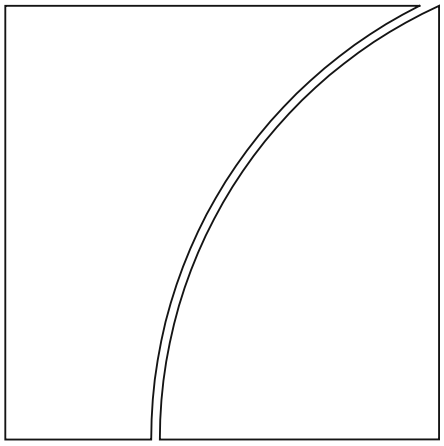

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by Konrad Adler, Sebastian Doerr and Xingyu Sonya Zhu

Monetary and Economic Department

February 2026

JEL classification: G21, G23, G32

Keywords: passive ownership, institutional investors, bank monitoring, syndicated loans

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Passive Investors and Loan Spreads

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Abstract

Over the past decades, index funds have amassed substantial ownership stakes in publicly traded firms. Index funds' rapid growth raises questions about their influence on governance and monitoring, as well as the consequences for other stakeholders. This paper examines how banks adjust their loan pricing when firms have a higher share of passive index fund investors as shareholders. Using syndicated loan data, we find that loan spreads increase with passive ownership and provide evidence consistent with higher loan spreads reflecting increased risk due to reduced shareholder oversight. Supporting this interpretation, we find stronger effects among firms in which shareholder oversight has more impact. However, the increase in loan spreads is not fully accounted for by changes in firm risk. Suggestive evidence points towards banks increasing their monitoring efforts in response to changes in shareholder composition, which is costly and reflected in loan spreads.

JEL Codes: G21, G23, G32.
Keywords: passive ownership, institutional investors, bank monitoring, syndicated loans.

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1 Introduction

Since the mid-2000s, the popularity of index funds as an investment vehicle has surged among institutional and retail investors (Bebchuk and Hirst, 2019).[1] Passive investment funds aim to replicate the performance of a specific stock market index, such as the S&P 500, by holding a diversified portfolio of stocks included in the index. As of today, passive funds hold about $7 trillion in assets under management, representing over 30% of total U.S. equity fund assets. As a consequence of their rapid growth, index funds have amassed substantial ownership stakes in a wide range of publicly traded firms.

The growing ownership share of index funds raises questions about their influence on the governance and monitoring of the firms in which they invest. To the extent that passive funds affect monitoring and corporate governance, their proliferation affects firms' creditors. One important type of creditor are banks, which, as major suppliers of credit, have a vested interest in monitoring the financial health and performance of their borrowing firms to mitigate credit risk.[2] The goal of our paper is to understand whether the rise of index funds, by affecting firms' riskiness and banks' incentives to monitor firms, impacts loan spreads.

Theoretically, the relationship between passive ownership and loan spreads could go in either direction. On the one hand, a higher share of passive investors might benefit creditors by reducing traditional shareholder-creditor conflicts (Jensen and Meckling, 1976). Active shareholders may push for riskier corporate policies that could harm creditors, such as increased leverage or riskier investments, so their replacement by passive investors might protect creditors.[3] On the other hand, active shareholder engagement might benefit creditors through improved corporate governance and oversight, for example by preventing managers from shirking or engaging in empire building (Jensen, 1986). Under this view, replacing active shareholders with passive investors would harm creditors, necessitating increased risk compensation and/or monitoring to make up for the reduced shareholder oversight.

[1] Global passive equity funds' net assets surpassed those of their active counterparts for the first time in 2023, see Reuters. Recent work by Chinco and Sammon (2024) suggests that the passive share is even higher, due to closet indexers, for example.

[2] This is also relevant from an aggregate perspective, as deteriorating bank health has stood at the center of most financial crises (Correia et al., 2024).

[3] This view is supported by Heath et al. (2022), who show that index funds rarely vote against management on corporate governance issues, are less likely to influence firm policies, and promote less board independence and worse pay-performance sensitivity at their portfolio companies.

We investigate how passive ownership affects bank loan spreads with data on U.S. public firms combined with granular information on syndicated loans. We first combine Thomson Reuters S12 mutual fund holdings data with the CRSP mutual fund database in order to understand whether an equity fund is passively or actively managed. We measure a firm's passive ownership using the ratio between total values held by passive mutual funds and its market value. Over our sample period from 2006 to 2022, the median firm saw an increase in passive ownership from around 2.5% to almost 20%. We then match the mutual fund holdings data with syndicated loan data from DealScan. The syndicated loan market is a key source of financing for larger firms in the U.S. (Chodorow-Reich, 2014) and rivals the market for corporate bonds in size. We aggregate the loan spread and other loan terms from DealScan to the firm-year level.

We start by investigating the evolution of bank loan spreads around large increases in the share of passive ownership, defined as increases exceeding five percentage points. We compare spreads of syndicated loans in the three years before to spreads in the three years after the increase in passive ownership. We find a statistically significant increase in loan spreads of around 6.5%, or 12 basis points (bps), when starting from the sample average of 175 bps, after the increase in passive ownership. This result supports the hypothesis that an increase in passive shareholders requires increased compensation for creditors.

Increases in passive ownership and the change in loan spreads are potentially driven by a common factor. We thus confirm our results in regressions that use Russell index reconstitutions as a plausibly exogenous source of variation in passive ownership, following Heath et al. (2022). Such variation arises from the fact that stock indices are mostly value-weighted. As a result, 'downgraded firms' – firms that move from a lower weight in Russell 1000 to a higher weight in the Russell 2000 – are exposed to an increase in passive ownership, while 'upgraded firms' move from the Russell 2000 to 1000 and are exposed to a decline in passive ownership.[4] We ensure the robustness of our analysis to the methodological improvements suggested by Gormley and Kim (2024), and conduct several additional tests, including separate regressions for down- and upgrades.

[4]In 2007, FTSE Russell modified its annual June reconstitution process by introducing a banding system around the rank-1000 cutoff (±2.5% of the Russell 3000E Index's market cap), replacing the previous simple market-cap ranking system. Under this new regime, stocks within these bands maintain their current index assignment rather than automatically switching based on market cap ranking. This banding system creates a natural experiment for studying the effects of passive ownership on firms' financing costs, as it produces comparable treated groups (stocks that switch indices) and control groups (stocks that stay in their current index) around the band thresholds.

We find that changes in passive ownership due to reclassification impact financing costs. Firms experience an increase in loan spreads following a downgrade (i.e., an increase in passive ownership), with an estimated 12% rise, equating to around 20 bps when starting at the sample average. Conversely, upgrading results in a decline in loan spreads, albeit with a smaller magnitude.[5] The magnitude of our coefficient estimates falls within the range of other studies that have examined shareholder composition and the cost of debt.

To explore the economic mechanism behind the positive effect of passive ownership on loan spreads, we analyze subsamples of firms. The evidence we find is consistent with the argument that passive investors engage in less shareholder monitoring. In particular, we find that the impact of increased passive ownership on loan spreads is more pronounced in firms with better corporate governance.[6] These results suggest that the shift toward passive ownership is particularly consequential when it displaces traditionally active shareholder monitoring in well-governed firms.[7] We find no systematic evidence that effects are stronger among firms with greater information asymmetries.

An open question is whether the increase in loan spreads reflects banks pricing firms' higher risk or a costly adjustment of their monitoring activity in response to reduced shareholder oversight.[8] Our granular data on syndicated loans allow us to analyze these competing explanations. In particular, we analyze how various established measures of firm risk and monitoring intensity evolve following increases in passive ownership to examine their relative importance.

We first show that firms experiencing an increase in passive ownership become riskier. This holds true when we measure risk with the expected default probability or the option-implied stock price volatility. We also find that banks require downgraded firms that see an increase in passive ownership to post collateral more frequently. Conversely, firms

[5]We also find that firms' total interest expense change in the same direction as the loan spreads.

[6]We use three measures of corporate governance. First, the presence of a "poison pill", second, the E-index for managerial entrenchment (Bebchuk et al., 2009), and third, the presence of institutional shareholders. Although poison pills are included in the E-index, we examine both to distinguish between specific takeover defenses and overall entrenchment.

[7]Blockholders are typically thought to be monitoring (Shleifer and Vishny, 1986), which could potentially confound our results. However, our findings are unchanged when controlling for the pre-reclassification blockholder share and concentration.

[8]Boone and White (2015) find higher analyst coverage and institutional ownership for downgraded firms. Conversely, we find lower analyst coverage, which may be due to differences in the sample period and methodology used.

that see a decrease in passive ownership benefit from more favorable terms, including larger loans with longer maturities, consistent with reduced risk. To examine how these changes relate to loan spreads, we assess to what extent the different measures of firm risk mediate the effect of changes in passive ownership on loan spreads.[9] Overall, we find that changes in firm risk are a modest mediator of the overall effect. This pattern suggests that the increase in loan spreads following higher passive ownership is not fully explained by changes in observable measures of firm risk or the information environment, pointing to banks' monitoring efforts as an alternative potential channel.

Next, we examine whether the relationship between increased passive ownership and higher loan spreads reflects more intense monitoring by banks. We first examine financial covenant strictness using two measures: the distance to covenant thresholds in new loan contracts and the probability of covenant violations at loan initiation.[10] We find that higher passive ownership leads to stricter covenant terms and higher violation probabilities. As argued by Rajan and Winton (1995), stricter covenants suggest enhanced incentives for a bank to monitor.[11] We also examine text-based monitoring measures by analyzing loan contracts for specific provisions that indicate bank monitoring intensity. We search publicly available material contracts for keywords related to loan-to-value (LTV) covenants and field examinations. Our results show that both LTV covenants and field examinations become significantly more prevalent in loan contracts following increased passive ownership. Similarly, the loan share of lead arrangers – who typically perform the primary monitoring function (Sufi, 2007; Gustafson et al., 2021) – significantly increases with the share of passive investors. These results are consistent with the hypothesis of enhanced bank monitoring following a rise in the share of passive investors.

Our results remain robust to a battery of extensions and robustness tests. Among other tests, we provide evidence that our results are unlikely to be driven by banks exploiting their market power, as the changes in loan spreads do not vary with firms' previous bank connections. Furthermore, we find that downgraded firms experience a decrease in analyst coverage but that this change cannot account for the entire change in loan spreads.

[9]For mediation analysis, see Acharya et al. (2016); Lin et al. (2021); Doerr et al. (2022).

[10]A subset of the Federal Reserve's Shared National Credit Register (SNC) includes direct measures of monitoring. But, as Table 1 in Gustafson et al. (2021) shows, these measures are available only for about 3% of all loans in the SNC sample and among those, only 36% are from publicly traded firm.

[11]For reporting covenants, Gad and Kim (2019) find that increased passive ownership correlates with a higher likelihood of banks requiring an auditor's certificate of covenant compliance (ACC) in loan contracts, as banks anticipate more earnings management.

Taken together, we find evidence consistent with the interpretation that part of the rise in the loan spread in response to a higher share of passive funds reflects banks' enhanced efforts, and hence higher cost, of monitoring. Our paper highlights a so-far understudied side effect of the rise in index funds, namely a significant increase in bank loan spreads and thus firms' cost of credit.

Related literature and contribution. A substantial body of research examines the impact of passive funds on corporate governance, yielding mixed evidence. Brav et al. (2022) provide a review of the literature. Schmidt and Fahlenbrach (2017) and Heath et al. (2022) find that higher passive ownership leads to a stronger agency conflict between managers and shareholders, likely due to less monitoring by passive investors. Appel et al. (2016, 2019) and Adib (2019) find that higher passive ownership improves firms' governance, through, for instance, improving activists' board representation and facilitating their ability to engage in costly, value-enhancing forms of monitoring.[12]

The interaction between shareholder composition and firms' debt financing cost has received less attention. A notable exception are Lin et al. (2011). For a cross-section of European and Asian firms, they find that a larger divergence between cash-flow rights and control rights among shareholders is associated with higher bank loan spreads. The authors attribute their findings to tunneling and other moral hazard activities by large shareholders, which increase banks' credit risk and monitoring costs. Another important contribution is Cremers et al. (2007), who focus on institutional ownership and show that an increase in its share is associated with higher bond yields, especially when a firm has weak takeover protections.[13] Sunder et al. (2014) focus on hedge fund interventions and find that interventions that address governance-related issues due to managerial entrenchment lead to a reduction in syndicated loan spreads.

We contribute to this literature by showing that higher *passive ownership* leads to an increase in bank loan spreads. To establish this finding, we use granular loan level data and confirm results using an event study and plausibly exogenous variation from index

[12] A related literature using Russell reconstitutions before 2007 finds that higher institutional ownership is associated with higher dividend payments and share buybacks (Crane et al., 2016) and more management disclosure and analyst following (Boone and White, 2015).

[13] Liu and Wu (2023) show that removing a firm's anti-takeover protections leads to higher borrowing costs, while Chava et al. (2009) finds that firms with weaker take-over protection pay higher bank loan spreads. Finally, Huang and Petkevich (2016) show that a greater share of short-term institutional investors leads to higher bond yield spreads, while Roberts and Yuan (2010) find a negative correlation with bank loan spreads.

reconstitutions.[14] Moreover, we provide novel suggestive evidence that the increase in loan spreads is partly driven by banks' increased monitoring efforts.

2 Hypothesis development

The relationship between passive ownership and loan spreads is theoretically ambiguous. On the one hand, firms that are increasingly exposed to passive ownership may benefit from more favorable bank loan terms due to more conservative corporate policies in absence of active investors, e.g., due to less risk shifting (Jensen and Meckling, 1976). Conversely, passive ownership could increase loan spreads if passive shareholders are less capable of preventing managerial misbehavior, such as empire building or diversion (Jensen, 1986; Inderst and Müller, 1999; Brav et al., 2008).

Recent work on the effects of passive ownership on corporate governance and risk-taking paints a mixed picture. On the one hand, Heath et al. (2022) find that index funds monitor less than the active funds they replace, causing a deterioration in corporate governance as passive ownership rises. This reduced oversight can increase agency costs and lower firm performance (Schmidt and Fahlenbrach, 2017), thereby elevating the perceived risk for lenders. Kashyap et al. (2021) and Buss and Sundaresan (2023) highlight that passive owners' inelastic demand for stocks can induce firms to undertake riskier projects. Riskier projects may further raise credit risk, prompting lenders to demand higher loan spreads.[15] In contrast, Appel et al. (2019) argue that passive ownership improves firms' governance through highers activists' board representation and facilitating their ability to engage in monitoring.

Regardless of whether passive investors increase or decrease firm risk and spreads, we expect a more pronounced impact among firms whose active shareholders were more effective or important in monitoring before the rise in passive ownership. This includes firms with better corporate governance or with more concentrated institutional ownership

[14] Conversely, Haque et al. (2024) find that banks monitor firms backed by private equity investors less.

[15] Additionally, the liquidity advantage of exchange traded funds (ETFs) may increase the stock's exposure to demand shocks from high-frequency traders. Consistent with this argument, Ben-David et al. (2018) find that stocks with higher ETF ownership display significantly higher volatility. Such increased price volatility can be therefore perceived as an additional risk factor by lenders, leading to higher loan spreads.

(Bebchuk et al., 2009).[16] Likewise, we expect more pronounced effects among firms for which information asymmetries and agency concerns are more severe, for example smaller firms or those covered by fewer analysts (Boone and White, 2015). For these firms, as active shareholders are replaced by passive shareholders, firms' credit risk is expected to change more, and so is the loan spread.

A change in firm risk may also affect banks' monitoring efforts, so as to substitute for shareholder monitoring. For instance, in response to an increase in risk, banks may tighten loan covenants once they perceive the credit risk to increase.[17] Similarly, lead arrangers may hold a larger share of the loan for riskier firms, as they perform the primary monitoring function (Sufi, 2007; Gustafson et al., 2021).

But do banks actually respond to changes in ownership structure? In practice, banks appear to pay close attention to the shareholder composition of their borrowers. Anecdotal as well as empirical evidence on hedge fund interventions as well as rising institutional ownership suggests that banks adjust loan rates and other loan terms as firm ownership changes (Roberts and Yuan, 2010; Lin et al., 2011; Sunder et al., 2014). Consistent with these findings, many loan agreements include explicit "change-in-control covenants", which allow banks to recall or modify the loan if there is a significant shift in ownership or an unapproved change in board composition (see Griffith and Reisel (2017), Section I.B.1, for a detailed discussion). Although these clauses are generally viewed as protections against risk-increasing actions by activist investors, their inclusion shows that banks closely monitor borrowers' shareholder structure.[18] Finally, loan contracts often feature shareholder representation clauses, requiring firms to disclose any changes in shareholder composition to the bank, typically within 90 days.

In sum, if borrowers with a higher proportion of passive shareholders are likely riskier, we expect banks to charge higher loan spreads to compensate for the additional risk. Banks may also respond by reducing the loan size, shortening maturities, and requiring collateral more frequently. We would expect the opposite if an increase in passive shareholders lowers firm risk.

[16] Shareholders play a more significant role in well-governed firms because strong governance mechanisms ensure that their influence translates into effective oversight and decision-making. In contrast, in firms with weak governance, entrenched management may resist shareholder influence, reducing their impact.

[17] Consistent with this argument, Ferreira et al. (2018) document an increase in bank-affiliated board members following covenant violations.

[18] Billett et al. (2010) examine the impact of change-in-control covenants in bonds on takeover activity.

3 Data

In this section, we describe how we measure firms' passive ownership and our data on loan contract terms.

Passive ownership. Since May 2004, all mutual funds holding stocks traded on U.S. exchanges are required to report their portfolio holdings every quarter to the Securities and Exchange Commission (SEC) using Forms N-CSR and N-Q. Reported securities include all NYSE/Amex/Nasdaq, Toronto, and Montreal common stocks. We obtain these data from the Thomson Reuters ownership database (TFN) to compute mutual fund holdings of each stock as a percentage of its market capitalization.[19] However, the TFN datbase does not provide information on whether a fund is passively or actively managed.

We consider two complementary approaches to classify mutual funds into passive or active ones. First, following standard practice in the literature, we rely on the CRSP Mutual Fund Database index fund flag, classifying funds with flag "D" as passive. The CRSP Mutual Fund Database also allows us to identify funds that are classified as S&P 500 Index Objective Funds by Lipper.

Second, we follow Appel et al. (2016) and look for keywords in the CRSP fund name that suggest the fund is an index fund.[20] However, the CRSP Mutual Fund Database's coverage for non-U.S. mutual funds is incomplete. For instance, the TD U.S. Index Fund is a passively managed equity fund based in Canada, but not included in the CRSP Mutual Fund Database. To alleviate this type of omission bias, we repeat the name search of index funds on the TFN fund names. After classifying CRSP Mutual Fund Database funds as passive or active, we link them to the TFN data using the MFLINKS database by the Wharton Financial Institution Center.[21]

[19]The database is now branded as LSEG Mutual Fund Holdings Database (S12). We use the old name since it is more familiar.

[20]The name of an index fund typically contains words like index, idx, indx, mkt, market, russell, nasdaq, ishares, spdr, holdrs, etf, composite, wilshire, nyse, dow, jones, streetracks, kbw, stoxx, msci, ftse, morningstar, bloomberg, tracker, S&P, SP, DJ; or numbers like 100, 400, 500, 600, 1000, 1500, 2000, 3000, and 5000.

[21]First, we convert CRSP fund identifiers (crsp_fundno) to wficn codes using MFLINKS Table 1. Second, we convert TFN fund identifiers (fundno) to wficn codes using MFLINKS Table 2. *wficn* is a unique and permanent fund portfolio identifier. Each CRSP *fundno* has a single *wficn*, but a *wficn* may have more than one CRSP *fundno*. This is because the CRSP *fundno* covers cases where funds are offered

Finally, we classify a fund as passive if either approach identifies it as such. For each stock-quarter observation, we calculate market value using price and shares outstanding from TFN. When TFN data is unavailable, we use quarter-end values from CRSP instead. We also calculate the values held by each fund by multiplying the stock price and the shares the fund holds, which are then aggregated for the passive funds.

We define the *passive ownership* of a firm as the ratio between the total value held by passive funds and the market capitalization of that firm.[22]

Loan terms and covenants. Loan contract terms, such as spread, size, maturity, and whether a loan is secured by collateral, come from Thomson Reuters LPC's database (DealScan) on syndicated loans. Syndicated loans are issued jointly by a group of banks to a single borrower. The lending syndicate includes at least one lead bank (also called lead arranger) and usually further participant banks. Lead banks negotiate terms and conditions of deals, perform due diligence, and organize participants. Therefore, lead arrangers stand in direct contact with the borrower and retain larger loan shares for signaling purposes (Sufi, 2007). Participants are usually not in direct contact with the borrower, but merely supply credit.

Syndicated lending constitutes a significant share of banks' total lending to non-financial firms, and is an important source of financing for firms, in the U.S. and globally (Chodorow-Reich, 2014; Cerutti, Hale and Minoiu, 2015). In the United States, syndicated loan issuance grew from about $200 billion in the early 1990s to about $2 trillion today. For the average listed firm, around 45% of total long-term debt is comprised of syndicated loans (Doerr and Schaz, 2021). Not only does syndicated lending represent over 50% of U.S. banks' aggregate C&I lending, it also rivals other popular types of funding, including corporate bonds (about $2 trillion today), in outstanding amounts. Compared to other types of bank loans, syndicated loans are on average larger in volume and issued to larger borrowers.

As is standard, we focus only on lead arrangers, i.e., those lenders that are in charge on monitoring borrowers and loan performance. We identify lead arrangers by examining their roles and responsibilities in lending transactions. This includes checking for explicit

as different share classes but have the same portfolio holdings.

[22]When a firm has multiple stocks, we aggregate the market capitalization and passive-owned values across these stocks before calculating passive ownership.

lead arranger designations or roles such as "Lead Arranger", "Joint Arranger", and similar titles that indicate leadership in the syndication. Additionally, if there is only one lender in the transaction, we classify that lender as the lead arranger.

We aggregate loan tranches to the deal level by taking the earliest loan initiation date, the latest maturity date, and summing tranche amounts for the total deal size. We compute weighted averages, based on tranche size, for loan spreads and maturities. For our baseline dataset, we aggregate deals to the firm-year level, weighting variables by deal size if a firm enters several new loan contracts in a year. For covenants, we retain the most stringent thresholds across the different deals. We then match the loan contracts to Compustat using the Chava and Roberts (2008) cross-walk.

To measure the strictness of financial covenants at loan initiation we use two different measures: first, we use the simulation-based probability of a covenant violation data provided by Demerjian and Owens (2016). Second, we compute the distance between covenant thresholds and account variables, using the standard covenant definitions in Demerjian and Owens (2016), normalized by the backward-looking standard deviation of the accounting variable. Covenant tightness is then measured as the strictest among the different normalized distances to the covenant threshold.

Other data. We obtain firms' accounting data from Compustat, analyst coverage data from the Institutional Brokers' Estimate System (I/B/E/S), and the stock price volatility data from Alfaro et al. (2024). For our difference-in-differences research design, we construct the treated and control group using data from CRSP and Compustat to calculate firms' market capitalization before the Russell reconstitution, following Chang et al. (2015).

We collect firms' credit default swap (CDS) spread from Markit RED and match them with firms' loan spread to investigate the impact of Russell reconstitution on default risk. We also add Moody's expected default risk measures. To measure institutional ownership, we use 13-F filings data from the Thomson Reuters S34 database. Finally, we compute managers' entrenchment E-index, measuring the degree of take-over protections, as in Bebchuk et al. (2009) using corporate governance data from Institutional Shareholder Services (ISS). We winsorize all continuous variables at 1%. All variable definitions are in Table A1.

Descriptive statistics. We start with 7,481 firms and around 60,000 end-of-year passive ownership ratio observations at the firm-year level, spanning the years from 2006 until 2022. Reflecting the increasing popularity of passive index funds, firms' *passive ownership* increases by an average of one percentage point per year in our sample. Figure 1 shows how passive ownership for the median firm in the sample has increased from around 2.5% initially, to almost 20% at the end of our sample.[23] Table 1 provides further summary statistics. The average (median) loan spread is 209 bps (175 bps), with a standard deviation of 110.

4 Passive ownership and loan spreads

In this section, we examine the effect of increasing passive ownership on loan spreads empirically. We first provide evidence from an event study around stark increases in passive ownership to show that bank loan spreads increase after an increase in passive ownership. We then confirm these results with Russell index reconstitutions.

4.1 Event study around large increases in passive ownership

We start by focusing on firms that have experienced a sharp increase in passive ownership by over five percentage points. This threshold is high, as it corresponds to the top fifth percentile in the distribution of the change in firms' passive ownership. We remove changes preceded or followed by equally large decreases in passive ownership that are potentially driven by measurement error. This results in 2,345 events involving 1,813 firms. After matching the events to the loan data from DealScan, we are left with 3,418 observations and 998 increases among 795 firms.

We then compare spreads of syndicated loans three years before to spreads three years after the increase in passive ownership by running the following regression:

$$y_{it} = \phi_{ic} + \delta_t + \beta_1 \cdot I(\Delta\text{Passive Ownership} > 0.05)_{ic} + \epsilon_{ict},$$

[23] Only a handful of firms, accounting for less than 50 observations, do not have a bank loan but report non-missing bond CDS spreads. Therefore, restricting our attention to firms with at least one bank loan does not exclude a substantial group of firms.

where y_{it} is the outcome variable for firm i in year t, with ϕ_{ic} and δ_t representing firm-cohort and calendar-year fixed effects, respectively. Standard errors are clustered at the firm and year level.

Panel a) in Figure 2 first shows large increases in passive ownership around our identified events, around 5.5 percentage points on average. Due to the steady increase in passive ownership over our sample period across firms (see Figure 1), there is a similar positive trend before and after the event.

We then turn to banks' loan spread in Panel b) of Figure 2. There is no significant upward trend in loan spreads before year 0, i.e., before firms experience sharp increases in passive ownership. Interestingly, directly after a sharp increase in passive ownership, we observe a large and persistent increase in loan spreads. All coefficient estimates are statistically significant after the change in passive ownership occurs. In terms of magnitude, the coefficient estimates imply that a strong increase in passive ownership is associated with a 12 bps increase in the bank loan spread. This compares to the sample average of 190 bps. In Figure A1, we show that results are unchanged when using a five-year event window.

Our results from this event-study analysis could indicate that banks are concerned about an increase in passive ownership, supporting the hypothesis that creditors benefit from monitoring by active shareholders. However, the event-study results should not be interpreted as causal because increases in passive ownership are potentially driven by unobservable factors that could also drive the change in loan spreads. In the next section, we thus turn to the Russell index reconstitutions as an arguably exogenous source of variation in passive ownership.

4.2 Russell index reconstitutions

4.2.1 Institutional background and empirical approach

In this section, we explain how we use reconstitutions of the Russell 1000 and Russell 2000 indices to obtain variation in passive ownership. We follow the methodology in Heath et al. (2022) with an extended sample.[24]

[24]The Russell dataset differs from the event study dataset, as they only have 188 firms in common. The event study dataset includes an additional 715 firms not present in the Russell index reconstitutions

Russell index. The Russell 3000 index is a market capitalization-weighted benchmark that tracks the U.S. equity market. Launched in 1984, it comprises the largest 3,000 publicly traded U.S. stocks, representing approximately 97% of the total market value at inception. The index is subdivided into two additional indices: the Russell 1000, which tracks the largest 1,000 companies, and the Russell 2000, which covers the remaining 2,000 smaller companies. FTSE Russell reconstitutes all three indices annually each June to reflect changes in market values over the preceding year.

Before 2007, FTSE Russell reconstituted their indices each June based on a simple rule. After sorting listed companies by their May market capitalization, FTSE Russell assigned the largest 1,000 companies to the Russell 1000 index and the following 2,000 companies to the Russell 2000 index.

In June 2007, FTSE Russell introduced a banding assignment regime for the index reconstitution, which has made the outcome of reconstitution difficult to anticipate for firms. While the sorting procedure is unchanged, the banding regime creates an upper and lower band around the rank-1000 cutoff. The bands are calculated as $+/-2.5\%$ of the total market capitalization of the Russell 3000E Index, which extends the Russell 3000 by adding microcap stocks. Stocks within the bands do not switch indices. That is, if a stock that was in the Russell 2000 last year is above the rank-1000 cutoff but below the upper band, it will stay in the Russell 2000 the following year, and vice versa.

We use this new regime for a difference-in-difference research design following Heath et al. (2022). We start by replicating Table 3 of Heath et al. (2022) and then extend the whole sample to the end of 2022.

Russell reconstitutions as exogenous variation in passive ownership. For our analysis, we consider stocks ranked from -100 to $+100$ around the two bands each year. This yields two sets of treated and control stocks per year: stocks that switch indices (from either Russell 1000 to Russell 2000 or vice versa) after reconstitution constitute the treated group, while those that remain in their current index serve as controls.[25]

In our baseline regression, a firm is included three years before and after a (potential)

sample, while the Russell index reconstitutions sample includes 490 firms that are not part of the event study dataset.

[25] Heath et al. (2022) provide evidence that these stocks are very similar before the index reconstitution.

reclassification in year c, but we also report robustness checks with different window lengths. We then run the following regression:

$$\begin{aligned} y_{it} =& \phi_{ic} + \delta_t + \beta_1 \cdot I(R1000 \to R2000)_{ic} \cdot Post_{ct} \\ &+ \beta_2 \cdot I(R2000 \to R1000)_{ic} \cdot Post_{ct} + \beta_3 \cdot \overline{X}_{ic} \cdot Post_{ct} + \epsilon_{ict} \end{aligned}$$

where y_{it} is the outcome variable for firm i in year t, with ϕ_{ic} and δ_t denoting firm-cohort and calendar-year fixed effects, respectively. $\overline{X}_{ic}$ are pre-reconstitution average firm covariates, including size, book leverage, return on assets, market to book value, cash holdings, tangible assets, sales growth, and acquisitions. Including these control variables helps ensure that our results are not unduly influenced by firms with unique characteristics. Finally, $Post_{ct}$ is an indicator variable for years after the reconstitution.

The coefficients of interest are β_1 and β_2. They capture the outcomes of being either downgraded to Russell 2000 or upgraded to Russell 1000 due to a quasi-random assignment.[26]

Russell index reconstitution sample. Our index reconstitution sample includes about 7,000 observations from 557 different firms. We require firms to have at least one bank loan before and one after the reconstitution. For the baseline regression, we aggregate loans to the firm-year level, but in robustness tests we also use datasets at the loan-lead-arranger-year level.

In the baseline three-year window analysis, our sample includes 376 control and 300 treated firm-cohorts. All firms in the sample are potential index switchers, but only treated firms actually switch indices after reconstitution. The control group consists of 237 firm-cohorts that could be upgraded but remain in their index, and 139 that could be downgraded but stay. The treated group consists of 170 firm-chorts upgraded from Russell 2000 to Russell 1000, and 130 downgraded from Russell 1000 to Russell 2000.

Table A2 provides summary statistics for the Russell reconstitution sample. The average (median) loan spread is 190 bps (175 bps), with a standard deviation of 88.95, which is close to the values in the event study sample. The median loan amount is 800

[26]See Heath et al. (2022): "On average, stocks that move from the Russell 1000 to the Russell 2000 switch from being one of the smallest stocks in the Russell 1000 to one of the largest stocks in the Russell 2000. Because both indexes are market capitalization weighted stocks should experience an increase in ownership by index funds."

million U.S. dollars, and the median maturity is about five years. About half of the loans in the reconstitution sample are amendments of existing loans, and also about half of the loans are secured by collateral. Around 20% of firms in our sample have a high probability of violating their financial covenant in the next quarter after loan inceptions. Conditional on being positive, the median distance to the covenant threshold is around 1.5 standard deviations of the underlying accounting variable.

4.2.2 Results

In this section, we present results where we study the effect of quasi-random changes in passive ownership on loan spreads.

Reclassification and passive ownership. We start by verifying that firms' passive ownership indeed changes with index reclassification.

The results in Columns 1 and 4 of Table 2 show strong and highly statistically significant effects: A downgrade from the Russell 1000 to the Russell 2000 index leads to a two percentage points increase in passive ownership, whereas an upgrade leads to about 1.5 percentage points lower passive ownership. These changes in passive ownership are significant, irrespective of whether a three- or a five-year window is considered. The magnitude is comparable to the first stage coefficients reported by Heath et al. (2022). Panels a) and b) in Figure A3 show event plots for down- and upgrades. Passive ownership changes strongly and persistently in the year of the reclassification, and there is no evidence of pre-trends in the passive ratio before the reclassification.

The sudden change in passive ownership around reclassification events is consistent with the argument that reclassification is quasi-random and not under the control for the firm. To substantiate this point, in Figure A2 we also show balancing tests comparing the passive ownership and loan spreads one year before the reclassification takes place. Panels a) and b) of Figure A2 indicate that passive ownership does not differ significantly whether a firm's market value rank is above or below the upper or lower band in the year of the reclassification. Similarly, while there is substantial variation in loan spreads across the relative ranks, there does not appear to be a discontinuity at zero in Panels c) and d) of Figure A2.

Passive ownership and bank loan spreads. Because the Russell index reconstitution affects passive ownership, we now turn to the second-stage regressions and investigate loan spreads. Results in Column 2 of Table 2 suggest loan spreads increase after firms are downgraded and decreases after firms are upgraded. This result is robust to adding pre-reclassification averages of standard firm-level control variables in Column 3. Moreover, the magnitude of the coefficients remains similar when moving from a window size of three to five years around the reclassification event in Columns 4, 5 and 6.[27]

In terms of economic magnitude, the estimated coefficients reported in Column 3 suggest that downgrading is associated with an approximately 13% increase in loan spreads. The median and mean spreads are 175 and 190 bps, respectively. Starting at a median or mean spread, a downgrade causes a 23–24 bps increase in a firm's loan spread. Upgrading, on the other hand, has a negative impact on loan spreads, with a slightly lower economic magnitude compared to downgrading, almost proportional to the smaller change in passive ownership after an upgrade.[28]

Panels c) and d) in Figure A3 illustrate the evolution of loan spreads around reclassification events. Following a downgrade, loan spreads increase immediately, and continue to increase until two years after the reclassification (Panel c). For downgraded firms, loan spreads are around 25 basis points higher three years after the reclassification, compared with the value three years before the reclassification. The confidence intervals widen over time, suggesting increasing uncertainty in the estimates, but the trend remains consistently upward, indicating persistently higher borrowing costs after a downgrade. Similarly, firms that are upgraded from the Russell 2000 to the Russell 1000 index also experience significant changes in their loan spreads. As Panel d) in Figure A3 shows, loan spreads respond immediately to an upgrading reclassification. The change in loan spreads is most pronounced one year after the reclassification and stabilizes afterwards. Loan spreads have on average decreased by 17 basis points at the end of our six-year reclassification event window.

[27]Results are very similar when splitting the sample into a pre- vs post-2014 subsample.

[28]The changes are nearly proportional: In absolute values, the passive ratio change is $1.46/2.02 = 0.72$, while the loan spread changes are $0.1/0.15 = 0.67$ and $0.09/0.13 = 0.69$.

4.2.3 Heterogeneity based on prior shareholder oversight

Before exploring possible explanations for why loan spreads react to changes in passive ownership, we investigate whether our baseline effect is stronger among certain groups of firms. We expect a stronger effect for firms where active shareholders can have a greater impact before the reclassification. The effect may also vary with the amount of available information about a firm ex-ante.

To measure shareholders' possibility to act, we use three proxies for a firm's corporate governance quality. First, we use the pre-reclassification average managerial entrenchment index from Bebchuk et al. (2009). Since shareholder monitoring is likely to be more effective in firms with strong corporate governance, we expect that changes in passive ownership will have a stronger impact when governance is good. Columns 1 and 2 of Table 3 confirm this, showing that the effect of downgrades and upgrades on loan spreads is concentrated in firms with a low E-index—indicative of *better* ex-ante corporate governance. Second, Columns 3 and 4 show that the effect is only present among firms without shareholder rights plans before the event, i.e., a poison pill.[29] Finally, Columns 5 and 6 in Panel A of Table 3 present an additional sample split depending on the pre-event share of institutional ownership. Column 5 shows a larger and statistically significant effect for firms with a *higher* share of institutional ownership before reclassification, where shareholder monitoring is likely more effective.

In Panel B of Table 3, we use a firm's pre-treatment average book value of assets (firm size) and the number of equity analysts covering the firm as indicators of the information available about it. Columns 1 and 2 show that changes in loan spreads are somewhat more pronounced among *smaller* firms and, at least for downgrades, among firms with *lower* analyst coverage.

In sum, we find that loan spreads increase following rises in passive ownership and decrease when passive ownership falls. Our baseline results are primarily driven by firms characterized by strong ex-ante corporate governance. This is consistent with the notion that, in these firms, shareholders played an important role in monitoring prior to reclassification.

[29]While poison pills are part of the E-index, we examine them separately because, unlike other entrenchment provisions, poison pills hinder shareholders from exercising influence through takeover threats or control contests.

4.2.4 Robustness and extensions

We run separate regressions for downgrades and upgrades and find that the baseline results continue to hold in Table A3, even if the size and statistical significance of the estimates decreases somewhat compared to the baseline results. As before the estimates are unaffected by whether we use a three or a five-year window around the reclassification.

Next, we investigate the intensive margin, i.e., whether the impact on loan spreads after reclassifications varies with the actual change in passive ownership. In Figure A4, we show marginal effects from a regression where we interact the reclassification dummies with the level of passive ownership. Consistent with our finding being driven by the increase in passive ownership, in Figure A4, for downgrades, we find stronger effects the larger the change in passive ownership. For upgrades, we find no difference, however.

It is possible that firms obtain a loan from a different syndicate of banks after the reclassification, and while unlikely, this change in the bank syndicate could account for the difference in spreads. Columns 1 and 2 in Appendix Table A4 thus show coefficients estimated on loan-lead arranger-level data and include lead arranger - year fixed effects in addition to firm-cohort and calendar year fixed effects. With this specification, we exploit within lender-borrower variation. The change in loan spreads remains similar to our baseline effect, indicating that our finding is not driven by a change in the lender-borrower composition.

Gormley and Kim (2024) point out potential methodological problems in the specification used by Heath et al. (2022). In Table A5 we show that our results hold when applying the corrections suggested by Gormley and Kim (2024). In all columns of Table A5 we use the treatment variable suggested by Gormley and Kim (2024) and denoted by $R2000_{post} - R2000_{pre}$, which, different from the treatment variables used above, takes three values: one when a stock switches from Russell 1000 to Russell 2000, zero if the stock remains in the same index, and minus one if the stock switches from Russell 2000 to Russell 1000. We also interact the firm-cohort and year fixed effects with an indicator for the initial index of each firm. Results for both the passive share and loan spreads are similar in Column 2 in Panel A and B of Table A5 where we add a firm's pre-reclassification market value as of end of May each year as control. Similarly, Column 3 show almost no change when excluding firm-cohorts that are "contaminated", i.e., firms that switch indices twice within a given window, from the sample. Finally, we combine the adjust-

ments in Column 4 and find that the estimates are almost unchanged. We conclude that our results are robust to the methodological concerns in Gormley and Kim (2024).

In Panel B of Table A6 we re-run our baseline regression and include the share and concentration of institutional blockholders as additional controls to address the concern that the presence of blockholders, known to be monitoring firms (Shleifer and Vishny, 1986), confounds our results. The magnitude and statistical significance are almost unchanged compared to the baseline results.

Does the change in loan spreads translate into a change in firms' cost of debt? To answer this question, we re-run the baseline regression with a firm's interest expenses relative to its total debt as a dependent variable. Panel A of Table A6 shows, with one exception, statistically significant increases in interest payments after downgrades. The coefficients for upgrades are negative, but statistically less significant. These results suggest that the changes in loan spreads indeed affect firms' cost of debt.

Turning to firms' capital structure, we find that leverage increases slightly after downgrades and decreases after upgrades, but the magnitude of these changes—3.4 and –1.9 percentage points, or 0.17 and 0.1 standard deviations—is economically small. Looking at debt composition, there is a small reduction in new loans (as opposed to amendments of existing loans) that firms contract after downgrades, but we observe no change in the overall number of bank loans. Consistent with this, Capital IQ data show no change in the share of bank debt around reclassifications (based on 306 firms and 2,331 firm-years).

As we restrict our sample to firms with non-missing bond CDS spreads, the sample size drops considerably. Among the 557 firms, only 90 have CDS spread data (846 firm-year observations). Among the firms with outstanding bonds, the share of bond debt remains stable, though we only have data for 27 firms and 155 firm-years.

5 Examining the channels

In this section, we study two complementary explanations for the increase in bank loan rates after an increase in the share of passive investors. First, we analyze whether banks raise loan spreads due to perceiving firms with higher passive ownership as fundamentally riskier. Second, we investigate whether banks need to expend more resources on monitoring to compensate for reduced shareholder oversight. Directly disentangling these

channels is challenging. We thus explore how different measures of firm risk and monitoring intensity change following increases in passive ownership to offer evidence of their relative significance.

5.1 Risk channel

We first run regressions with different risk proxies as dependent variables and then include those variables as controls into our baseline regression to assess to what extent they mediate (i.e., explain) the overall effect of passive ownership on loan spreads.

Firm-level risk proxies. Our four proxies are the following. First, we consider a firm's expected default frequency over a six-month horizon as a forward-looking assessment of creditworthiness. Second and third, we use firms' realized and option-implied stock price volatility, which indicates expected price fluctuations. And fourth, we use the par spread from credit default swap (CDS) curves, which indicates market-implied credit risk.[30]

Columns 1 to 4 of Table 4 show that downgrades, i.e. an increase in the passive share, lead to higher default risk, higher implied and realized volatility, whereas upgrades have the opposite effect. In addition, Column 4 of Table 4 shows that bond CDS spreads decrease after an upgrade. The asymmetric impact of reclassifications on bond CDS spreads could indicate that part of the increase in loan spreads we observe for downgrades might be to cover banks' additional costs from monitoring, which we investigate in more detail below.

The estimate in Column 1 of Table 4 implies that a downgraded firm experiences an approximately 45% increase in expected default frequency. The average firm has an expected default frequency of only 0.8%, so this increase translates into a 0.36 percentage point increase.

Risk-related loan terms. Models of adverse selection suggest that firms with higher default probabilities rely more on collateralized borrowing (Rajan and Winton, 1995). Empirically, Strahan (1999) finds that riskier borrowers receive smaller loans with shorter

[30]CDS data are available only for a limited subset of firms despite our efforts to improve the matching. Bond CDS spreads arguably represent default risk only compared to loan spreads, with the caveat that bond holders free-ride on bank monitoring (Ma et al., 2019).

maturities and are more likely to pledge collateral. Similarly, Bharath et al. (2011) show that firms with longer banking relationships—indicating lower perceived risk—obtain larger loans with extended maturities.

In the lower panel of Table 4, we thus study the impact of a reclassification on loan size, maturity, and collateral. According to the first two columns, when firms are upgraded, banks not only provide cheaper loans but also increase the volume and maturity of loans. We find no corresponding effect after downgrades. Column 3 of the lower panel of Table 4 shows that after a downgrade the loan is more likely to be secured. This change is indicative of banks wanting to "tighten the leash" on the borrower. For upgrades, we find no effect on the likelihood of the loan being secured by collateral.

Mediation analysis. We now incorporate the risk variables directly into our baseline regression to examine their role as factors mediating the effect of passive ownership on bank loan spreads.[31] The estimates of the overall effect of the risk proxies in Table 5 are intuitive, i.e., higher expected default frequency and higher implied stock price volatility are associated with higher spreads.

The results of the interaction effects in the lower portion of Table 5 present a mixed picture: for downgrades, expected default and stock-price volatilities do not appear to serve as key mediating factors, as the estimates of the baseline coefficients remain statistically significant after their inclusion. For upgrades, changes in expected default frequency do not alter the baseline coefficient, while stock price volatility does seem to play an important mediating role. In the bond CDS regression, the absence of a significant effect may stem from limited statistical power due to the relatively small sample size.

We conclude that while firm risk changes in the expected direction, it does not account for the entire change in loan spreads observed after changes in the share of passive investors.

5.2 Monitoring channel

We now investigate whether changes in loan spreads are influenced by banks' monitoring efforts following changes in passive ownership. To the extent that active investors monitor

[31] For mediation analysis, see Acharya et al. (2016); Lin et al. (2021); Doerr et al. (2022).

firms, an increase in passive ownership should lead to higher expected monitoring costs for banks, while a decrease in passive ownership is likely to reduce these costs. To assess this relationship, we focus on variables that proxy bank monitoring, including financial covenants and other loan terms.

Financial covenants. We study financial covenant strictness because stricter covenants create stronger incentives for banks to engage in monitoring (Rajan and Winton, 1995). Financial covenants serve as tripwires for identifying potential changes in firm policy that may be detrimental to creditors.[32]

We use two different measures for covenant strictness.[33] First, we compute a firm's distance to all covenants included in a new loan contract and scale the distance to the accounting variable by the backward-looking, average pre-reclassification standard deviation of the underlying accounting variable. We then use the tightest covenant as our distance measure. We also include an indicator variable when the distance is negative and take logs when the distance is positive.

As a second measure we use an indicator variable for firms with a high, i.e., higher than 75%, probability of violating their financial covenants at loan initiation. We use the simulation-based probability measure from Demerjian and Owens (2016).

The results in the upper panel of Table 6 are consistent across all four columns: downgraded firms get tighter covenants (Columns 1 and 2), which have a higher ex-ante probability of violation (Columns 3 and 4). For upgrades, we do not find a statistically significant effect on covenant tightness. This could be because upgraded firms trade off stricter financial covenants against improvements in other loan terms, such as loan size and maturity, documented above. However, it is important to note that due to missing information about financial covenants in DealScan, the sample size for the analysis in the upper panel of Table 6 is smaller than the baseline results on spreads, reducing the power of our analysis substantially.

Text-based measures. Gustafson et al. (2021) find that the presence of loan-to-value

[32] Another category of covenants limits firms' capital expenditures. However, for our sample, DealScan contains only 245 non-missing observations for CAPEX covenants, which is insufficient for a meaningful analysis.

[33] Due to missing data on financial covenants, both measures are only available for a subset of our sample.

(LTV) covenants is correlated with their monitoring measures. In our sample, DealScan only reports missing values for LTV covenants. To address this, we directly examine the firms' loan contracts for the presence of LTV covenants. Additionally, we construct a measure of field examinations following the approach in Jiang et al. (2022).[34]

We use contract data from Adelson and Nyarko (2025), who provide a valuable service to the profession by making the material contracts of all U.S. public firms publicly available.[35] We match these contracts to the firms in our sample using the SEC's Central Index Key (CIK) and extract all agreements classified as "Equity, debt, and other securities" related to our firms. Each agreement is then searched for specific keywords to construct our variables: for the *field examinations* measure (following Jiang et al. (2022)), we search for *field exam*, *inspections*, *asset appraisal*, and *collateral appraisal*; for the LTV indicator, we search for *loan-to-value* or *loan to value*. These measures are then aggregated across firms and years before we match them to our main sample. LTV covenants are rare, appearing in only 2% of our sample, whereas our field examination indicator is present in 32% of firm-years.

Results are presented in Table 7. Column 1 shows that loan contracts are significantly more likely to include LTV covenants following downgrades, and, conversely, less likely after upgrades. This aligns with our previous findings on financial covenants and suggests that banks increase monitoring when passive ownership rises. Columns 2 and 3 indicate that field examinations are both more likely and more frequently mentioned in loan contracts after downgrades, whereas no significant change is observed following upgrades.

Overall, our results suggest that banks tighten financial covenants as the share of passive ownership increases.[36]

Loan syndicate structure. The share retained by lead arrangers has been shown to act as a tool to mitigate asymmetric information in the syndicated loan market (Sufi, 2007; Ivashina, 2009). In the following, we test whether syndicate size and lead-shares are changing after changes in the passive ownership.

[34] Additionally, Gustafson et al. (2021) find that more monitoring is associated with credit line draw-downs. Unfortunately, the draw-down data were available for only a handful of firms.

[35] https://mcc.law.stanford.edu/search/

[36] This stands in contrast to Lin (2022), who finds that banks impose less restrictive financial covenants on firms with a higher share of common stock ownership. This divergence in findings indicates that our results are unlikely to be driven by a simultaneous increase in common ownership.

Consistent with monitoring by banks becoming more important, in the lower panel of Table 6, we find that the syndicate size decreases, whereas the share of lead-arrangers increases significantly in new loans issued after a firm is downgraded, and vice-versa for upgrades.[37]

Overall, we find evidence that banks' cost of monitoring is affected by the share of passive ownership. After downgrades, but not upgrades, banks set tighter covenants, lend in smaller syndicates, and lead-banks retain a larger share.

5.3 Examining alternative explanations

In this section, we explore whether bank market power or changes in analyst coverage after reclassification can account for our results.

Bank market power. An alternative explanation for our finding is that banks may exploit their market power when firms are downgraded, whereas an upgrade could intensify bank competition, benefiting the firm. We explore this in Figure A5, which presents our treatment dummies interacted with the number of lead arranger banks a firm was connected to over the previous five years, measured in the year before the reclassification. If banks took advantage of downgraded borrowers' deteriorated situation, we would expect a stronger increase in loan spreads for firms with few bank connections. If anything, Figure A5 shows that the effect on loan spreads we find is stronger in both directions the more bank connections a bank has, thus making an explanation based on competition not very likely.

Analyst coverage. Index reclassification can alter the amount of public information available about a firm. As a proxy for public information, we use the log number of equity analysts following a firm, which reflects the level of market attention and information available. Boone and White (2015) find that firms at the top of the Russell 2000 index relative to those at the bottom of the Russell 1000 have more equity analysts following, lower levels of information asymmetry, and higher stock liquidity.

The coefficients in Column 1 of Table A7 show that after downgrades, the number of

[37] Due to missing data about lender-shares the sample size is reduced.

analysts decreases, and vice-versa for upgrades, the opposite of what Boone and White (2015) find. This discrepancy is likely due to the different sample period and the changed methodology. We do not find statistically significant changes at the extensive margin, i.e., whether any analyst follows a firm.

Similar to the mediation analysis with the risk variables, we directly include the log number of analysts in our baseline regression as a control. Column 2 of Table A7 indicates that the increase in loan spreads after downgrades does not appear to be driven by the decrease in the number of analysts. Conversely, controlling for analysts does affect the impact on loan spreads after upgrades, which is no longer statistically significant.

6 Conclusion

In this paper, we study how changes in passive ownership affect bank loan spreads. Using an event study and difference-in-differences research design, we find that increases in passive ownership lead to higher loan spreads. This effect is most pronounced for firms with strong ex-ante corporate governance, where shareholder oversight is likely more effective.

Our analysis of potential mechanisms suggests that the change in loan spreads is due to an increase in firms' risk and banks' enhanced monitoring efforts.. In particular, we document that increases in passive ownership are associated with higher default risk, implied volatility, and lower analyst coverage. However, these factors only partially mediate the effect on loan spreads. The change in passive ownership affects banks' monitoring costs. Specifically, we show that downgrades to the Russell 2000 index are accompanied by tighter financial covenants, smaller loan syndicates, and a higher lead-arranger share, all of which are suggestive of higher monitoring efforts by banks.

Overall, our findings highlight that recent changes in the shareholder base can have significant implications for a firm's cost of debt, and that creditors appear to view passive shareholders as less effective in monitoring compared to their active counterparts. This suggests that the growth of passive investing may have broader consequences for firm financing by affecting how firms are monitored and the scope of bank monitoring.

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Table 1: Summary statistics

	Mean	Median	Std.Dev.	Obs
Passive Ratio (*in %*)	14.31	12.86	9.23	2747
Loan terms (DealScan)				
Collateral	0.53	0.76	0.48	2988
Distance (*log*)	0.46	0.59	1.58	891
High Violation Probability	0.21	0.00	0.41	847
Loan Size (*millions*)	1098.60	600.00	1452.83	2988
Loan Spread (*bps*)	209.33	175.00	110.53	2988
Maturity (*months*)	51.52	59.14	15.63	2988
Syndicate Size	7.77	6.99	5.40	2988
Analysts (*log*)	1.91	1.95	0.77	2821
Blockholder Share	0.30	0.30	0.15	2680
CDS Spread (*log*)	5.18	5.11	0.83	390
Other variables				
E-Index	3.46	3.00	0.90	1828
Exp. Default (*log*)	−0.04	−0.03	0.98	2492
Institutional Share	0.82	0.88	0.25	2680
Interest Expense (*in %*)	0.13	0.05	0.89	2529
Implied Volatility	0.39	0.37	0.14	2002
Poison Pill	0.11	0.00	0.31	1835
Control variables (Compustat)				
Book Leverage	0.30	0.29	0.20	2988
Firm Size (*log*)	7.48	7.44	1.34	2988
Return on Assets	0.13	0.12	0.09	2988
Market-to-Book	1.67	1.37	0.99	2988
Cash-to-Assets	0.10	0.06	0.11	2988
Tangible Share	0.31	0.23	0.26	2988
Sales Growth	0.10	0.06	0.20	2988
Acquisition	0.06	0.01	0.14	2988

Notes: Summary statistics for the firms in the event study sample. The sample runs from 2004 to 2022. Each firm is included for three years before and after the reclassification event. All continuous variables are winsorized at 1%. Variable definitions are in Appendix A1.

Table 2: Index switching and loan spreads

	A. ± Three Years		
	(1)	(2)	(3)
	Passive Ratio	Loan Spread	Loan Spread
R1000 → R2000 · Post	2.02***	0.15***	0.13**
	(0.44)	(0.04)	(0.05)
R2000 → R1000 · Post	−1.46***	−0.10***	−0.09**
	(0.30)	(0.03)	(0.04)
R^2	0.92	0.69	0.70
Observations	4964	3208	2645
Controls			✓

	B. ± Five Years		
	(4)	(5)	(6)
	Passive Ratio	Loan Spread	Loan Spread
R1000 → R2000 · Post	2.02***	0.17***	0.14***
	(0.48)	(0.03)	(0.04)
R2000 → R1000 · Post	−1.32***	−0.10***	−0.08**
	(0.31)	(0.03)	(0.04)
R^2	0.89	0.63	0.64
Observations	7796	4944	4109
Controls			✓

Notes: This table presents differences-in-differences estimates of the effects of Russell index reclassifications on the share of passive stock ownership, expressed in percent, in Columns 1 and 4, and the log loan spread in Columns 2, 3, 5, and 6. Firms within a +/-100-rank window of the event year's Russell upper and lower bands are included. In Panel A, three years before and after the event year are included, whereas Panel B includes five years of data. *R1000 → R2000* equals one if a firm switches from the Russell 1000 to the Russell 2000, whereas *R2000 → R1000* equals one if a firm switches from the Russell 2000 to the Russell 1000. *Post* is an indicator variable that equals one after index reconstitution. All regressions include firm times cohort fixed effects. Columns 3 and 6 also include pre-reclassification averages of firm size, return on assets, cash to assets, tangible share, sales growth, and book leverage interacted with the *Post* indicator as control variables. Robust standard errors clustered at the firm and year level in parentheses.

Table 3: Index switching: Heterogeneity by firm characteristics

A. Corporate Governance

DV: Loan Spread	E-Index		Poison pill		Inst. Share	
	(1)	(2)	(3)	(4)	(5)	(6)
	Low	High	Low	High	High	Low
R1000 → R2000 · Post	0.20***	0.10	0.20***	0.02	0.20***	0.10
	(0.05)	(0.10)	(0.05)	(0.12)	(0.04)	(0.08)
R2000 → R1000 · Post	−0.11**	−0.10	−0.11**	−0.08	−0.16***	−0.05
	(0.05)	(0.08)	(0.05)	(0.11)	(0.03)	(0.05)
R^2	0.69	0.69	0.69	0.69	0.66	0.72
Observations	929	810	1438	304	1511	1550

B. Information

DV: Loan Spread	Size		Analysts	
	(1)	(2)	(3)	(4)
	Low	High	Low	High
R1000 → R2000 · Post	0.13**	0.16**	0.23***	0.11*
	(0.06)	(0.06)	(0.05)	(0.06)
R2000 → R1000 · Post	−0.10***	−0.06	−0.02	−0.19***
	(0.03)	(0.05)	(0.04)	(0.04)
R^2	0.71	0.68	0.73	0.65
Observations	1429	1779	1693	1488

Notes: This table shows differences-in-differences estimates of the effects of Russell index reclassification on log loan spreads, splitting the firm-level sample depending on pre-reclassification firm characteristics. *Low* and *High* indicate above and below median values depending on the pre-treatment average of a firm's E-Index, presence of a Poison Pill, share of institutional ownership, firm size, and number of equity analysts following a firm. All regressions include firm times cohort, and year fixed effects. Robust standard errors clustered at the firm and year level in parentheses.

Table 4: Index switching: Risk measures

A. Firm-Level

	(1) Exp. Default	(2) Implied Vol.	(3) Realized Vol.	(4) CDS Spread
R1000 → R2000 · Post	0.45***	0.07***	0.08***	0.07
	(0.07)	(0.01)	(0.02)	(0.10)
R2000 → R1000 · Post	−0.16***	−0.02***	−0.03**	−0.25**
	(0.04)	(0.01)	(0.01)	(0.12)
R^2	0.81	0.81	0.74	0.77
Observations	4702	3506	3691	738

B. Loan Terms

	(1) Maturity	(2) Loan Size	(3) Collateral
R1000 → R2000 · Post	0.96	−0.11	0.11***
	(1.58)	(0.10)	(0.04)
R2000 → R1000 · Post	2.17*	0.23***	0.00
	(1.17)	(0.06)	(0.03)
R^2	0.50	0.67	0.77
Observations	3286	3286	3286

Notes: This table shows differences-in-differences estimates of the effects of Russell index reclassification on four different firm-level risk measures as outcome variables (Panel A) and risk-related loan terms (Panel B). *Exp. Default* is the log expected default frequency at six months, *Implied Vol.* and *Realized Vol.* are the option-implied and realized stock price volatility measures from Alfaro et al. (2024), and *CDS Spread* is the log bond CDS spread. *Loan Size* is the log loan size, *Maturity* the loan maturity in months, and *Collateral* indicates whether the loan is secured. All regressions include firm times cohort, and year fixed effects. Robust standard errors clustered at the firm and year level in parentheses.

Table 5: Index switching: Risk measures - mediation analysis

DV: Loan Spread				
	(1)	(2)	(3)	(4)
X=	Exp. Default	Implied Vol.	Realized Vol.	CDS Spread
X	0.13***	1.06***	0.63***	0.03
	(0.03)	(0.25)	(0.13)	(0.05)
R1000 → R2000 · Post	0.12**	0.30**	0.27***	0.32
	(0.05)	(0.12)	(0.07)	(0.32)
R2000 → R1000 · Post	−0.08*	−0.13	−0.09	0.34
	(0.04)	(0.13)	(0.08)	(0.45)
R1000 → R2000 · Post · X	−0.07	−0.47	−0.34**	−0.04
	(0.06)	(0.30)	(0.15)	(0.06)
R2000 → R1000 · Post · X	−0.03	0.24	0.07	−0.09
	(0.05)	(0.35)	(0.19)	(0.07)
R^2	0.71	0.70	0.72	0.76
Observations	2569	1920	2009	430

Notes: This table shows differences-in-differences estimates of the effects of Russell index reclassification on log loan spreads with the risk measures included as mediating factors. *Exp. Default* is the log expected default frequency at six months, *Implied Volatility* is option-implied stock price volatility measure from Alfaro et al. (2024), and *CDS Spread* is the log bond CDS spread. All regressions include firm times cohort and year fixed effects. Robust standard errors clustered at the firm and year level in parentheses.

Table 6: Index switching: Bank monitoring

A. Financial Covenants

	(1) Distance to Violation	(2) Distance to Violation	(3) High Violation Probability	(4) High Violation Probability
R1000 → R2000 · Post	−0.38**	−0.34*	0.17*	0.17
	(0.17)	(0.17)	(0.10)	(0.10)
R2000 → R1000 · Post	0.03	−0.07	0.00	0.03
	(0.18)	(0.18)	(0.07)	(0.06)
Negative Distance · Post	0.42**	0.13		
	(0.15)	(1.41)		
R^2	0.75	0.75	0.67	0.64
Observations	1345	1273	747	681
Controls		✓		✓

B. Other Loan Terms

	(1) Syndicate Size	(2) Syndicate Size	(3) Log Lead-Share	(4) Lead-Share
R1000 → R2000 · Post	−1.07**	−1.02*	0.45***	6.17**
	(0.51)	(0.54)	(0.14)	(2.68)
R2000 → R1000 · Post	1.21**	1.17**	−0.18*	−5.75**
	(0.45)	(0.51)	(0.10)	(2.58)
Loan Size	1.89***	1.57***		
	(0.20)	(0.22)		
R^2	0.57	0.58	0.73	0.63
Observations	3335	2739	1787	1790
Controls		✓		

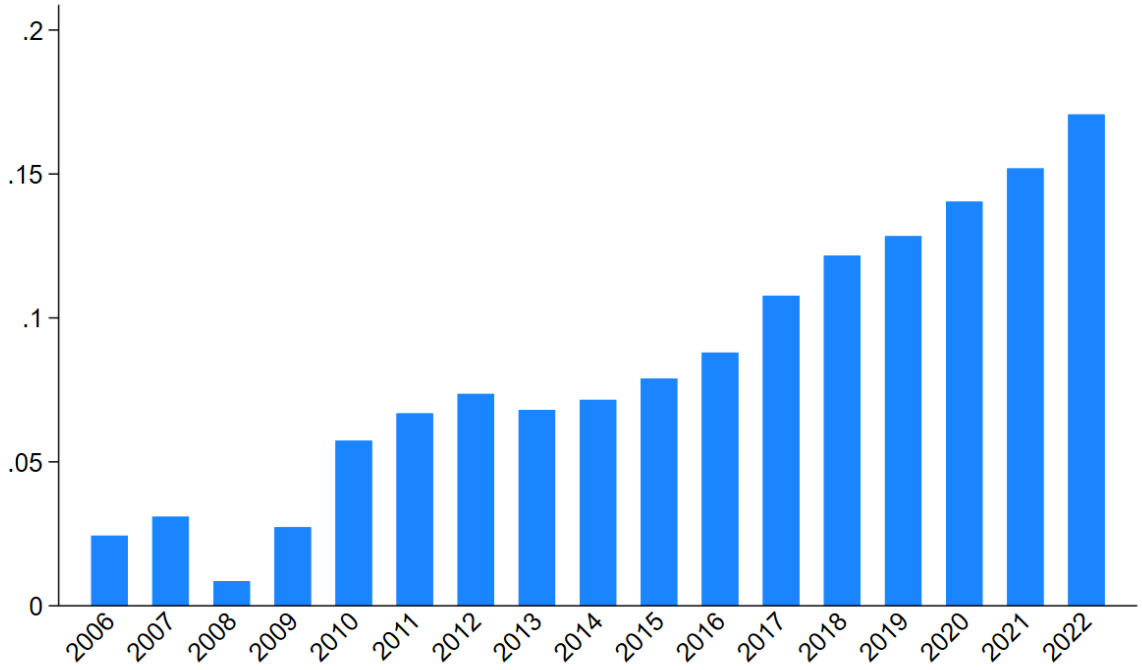
Notes: This table shows differences-in-differences estimates of the effects of Russell index reclassification on financial covenant strictness (Panel A) and other loan terms (Panel B). *Distance to Violation* is the normalized log distance between a firm's tightest financial covenant and the corresponding accounting variable when this distance is positive. *Negative Distance* indicates firm years where the firm violates at least one financial covenant. *High Violation Probability* indicates a covenant violation probability exceeding 75% at loan initiation. *Syndicate Size* is the number of banks in the lender syndicate, and *Lead-Share* is the loan share retained by the lead arranger. All regressions include firm times cohort, and year fixed effects. Robust standard errors clustered at the firm and year level in parentheses.

Table 7: Index switching: Text-based loan term measures

	(1) LTV Covenant	(2) Field Examination	(3) Any Field Examination
R1000 → R2000 · Post	0.03*	0.07**	0.12***
	(0.01)	(0.03)	(0.04)
R2000 → R1000 · Post	−0.02***	0.02	0.02
	(0.01)	(0.02)	(0.02)
R^2	0.48	0.50	0.52
Observations	3595	3595	3595

Notes: The table presents differences-in-differences estimates of the effects of Russell index reclassifications on *LTV Covenant*, which indicates the presence of at least one loan-to-value covenant in a material securities contract of a firm in one year, and *Field Examination*, which indicates the mention of direct monitoring through an on-site visit in a contract. All regressions include firm times cohort fixed effects. Robust standard errors clustered at the firm and year-level in parentheses.

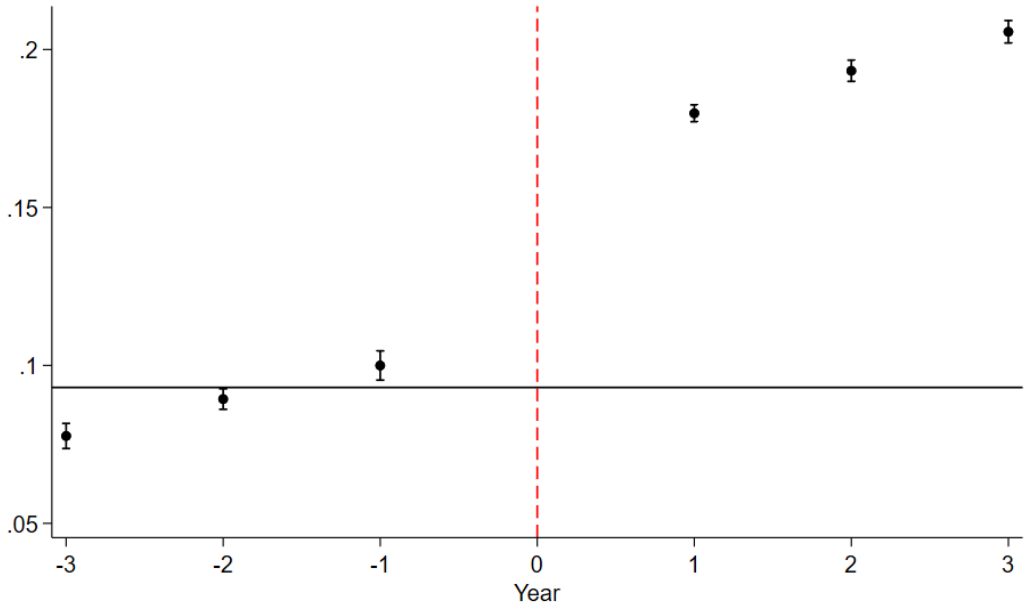
Figure 1: Passive ratio



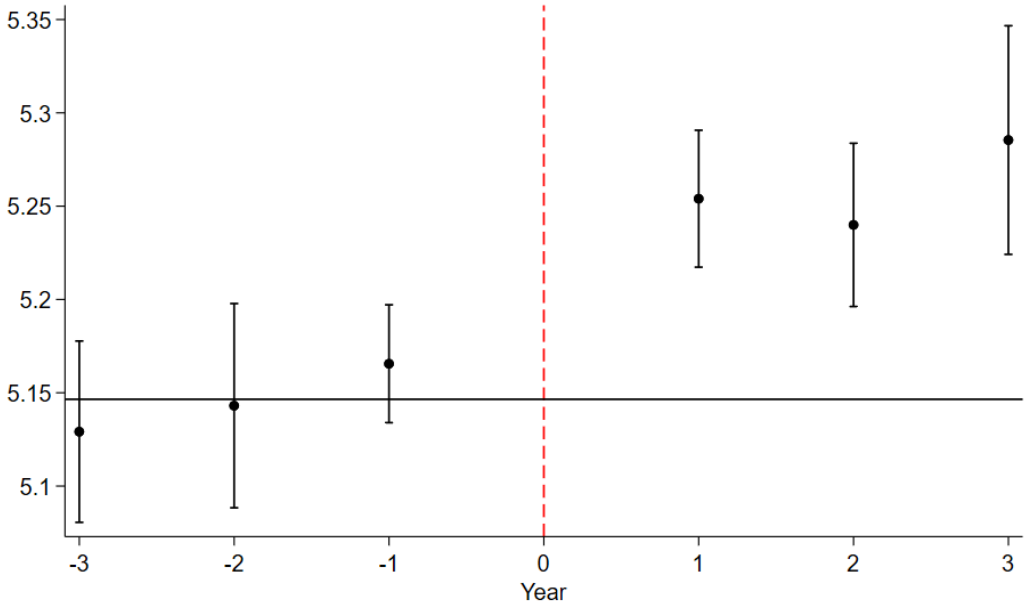
Notes: This figure shows the share of passive ownership at the median firm in the full sample. The sample includes firms with non-missing Thomson-Reuters Fund ownership data about mutual fund holdings and market value from CRSP-Compustat. See Section 3 for the details of how a fund is classified as passive.

Figure 2: Event study

(a) Passive ratio



(b) Loan spread



Notes: This figure shows event study plots presenting the evolution of a firm's passive ownership ratio in Panel a), and a firm's bank loan spread (in logs) in Panel b), three years before and three years after a large increase in passive ownership. The solid vertical lines represent pre-increase averages. Large increases are changes in the passive ownership ratio exceeding the 95th percentile of the variable's cross-sectional distribution. The coefficients are from a regression with calendar-year and firm-episode fixed effects. 95% confidence intervals based on robust standard errors clustered at the firm and year level.

A Appendix

Table A1: Variable definitions

Passive ratio	The share of passive index funds in total shares (Thomson-Reuters).
Loan terms (DealScan)	
Collateral	Indicator for a loan secured by collateral.
Distance	Log distance between a covenant threshold and the accounting variable, scaled by the backward-looking standard deviation of the accounting variable.
High violation probability	Indicator if the probability of covenant violation by Demerjian and Owens (2016) exceeds 75%.
Lead-share	Loan share provided by lead arranger.
Loan size	Log loan size, in millions.
Loan spread	Log all-in-spread-drawn, in bps.
Maturity	Maturity, in months.
Syndicate size	Number of banks in the syndicate.
Other variables	
Analysts	Log number of equity analysts following a firm (IBES).
Blockholder share	Share of blockholder ownership ($> 5\%$, Thomson-Reuters 13F).
CDS spread	Log par spread associated with the contributed CDS curve (Markit).
E-Index	Managerial entrenchment index (ISS governance).
Exp. default	Log expected default frequency at six months (Moody's).
Institutional share	Share of institutional ownership (Thomson-Reuters 13F).
Interest expense	Interest & related expense (xint) divided by total debt (Compustat).
Option implied volatility	Option-implied stock price volatility (Alfaro et al., 2024).
Poison pill	Presence of a shareholder rights plan (ISS governance)
Control variables (Compustat)	
Acquisition	Acquisitions (aqc) scaled by total assets.
Book leverage	Total debt scaled by total assets.
Cash to assets	Cash and short-term investments (che) scaled by total assets.
Firm size	Log total assets.
Market to book	Market value scaled by total assets.
Return on assets	Ratio of operating income before depreciation (oibdp) divided by lag total assets.
Sales growth	Growth rate of sales (sale).
Tangible share	Property, plant, and equipment (ppent) divided by total assets.

Table A2: Summary statistics

	Mean	Median	Std.Dev.	Obs
Passive Ratio (*in %*)	12.56	11.71	7.90	2753
Loan terms (DealScan)				
Collateral	0.47	0.33	0.48	3346
Distance (*log*)	0.33	0.36	1.63	1071
High Violation Probability	0.17	0.00	0.37	967
Loan Size (*millions*)	1211.29	800.00	1291.41	3346
Loan Spread (*bps*)	190.17	175.00	88.95	3346
Maturity (*months*)	52.25	59.19	14.88	3346
Syndicate Size	9.12	8.00	6.21	3346
Other variables				
Analysts (*log*)	2.01	2.08	0.71	3215
Blockholder Share	0.28	0.28	0.15	2987
CDS Spread (*log*)	5.43	5.36	0.77	467
E-Index	3.41	3.00	0.90	1864
Exp. Default (*log*)	−0.22	−0.20	0.88	2743
Institutional Share	0.84	0.89	0.23	2987
Interest Expense (*in %*)	5.48	5.12	2.58	2876
Implied Volatility	0.38	0.35	0.13	2140
Poison Pill	0.11	0.00	0.31	1866
Control variables (Compustat)				
Book Leverage	0.32	0.30	0.20	3346
Firm Size (*log*)	7.84	7.83	0.87	3346
Return on Assets	0.14	0.13	0.08	2967
Market-to-Book	1.77	1.48	1.04	3188
Cash-to-Assets	0.11	0.06	0.12	3346
Tangible Share	0.30	0.21	0.27	2980
Sales Growth	0.14	0.08	0.21	3345
Acquisition	1.32	0.01	33.69	3291

Notes: Summary statistics for the firms in the Russell index reconstitution sample. The sample runs from 2004 to 2022. Each firm is included for three years before and after the reclassification event. All continuous variables are winsorized at 1%. Variable definitions are in Appendix A1.

Table A3: Index switching: Separate regressions for upgrades and downgrades

A. ± Three Years

	(1) Passive Ratio	(2) Passive Ratio	(3) Loan Spread	(4) Loan Spread
R1000 → R2000 · Post	1.38***		0.08*	
	(0.43)		(0.05)	
R2000 → R1000 · Post		−1.16***		−0.06*
		(0.25)		(0.03)
R^2	0.92	0.93	0.70	0.69
Observations	1763	3201	1080	2128

B. ± Five Years

	(1) Passive Ratio	(2) Passive Ratio	(3) Loan Spread	(4) Loan Spread
R1000 → R2000 · Post	1.27**		0.08**	
	(0.50)		(0.04)	
R2000 → R1000 · Post		−0.99***		−0.06**
		(0.28)		(0.03)
R^2	0.88	0.90	0.63	0.64
Observations	2769	5027	1672	3272

Notes: This table presents differences-in-differences estimates of the effects of Russell index reclassifications on the share of passive stock ownership, expressed in percent, in Columns 1 and 4, and the log loan spread in Columns 2, 3, 5, and 6. In contrast to Table 2, the estimates come from separate regressions for firms around the lower and upper band. All regressions include firm times cohort fixed effects. Robust standard errors clustered at the firm and year level in parentheses.

Table A4: Index switching: Loan–lender-level regressions

	± **Three Years**		± **Five Years**	
	(1)	(2)	(3)	(4)
	Loan Spread	Loan Spread	Loan Spread	Loan Spread
R1000 → R2000 · Post	0.13***	0.12***	0.15***	0.11***
	(0.04)	(0.04)	(0.03)	(0.04)
R2000 → R1000 · Post	−0.07**	−0.07**	−0.08***	−0.06*
	(0.03)	(0.03)	(0.02)	(0.03)
R^2	0.74	0.74	0.71	0.71
Observations	12006	12006	17555	14418
Controls		✓		✓
Lender-Year FE	✓	✓	✓	✓

Notes: This table presents differences-in-differences estimates of the effects of Russell index reclassifications on the share of passive stock ownership, expressed in percent, in Columns 1 and 4, and the log loan spread in Columns 2, 3, 5, and 6. In contrast to Table 2, the data are at the loan-leadarranger level. All regressions include firm times cohort, and leadarranger-year fixed effects. Columns 2 and 4 also include pre-reclassification averages of firm size, return on assets, cash to assets, tangible share, sales growth, and book leverage interacted with the *Post* indicator as control variables. Robust standard errors clustered at the firm, year, and lead-arranger level in parentheses.

Table A5: Index switching: Robustness tests following Gormley and Kim (2024)

A. DV: Passive Ratio

	(1) Passive Ratio	(2) Passive Ratio	(3) Passive Ratio	(4) Passive Ratio
Post · $R2000_{post} - R2000_{pre}$	1.30***	1.24***	1.53***	1.47***
	(0.25)	(0.24)	(0.32)	(0.30)
log market value		−0.80***		−0.68***
		(0.21)		(0.22)
R^2	0.93	0.93	0.92	0.92
Observations	4964	4898	3666	3608
Controls			One-time	One-time

B. DV: Loan Spread

	(1) Loan Spread	(2) Loan Spread	(3) Loan Spread	(4) Loan Spread
Post · $R2000_{post} - R2000_{pre}$	0.08**	0.07**	0.09**	0.08**
	(0.03)	(0.03)	(0.03)	(0.03)
log market value		−0.07***		−0.08***
		(0.02)		(0.02)
R^2	0.72	0.73	0.73	0.74
Observations	3207	2963	2430	2224
Controls			One-time	One-time

Notes: The table presents differences-in-differences estimates of the effects of Russell index reclassifications on the share of passive stock ownership, expressed in percent, in Panel A, and the log loan spread in Panel B. $R2000_{post} - R2000_{pre}$ equals one if a stock switches from Russell 1000 to Russell 2000, zero if the stock remains in the same index, and minus one if the stock switches from Russell 2000 to Russell 1000, as defined in Gormley and Kim (2024). *One-time* excludes firm episodes of firms with more than one reclassification and *log market value* is the firm's market value as of end of May in each year. *Post* is an indicator variable that equals one after index reconstitution. All regressions include stock-by-cohort-by-pre-cohort-assignment and cohort-by-year-by-pre-cohort-assignment Russell index fixed effects. Robust standard errors clustered at the firm and year level in parentheses.

Table A6: Index Switching: Total interest expense and ownership controls

A. Total Interest Expenses

	(1) Int.Exp.	(2) Int.Exp.	(3) Log Int.Exp.	(4) Log Int.Exp.
R1000 → R2000 · Post	0.53**	0.67***	1.33**	1.67**
	(0.20)	(0.23)	(0.60)	(0.73)
R2000 → R1000 · Post	−0.30	−0.23	−1.16*	−1.19
	(0.18)	(0.23)	(0.66)	(0.83)
R^2	0.57	0.56	0.48	0.46
Observations	5656	4665	5656	4665
Controls		✓		✓

B. Ownership Controls

	(1) Loan Spread	(2) Loan Spread
R1000 → R2000 · Post	0.15***	0.13**
	(0.04)	(0.05)
R2000 → R1000 · Post	−0.10***	−0.08*
	(0.03)	(0.04)
Blockholder HHI · Post	0.00	−0.12
	(0.17)	(0.24)
Blockholder Share · Post	−0.10	0.45
	(1.26)	(1.55)
R^2	0.69	0.70
Observations	3061	2595
Controls		✓

Notes: This table presents differences-in-differences estimates of the effects of Russell index reclassifications on the firms' total interest expenses, in Panel A, and the log loan spread in Panel B. In contrast to Table 2, the regressions in Panel B include the pre-reclassification blockholder share and concentration. All regressions include firm times cohort fixed effects, and year fixed effects. Robust standard errors clustered at the firm and year level in parentheses.

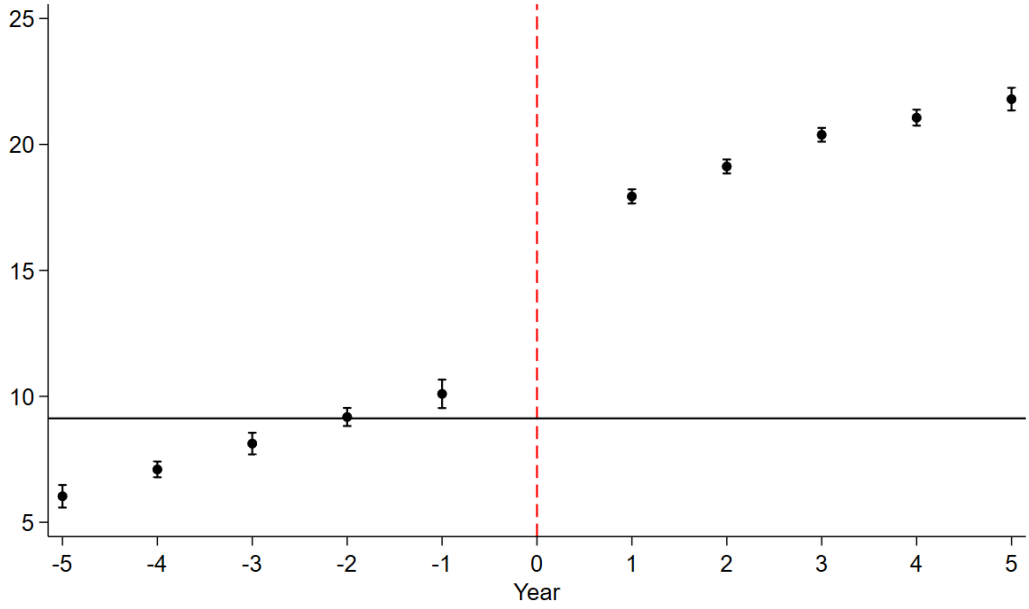
Table A7: Index switching: Analyst coverage

	Log Analysts		Any Analyst	
	(1)	(2)	(3)	(4)
	Analysts	Loan spread	Analysts	Loan spread
R1000 → R2000 · Post	−0.27***	0.34***	0.01	0.02
	(0.03)	(0.09)	(0.02)	(0.13)
R2000 → R1000 · Post	0.16***	0.02	0.01	0.06
	(0.03)	(0.09)	(0.02)	(0.11)
R1000 → R2000 · Post · Analysts		−0.09*		0.14
		(0.05)		(0.13)
R2000 → R1000 · Post · Analysts		−0.05		−0.15
		(0.04)		(0.11)
R^2	0.80	0.70	0.62	0.69
Observations	6515	3075	7168	3208

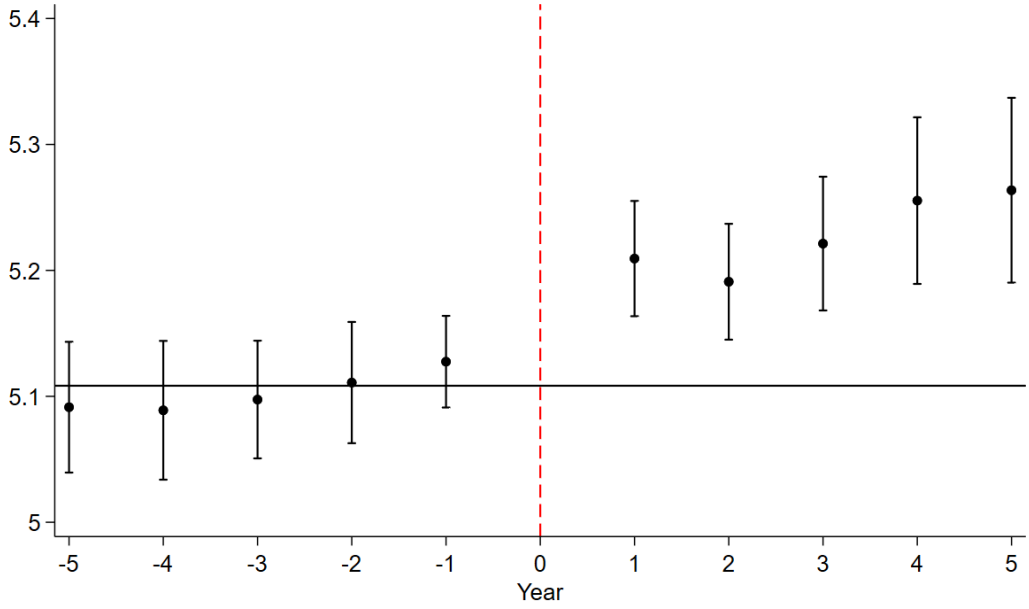
Notes: This table shows differences-in-differences estimates of the effects of Russell index reclassification on the log number of equity analysts (Column 1), an indicator for the presence of any analysts, and the log loan spreads with the analyst measures included as mediating factors in Columns 2 and 4. All regressions include firm times cohort, and year fixed effects. Robust standard errors clustered at the firm and year level in parentheses.

Figure A1: Event study

(a) Passive ratio



(b) Loan spread

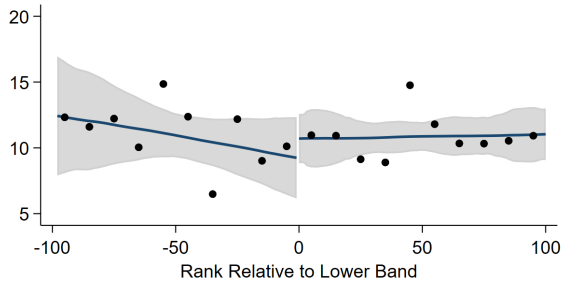


Notes: This figure shows event study plots presenting the evolution of a firm's passive ownership ratio in Panel a), and a firm's bank loan spread (in logs) in Panel b), five years before and five years after a large increase in passive ownership. The solid vertical lines represent pre-increase averages. Large increases are changes in the passive ownership ratio exceeding the 95th percentile of the variable's cross-sectional distribution. The coefficients are from a regression with calendar-year and firm-episode fixed effects. 95% confidence intervals based on robust standard errors clustered at the firm and year level.

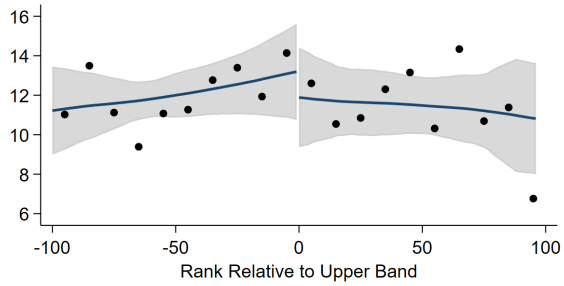
Figure A2: Balance tests

Passive ratio

(a) Downgrade

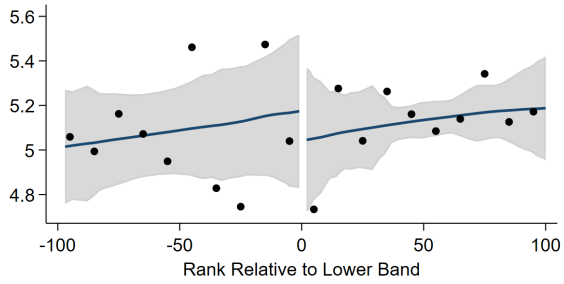


(b) Upgrade

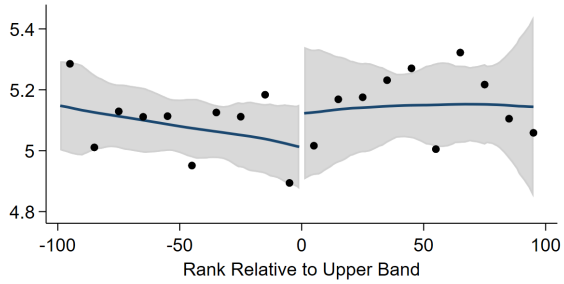


Loan spread

(c) Downgrade

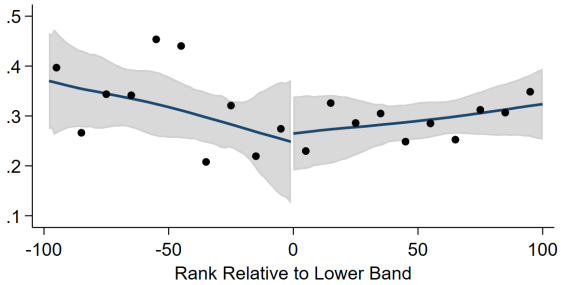


(d) Upgrade

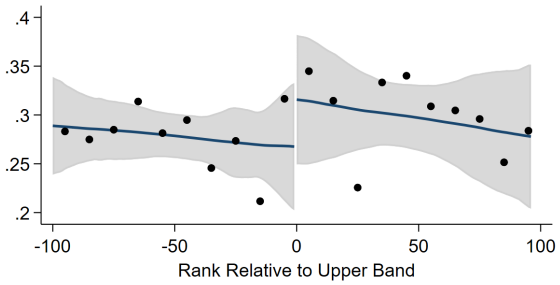


Leverage

(e) Downgrade

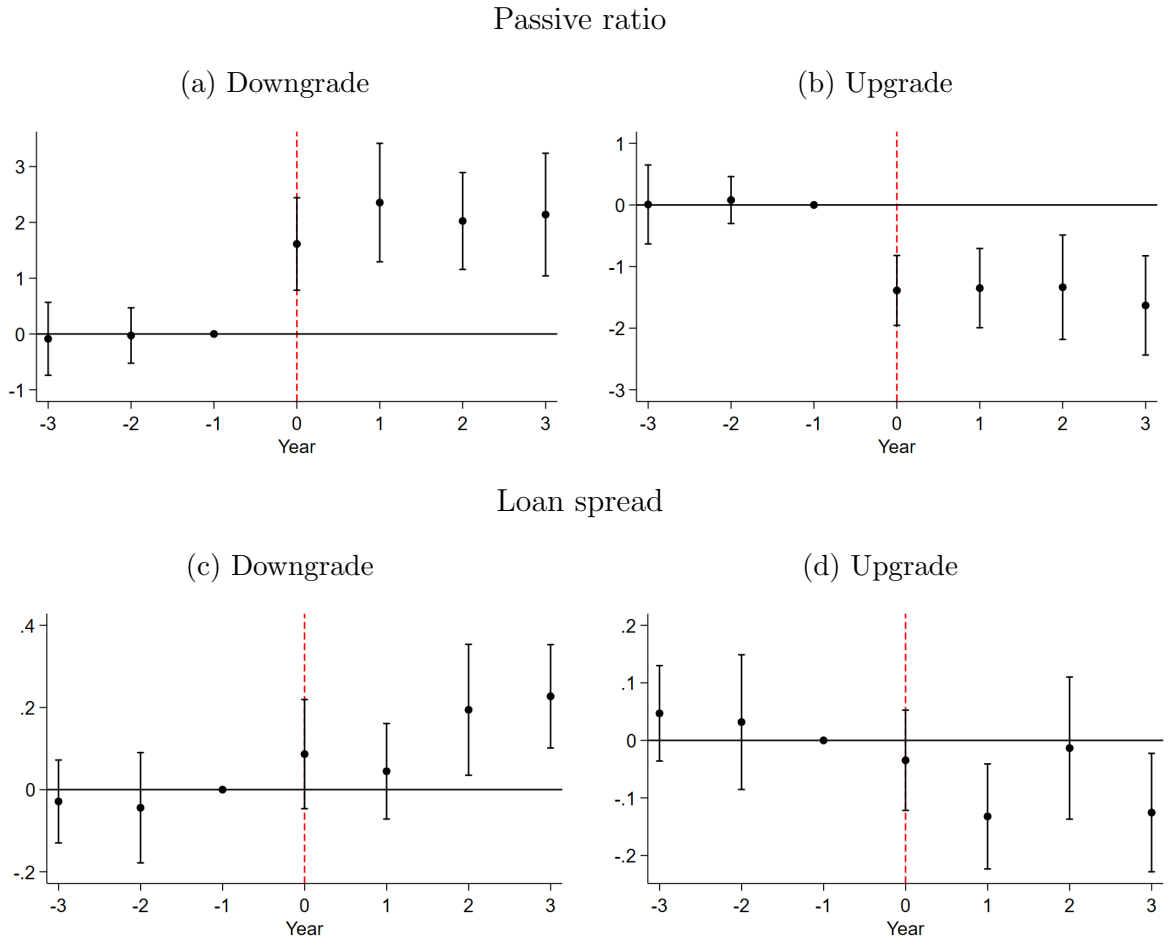


(f) Upgrade



Notes: This figure shows regression discontinuity plots of passive ownership, in Panels a) and b), the log loan spread, in Panels c) and d), and a firm's book leverage in Panels e) and f) across the upper (left side) and lower (right side) bands as of the last pretreatment year, for firms in the Russell cohorts. In each panel, local polynomial regression lines are shown with 99% confidence intervals shaded in gray.

Figure A3: Difference-in-differences event plots

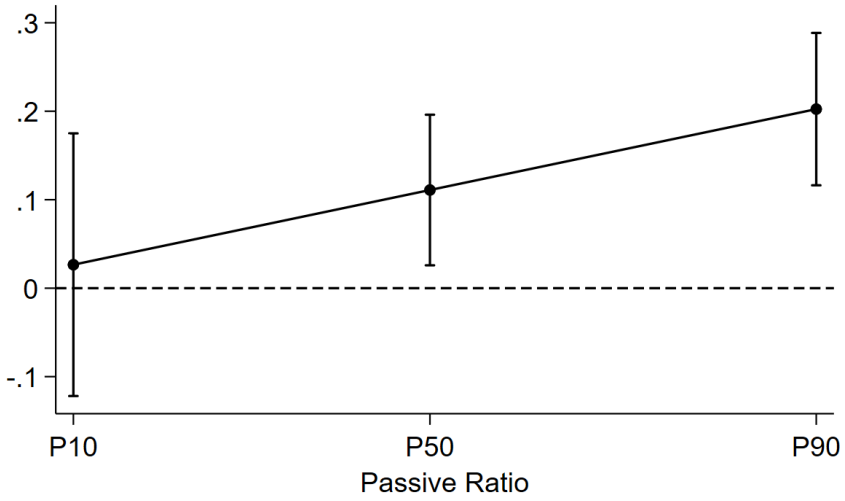


Notes: The figure presents differences-in-differences estimates of the effects of Russell index reclassifications on the share of passive stock ownership, expressed in percent, in Panels a) and b), and the log loan spread in Panels c) and d). The coefficients are from a regression that includes calendar-year and firm-episode fixed effects. 95% confidence intervals based on robust standard errors clustered at the firm and year level.

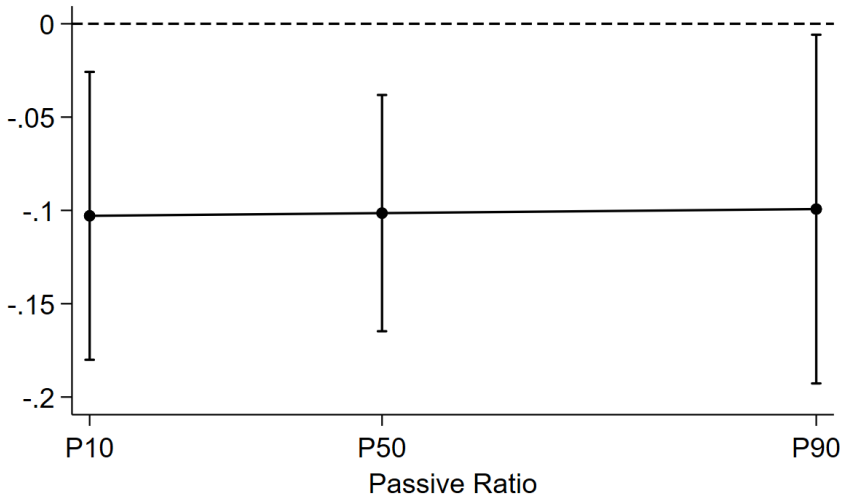
Figure A4: Interaction with passive ownership

Loan spread

(a) Downgrade



(b) Upgrade

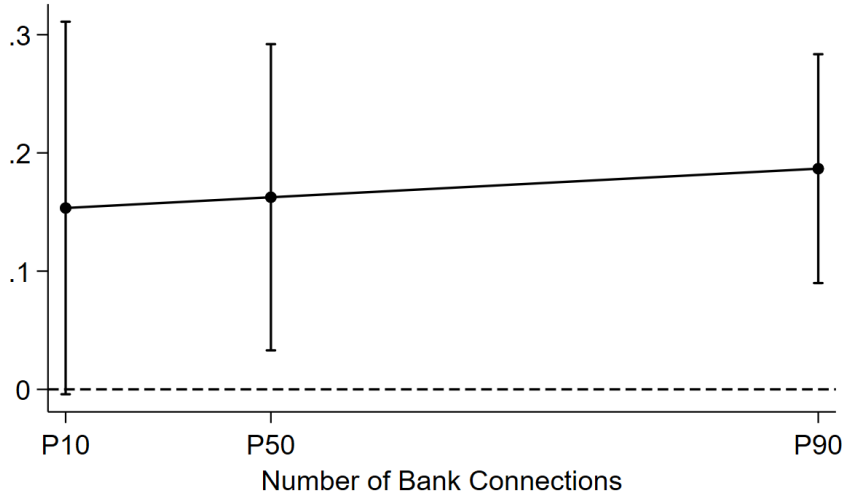


Notes: This figure shows marginal effects of a downgrade (Panel a) and an upgrade (Panel b) on log loan spreads interacted with passive ownership around the reclassification. 95% confidence interval based on robust standard errors clustered at the firm and year level.

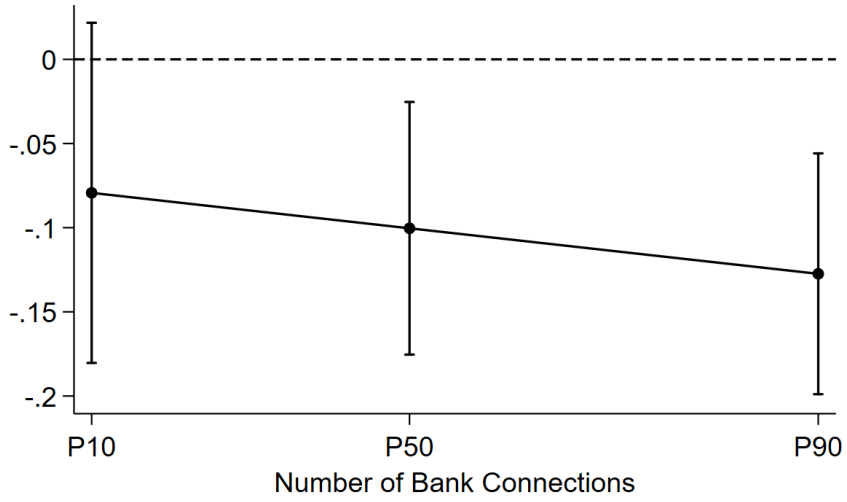
Figure A5: Interaction with bank connections

Loan spread

(a) Downgrade



(b) Upgrade



Notes: This figure shows marginal effects of a downgrade (Panel a) and an upgrade (Panel b) on log loan spreads interacted with the average number of a firm's bank connections in the year before the reclassification based on the previous five years. 95% confidence interval based on robust standard errors clustered at the firm and year level.

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