(2.09)											(1.79)
Rank				-0.005										
				(-0.12)										
Not ranked				-0.200										
				(-1.63)										
Football rank					-0.064**									
					(-2.16)									
Football not ranked					0.124									
					(0.92)									
% of international students						0.041								
						(0.90)								
% of tenured faculty							-0.199***							-0.073*
							(-5.83)							(-1.79)
Enrollment/Admission								0.249**						0.138*
								(2.62)						(1.84)
Admission/Application								0.272***						0.119
								(3.05)						(1.49)
Metropolitan area									0.180					
									(0.66)					
Medical degree offer										0.471***				0.263**
										(5.62)				(2.42)
PhD degree offer											0.528***			0.499***
											(6.71)			(4.67)
Religious institution												-0.234***		-0.267***
												(-3.00)		(-3.09)
SAT verbal 75th													-0.291**	-0.060
													(-2.43)	(-0.58)
SAT math 75th													0.062	
													(0.44)	
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Time FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Adj. R^2	0.342	0.318	0.352	0.331	0.325	0.330	0.371	0.384	0.332	0.371	0.392	0.342	0.359	0.507
Obs.	22,872	22,375	22,769	24,971	24,971	24,734	22,872	23,698	24,734	24,734	24,734	24,734	20,046	17,033

This table presents the determinants of the equity market-to-book ratio without university fixed effects. *Student-to-faculty*: The ratio of the total number of students to the total number of faculty. *% of student loan*: The percent of undergraduate students awarded federal student loans *Loan-to-tuition*: The ratio of the total amount of federal student loans awarded to undergraduate students to tuition and fees, after deducting discounts and allowances. *Rank*: US NEWS rank. A higher value indicates a better rank. *Not ranked*: an indicator for the rank variable being missing. *% of international students*: Percentage of international students in the total number of students. *% of tenured faculty*: Percentage of tenured faculty members in the total number of faculty. *Enrollment/Admission*: The ratio of the number of enrolled students to the number of admitted students. *Admission/Application*: The ratio of the number of admitted students to the number of applicants. *SAT verbal 75th*: SAT verbal 75th percentile score. *SAT math 75th*: SAT Math 75th percentile score. All explanatory variables, except for *Not ranked*, are standardized to have a mean of zero and a standard deviation of one. Control variables include asset variance, credit spreads, and dummies for credit ratings. t-statistics based on standard errors, clustered by university and year, are in parentheses. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 8: Federal Research Funding Freezes and Endowment Tax Proposals on Top Universities in March 2025

	(1)	(2)	(3)	(4)	(5)	(6)
			Log(Equity market)			
Post×Treat	-0.112***	-0.080***	-0.054**	-0.078***	-0.078***	-0.065**
	(-3.84)	(-2.75)	(-2.00)	(-2.65)	(-2.61)	(-2.38)
Post×Treat×Ivy League		-0.257***				
		(-4.56)				
Post×Treat×High endowment			-0.247***			
			(-4.30)			
Post×Treat×High Gov't grant share				-0.187***		
				(-2.99)		
Post×Treat×High tuition					-0.156***	
					(-2.63)	
Post×Treat×High international student						-0.224***
						(-3.46)
University controls	✓	✓	✓	✓	✓	✓
University FEs	✓	✓	✓	✓	✓	✓
Year-month FEs	✓	✓	✓	✓	✓	✓
Adj. R^2	0.991	0.992	0.992	0.992	0.992	0.992
Obs.	1,174	1,174	1,174	1,174	1,174	1,174

The dependent variable is the log of equity market value. The sample period is from November 2024 to June 2025. *Post* is an indicator taking one from March 2025. *Treat* is the treatment group, which are universities in the top quintile of average total revenue over the 2011-2024 period. *Ivy League* denotes the eight Ivy League institutions. *High endowment* denotes universities in the top decile of endowment size, where endowment is the sum of Investments—publicly traded securities and Investments—other securities. *High Gov't grant share* denotes universities in the top decile of the share of government grants in total revenue. *High tuition* denotes universities in the top decile of the total tuition. *High international student* denotes universities in the top decile of the share of international students. The university characteristics used for the triple DiD are based on information available to investors in 2024. Control variables include asset variance, credit spreads, and dummies for credit ratings. t-statistics based on standard errors clustered by university are in parentheses. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 9: Federal Student Loan Payment Pause in March 2020

	(1)	(2)	(3)	(4)
	Log(Equity market)			
Post×High loan share	0.147***		0.117***	
	(4.40)		(3.36)	
Post×High loan-to-tuition		0.109***		0.118***
		(2.90)		(3.14)
Post×High loan share×Low revenue school			0.194**	
			(2.22)	
Post×High loan-to-tuition×Low revenue school				-0.035
				(-0.37)
University controls	✓	✓	✓	✓
University FEs	✓	✓	✓	✓
Year-month FEs	✓	✓	✓	✓
Adj. R^2	0.990	0.990	0.990	0.990
Obs.	1,250	1,250	1,250	1,250

The dependent variable is the log of equity market value. The sample period is from November 2019 to June 2020. *Post* is an indicator taking one from March 2020. *High loan share* denotes universities in the top quartile of the percent of undergraduate students awarded federal student loans. *High loan-to-tuition* denotes universities in the top quartile of the ratio of the total amount of federal student loans awarded to undergraduate students to tuition and fees, after deducting discounts and allowances. *Low revenue school* denotes universities in the bottom decile of total revenue available to investors in 2019. The university characteristics used to define the treatment group and variables for the triple DiD tests are based on information available to investors in 2019. Control variables include asset variance, credit spreads, and dummies for credit ratings. t-statistics based on standard errors clustered by university are in parentheses. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 10: Visa Scrutiny and Deportations of Chinese International Students in April 2024

	(1)	(2)	(3)	(4)
		Log(Equity market)		
Post×High Foreign Asian student	-0.196***	-0.202***	-0.179***	-0.106*
	(-4.70)	(-4.15)	(-3.13)	(-1.78)
Post×High Foreign Asian student×High Foreign Asian faculty		0.033		
		(0.52)		
Post×High Foreign Asian student×High Government grant share			-0.040	
			(-0.54)	
Post×High Foreign Asian student×High assets				-0.149**
				(-2.01)
University controls	✓	✓	✓	✓
University FEs	✓	✓	✓	✓
Year-month FEs	✓	✓	✓	✓
Adj. R^2	0.987	0.987	0.987	0.987
Obs.	1,281	1,281	1,281	1,281

The dependent variable is the log of equity market value. The sample period is from December 2023 to July 2024. *Post* is an indicator taking one from April 2024. *High Foreign Asian student* denotes universities in the top quartile of the share of international students and in the top quartile of the share of Asian students (15% of the sample). *High Foreign Asian faculty* denotes universities in the top quartile of the share of foreign faculty members and in the top quartile of the share of Asian faculty members (5% of the sample). *High Gov't grant share* denotes universities in the top decile of the share of government grants in total revenue. *High assets* denotes universities in the top decile of the amount of total assets. *High revenues* denotes universities in the top decile of the amount of total revenues. The university characteristics used to define the treatment group and variables for the triple DiD tests are based on information available to investors in 2023. Control variables include asset variance, credit spreads, and dummies for credit ratings. t-statistics based on standard errors clustered by university are in parentheses. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.

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I Stochastic Volatility Model and Aaa Corporate Credit Spreads

In this section, we calibrate the stochastic volatility model of Du et al. (2019) to the Aaa-rated U.S. corporate bonds. The goal of this exercise is to recalibrate their model specifically to price the long-term Aaa-rated securities to ensure that the model-implied stock price is reliable.

In our calibration, we tie our hands by mostly using the parameters of Du et al. (2019) except the default boundary parameter X_D and the price of risk parameters, λ_V and λ_D. We recalibrate these to maximize the fit to the two Aaa corporate credit during our sample period: Microsoft and Johnson & Johnson. The calibration consists of two steps. First, we calibrate the optimal value of X_D that minimizes the distance between the model's default probability under the physical measure and Moody's historical default probability for Aaa-rated borrowers. Second, we calibrate the price of risk parameters λ_V and λ_D to minimize the pricing errors of long-term corporate bonds issued by these two firms, while keeping the asset's Sharpe ratio constant.

For this exercise, we obtain the corporate bond data from the ICE BofA Merrill Lynch database and narrow our sample to industrial bonds that are rated AAA, which are Microsoft and Johnson and Johnson. We use CRSP to compute the equity volatility using the daily return over the 3-year rolling window, and we use Compustat to obtain the data on the borrowers' debt and payout rate following the definition of Feldhütter and Schaefer (2018). The sample is monthly from January 2018 to January 2023, where the end of the sample is determined by the availability of the ICE data.

Table A7 reports the summary statistics of the merged panel data. Overall, we have 3,407 bond-month observations for 77 bonds issued by the two firms. These bonds have a long time to maturity, with an average of 15.6 years. As expected for their AAA ratings, these borrowers have low leverage: on average, their debt is only 7.1% of their assets.

First, we search for the optimal value of X_D that minimizes the distance in probability of default between the model and the data. Following Feldhütter and Schaefer (2018), we numerically find

the optimal value to minimize the error,

$$\min_{X_D} \sum_{\tau=1}^{20} (PD_\tau^{Model}(\bar{F}, \bar{V}, \bar{q}, \bar{r}, X_D) - PD_\tau^{Moody's})^2, \tag{16}$$

where $PD_\tau^{Moody's}$ is the τ-year cumulative probability of default published by Moody's for the period from 1920 to 2020. In our sample, we find the optimal value of X_D, which is 1.09. Table A8 reports the fitted probability of default compared with the data.

Second, we calibrate the model to match the credit spreads in the data. Since bonds issued by universities are effectively medium-term bonds with an effective maturity of less than 10 years, we focus on the category of bonds with a maturity of less than 10 years. Specifically, we search for the optimal value of λ_V and λ_D that solve the following problem,

$$\min_{\lambda_V, \lambda_D} \sum_t \sum_{i \in G_t} (s^{Model}(F_{it}, V_{it}, q_{it}, r_{it}, X_D^*) - s_{it})^2, \tag{17}$$

$$s.t. \quad SR = (\sqrt{1-\rho^2}\lambda_D + \rho\lambda_V)\sqrt{\theta} = 0.22. \tag{18}$$

We restrict the long-run asset Sharpe ratio to 0.22, the benchmark value used in Du et al. (2019). We find that the optimal value is $\lambda_D = -0.355$ and $\lambda_V = -7.400$. Table A9 reports the resulting fit of the model. In the data, the average model credit spread is 25 bps, while that of the data is 28 bps, and the difference is statistically insignificant.

To verify the soundness of our approach, we compute the model's equity value calculated using (6) scaled by the issuer's book equity, and compare the ratio with the data. Figure A11 shows that the values line up along the 45-degree lines, implying that the model is consistent with a wide range of the market-to-book ratio.

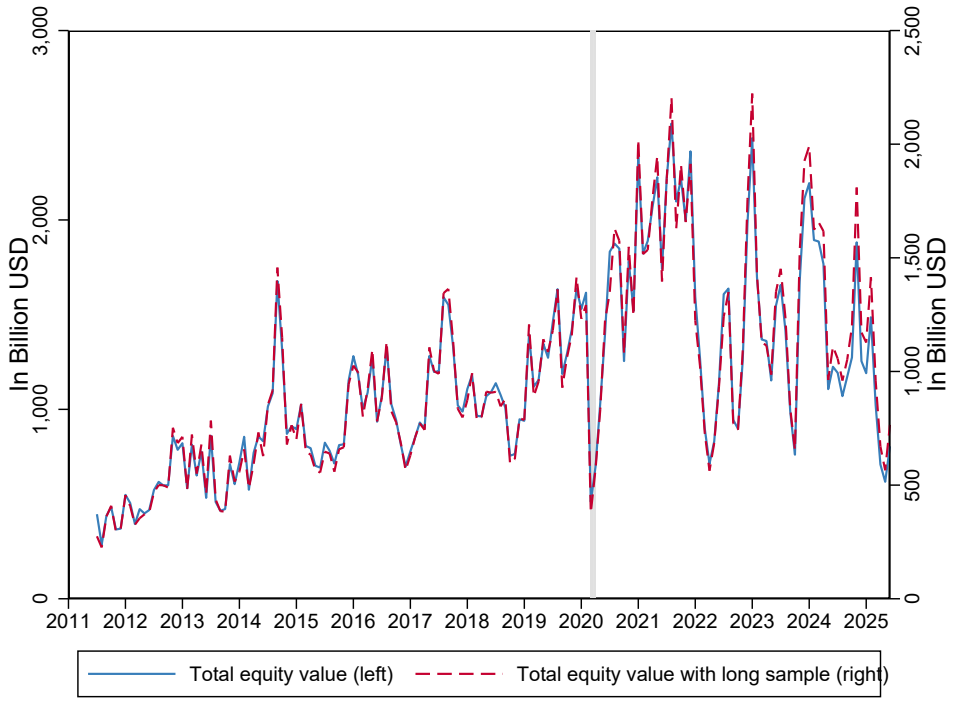


Figure A1: Total Equity value of Universities and Universities that always stay in the sample in Billion USD

This figure plots the total equity value of universities and the total equity value of universities with a long sample period (defined as universities with observations in both 2011 and 2025). The total equity value of universities (with long sample) is calculated by summing the equity values across all universities (with long sample) in our sample for each month. The shaded area denotes the NBER recession from March 2020 to April 2020. The sample period is from July 2011 to June 2025.

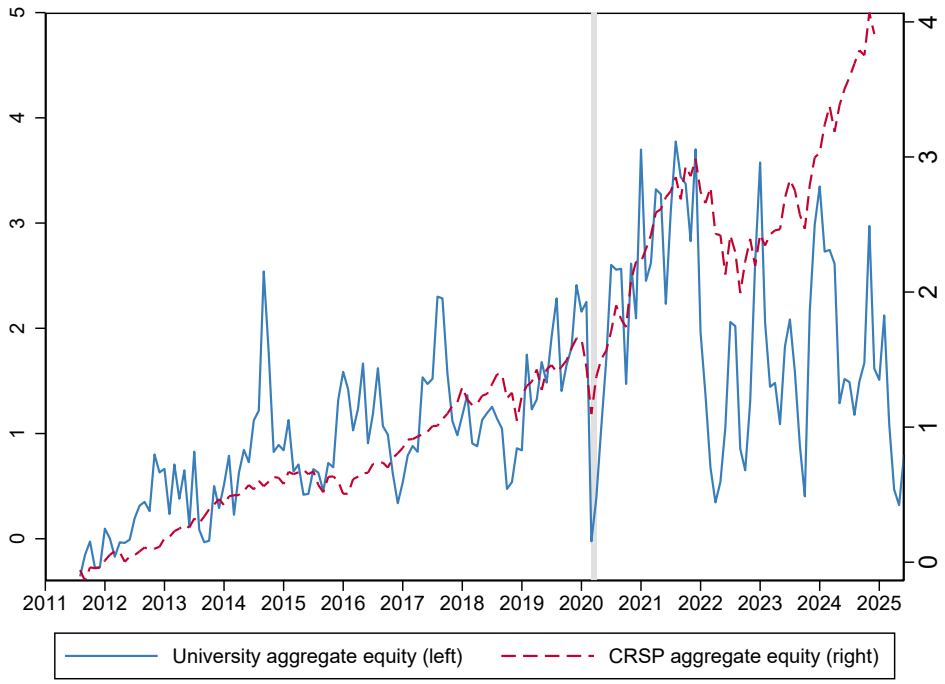


Figure A2: Cumulative returns of Total Equity value of Universities and CRSP equity index

This figure plots the cumulative value-weighted returns of individual university equity returns and the cumulative returns of the CRSP value-weighted index, including distributions from NYSE/NASDAQ/AMEX. The shaded area denotes the NBER recession from March 2020 to April 2020. The sample period is from July 2011 to June 2025.

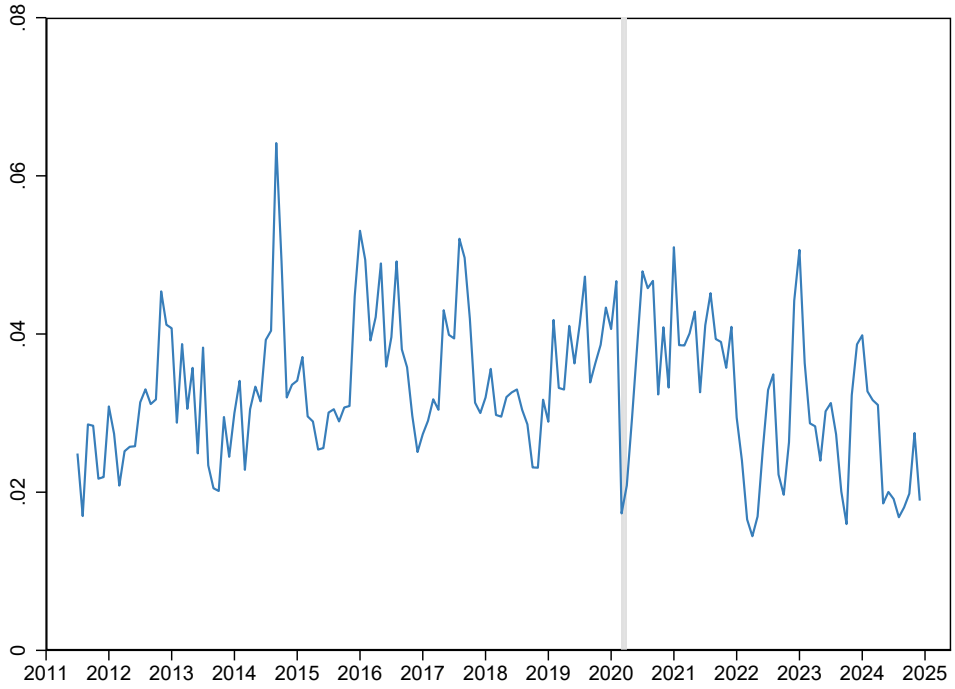


Figure A3: Ratio of total equity value of universities to CRSP total market capitalization

This figure plots the ratio of the total equity value of universities to the total market capitalization of the CRSP equity universe from NYSE/NASDAQ/AMEX from July 2011 to June 2025. The shaded area denotes the NBER recession from March 2020 to April 2020.

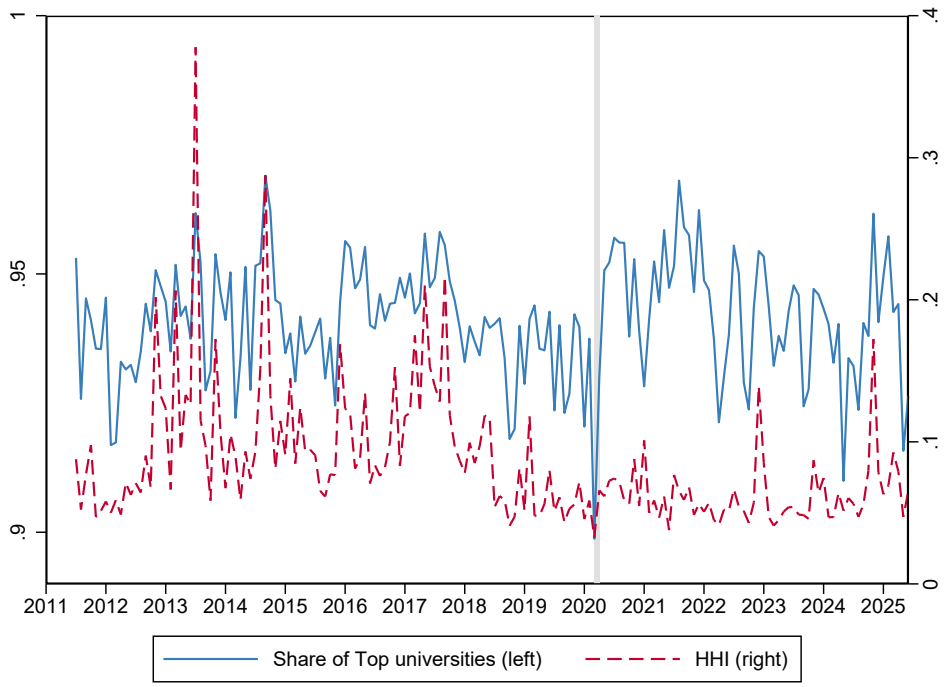


Figure A4: The Share of Top Universities and HHI of equity share

This figure plots the share of the top universities in the total equity value of universities and the Herfindahl-Hirschman Index of university equity value share. The top universities are defined as universities in the top quintile of average total revenue over the 2011-2024 period. The shaded area denotes the NBER recession from March 2020 to April 2020.

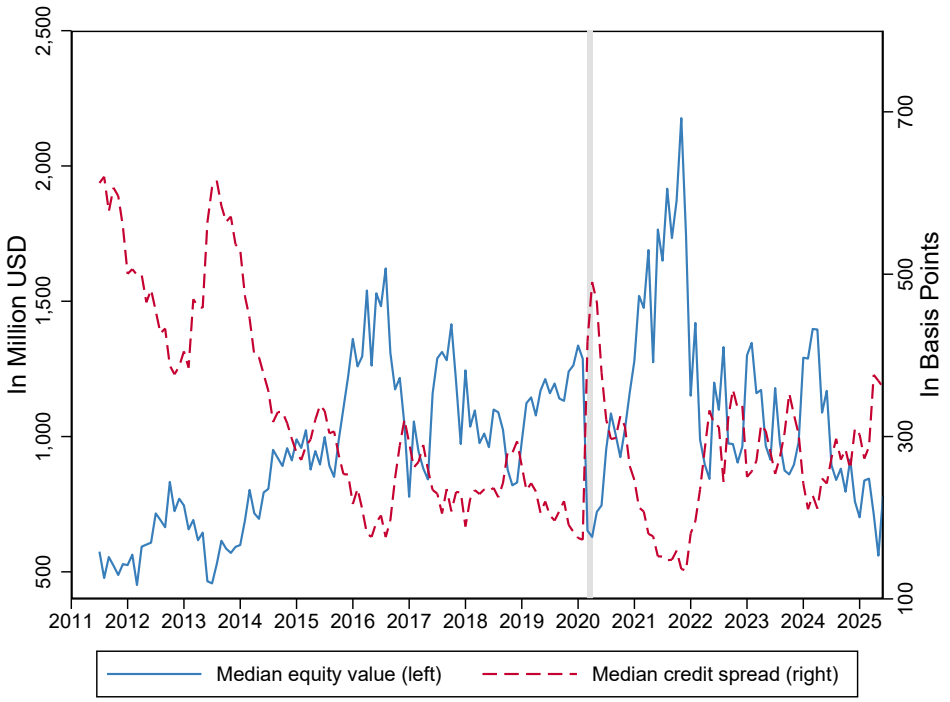


Figure A5: Median Equity value

This figure plots the median equity value of universities in million USD and the median credit spread from July 2011 to June 2025. The median equity value (credit spread) is calculated as the cross-sectional median of equity values (credit spreads) across all universities for each month. The shaded area denotes the NBER recession from March 2020 to April 2020.

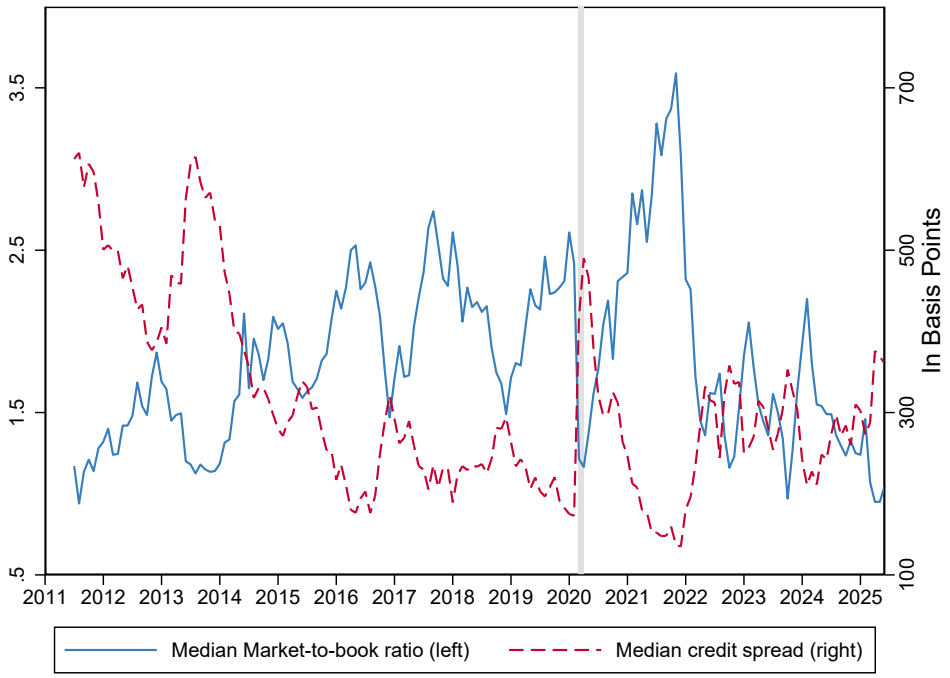


Figure A6: Median Equity Market-to-Book Ratio

This figure plots the median equity market-to-book ratio of universities and the median credit spread from July 2011 to June 2025. The median market-to-book ratio (credit spread) is calculated as the cross-sectional median of market-to-book ratios (credit spreads) across all universities for each month. The shaded area denotes the NBER recession from March 2020 to April 2020.

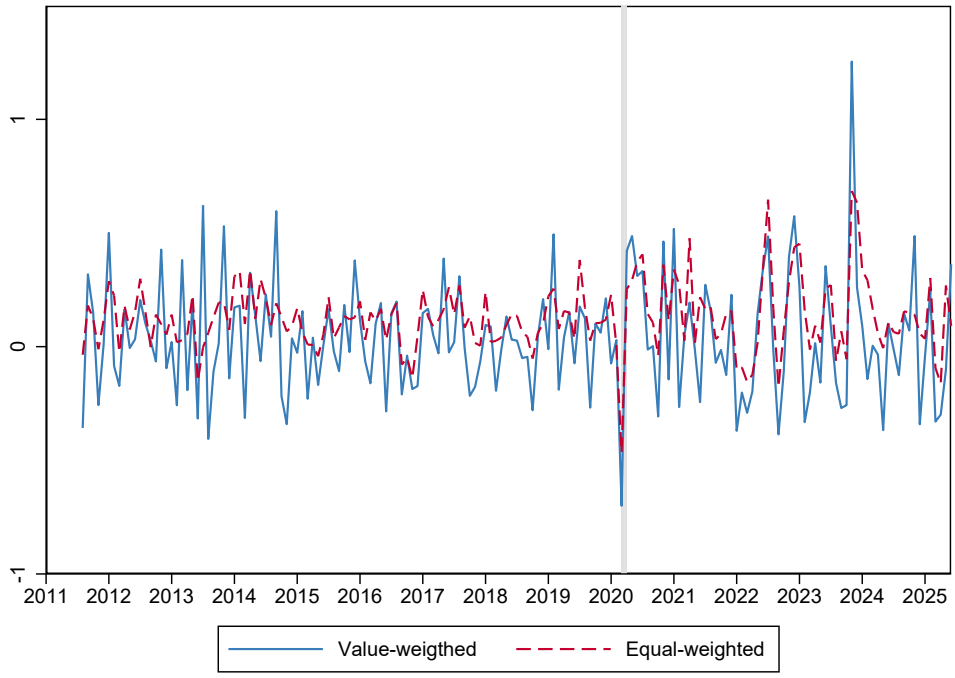


Figure A7: Aggregate Equity Returns of Universities

This figure plots the value- and equal-weighted mean of individual university equity returns. For the value-weighted mean, each university's return is weighted by its equity value from the previous month. The shaded area denotes the NBER recession from March 2020 to April 2020.

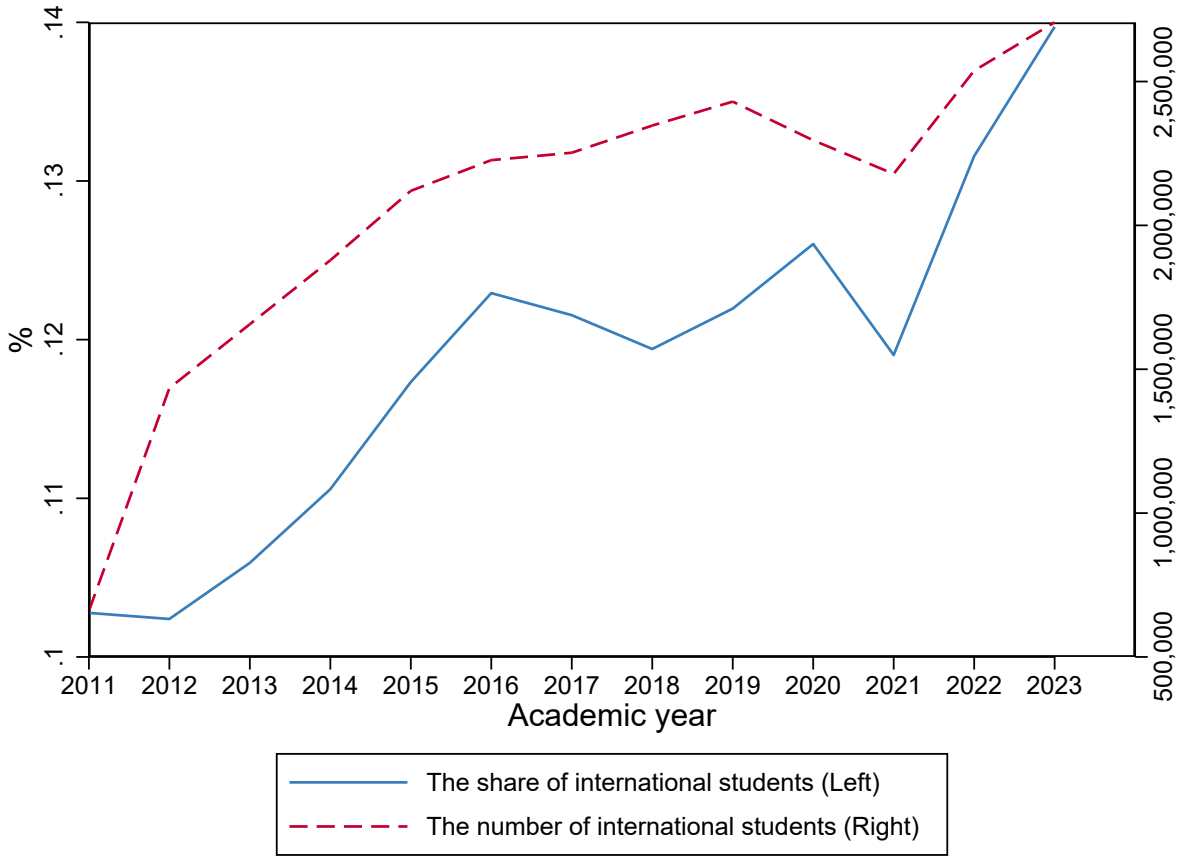


Figure A8: Percentage and Number of International Students

This figure plots the share of international students (Left) and the number of international students (Right) in our sample from the 2011 academic year to the 2023 academic year.

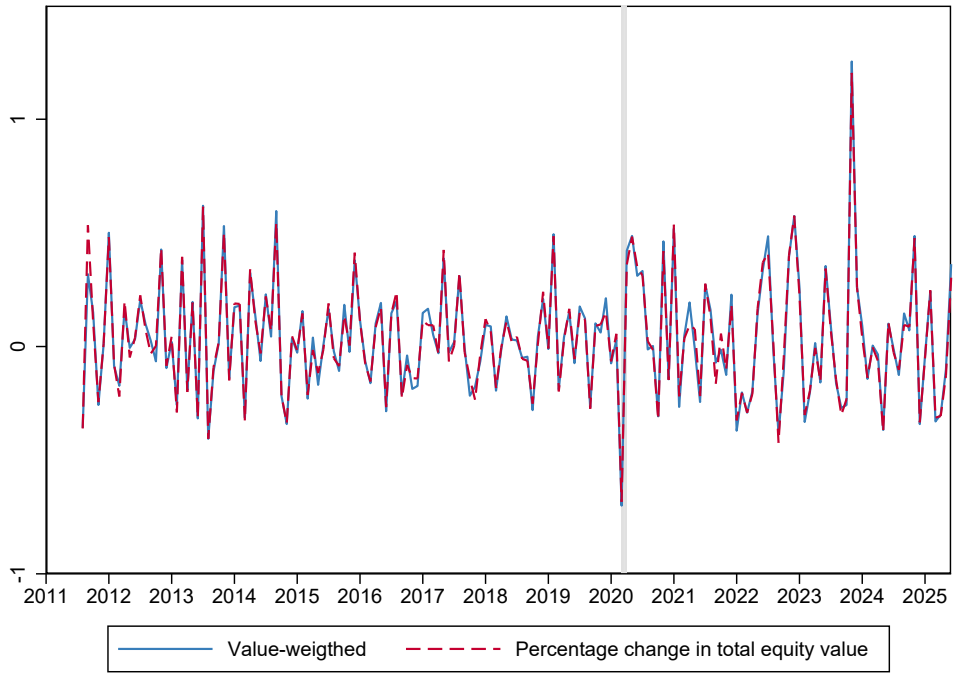


Figure A9: Aggregate Equity Returns of Universities by imposing non-missing values for the two consecutive months

This figure plots the value-weighted mean of individual university equity returns and the percentage change in the total equity value of universities from July 2011 to June 2025. For the value-weighted mean, each university's return is weighted by its equity value from the previous month. The shaded area denotes the NBER recession from March 2020 to April 2020.

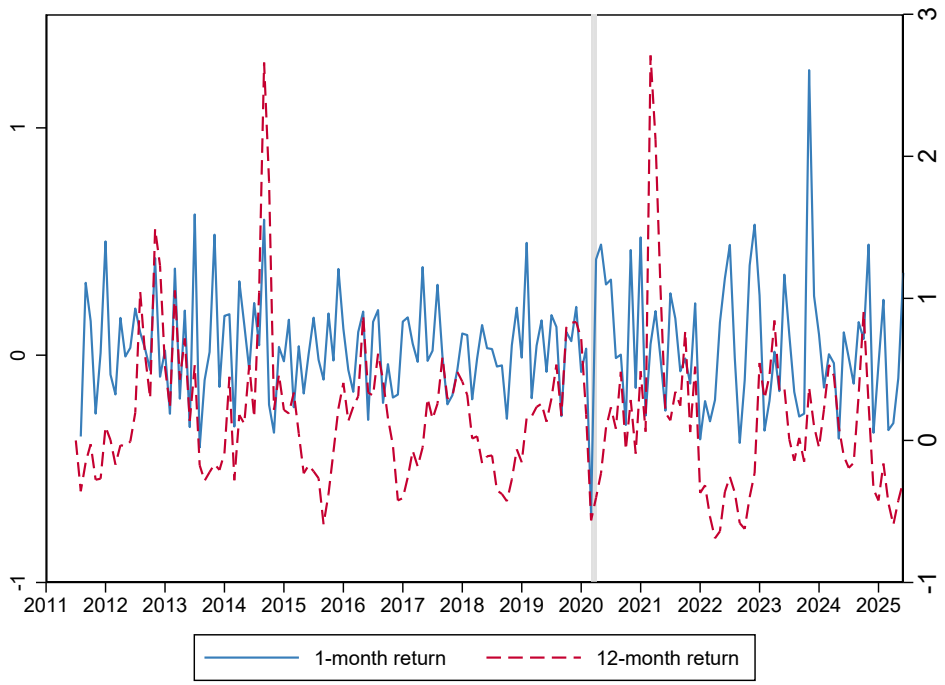
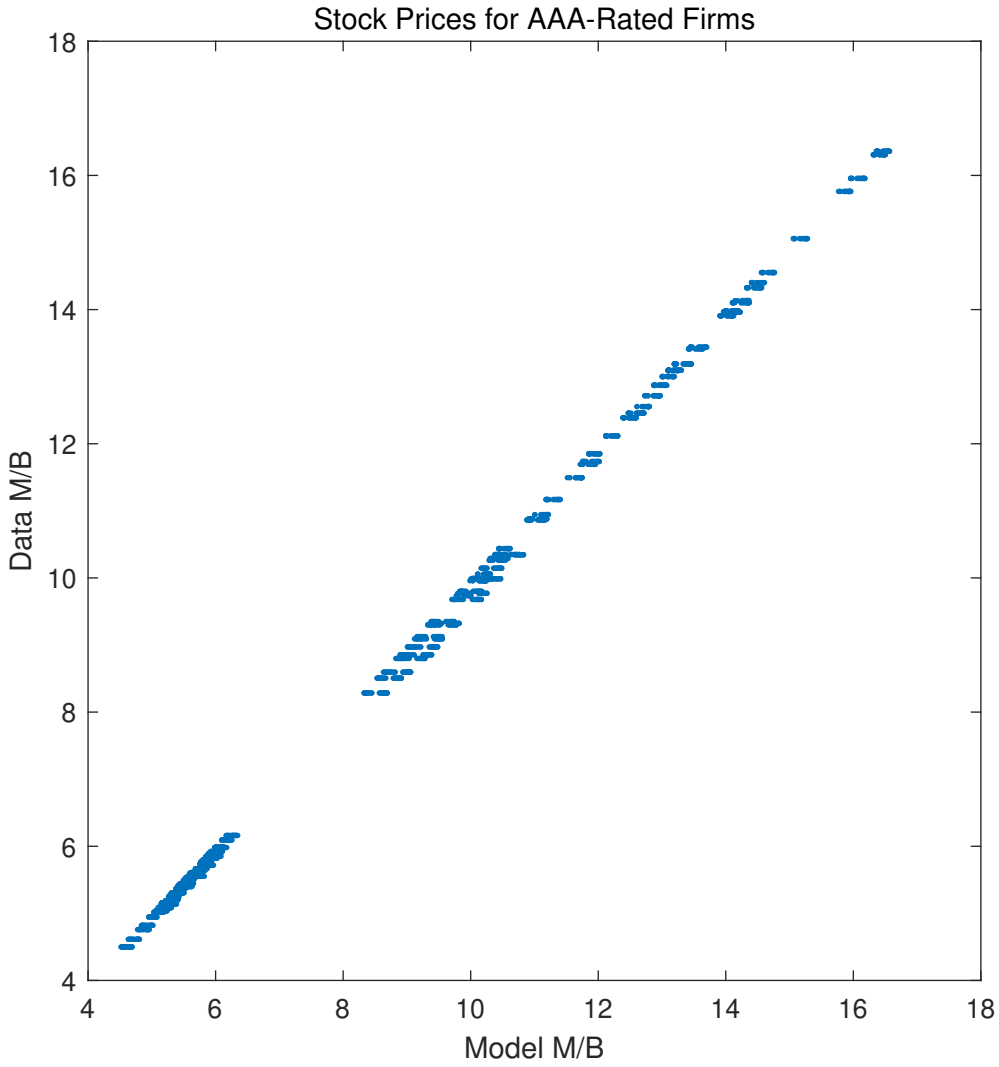


Figure A10: Aggregate 1-month and 12-month Universities Equity Returns

This figure plots the 1-month and 12-month value-weighted mean of individual university equity returns from July 2011 to June 2025. For the value-weighted mean, each university's return is weighted by its equity value from the previous month. The shaded area denotes the NBER recession from March 2020 to April 2020.

Figure A11: Equity Market-to-Book Ratio of Aaa-Rated Bond Issuers



This figure plots the equity market-to-book ratios of the AAA corporate bond issuers in the data and the stochastic volatility model by maturity categories.

Table A1: Steps to Cleaning Data

Step	EINs	Issues	CUSIPs	Trades	Trading days	Trading months	Months
				Bond level			Entity level
University bond list	777	4,619	41,881				
MSRB merged with university bond list	760	4,157	32,671	4,299,970	1,627,721	580,391	94,083
Remove trades without fundamental price	738	3,889	28,899	3,473,155	987,806	454,560	84,807
Remove observations without coupon_f	612	2,908	27,881	3,122,817	886,159	427,722	78,902
Remove coupon_code_c = "ADJ", "VAR", "FAR"	612	2,902	27,873	3,122,037	885,893	427,617	78,860
Remove bonds with the observations < 10	542	2,294	12,324	2,859,162	803,275	369,566	72,139
Remove bonds with credit spread $=< 0$ or > 10	533	2,233	12,057	2,431,398	668,761	304,115	62,228
Remove bonds with maturity outside the bandwidth	528	2,170	11,752	1,406,919	429,391	203,617	51,463
Remove missing values of key variables	416	1,402	4,991	753,637	223,300	78,050	25,294
Final sample after interpolation	416	1,402	4,991	753,637	223,300	78,050	25,183

This table presents the number of observations for each data cleaning step. EINs denotes the number of distinct EINs (Employer Identification Number). Issues denotes the number of distinct issues. CUSIPs denotes the number of distinct CUSIPs. Bond-level columns report the number of trades, trading days, and trading months at the bond level. Entity-level months denote the number of distinct months for each EIN.

Table A2: Summary Statistics for IRS Form 990 variables

	N	Mean	SD	Min	p1	p10	p50	p90	p99	Max
Panel A: Key income and balance sheet variables										
Revenue	3,121	677.6	1,333.2	0.0	6.1	63.6	209.2	1,666.1	6,654.8	11,078.6
Expenses	3,121	609.1	1,174.3	0.1	4.9	63.9	191.5	1,489.5	5,826.8	10,094.8
Profit	3,121	68.6	241.8	-1,383.3	-82.2	-5.4	10.3	144.2	1,075.5	3,796.9
Assets	3,121	2,563.5	6,966.1	0.3	37.5	145.3	599.9	4,849.0	39,065.8	75,287.5
Liabilities	3,121	693.7	1,875.4	0.0	17.2	51.4	172.4	1,578.8	8,280.8	35,024.4
Panel B: Total revenue breakdown										
Contributions	3,106	139.1	354.9	0.0	0.3	4.9	20.7	407.0	1,872.4	3,487.4
Program service	3,121	435.3	805.0	0.0	0.3	46.1	154.8	1,030.0	4,186.7	8,229.6
Investment income	3,120	23.9	129.4	-258.1	0.0	0.5	3.6	48.3	366.2	3,835.9
Income From Invest Bond Proceeds	2,492	0.1	0.5	-1.2	0.0	0.0	0.0	0.1	2.1	12.6
Royalties Revenue	2,563	4.8	32.8	0.0	0.0	0.0	0.0	7.9	85.6	1,261.0
Net Rental Income Or Loss	2,764	2.2	12.6	-38.3	-1.3	0.0	0.1	3.1	38.2	211.5
Net Gain Or Loss From Sales of Assets	3,095	68.9	276.8	-952.3	-8.5	-0.1	6.0	119.6	1,407.1	5,042.3
Net Income From Fundraising Events	2,757	-0.1	0.3	-4.2	-1.1	-0.3	0.0	0.0	0.6	2.9
Net Income From Gaming	2,199	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2
Net Income From inventory sales	2,336	0.7	3.5	-3.8	-0.1	0.0	0.0	1.0	11.9	47.3
Other miscellaneous revenue	2,956	7.1	43.0	-51.0	-3.4	0.0	0.8	10.8	84.4	750.0
Panel C: Total contributions breakdown										
Federated campaigns	1,053	0.1	0.3	0.0	0.0	0.0	0.0	0.1	1.4	4.4
Membership dues	959	0.1	1.0	0.0	0.0	0.0	0.0	0.1	3.3	17.5
Fundraising events	2,415	0.7	2.5	0.0	0.0	0.0	0.1	1.6	8.3	95.1
Related organizations	1,312	4.6	21.8	0.0	0.0	0.0	0.0	7.0	109.8	393.1
Government grants	2,968	69.7	195.4	0.0	0.0	0.7	4.0	219.5	1,037.0	1,772.0
All other contributions	3,103	70.4	177.9	-1.2	0.1	2.8	14.5	179.4	848.2	2,494.9
Noncash contributions	3,016	9.9	40.6	0.0	0.0	0.1	1.4	21.2	144.8	1,608.0
Panel D: Total assets breakdown										
Cash	2,836	18.3	81.6	-58.4	0.0	0.0	0.6	36.1	281.4	1,534.8
Savings	3,018	97.5	253.2	0.0	0.0	1.0	23.8	201.6	1,278.9	3,205.3
Pledges and grants receivable	3,056	74.9	212.9	0.0	0.0	1.3	11.7	181.9	998.8	2,745.5
Net accounts receivable	3,089	38.7	111.3	0.0	0.0	0.6	3.8	90.9	556.9	1,308.1
Loans and other receivables	2,229	0.4	1.4	0.0	0.0	0.0	0.0	0.8	7.7	17.9
Loans and other receivables from other disqualified persons	1,975	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	8.2
Notes and loans receivable	2,811	19.3	68.5	0.0	0.0	0.0	3.1	42.1	379.3	1,119.8
Inventories for sale or use	2,689	1.9	5.9	0.0	0.0	0.0	0.3	3.5	34.6	67.4
Prepaid expenses and deferred charges	3,067	11.3	41.9	0.0	0.0	0.3	2.3	18.4	178.5	1,182.0
Land, buildings, and equipment	3,121	596.5	1,086.4	0.0	2.8	68.7	223.3	1,431.6	5,739.9	9,037.6
Investments—publicly traded securities	3,023	552.7	2,201.0	0.0	0.0	19.4	131.5	949.0	6,027.8	35,816.9

Table A2 – continued from the previous page

	N	Mean	SD	Min	p1	p10	p50	p90	p99	Max
Investments—other securities	2,996	1,137.8	3,792.5	-0.4	0.0	0.9	109.4	2,063.8	22,331.8	39,503.7
Investments—program-related	2,226	10.5	61.7	-9.2	0.0	0.0	0.0	21.8	120.5	1,485.3
Intangible assets	1,927	0.9	8.2	0.0	0.0	0.0	0.0	0.0	31.5	165.8
Other assets	3,028	82.1	540.5	0.0	0.0	0.1	7.4	126.2	883.5	16,255.4
Panel E: Total liabilities breakdown										
Accounts payable and accrued expenses	3,120	85.5	227.1	0.0	0.2	3.8	17.2	218.3	1,211.9	3,705.2
Grants payable	1,926	2.4	10.4	0.0	0.0	0.0	0.0	4.9	61.2	123.6
Deferred revenue	3,014	40.4	124.9	0.0	0.0	0.8	6.9	89.4	563.8	1,840.7
Tax-exempt bond liabilities	3,066	272.6	464.1	0.0	3.9	35.2	110.9	648.2	2,657.1	3,705.2
Escrow or custodial account liability	1,942	4.5	39.5	-0.4	0.0	0.0	0.0	2.8	56.6	623.0
Loans and other payables	1,818	0.3	2.9	0.0	0.0	0.0	0.0	0.0	10.6	40.0
Secured mortgages and notes	2,711	65.6	325.4	0.0	0.0	0.0	1.3	70.0	2,270.6	3,798.7
Unsecured notes and loans	2,137	98.7	370.8	0.0	0.0	0.0	0.0	176.1	2,174.6	3,984.2
Other liabilities	3,100	186.0	1,092.9	0.0	0.0	1.3	15.7	354.1	3,022.3	28,724.4

The sample is at the tax year-EIN level. The values are in million USD.

Table A3: Summary Statistics for IRS Form 990 variables as a percentage of revenue, contributions, assets, and liabilities

	N	Mean	SD	Min	p1	p10	p50	p90	p99	Max
Panel A: Total revenue breakdown – value of each item as a percentage of total revenue (%)										
Contributions	3,106	13.15	116.36	-6413.60	0.97	4.00	10.91	29.61	85.33	257.16
Program service	3,121	74.17	20.69	0.00	1.44	44.81	80.58	92.55	98.04	242.77
Investment income	3,120	2.32	41.36	-2282.09	0.00	0.45	1.71	5.83	29.30	92.39
Income From Invest Bond Proceeds	2,492	0.07	1.79	-0.56	0.00	0.00	0.00	0.04	0.72	89.11
Royalties Revenue	2,563	0.32	2.21	0.00	0.00	0.00	0.00	0.51	5.54	83.54
Net Rental Income Or Loss	2,764	-1.67	101.85	-5353.69	-0.33	-0.01	0.05	0.55	2.45	36.51
Net Gain Or Loss From Sales of Assets	3,095	10.55	258.57	-586.44	-3.85	-0.06	2.71	17.38	46.03	14367.61
Net Income From Fundraising Events	2,757	0.00	0.27	-1.98	-0.25	-0.07	0.00	0.02	0.40	9.11
Net Income From Gaming	2,199	0.00	0.02	-0.01	0.00	0.00	0.00	0.00	0.03	0.69
Net Income From inventory sales	2,336	0.18	1.13	-1.37	-0.08	0.00	0.00	0.30	3.53	22.88
Other miscellaneous revenue	2,956	1.22	5.46	-218.22	-0.70	0.00	0.48	2.91	18.45	54.14
Panel B: Total contributions breakdown – value of each item as a percentage of total contributions (%)										
Federated campaigns	1,053	0.42	5.56	0.00	0.00	0.00	0.00	0.19	1.82	100.00
Membership dues	959	0.25	1.89	0.00	0.00	0.00	0.00	0.15	7.20	27.96
Fundraising events	2,415	1.47	3.00	0.00	0.00	0.00	0.42	4.08	12.29	47.24
Related organizations	1,312	4.27	14.36	0.00	0.00	0.00	0.00	8.38	100.00	100.00
Government grants	2,968	31.40	24.13	0.00	0.02	4.60	25.56	66.86	95.69	150.40
All other contributions	3,103	68.26	24.87	-50.40	4.46	31.23	73.56	96.51	100.00	100.00
Noncash contributions	3,016	9.47	12.21	0.00	0.00	0.62	5.62	22.04	63.88	100.00
Panel C: Total assets breakdown – value of each item as a percentage of total assets (%)										
Cash	2,836	1.83	4.99	-1.45	0.00	0.00	0.11	5.23	21.27	94.56
Savings	3,018	5.30	5.31	0.00	0.00	0.19	3.68	12.42	23.24	43.04
Pledges and grants receivable	3,056	2.69	2.89	0.00	0.00	0.42	1.92	5.65	14.79	39.55
Net accounts receivable	3,089	1.41	2.22	0.00	0.00	0.11	0.73	3.22	9.63	29.33
Loans and other receivables	2,229	0.01	0.06	0.00	0.00	0.00	0.00	0.04	0.25	1.73
Loans and other receivables from other disqualified persons	1,975	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.01	1.64
Notes and loans receivable	2,811	0.87	1.16	0.00	0.00	0.00	0.51	2.24	4.46	25.48
Inventories for sale or use	2,689	0.09	0.18	0.00	0.00	0.00	0.04	0.21	0.72	3.11
Prepaid expenses and deferred charges	3,067	0.54	0.92	0.00	0.00	0.07	0.36	1.08	3.76	30.72
Land, buildings, and equipment	3,121	38.58	16.19	0.00	2.85	16.81	38.91	59.17	78.96	89.96
Investments—publicly traded securities	3,023	23.22	13.85	0.00	0.00	5.83	21.72	42.04	60.43	81.14
Investments—other securities	2,996	23.25	20.06	-0.29	0.00	0.48	19.42	53.60	76.37	86.37
Investments—program-related	2,226	1.18	5.95	-0.57	0.00	0.00	0.00	1.83	25.93	85.72
Intangible assets	1,927	0.06	0.36	0.00	0.00	0.00	0.00	0.00	2.02	5.10
Other assets	3,028	4.14	9.35	0.00	0.00	0.01	1.31	9.74	56.87	90.84

Table A3 – continued from the previous page

	N	Mean	SD	Min	p1	p10	p50	p90	p99	Max
Panel D: Total liabilities breakdown– value of each item as a percentage of total liabilities (%)										
Accounts payable and accrued expenses	3,120	11.8	7.9	0.0	0.5	4.8	10.3	19.6	39.9	100.0
Grants payable	1,926	0.7	1.6	0.0	0.0	0.0	0.0	2.6	8.3	13.4
Deferred revenue	3,014	5.5	5.8	0.0	0.0	0.6	4.1	11.6	28.8	54.6
Tax-exempt bond liabilities	3,066	61.3	19.4	0.0	4.6	33.7	65.5	82.2	94.9	99.6
Escrow or custodial account liability	1,942	0.6	2.6	-0.5	0.0	0.0	0.0	1.1	13.0	71.1
Loans and other payables	1,818	0.1	1.3	0.0	0.0	0.0	0.0	0.0	1.8	19.6
Secured mortgages and notes	2,711	6.7	14.1	0.0	0.0	0.0	0.8	18.8	81.0	93.0
Unsecured notes and loans	2,137	4.6	10.3	0.0	0.0	0.0	0.0	17.4	47.4	75.3
Other liabilities	3,100	13.9	13.7	0.0	0.0	1.4	10.4	30.2	70.9	99.9

Table A4: Ranking of Universities by Equity Value

Rank	Name	Equity value (Million $)	Equity M/B	Credit spread (%)	US News rank
1	Yale University	181,697	4.90	0.70	5
2	Harvard University	171,955	3.20	0.62	3
3	Stanford University	152,672	3.40	0.63	3
4	Massachusetts Institute of Technology	85,377	2.99	0.65	2
5	New York University	74,916	11.73	1.63	35
6	Princeton University	63,852	1.95	0.91	1
7	University of Pennsylvania	57,466	2.89	1.86	6
8	Cornell University	55,422	4.77	0.78	12
9	Emory University	54,630	4.30	1.13	24
10	Columbia University in the City of New York	51,674	2.94	0.86	12
11	University of Southern California	49,358	5.38	0.68	28
12	Duke University	47,996	3.68	1.23	7
13	University of Notre Dame	46,528	2.83	0.73	20
14	Dartmouth College	39,703	5.16	0.64	18
15	University of Chicago	35,503	4.34	2.62	12
16	Northwestern University	30,815	2.16	1.03	9
17	Boston University	27,914	5.83	1.42	43
18	Johns Hopkins University	26,532	2.92	1.68	9
19	University of Pittsburgh-Pittsburgh Campus	25,057	4.51	1.02	67
20	Washington University in St Louis	22,056	1.83	3.16	24
21	Carnegie Mellon University	21,591	5.11	0.72	24
22	University of Rochester	19,614	5.04	2.47	47
23	University of Miami	17,938	5.83	2.51	67
24	Boston College	17,776	4.32	1.35	39
25	Brown University	17,496	2.65	1.21	9
26	University of Delaware	16,526	6.06	0.95	76
27	Thomas Jefferson University	15,418	20.71	2.42	142
28	Georgetown University	15,189	7.98	1.98	22
29	Vanderbilt University	13,840	1.90	1.89	18
30	Northeastern University	13,246	4.60	2.05	53
31	Syracuse University	9,983	3.82	1.27	67
32	Rockefeller University	9,554	3.58	1.90	
33	Southern New Hampshire University	8,975	13.28	0.72	
34	Temple University	8,908	3.42	1.28	89
35	Case Western Reserve University	8,393	3.06	1.55	53
36	Baylor University	7,921	3.21	2.12	93
37	Williams College	7,043	1.93	1.87	
38	Baylor College of Medicine	6,629	4.57	2.64	
39	Wesleyan University	6,066	3.33	0.87	
40	Southern Methodist University	5,965	2.19	1.82	89
41	Drexel University	5,726	4.58	2.43	98
42	Wake Forest University	5,610	3.57	2.02	47
43	Texas Christian University	5,379	2.00	3.35	98
44	Pepperdine University	5,284	3.53	1.19	76
45	Tufts University	5,175	1.79	2.90	40
46	Swarthmore College	5,053	1.90	1.40	
47	St John's University-New York	4,654	4.67	1.95	
48	Midwestern University-Glendale	4,481	3.15	1.32	

Table A4 – continued from the previous page

Rank	Name	Equity value (Million $)	Equity M/B	Credit spread (%)	US News rank
49	Pomona College	4,286	1.37	1.12	
50	Nova Southeastern University	4,261	4.27	2.71	
51	Fordham University	4,125	2.85	2.94	89
52	Wellesley College	3,908	1.31	2.46	
53	DePaul University	3,867	3.13	2.37	151
54	Lehigh University	3,794	1.70	2.40	47
55	Saint Louis University-Main Campus	3,781	2.02	3.21	105
56	Claremont McKenna College	3,642	2.45	1.16	
57	Loma Linda University	3,447	4.51	3.31	
58	Marquette University	3,351	2.49	1.89	86
59	Babson College	3,250	3.96	2.09	
60	Santa Clara University	3,241	1.67	2.42	60
61	Quinnipiac University	2,992	2.77	2.21	170
62	University of Dayton	2,992	2.12	2.19	133
63	Villanova University	2,877	1.77	1.40	67
64	Brandeis University	2,711	1.95	1.22	60
65	Colby College	2,684	1.78	0.65	
66	Berklee College of Music	2,628	6.41	2.43	
67	Duquesne University	2,614	4.15	2.05	151
68	University of Richmond	2,582	0.95	1.87	
69	Delaware State University	2,463	-28.17	1.96	
70	Chapman University	2,462	1.75	2.54	133
71	Sacred Heart University	2,425	3.83	2.87	
72	Lafayette College	2,344	2.14	2.08	
73	Embry Riddle Aeronautical University-Worldwide	2,270	2.79	2.56	
74	Colgate University	2,269	1.72	1.65	
75	Hofstra University	2,224	2.31	2.50	
76	Bucknell University	2,121	1.70	1.17	
77	Washington and Lee University	2,064	0.94	1.83	
78	Emerson College	2,025	4.21	3.68	
79	Kennesaw State University	2,014	16.59	2.82	
80	Creighton University	1,990	1.79	3.23	124
81	Vassar College	1,957	1.42	2.90	
82	Loyola Marymount University	1,927	1.60	3.23	93
83	University of San Francisco	1,843	1.98	3.10	115
84	Savannah College of Art and Design	1,829	1.59	2.08	
85	Bowdoin College	1,806	0.69	2.13	
86	Fairfield University	1,700	2.48	3.00	124
87	Samford University	1,645	4.68	4.17	185
88	Oberlin College	1,614	1.18	2.53	
89	Hamilton College	1,576	1.33	1.00	
90	Suffolk University	1,549	4.66	3.83	
91	Grinnell College	1,515	0.59	1.71	
92	Long Island University-C W Post Campus	1,486	3.40	1.11	
93	Bentley University	1,479	3.07	2.09	
94	College of the Holy Cross	1,451	1.16	1.93	
95	Denison University	1,409	1.08	1.97	
96	University of the Pacific	1,401	1.49	2.68	142
97	Carleton College	1,399	1.03	1.35	

Table A4 – continued from the previous page

Rank	Name	Equity value (Million $)	Equity M/B	Credit spread (%)	US News rank
98	Colorado College	1,394	1.16	1.94	
99	Longwood University	1,388	-63.59	5.90	
100	University of South Carolina-Columbia	1,280	30.13	1.60	124
101	University of Louisville	1,244	10.14	1.20	
102	Bard College	1,240	2.04	5.34	
103	Butler University	1,191	2.44	2.62	
104	Hampton University	1,167	2.01	1.89	
105	Union College	1,159	1.67	2.42	
106	Providence College	1,147	1.83	2.30	
107	University of San Diego	1,111	0.83	3.24	98
108	Marist College	1,107	1.82	2.73	
109	High Point University	1,096	1.30	1.70	
110	University of Georgia	1,089	3.30	0.97	47
111	Saint Joseph's University	1,087	1.46	4.86	
112	The University of Tampa	1,079	1.63	4.31	
113	Barnard College	1,069	1.79	3.77	
114	Teachers College at Columbia University	1,030	2.05	1.90	
115	Abilene Christian University	1,019	1.37	4.33	
116	Kenyon College	1,011	1.50	3.61	
117	Lipscomb University	983	4.92	4.40	
118	Trinity University	977	0.56	1.84	
119	Dickinson College	956	1.53	2.00	
120	Simmons College	937	3.81	3.51	151
121	Bates College	926	1.72	1.80	
122	Bryn Mawr College	917	0.70	2.31	
123	DePauw University	894	1.01	3.15	
124	Stetson University	885	2.02	2.22	
125	Columbia College-Chicago	860	2.13	3.65	
126	St Olaf College	855	1.07	3.21	
127	Johnson & Wales University-Providence	847	1.13	3.27	
128	Bryant University	846	2.44	1.99	
129	Seton Hall University	844	1.80	6.16	151
130	University of New England	836	1.97	3.74	
131	Catholic University of America	831	1.25	3.10	178
132	Fairleigh Dickinson University-Metropolitan Campus	825	2.82	2.53	
133	University of La Verne	825	2.89	3.84	170
134	North Georgia College & State University	800	59.65	2.26	
135	University of Scranton	798	1.80	4.04	
136	Rollins College	789	1.52	3.53	
137	Occidental College	783	1.17	1.17	
138	Adelphi University	766	2.19	4.09	
139	Ithaca College	759	1.13	2.61	
140	Bradley University	744	1.46	5.54	
141	Loyola University-New Orleans	738	2.27	4.11	
142	Georgia State University	730	22.75	1.46	
143	Skidmore College	721	0.89	4.00	
144	West Virginia University	713	18.11	2.22	
145	Albert Einstein College of Medicine	708	1.39	5.86	
146	Samuel Merritt University	707	2.39	2.93	
147	Campbell University	698	1.44	2.45	

Table A4 – continued from the previous page

Rank	Name	Equity value (Million $)	Equity M/B	Credit spread (%)	US News rank
148	Belmont University	689	0.53	3.11	
149	Agnes Scott College	686	2.38	3.94	
150	Pace University-New York	682	2.27	4.86	
151	Olivet Nazarene University	660	6.12	1.04	
152	Loyola University-Baltimore	656	1.19	3.61	
153	Lesley University	635	2.33	3.26	
154	Upper Iowa University	628	14.76	1.13	
155	Centre College	624	1.42	4.17	
156	University of Portland	620	1.17	3.15	
157	Clarkson University	613	1.90	4.44	142
158	St Lawrence University	606	1.30	2.99	
159	Spelman College	600	1.07	2.02	
160	Saint Anselm College	595	2.68	3.73	
161	Whitworth University	590	2.17	3.18	
162	Pacific University	583	3.44	4.50	
163	Savannah State University	577	-184.15	2.04	
164	Whitman College	575	0.72	2.73	
165	Art Center College of Design	565	2.83	4.35	
166	Seattle University	549	0.83	5.39	163
167	Gettysburg College	546	1.13	3.11	
168	University of Tulsa	545	0.41	4.27	195
169	Western New England University	536	3.97	3.23	
170	Biola University	529	1.68	3.44	
171	University of New Haven	528	2.29	3.62	
172	Furman University	528	0.51	3.05	
173	Willamette University	522	1.42	4.57	
174	Gustavus Adolphus College	510	1.36	4.39	
175	Saint Edward's University	506	2.03	5.47	
176	Rosalind Franklin University of Medicine and Science	494	3.56	6.46	
177	University of the Incarnate Word	491	1.47	5.78	
178	Saint Ambrose University	489	2.03	2.72	
179	California Lutheran University	478	1.73	2.82	
180	University of Puget Sound	478	0.84	2.34	
181	Calvin College	466	1.04	9.48	
182	Regent University	466	5.45	5.14	
183	Muhlenberg College	464	1.01	2.34	
184	Touro University Nevada	462	13.81	3.69	
185	University of Redlands	455	1.35	3.87	
186	Valparaiso University	452	1.03	4.87	
187	Wofford College	443	0.79	5.21	
188	John Carroll University	442	1.12	5.30	
189	Ringling College of Art and Design	438	2.11	4.52	
190	CUNY Queens College	437	-38.08	1.63	
191	Macalester College	433	0.42	2.45	
192	Marian University	429	2.54	4.05	
193	Gannon University	421	2.34	4.82	
194	Hampden-Sydney College	416	1.04	3.78	
195	Robert Morris University	414	2.81	5.16	
196	Connecticut College	404	0.80	4.99	
197	Mount St Mary's University	400	3.55	2.64	

Table A4 – continued from the previous page

Rank	Name	Equity value (Million $)	Equity M/B	Credit spread (%)	US News rank
198	Harvey Mudd College	393	0.86	1.79	
199	Arcadia University	393	2.58	4.48	
200	Merrimack College	392	2.33	5.21	
201	The College of Wooster	384	0.66	2.06	
202	Illinois Wesleyan University	383	1.32	5.14	
203	Virginia Commonwealth University	380	7.91	1.09	142
204	Gallaudet University	380	0.95	2.76	124
205	Wilkes University	373	2.82	5.71	
206	Goucher College	369	1.29	5.53	
207	Azusa Pacific University	361	1.96	6.53	
208	California State University-East Bay	356	24.51	0.39	
209	Webster University	351	1.29	4.80	
210	Widener University-Main Campus	348	1.59	5.11	
211	Rhodes College	346	0.66	3.32	
212	Southwestern University	342	0.71	3.23	
213	St Louis College of Pharmacy	339	2.09	5.04	
214	Manhattan College	337	1.12	4.25	
215	National University	335	0.24	4.72	
216	Wingate University	331	1.81	4.96	
217	Houston Baptist University	330	1.49	5.65	
218	Drake University	329	0.81	5.08	178
219	Massachusetts College of Pharmacy and Health Sciences	317	0.17	6.21	
220	Saint Johns University	313	0.68	4.86	
221	Allegheny College	304	0.92	5.05	
222	Mercy College	303	0.91	2.84	
223	Lewis University	298	2.01	5.18	
224	St Catherine University	294	1.18	3.46	
225	Le Moyne College	293	0.99	3.57	
226	Moravian College and Moravian Theological Seminary	293	1.36	4.84	
227	Seattle Pacific University	291	1.13	4.35	
228	The University of West Florida	290	2.35	2.31	
229	Earlham College	285	1.11	7.52	
230	Randolph-Macon College	285	0.88	3.24	
231	Iona College	283	0.92	4.44	
232	Washington College	282	0.68	2.89	
233	Oklahoma City University	281	1.17	5.37	
234	University of Hartford	281	1.28	6.75	
235	Saint Leo University	271	1.77	3.44	
236	York College Pennsylvania	270	0.62	5.27	
237	Roanoke College	267	0.92	6.31	
238	Meredith College	258	1.67	1.93	
239	Ouachita Baptist University	257	1.77	4.15	
240	University of Evansville	255	1.02	5.07	
241	Hartwick College	249	2.72	7.25	
242	Gwynedd Mercy College	247	2.53	3.43	
243	Regis University	243	1.78	5.61	
244	Cabrini College	227	3.58	4.63	
245	Thomas College	224	3.87	1.03	
246	Wartburg College	221	1.68	6.82	

Table A4 – continued from the previous page

Rank	Name	Equity value (Million $)	Equity M/B	Credit spread (%)	US News rank
247	Sarah Lawrence College	219	1.38	6.39	
248	Ursinus College	218	0.90	5.84	
249	Des Moines University-Osteopathic Medical Center	216	0.92	6.34	
250	Hendrix College	215	1.07	7.13	
251	Kansas City University of Medicine and Biosciences	214	0.65	2.47	
252	Franciscan University of Steubenville	213	1.24	5.22	
253	Neumann University	213	2.20	3.56	
254	Misericordia University	211	1.35	5.25	
255	Flagler College-St Augustine	211	1.31	3.06	
256	George Fox University	211	1.21	5.62	
257	Kalamazoo College	210	0.60	4.87	
258	St John's College	209	0.69	4.39	
259	Saint Michael's College	206	1.49	5.48	
260	The University of Findlay	204	1.21	4.25	
261	Messiah College	202	0.85	6.11	
262	University of Indianapolis	200	1.21	4.87	
263	Transylvania University	195	1.02	4.75	
264	Guilford College	194	1.48	5.53	
265	Lenoir-Rhyne University	192	0.90	4.64	
266	Juniata College	192	1.23	5.84	
267	Ohio Wesleyan University	192	0.48	5.21	
268	Washington & Jefferson College	188	0.73	4.92	
269	Molloy College	183	1.39	7.07	
270	University of North Carolina at Chapel Hill	182	0.35	7.08	22
271	Florida Southern College	172	0.81	2.84	
272	Knox College	171	0.81	3.00	
273	Rider University	170	1.15	6.80	
274	Immaculata University	169	5.27	7.38	
275	Southern California College of Optometry	165	2.63	2.99	
276	University of North Carolina at Pembroke	161	8.71	4.85	
277	Southeastern University	160	3.35	8.45	
278	Monroe Community College	159	10.88	2.64	
279	Centenary College	157	-13.33	1.45	
280	College of Notre Dame of Maryland	157	1.60	8.02	
281	Benedictine University	156	1.55	6.62	
282	Georgian Court University	155	1.66	4.04	
283	Taylor University	154	0.52	4.16	
284	Augsburg College	152	1.21	7.33	
285	Holy Family University	151	2.32	5.77	
286	Southeastern Louisiana University	150	3.54	3.64	
287	Lindsey Wilson College	150	2.14	3.67	
288	Saint Vincent College	149	0.62	3.10	
289	Lynchburg College	147	0.83	6.35	
290	Otterbein University	146	0.77	4.79	
291	University of West Georgia	145	2.39	1.85	
292	Lewis & Clark College	144	0.45	8.55	

Table A4 – continued from the previous page

Rank	Name	Equity value (Million $)	Equity M/B	Credit spread (%)	US News rank
293	University of Maryland-College Park	138	0.16	1.53	46
294	Nazareth College	130	0.58	7.39	
295	Medaille College	128	7.64	7.54	
296	Florida International University	121	45.60	2.53	
297	Seton Hill University	119	0.90	6.27	
298	College of Saint Benedict	118	0.58	6.52	
299	Lubbock Christian University	116	1.40	5.69	
300	Saint Francis University	115	1.17	5.29	
301	Queens University of Charlotte	110	1.64	9.26	
302	D'Youville College	109	0.67	5.83	
303	Buena Vista University	109	0.57	4.87	
304	Niagara University	105	0.55	5.74	
305	Springfield College	105	0.60	8.45	
306	Ave Maria University	93	0.50	6.01	
307	Saint Joseph's College of Maine	92	1.92	3.37	
308	Northwest Nazarene University	90	0.77	6.78	
309	Mount Saint Mary College	82	0.63	6.02	
310	William Jessup University	81	2.46	7.90	
311	Benedict College	80	1.25	6.77	
312	Georgia Southern University	71	5.26	3.64	
313	Mount Aloysius College	70	0.49	5.50	
314	Averett University-Non-Traditional Programs	69	1.36	8.47	
315	Wayland Baptist University	67	0.44	3.31	
316	Manchester College	65	0.47	6.49	
317	Barton College	60	1.19	6.84	
318	Carlow University	58	0.82	6.52	
319	Gardner-Webb University	56	0.44	5.13	
320	Thiel College	54	1.15	6.85	
321	Kettering University	54	0.23	7.17	
322	Concordia University-Irvine	51	0.31	5.99	
323	Daemen College	44	1.03	8.08	
324	Texas Southern University	42	6.18	3.70	
325	South Carolina State University	42	-64.65	1.18	
326	Albany College of Pharmacy and Health Sciences	40	0.39	8.16	
327	Robert Morris University Illinois	19	0.60	5.62	
328	Appalachian State University	19	0.09	5.67	
329	Philadelphia College of Osteopathic Medicine	17	0.04	0.95	

Table A5: Mapping of EINs between IPEDS and IRS Form 990

Institution Name	UNITID	EIN in IPEDS	EIN in IRS
Albert Einstein College of Medicine	385415	830621846	472209056
Appalachian State University	197869	561176030	237099379
Atlanta Metropolitan College	138901	581190222	581727943
California State University-East Bay	110574	946390556	941524922
California State University-Long Beach	110583	931150363	956106694
College for Creative Studies	169442	382539067	381550064
Columbia University in the City of New York	190150	603800000	135598093
CUNY Queens College	190664	133893536	911917512
CUNY Queens College	190664	136400434	911917512
East Stroudsburg University of Pennsylvania	212115	232504462	562385309
Florida International University	133951	650177616	800151379
Florida International University	133951	596001874	800151379
Georgia Southern University	139931	586002059	581485954
Kennesaw State University	486840	580965786	237034345
Kennesaw State University	140164	580965786	237034345
Kennesaw State University	486840	371535589	237034345
Loma Linda University	117636	931221825	951816009
Longwood University	232566	546001788	201612906
Manchester College	151777	380868127	350868127
Middle Georgia State College	482158	586002057	237356941
Monroe Community College	193326	160849590	160863558
North Dakota State University-Main Campus	200332	456002439	237120898
North Georgia College & State University	482680	586002060	263332258
North Georgia College & State University	140669	586002060	263332258
Pacific Northwest College of Art	209603	930386972	931139187
Philadelphia College of Osteopathic Medicine	215123	231355135	222691757
Saint Johns University	174792	410693973	453656162
Saint Johns University	174792	453656132	453656162
Santa Clara University	122931	941156697	941156617
Savannah State University	140960	586002069	237305890
Shippensburg University of Pennsylvania	216010	232500361	542101819
South Carolina State University	218733	576000950	562449101
Southeastern Louisiana University	160612	726000816	721417328
Stephen F Austin State University	228431	756002514	751623068
Texas Southern University	229063	746001391	741620415
The University of West Florida	138354	596001874	596166292
Tompkins Cortland Community College	196565	160928736	237083038
University of Georgia	139959	586001998	580652518
University of Louisville	157289	611014882	311106941
University of Maryland-College Park	163286	526002033	522197313
University of North Carolina at Chapel Hill	199120	566001393	591711424
University of North Carolina at Pembroke	199281	566000805	581592230
University of Rochester	195030	263800000	160743209
University of South Carolina-Columbia	218663	576001153	576026593
University of West Georgia	141334	586002055	586056464
Virginia Commonwealth University	234030	546001758	541666531
West Virginia University	238032	556000793	550665758
West Virginia University	238032	556000842	550665758

Table A6: Change in equity MB and equity value from the term start to the end

			Log EquityMB		Equity market value (in million USD)		Equity book value (in million USD)	
Administration	Term	N	Mean	Median	Mean	Median	Mean	Median
Panel A: All universities								
Obama 2nd	2013 - 2016	84	-0.34	-0.25	-3,023	-112	774	233
Trump 1st	2017 - 2020	84	0.73	0.73	11,142	2,041	467	120
Biden	2021 - 2024	95	-0.68	-0.74	-4,332	-995	402	34
Trump 2nd	2025 -	101	-0.31	-0.42	-3,682	-389	-95	-21
Panel B: Top universities								
Obama 2nd	2013 - 2016	58	-0.31	-0.27	-4,309	-363	1,088	436
Trump 1st	2017 - 2020	55	0.75	0.72	16,831	4,917	718	249
Biden	2021 - 2024	51	-0.56	-0.60	-7,378	-2,193	749	155
Trump 2nd	2025 -	54	-0.33	-0.40	-7,005	-886	-167	-40
Panel C: Non top-universities								
Obama 2nd	2013 - 2016	26	-0.41	-0.24	-155	-44	73	27
Trump 1st	2017 - 2020	29	0.67	0.73	1,048	621	21	19
Biden	2021 - 2024	44	-0.81	-0.90	-801	-476	-1	-20
Trump 2nd	2025 -	47	-0.30	-0.53	135	-122	-12	-7

Equity and book values are converted to 2024 USD.

Table A7: Summary Statistics of AAA-Rated Corporate Bonds

Variable	Mean	Std	1%	10%	50%	90%	99%
Credit Spread	63	34	6	15	68	103	138
Leverage	0.071	0.021	0.031	0.039	0.073	0.096	0.122
Asset Volatility	0.221	0.058	0.133	0.148	0.205	0.307	0.335
Payout	0.015	0.004	0.008	0.009	0.016	0.019	0.02
Maturity	15.573	10.994	1.174	2.425	15.685	30.059	39.42
Coupon	3.592	1.226	0.95	2.125	3.55	5.2	6.95
Amount Outstanding	1413	1125	250	499	1000	3000	6250

This table reports the summary statistics of the monthly panel data of AAA-rated U.S. corporate bonds from January 2018 to January 2013 (61 months). Credit spread is the yield difference between the corporate and Treasury bonds adjusted for embedded option values, expressed in basis points. Leverage is the ratio of the book value of debt to the sum of the book value of debt and the market value of equity. Asset volatility is computed following Feldhütter and Schaefer (2018) using a 3-year rolling window estimates of equity volatility. Payout is the amount of payout (common stock and preferred dividend, and interest payments) scaled by the quasi-market value of the asset. Maturity is the remaining time to maturity in years. Coupon is the coupon rate per year in percent. Amount outstanding is in million dollars. The number of observations is 3,407 bond-months and 77 bonds.

Table A8: Cumulative Probability of Default (Percent) of the Stochastic Volatility Model

	1Y	5Y	10Y	15Y	20Y
Model	0.000	0.000	0.180	0.780	1.800
Moody's	0.000	0.136	0.679	1.061	1.308

This table reports the cumulative probability of default in percent. Model is the model-implied probability using the average value of inputs. Specifically, we use leverage $F = 0.069$, asset variance $V_0 = 0.053$, payout rate $q = 0.015$, and the risk-free rate $r = 0.022$. The optimal value for the default boundary X_D, which minimizes the sum of squared differences in probability of default, is $X_D = 1.09$. For Moody's, we report the cumulative probability of default for a AAA-rated borrower averaged from 1920 to 2020.

Table A9: Average Credit Spreads (Basis Points) of the Stochastic Volatility Model

	Model	Data	Difference	N
Less Than 10 Years	25.3	27.8	2.6	1365
	(7.3)	(12.2)	(0.9)	

Each month, we take the equal-weighted average of the credit spreads based on the stochastic volatility model and the data within the three maturity buckets, and then average them over time. To obtain the model value, we select the values of the price of risks λ_V and λ_D to minimize the sum of squared differences for the credit spreads of bonds with a maturity of less than 10 years. The resulting optimal values are $\lambda_V = -7.400$ and $\lambda_D = -0.355$. Values in parentheses are a t-statistic accounting for Newey-West 12 lags. N is the number of observations.

Table A10: Determinants of Credit spread

	Dep. Var = Credit spread (%)					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Fixed effects and monthly financial market variables						
Asset variance					-0.009	-0.013
					(-0.38)	(-0.57)
Rating control				✓		✓
University FEs	✓		✓	✓	✓	✓
Time FEs		✓	✓	✓	✓	✓
Adj. R^2	0.434	0.207	0.642	0.650	0.642	0.650
Obs.	25,173	25,183	25,173	25,173	25,170	25,170

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel B: Contribution-related variables								
Donation	0.003		-0.159					
	(1.08)		(-0.79)					
Govt grant		0.207*	0.226**					
		(2.12)	(2.24)					
Contribution				0.008				
				(1.08)				
Donation growth					-0.015		-0.011	
					(-0.82)		(-0.57)	
Govt grant growth						0.013	0.012	
						(0.42)	(0.36)	
Contribution growth								-0.010
								(-0.65)
Controls	✓	✓	✓	✓	✓	✓	✓	✓
University FEs	✓	✓	✓	✓	✓	✓	✓	✓
Time FEs	✓	✓	✓	✓	✓	✓	✓	✓
Adj. R^2	0.648	0.649	0.647	0.651	0.627	0.632	0.626	0.633
Obs.	24,405	24,086	23,520	25,086	22,104	22,182	21,120	23,345

Table A10 – continued from the previous page

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Panel C: Income statement-related variables													
Program service	0.014						0.003						
	(0.24)						(0.04)						
Tuition		0.083		0.077									
		(1.19)		(1.06)									
Other Program service			-0.041	-0.033									
			(-0.66)	(-0.55)									
Investment income					0.005		-0.045						
					(1.40)		(-0.35)						
Income from asset sales						-0.006	-0.047						
						(-1.03)	(-0.39)						
Revenue growth								-0.018					
								(-1.30)					
Salary total									0.017				
									(0.63)				
Salary faculty										0.006		-0.172	
										(0.14)		(-0.83)	
Salary non-faculty											0.021	0.168	
											(1.07)	(1.03)	
ROE													-0.008
													(-0.33)
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
University FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Time FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Adj. R^2	0.650	0.653	0.653	0.653	0.650	0.651	0.651	0.632	0.666	0.652	0.666	0.666	0.650
Obs.	25,170	21,772	21,772	21,772	25,158	24,992	24,980	23,522	23,069	24,908	23,032	23,032	25,170

Table A10 – continued from the previous page

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
				Panel D: Balance sheet-related variables					
Log(Assets)	-1.193**								
	(-2.63)								
Log(Liabilities)		-0.088			0.001				
		(-0.34)			(0.00)				
Log(Endowment)			-1.511***		-1.521***				
			(-3.73)		(-3.66)				
CAPEX				0.161	0.090				
				(1.50)	(0.71)				
Asset growth						0.048			0.023
						(1.43)			(0.34)
Liability growth							0.011		-0.005
							(0.47)		(-0.13)
Endowment growth								0.005	-0.003
								(0.15)	(-0.07)
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
University FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓
Time FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓
Adj. R^2	0.652	0.650	0.654	0.651	0.654	0.632	0.633	0.635	0.635
Obs.	25,170	25,167	23,396	25,170	23,396	23,522	23,507	21,728	21,728

Table A10 – continued from the previous page

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel E: University characteristics										
Student-to-faculty	-0.077***									-0.054**
	(-4.84)									(-2.38)
% of student loan		0.173								
		(1.18)								
Loan-to-tuition			0.106							
			(1.22)							
Rank				0.135						
				(0.77)						
Not ranked				-0.615						
				(-1.02)						
Football rank					-0.007					
					(-0.17)					
Football not ranked					0.178					
					(0.89)					
% of international students						-0.070				
						(-0.63)				
% of tenured faculty							0.056			
							(0.54)			
Enrollment/Admission								-0.044		
								(-0.31)		
Admission/Application								0.284**		0.321***
								(2.79)		(3.32)
SAT verbal 75th									0.162	
									(0.86)	
SAT math 75th									-0.049	
									(-0.25)	
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Time FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
University FEs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Adj. R^2	0.645	0.666	0.666	0.651	0.650	0.652	0.645	0.652	0.667	0.645
Obs.	23,036	22,537	22,932	25,170	25,170	24,908	23,036	23,852	20,191	22,133

Table A10 – continued from the previous page

	(1)	(2)	(3)	(4)
Panel F: Horse-race regression				
Govt grant	0.207*			0.168*
	(2.12)			(2.07)
				[-1.14]
Log(Endowment)		-1.511***		-1.594***
		(-3.73)		(-4.03)
				[36.37]
Admission/Application			0.299***	0.331***
			(3.05)	(3.54)
				[6.31]
Controls	✓	✓	✓	✓
Time FEs	✓	✓	✓	✓
University FEs	✓	✓	✓	✓
Adj. R^2	0.649	0.654	0.652	0.650
Obs.	24,086	23,396	23,852	21,794

This table presents the determinants of the equity market-to-book ratio. *Asset variance*: model-implied asset variance, *credit spread*: credit spread, where the Treasury yield data is from Gürkaynak et al. (2006). *Rating*: a numeric credit rating converted from letter grades. *Donation*: the sum of all other contributions, gifts, grants, and similar amounts and noncash contributions, divided by total revenue. *Govt grant*: Government grants divided by total revenue. *Contribution*: Total contributions divided by total revenue. *'variable' growth* is the log growth of the variable. *Controls*: asset variance, credit spread, rating controls. *Program service*: Program service revenue total divided by total revenue. *Investment income*: Investment income divided by total revenue. *Income from asset sales*: Net income from sales of assets divided by total revenue. *Tuition*: Tuition and fees, after deducting discounts and allowances divided by total revenue. *Salary total*: total salary divided by total expenses. *Salary faculty*: Salary outlays of full-time instructional faculty divided by total expenses. *Gross profit*: Total revenue minus total expenses divided by total revenue. *ROA*: Total revenue minus total expenses divided by total assets. *ROE*: Total revenue minus total expenses divided by total book value of equity, which is total assets minus total liabilities. *Assets*: Total book value of assets. *Liabilities*: Total book value of liabilities. *Endowment*: the sum of Investments—publicly traded securities and Investments—other securities divided by total revenue. *CAPEX*: Land, buildings, and equipment, net at the end of the year minus Land, buildings, and equipment, net at the beginning of the year plus depreciation, depletion, and amortization divided by total assets. *Student-to-faculty*: The ratio of the total number of students to the total number of faculty. *% of student loan*: The percent of undergraduate students awarded federal student loans *Loan-to-tuition*: The ratio of the total amount of federal student loans awarded to undergraduate students to tuition and fees, after deducting discounts and allowances. *Rank*: US NEWS rank. A higher value indicates a better rank. *Not ranked*: an indicator for the rank variable being missing. *% of international students*: Percentage of international students in the total number of students. *% of tenured faculty*: Percentage of tenured faculty members in the total number of faculty. *Enrollment/Admission*: The ratio of the number of enrolled students to the number of admitted students. *Admission/Application*: The ratio of the number of admitted students to the number of applicants. *SAT verbal 75th*: SAT verbal 75th

percentile score. *SAT math 75th*: SAT Math 75th percentile score. All explanatory variables, except for *Not ranked*, are standardized to have a mean of zero and a standard deviation of one. Control variables include asset variance, credit spreads, and dummies for credit ratings. t-statistics based on standard errors are in parentheses. In Panel A, standard errors are clustered by university. From Panels B to E, standard errors are clustered by university and year, because explanatory variables are yearly frequency, while the M/B ratio is monthly frequency. Values in square brackets in Column (4) of Panel F denote the variance decomposition in percentage terms, defined as $\beta_x \frac{cov(y,x)}{var(y)}$ where β_x is an OLS coefficient for a variable x from the regression in column (4). ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A11: Federal Research Funding Freezes and Endowment Tax Proposals on Top Universities in March 2025

	(1)	(2)	(3)	(4)	(5)	(6)
			Log(Asset market)			
Post×Treat	-0.110***	-0.077***	-0.050**	-0.075***	-0.074***	-0.062**
	(-3.99)	(-2.81)	(-1.99)	(-2.71)	(-2.64)	(-2.47)
Post×Treat×Ivy League		-0.263***				
		(-4.84)				
Post×Treat×High endowment			-0.256***			
			(-4.47)			
Post×Treat×High Gov't grant share				-0.192***		
				(-2.99)		
Post×Treat×High tuition					-0.164***	
					(-2.75)	
Post×Treat×High international student						-0.226***
						(-3.40)
University controls	✓	✓	✓	✓	✓	✓
University FEs	✓	✓	✓	✓	✓	✓
Year-month FEs	✓	✓	✓	✓	✓	✓
Adj. R^2	0.992	0.993	0.993	0.992	0.992	0.993
Obs.	1,174	1,174	1,174	1,174	1,174	1,174

The dependent variable is the log of the asset market value. The sample period is from November 2024 to June 2025. *Post* is an indicator taking one from March 2025. *Treat* is the treatment group, which are universities in the top quintile of average total revenue over the 2011-2024 period. *Ivy League* denotes the eight Ivy League institutions. *High endowment* denotes universities in the top decile of endowment size, where endowment is the sum of Investments—publicly traded securities and Investments—other securities. *High Gov't grant share* denotes universities in the top decile of the share of government grants in total revenue. *High tuition* denotes universities in the top decile of the total tuition. *High international student* denotes universities in the top decile of the share of international students. The university characteristics used for the triple DiD are based on information available to investors in 2024. Control variables include asset variance, credit spreads, and dummies for credit ratings. t-statistics based on standard errors clustered by university are in parentheses. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A12: Federal Student Loan Payment Pause in March 2020

	(1)	(2)	(3)	(4)
	Log(Asset market)			
Post×High loan share	0.148***		0.118***	
	(4.64)		(3.53)	
Post×High loan-to-tuition		0.117***		0.127***
		(3.23)		(3.60)
Post×High loan share×Low revenue school			0.196***	
			(2.64)	
Post×High loan-to-tuition×Low revenue school				-0.039
				(-0.44)
University controls	✓	✓	✓	✓
University FEs	✓	✓	✓	✓
Year-month FEs	✓	✓	✓	✓
Adj. R^2	0.990	0.990	0.990	0.990
Obs.	1,250	1,250	1,250	1,250

The dependent variable is the log of the asset market value. The sample period is from November 2019 to June 2020. *Post* is an indicator taking one from March 2020. *High loan share* denotes universities in the top quartile of the percent of undergraduate students awarded federal student loans. *High loan-to-tuition* denotes universities in the top quartile of the ratio of the total amount of federal student loans awarded to undergraduate students to tuition and fees, after deducting discounts and allowances. *Low revenue school* denotes universities in the bottom decile of total revenue available to investors in 2019. The university characteristics used to define the treatment group and variables for the triple DiD tests are based on information available to investors in 2019. Control variables include asset variance, credit spreads, and dummies for credit ratings. t-statistics based on standard errors clustered by university are in parentheses. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A13: Visa Scrutiny and Deportations of Chinese International Students in April 2024

	(1)	(2)	(3)	(4)
	Log(Asset market)			
Post×High Foreign Asian student	-0.206***	-0.211***	-0.188***	-0.118**
	(-5.03)	(-4.42)	(-3.33)	(-2.03)
Post×High Foreign Asian student×High Foreign Asian faculty		0.031		
		(0.50)		
Post×High Foreign Asian student×High Government grant share			-0.043	
			(-0.58)	
Post×High Foreign Asian student×High assets				-0.145**
				(-1.98)
University controls	✓	✓	✓	✓
University FEs	✓	✓	✓	✓
Year-month FEs	✓	✓	✓	✓
Adj. R^2	0.988	0.988	0.988	0.988
Obs.	1,281	1,281	1,281	1,281

The dependent variable is the log of the asset market value. The sample period is from December 2023 to July 2024. *Post* is an indicator taking one from April 2024. *High Foreign Asian student* denotes universities in the top quartile of the share of international students and in the top quartile of the share of Asian students (15% of the sample). *High Foreign Asian faculty* denotes universities in the top quartile of the share of foreign faculty members and in the top quartile of the share of Asian faculty members (5% of the sample). *High Gov't grant share* denotes universities in the top decile of the share of government grants in total revenue. *High assets* denotes universities in the top decile of the amount of total assets. *High revenues* denotes universities in the top decile of the amount of total revenues. The university characteristics used to define the treatment group and variables for the triple DiD tests are based on information available to investors in 2023. Control variables include asset variance, credit spreads, and dummies for credit ratings. t-statistics based on standard errors clustered by university are in parentheses. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels, respectively.