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Never Let Me Go: Why Do Lenders Recall Loaned Shares? Evidence from Japan's Cross-Shareholding Practice

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Abstract

In stock lending transactions, all rights associated with the original owner (lender), including ownership, voting rights, dividends, shareholder benefits, and other rights are transferred to the borrower during the lending period. Unless the lent shares are reclaimed, these rights, other than dividends, cannot be regained. Therefore, in Japan's stock lending market, many stock lenders recall their lent shares approximately seven days before the record date of the settlement month to retain their names on the shareholder register. This practice, which originated from Japan's long-standing tradition of cross-shareholding, has non-negligible effects on the prices of loaned shares in the equity market. We examine the relationship between stock loan recalls and the transfer of ownership rights, focusing on short-covering activity around recall events. We show that the seasonal recall-induced supply reduction leads to an increase in lending fees and short covering activities, ultimately inflating stock prices by approximately 2% over the four-day window surrounding the recall date.

Keywords: Securities lending, Market quality, Cross-shareholding

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1. Introduction

Securities lending transactions involve a critical issue: the temporary transfer of ownership rights attached to the shares. During the loan period, all associated rights—including ownership, voting rights, dividends, and shareholder benefits[1]—are transferred to the borrower. The lender needs to recall the loaned share before the dividend record date to retain these rights, or they cannot exercise shareholder rights. Among these rights, dividend entitlements are somewhat different: the lender retains the economic benefit even if the loan extends beyond the record date. Specifically, when a loan extends beyond the record date, the borrower has the obligation to compensate the lender with a cash payment equivalent to the dividend, known as a "*substitute dividend*[2]". As a result, the lender retains their economic interest in the dividend, even if their stock is out "on loan". By contrast, voting rights and legal ownership cannot be reclaimed unless the lender recalls the loaned shares before the dividend record date.

The transfer of ownership rights has been the subject of long-standing debate and regulatory attention in the financial market. Hu and Black (2007) highlight the issue of "*empty voting*" and "*hidden ownership*," where an investor temporarily borrows shares before the record date to obtain voting rights while hedging away the economic exposure using derivatives. Such behavior leads to a decoupling of voting power and economic incentives, potentially undermining corporate value and harming other shareholders' rights. Accordingly, these concerns have prompted discussions on governance-related risk management and necessary institutional safeguards. In Japan, similar concerns have prompted a regulatory action. In June 2025, the Financial Services Agency revised the Japan Stewardship Code, which encourages institutional investors to pre-disclose their policies regarding securities lending,[3] if they intend

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[1] In Japan, many listed companies offer "shareholder benefits"—non-cash rewards such as company products or gift cards—granted to shareholders holding a minimum threshold number of shares.

[2] From Thornock (2013, p.1836): "*If the stock loan is open over the dividend record date, then the short seller repays the value of the dividend to the lender. This payment is called a substitute dividend.*"

[3] Institutional investors can earn lending fees by lending out the shares they hold over a specified period.

to loan out the shares for a period that extends beyond the record date. This reform underscores the importance of right transfers during loan periods, attract public attention, and signal the importance of the securities lending market.

How often do loaned shares extend beyond the record date? According to D'Avolio (2002), recalls are rare for U.S. stocks, accounting for only about 2% of shares on loan[4]. On the other hand, such recalls are seemingly more frequent in Japan: Analyzing securities lending transaction data obtained from S&P Global, we observe that the average loan duration—measured as the weighted average number of calendar days from loan initiation to return—is approximately 160 calendar days. This implies that many stock loans are repaid within half a year[5] and therefore do not extend beyond the record date, returning ownership to the lender. Anecdotally, practitioners at securities firms' lending desks[6] likewise observe that, for securities lending transactions involving non-Japanese securities—including U.S. equities—it is common for their loan terms to extend beyond one year. (From here onwards, we refer to "lending desks" as dedicated securities-lending units, mainly within brokerage firms, that source shares for short-sale settlements and intermediate borrowing and lending needs.)

This raises another question: Why are loan terms relatively short in Japan, with fewer transactions extend beyond the record date? One possible explanation lies in Japan's long-standing practice of cross-shareholding among corporations and the disclosure requirement for shareholder registers at the fiscal year-end. Cross-shareholding refers to a unique Japanese ownership structure in which companies mutually hold each other's shares in order to maintain

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[4] D'Avolio (2002), analyzing U.S. stocks, stated: "*Recall is rare. In an average sample month, 2% of the stocks on loan are recalled. ….Days on which recalled borrowers might be forced to cover shorts are marked by extraordinary trading volume (more than twice the recalled stock's overall sample mean) and intraday volatility.*"

[5] Most Japanese firms designate record dates twice a year—typically at the fiscal year-end and the interim period (e.g., March and September).

[6] Securities firms have lending desks that specialize in securities lending business. This is also referred to as prime brokerage services.

a stable shareholder base and to strengthen business and managerial relationships. This practice, established in the postwar corporate governance context, has served to secure friendly shareholders and function as a defense mechanism against hostile takeovers from outside. However, if it becomes known that these cross-held shares have been lent out to third parties (and hence the lender can earn lending fees), the trust underlying such inter-firm relationships may be undermined. According to Uetsuki (2005), many domestic corporations are aware of the fact that the name registration of their holdings is disclosed at fiscal year-end and seek to avoid having cross-held shares reported as being "lent out". As a result, it has become customary for lenders to recall their loaned shares approximately seven days[7] before the record date of the settlement month to retain shareholder registration. When lending out shares whose ownership status is especially important to lenders for the "strengthening inter-corporate ties" purpose, the lenders often use "*callable*" loan structures.

Callable loans cannot extend beyond the record date and come with a predetermined term date at initiation. For non-callable loans, by contrast, "term dates" are not pre-set and may extend beyond the record date. Non-callable loans are the standard practice used when lending out foreign stocks, while callable loans are a practice unique to Japan. Toward the fiscal year-end, lending desks at Japanese securities firms actively refinance positions by unwinding callable loans with domestic lenders and replacing them with non-callable loans from foreign lenders. This recall practice in Japan is rarely observed in other markets. Although the practice of cross-shareholding among firms has declined in recent years, the custom of recalling loaned shares at fiscal year-end remains firmly embedded in operational practice. These pre-fiscal-year-end recalls serve as anticipated, exogenous lending supply shock in the Japanese equity market. Because most Japanese firms designate the final business day of the fiscal year end as

[7] Uetsuki (2005) reports that recalls were "effectively made nine business days in advance," but this reflects the practice as of 2005. Based on the author's professional experience and contemporary market practice, this study instead defines the recall date as seven business days prior to the record date, as discussed in Section 2.

the record date, this feature allows us to exploit such seasonal recall events, as a quasi-natural experiment, to examine the linkage between the securities lending market and the equity market.

Analyzing the sample of all listed firms (with dividends) during the April 2010 - March 2021 period, this study empirically examines the effect of these anticipated recalls—specifically, the sudden reduction in the number (supply) of lendable shares—on lending fees, short-covering activity in the lending market, and liquidity and prices of loaned shares in the equity market. First, using an event study approach, we examine lending and short-selling activities around recall dates. In the lending market, we observe a greater concentration of lending and borrowing demand, an increase in inventory concentration, and a contraction of lending supply around "recalls days (i.e., seven days before the record date)." In the equity market, we also observe that bid–ask spreads widen and stock turnover increases around the recall date, suggesting a deterioration in market quality driven by heightened information asymmetry and higher trading costs despite an increase in trading volume.

Next, we investigate the determinants of lending fee and quantity spikes using probit models and panel regressions. The results show that around recall days there is a significant contraction in the supply of lending shares, leading to a significant increase in lending fees. In addition, increases in borrower concentration around recall dates and declines in the stable–shareholder ownership ratio worsen the supply–demand imbalance and significantly increase the likelihood of fee spikes. The analysis of quantity spikes further indicates that, in the Japanese market, recall activity motivated by the restoration of shareholder-of-record status plays a more dominant role than dividend-tax considerations emphasized in prior studies (e.g. Thornock 2013).

Finally, using a two-stage least squares (2SLS) approach, we analyze the impact of quantity spikes on stock returns around the recall dates. Because the naked short-selling regulation requires short sellers to borrow shares in advance, we expect a reduction in the

inventory of lendable shares to decrease short-selling opportunities and hence affect stock returns. The results suggest that fiscal-year-end recall practices simultaneously raise lending fees and intensify short-selling activity, which in turn triggers short covering[8]. Consequently, the prices of loaned stocks subject to "recalls" increase by approximately 2% within the four-day window surrounding the recall event.

Why do short-selling volumes increase—and why does short covering subsequently push prices upward—despite the increase in borrowing costs? Diamond and Verrecchia (1987) argue that higher short-selling costs reduce the attractiveness of shorting and thereby decrease short-selling activity. Their model predicts that only relatively informed traders, who are willing to bear the additional cost, continue to maintain short positions, whereas relatively uninformed traders exit the market. Contrary to the Diamond and Verrecchia's (1987) prediction, the Japanese equity market exhibits a pattern that runs counter to this theoretical prediction: short-selling volumes do not decline but instead increase sharply from the recall date through the record date, known as the period with elevated lending fees. The existing theories cannot account for this behavior.

To explain this discrepancy, this study highlights a unique institutional mechanism in Japan—the practice of share recalls at fiscal year-end. In Japan, lenders routinely recall shares to restore shareholder-of-record status before the fiscal year end. Short sellers, seeking to maintain their existing positions despite elevated borrowing costs, rely on lending desks at securities firms to refinance their borrowings—typically by replacing domestic callable shares with more expensive non-callable shares supplied by foreign lenders. Because many market participants attempt the same refinancing activities around the same time, the availability of non-callable shares become so scarce that lending fees increase even further. Large short sellers

[8] When lending supply becomes tight, lenders recall loaned shares. Borrowers are generally required to return the shares within two business days; if replacement shares cannot be secured, they are forced to repurchase the shares to close their short positions, a process known as short covering.

with strong relationships with lending desks may receive preferential rate adjustments, but when refinancing is infeasible they must return the recalled shares to the lender. This forces them to repurchase previously shorted shares, (known as "short covering") exerting upward pressure on stock prices. Motivated by this institutional context, this study seeks to provide empirical evidence on how Japan's fiscal-year-end recall practices create a systematic linkage between the securities lending market and the equity market.

Prior studies—such as Miller (1977), D'Avolio (2002), and Blocher et al. (2013)—have generally assumed that all securities loans are used for short selling.[9] However, in practice, not all borrowed shares are used for this purpose; securities lending also facilitates other transactions, including cash financing and collateral provision. Despite their importance, empirical research on non–short selling–motivated borrowing and its broader market implications remains scarce. The primary contribution of this study is to reassess the linkage between the securities lending market and the equity market from a novel perspective. Specifically, rather than focusing on lending activity for short selling, as is common in the literature, we examine the market impact of short covering activities triggered by lender-initiated recalls. By identifying and analyzing recall behaviors driven by name registration considerations, this study sheds new light on how such activities affect liquidity in the equity market and the price formation of loaned shares. By doing so, it contributes to a more comprehensive understanding of lender behavior in securities lending and its interaction with equity market.

The remainder of this paper is organized as follows. Section 5.2. provides the institutional background and market practices in Japan's securities lending market and introduces relevant literature. Section 5.3. describes the data. Section 5.4. presents our main

[9] Blocher et al. (2013) state that for the stock market to be in equilibrium, the number of shares demanded for purchase by long investors and the number of shares demanded for short selling by short investors must equal the number of shares outstanding. They present the following equation: $D_L(p, ps) + D_S(p, ps) = N$

empirical results. Section 5.5. provides conclusion.

2. Institutional Background and Related Literature

2.1. Institutional Background

The origins of the securities lending market in Europe and the United States can be traced back to the 17th century. During the long voyages of the Dutch East India Company's fleet between its colonies and homeland, individuals who obtained early information about weather and other developments reportedly borrowed shares from existing shareholders and engaged in short selling[10]. In contrast, according to Miura and Shimizu (2025), Japan's securities lending market was introduced centuries later, as a response to rising hedging demands and influenced by developments in overseas markets. Although a centralized framework for borrowing shares—known as the Standardized Margin Transactions (SMTs)—was established after the World War II, in which the Japan Securities Finance (JSF) played a key intermediary role, there was initially limited demand for securities lending via brokerage firms, and the market's expansion was slow.

In 1985, when market makers in London began to use Japanese stocks for lending, and 1986, when foreign securities firms were allowed to become the member of the Tokyo Stock Exchange, Japan's securities lending market began to grow more rapidly. Securities lending was first codified in the Securities and Exchange Law in 1997, and the market was formally recognized in November 1998, when the Japan Securities Dealers Association (JSDA) implemented the "Rules on the Handling of Securities Lending Transactions." Since then, the market has expanded primarily among institutional investors and is now estimated to be worth approximately 12 trillion yen.[11]

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[10] Blocher et al. (2013, p.308-309) state as follows: "*One of the earliest examples is the Dutchman Isaac Le Maire, who was the first known short seller. He went short in shares of the Dutch East India Company in 1609.*"

[11] Miura and Shimizu (2025) present an estimate of the size of Japan's securities lending market: Securities lending transactions by institutional investors 6.7 trillion yen (59%) followed by negotiable margin transactions (NMTs) 1.98 trillion yen (17%) and standardized margin transactions (SMTs) 2.74 trillion yen (24%). Lending data are based on Markit as of 2020; margin trading balances as of June 27, 2025, from TSE.

Figure 1 outlines the key participants in Japan's securities lending and equity markets[12]: lenders, borrowers, and financial intermediaries. Lenders include securities finance companies, life and non-life insurance firms, trust banks managing pension assets, investment management firms, and foreign custodians. Borrowers typically are both retail investors and institutional investors such as hedge funds that rely on stock borrowing for various trading strategies. Brokers—mainly securities firms—facilitate short-selling settlements, collateralized financing, and other transactions that connect the needs of lenders and borrowers.

Lending fees are determined based on whether stocks are "easy-to-borrow" (General Collateral, or GC), or "hard-to-borrow" (Special Collateral, or SC). GC stocks typically command the fees of 0.40%[13] or less and are used primarily for funding purposes in equity repos. In contrast, SC stocks carry much higher fees and are usually involved in stock borrowing transactions tied to short selling.

Regarding U.S. stocks, D'Avolio (2002) states that lenders retain the right to recall the shares from borrowers at any time, and transactions are effectively rolled over until the lender recalls them or the borrower voluntarily returns the borrowed shares. In practice, loan terms exceeding one year are also commonly seen in U.S. stocks. However, in Japanese stocks, as a practice unique to Japan, there are two types of securities lending transactions: Callable transactions and non-callable transactions. Callable loans cannot extend beyond the record date and come with a predetermined term date at the loan origination. On the other hand, term dates of non-callable loans are flexible and may extend beyond the record date. Historically, callable loans require borrowers to give two-business day notice when they intend to return the

[12] For a detailed overview of Japan's securities lending market, see Miura (2025).

[13] D'Avolio (2002) states that "*Practitioners refer to stocks with high fees (and low rebates) as being "special" and those with baseline fees (about 15 basis points) as "general collateral" or "GC.*", but in practice, this level fluctuates depending on factors such as prevailing supply and demand conditions. In this analysis, considering the perspective of actual operations at the lending desk, we define GC issues as those with a spread of 0.40% (40 basis points) or less.

borrowed shares. Today, however, both callable and non-callable loans are effectively repayable at any time, and their principal distinction lies in whether a term date is set at the outset and whether the loan can extend beyond the record date.[14] Lending via non-callable loans are the standard practice for overseas stocks, while doing so via callable loans are a practice unique to Japan.

In Japan, when the ownership status is especially important to lenders, many lenders often use "callable" loan structures. When shares are loaned out under the "callable" structure, the shares are recalled before the record date of the settlement month. As a result, the loan period tends to be relatively short. This stems from the long-standing cross-shareholding practice among companies and the disclosure system for shareholder registers at the fiscal year-end.[15] Under Article 121 of the Companies Act[16], firms are required to disclose a shareholder register, and most firms designate the final business day of the fiscal year as the record date to determine shareholders eligible for annual meeting invitations and dividend entitlements. Moreover, firms are obligated under the Financial Instruments and Exchange Act (FIEA) to submit an annual securities report, which is made publicly available via the Financial Services Agency's (FSA) electronic disclosure system, EDINET.[17] The "Major Shareholders" section of this report discloses the names of large shareholders as of the record date, thereby making the ownership status—including cross-shareholdings—visible to public. In addition, in recent years, listed firms have been required to disclose their policies and annual evaluations

[14] Uetsuki (2005) notes that, in practice, the term non-callable transaction in the Tokyo market has been used to mean "a transaction that can carry over into the next period." He further suggests that, to avoid future confusion, the term will likely shift toward the expression "a transaction that can cross periods." Indeed, recent market practice has evolved in this direction.

[15] Another reason for the persistence of stock-lending recalls in Japan may be the existence of shareholder benefit programs, which require name registration to claim entitlements—a topic that warrants further investigation.

[16] See Article 121, available at https://www.japaneselawtranslation.go.jp/en/laws/view/3206/en

[17] https://disclosure2.edinet-fsa.go.jp/week0020.aspx

concerning cross-shareholdings in corporate governance reports submitted to the TSE, further increasing the transparency of shareholder names over time.

Given this context, many domestic institutions are aware of the fact that the name registration of their holdings is disclosed at fiscal year-end, and they hence seek to avoid having cross-held shares reported as being "out on loan". According to Uetsuki (2005), who summarizes the early development of Japan's securities lending market, many Japanese corporations place strong emphasis on maintaining shareholder-of-record status due to long-standing cross-shareholding practice. As a result, firms (i.e., as lenders) frequently request that their shares be returned by the fiscal year-end in order to restore the shareholder name on the register. As will be discussed later, Japan's practice of cross-shareholdings is intended to strengthen inter-corporate ties as a defense against hostile takeovers. However, if it becomes known that these cross-held shares have been lent out to third parties, the trust underlying such inter-firm relationships may be undermined. Therefore, it has become customary for lenders to recall shares approximately seven days before the record date in order to restore name registration and exercise voting rights. Uetsuki (2005) notes that the practice of initiating recalls several days before the record date was intended to ensure sufficient time for borrowers to manage their positions. In cases where the underlying stock was extremely illiquid, borrowers might be unable to buy back shares or otherwise secure coverage, making an earlier recall operationally necessary. Shares for which name recognition is especially important are frequently lent under callable structures. Consequently, toward the fiscal year-end, lending desks of stockbrokerage firms typically engage in refinancing: they repay callable loans with domestic lenders and replace them with non-callable loans from foreign lenders.

Foreign institutional investors and custodian banks primarily hold Japanese equities for portfolio management purposes and do not necessarily seek to exercise managerial influence or secure voting rights. As such, the temporary transfer of voting rights through securities

lending does not impose significant economic costs, and there is little incentive for them to reclaim title ahead of record dates. Moreover, lenders continue to receive dividend-equivalent payments even while shares are on loan, and non-resident investors are ineligible to receive shareholder benefit packages. Consequently, economic considerations—such as lending revenue and the reduction of operational costs— tend to be prioritized. As a result, toward fiscal year-end, it is not uncommon for overseas lenders to proactively approach domestic securities lending desks to explore additional lending opportunities. However, because the lending fees for non-callable securities provided by overseas lenders are relatively high, and lower-fee, new-term callable securities become available from domestic lenders on the first business day of the following month, lending desks invariably repay the shares borrowed from overseas lenders promptly at the beginning of the month.

Figure 2 illustrates the average duration of lending transactions—measured as the weighted average number of days from the start to the end of each transaction—this confirms the relatively short duration of securities lending transactions, approximately 160 calendar days. This indicates that many loans are repaid within six months, well before the record date, allowing the lenders to retain name registration. This recall practice is unique to Japan and represents a predictable exogenous shock—what we refer to as the "seasonal recall," where recall cases surge sharply one week before the fiscal year-end. Because the majority of Japanese firms' record dates clusters on the final business day of the fiscal year end, this institutional regularity enables a quasi-natural experiment to examine.

The contribution of this study lies in leveraging this institutional context to examine how seasonal recalls—motivated by the restoration of shareholder title—affect liquidity in the equity market and the price formation of loaned shares, thereby shedding light on the linkage between the securities lending market and the equity market.

2.2. Related Literature

2.2.1. Transfer of Ownership Rights

In recent years, a practice has emerged in which investors temporarily borrow shares immediately before the record date of a shareholder meeting to acquire voting rights, while simultaneously hedging the downward price risk using derivatives. This allows them to exercise voting rights without bearing the underlying economic risk of ownership. The fact that certain hedge funds have borrowed a large volume of shares can signal the possibility of future short selling, thereby sending a negative signal to other shareholders. This may prompt concerns over weak or opaque corporate governance, diminishing the firm's investment appeal and potentially leading to share sell-offs and a subsequent decline in stock price. Earlier studies such as Hu and Black (2007) refer to such practices as "*empty voting*" or "*hidden ownership*," and warn of the lack of prior disclosure surrounding these transactions.

As illustrated in Figure 3, consider a scenario involving three parties. The original shareholder, Party A, lends shares to Party B, a hedge fund. Party B intends to influence the outcome of the upcoming shareholder meeting and therefore borrows a significant number of shares to obtain voting rights. At the same time, Party B enters into a derivative contract with Party C to hedge against any price fluctuation risk associated with the borrowed shares. After exercising the voting rights, Party B promptly returns the shares to Party A. This type of behavior creates a mismatch between economic incentives and voting power, potentially undermining decision-making processes intended to enhance firm value. It also raises concerns about the erosion of firm value and the infringement of other shareholders' interests. As such, it has been regarded as a form of governance avoidance, making it imperative for market participants to strengthen risk management, regulatory frameworks, and the transparency of voting policies.

Building on Hu and Black's work, Iwatani (2007) investigates the *empty voting* problem in Japan. While countermeasures have progressed in the Western markets, Iwatani (2007)

points out that such practices can be difficult to detect in Japan, particularly when they are executed through swap transactions—a regulatory loophole. He argues that enhanced disclosure requirements and more rigorous control of voting rights by lenders are needed to address the issue. For example, when loaned shares are further re-lent, it is practically difficult to monitor the full chain of transactions. As a result, tracing who ultimately holds the voting rights becomes infeasible, and there have been reported cases in which proxy materials were sent to multiple parties for the same shares.

2.2.2. Securities Lending Recall

Under what circumstances, and for what reasons, do lenders recall the shares they have lent out? This question has been the focus of a growing body of research, particularly those studying the foreign markets. D'Avolio (2002) stated that recalls are rare for U.S. stocks, occurring in only about 2% of shares on loan. He reports that lenders initiate recalls realizing mark-to-market gains or losses and finds that such recalls restrict the supply of lendable shares, leading to sharp increases in lending fees. Similarly, Thornock (2013) and Dixon et al. (2021) argue that lenders recall shares prior to the record date to avoid unfavorable tax treatment, as explained below.

A fundamental issue in securities lending transactions involves the temporary transfer of ownership rights. During the loan period, all associated rights—including ownership, voting rights, dividends, and shareholder benefits—are transferred from the lender to the borrower. In the case of dividends, borrowers are obligated to compensate lenders with a "*substitute dividend*" if the loan extend beyond the record date. Thornock (2013) highlights the economic inefficiency of this arrangement: substitute dividends are taxed at a higher marginal rate of 35%, compared to the standard 15% on ordinary dividends. While lenders remain economically entitled to dividend-equivalent payments, the higher tax burden creates an incentive for lenders

to recall shares before the record date. Dixon et al. (2021) further note that recalled shares may be re-lent for arbitrage purposes, compounding the price and liquidity distortions introduced by lending constraints.

More recently, Li and Zhu (2023) focus on ESG-oriented funds and document cases in which lenders recall shares ahead of the record date in order to exercise voting rights. They empirically examine the interaction between lending recalls and proxy voting, showing that social norms associated with contributing to ESG improvement influence shareholder behavior. They find that recalling shares—despite forfeiting lending income—enables more active voting behavior, such as opposing management proposals or supporting shareholder proposals, thereby enhancing fiduciary responsibility.

Taken together, prior research—largely centered on U.S. markets—identifies multiple incentives for stock loan recalls. However, no study has yet examined recall practices rooted in Japan's distinctive practice of cross-shareholding, where loans are recalled primarily to restore name registration. This study fills that gap by providing an empirical analysis grounded in the operational realities of Japan's securities lending market.

2.2.3. Cross-shareholding

Japan has long maintained a unique practice of cross-shareholding between firms and between firms and banks. According to Miyajima and Kuroki (2007), this distinct ownership structure, which emerged in the postwar economic reforms, had become firmly established by the late 1960s as an effective defense mechanism against hostile takeovers. However, since 2014, the introduction of Japan's Corporate Governance Code and Stewardship Code has required firms to justify the economic rationale for holding strategic shareholdings. The revised version of the Corporate Governance Code, issued in June 2021,[18] further mandates an annual review of such

[18] See "Japan's Corporate Governance Code" by TSE (2021/6/11), available at https://www.jpx.co.jp/english/news/1020/b5b4pj0000046kxj-att/b5b4pj0000046l07.pdf

holdings and encourages divestment when economic rationale cannot be demonstrated. In line with these governance reforms, the overall level of cross-shareholdings among Japanese firms has declined sharply, falling into the 10% range by the 2020s.

Several empirical studies have examined the implications of unwinding cross-shareholdings. Isagawa (2004) argues that the dissolution of cross-shareholdings by firms in financial distress sends a negative signal to the market, depressing stock prices. Miyajima and Nitta (2011) similarly suggest that the unwinding of cross-shareholdings—which often implies that the main bank has withdrawn support—acts as an adverse signal and may increase the bankruptcy risk of affiliated firms. Uno et al. (1998) demonstrate that changes in the degree of cross-shareholding can influence market liquidity. Miyajima and Kuroki (2007) further show that firms with higher foreign ownership or profitability tend to unwind cross-shareholdings, whereas firms with lower foreign ownership or profitability maintain reciprocal shareholdings with banks. Their findings suggest that bank-held equity stakes may adversely affect firm performance.

While the signaling and market effects of unwinding cross-shareholdings have been well-documented, no prior empirical study has explored the relationship between cross-shareholdings and the securities lending market. However, as noted in Uetsuki (2005), the prevalence of cross-shareholding relationships in Japan led many corporate investors to place great importance on shareholder registration, resulting in frequent requests to have lent shares returned and their names restored prior to the fiscal year-end. In practice, even today, Japanese lending desks continue to treat strategic shareholdings—whose registered ownership is considered particularly important—as callable securities. This study examines how such recall practices, rooted in Japan's cross-shareholding practice and motivated by the need to restore shareholder status, affect the market. Our analysis incorporates not only empirical evidence but also insights drawn from actual securities lending operations.

2.2.4. Short Selling Restrictions

In general, short sellers are regarded as informed traders who contribute to price discovery and market liquidity by driving overpriced securities toward their fundamental values. Diamond and Verrecchia (1987) theoretically show that an increase in short-selling costs reduces the attractiveness of shorting and leads to a decline in short-selling activity. Moreover, only relatively informed investors—those willing to bear higher costs—continue to short, while relatively uninformed investors exit the market. To clarify these mechanisms, they distinguish between two types of short-selling frictions: a *short-prohibition effect* and a *short-restriction effect*.

The first mechanism, the *short-prohibition effect*, arises when legal or contractual restrictions, the inability to borrow shares, or rules such as the "uptick rule[19]" constraint effectively eliminate short selling, regardless of traders' information sets. As Diamond and Verrecchia (1987) suggest, a similar form of prohibition emerges in Japan at fiscal period-ends. In addition to these mechanisms, this study highlights a third, uniquely Japanese source of effective prohibition: lenders' recalls aimed at restoring shareholder-of-record status, which force certain short sellers to unwind positions.

The second mechanism, the *short-restriction effect*, occurs when higher borrowing costs restrict short selling, allowing only traders with sufficiently strong negative signals to maintain short positions. Because uninformed traders are more sensitive to borrowing costs, the composition of the short-selling pool shifts toward relatively informed investors. According to Glosten and Milgrom (1985) and Easley and O'Hara (1987), an increase in the presence of informed traders raises the likelihood that market makers incur losses when trading against the informed. To compensate for this adverse-selection risk, market makers widen the bid–ask

[19] Although the rule was eliminated in the United States in 2007, Japan continues to enforce a short-sale price restriction based on the "uptick rule" through a trigger-based system.

spread in advance and rely on profits from transactions with uninformed traders to offset potential losses. The bid–ask spread is widely used as a key indicator of market liquidity and information asymmetry, and prior research shows that a wider spread increases investors' trading costs and ultimately impairs market liquidity. Although this restriction effect appears in Japan—evidenced by rising lending fees—Japan's institutional structure permits temporary refinancing from domestic callable shares to more expensive non-callable shares. Consequently, some investors can maintain their short positions despite elevated costs around the recall date. Large short sellers with strong relationships with lending desks may also receive preferential rate adjustments, consistent with the observed increase in lending volumes and transaction counts around recall dates. By contrast, traders unable to refinance are forced to buy back shares to return them to lenders, generating short covering and upward pressure on stock prices.

In summary, the Japanese market exhibits a notable deviation from the Diamond–Verrecchia prediction: despite the elevated borrowing costs (which would decrease short selling activity), short selling activity increases sharply from the recall date through the record date. Prior literature cannot account for this pattern. This study argues that the phenomenon is driven by Japan's distinctive "seasonal recalls." As Uetsuki (2005) pointed out,[20] because lenders initiate widespread recalls at fiscal period-end to restore shareholder-of-record status, short sellers attempt to maintain their positions despite rising fees, creating intense refinancing demand for switching from callable to non-callable shares. As the supply of non-callable loans becomes severely constrained, borrowing fees increase even further. Short sellers who are unable to refinance must cover their positions, thereby contributing to temporary upward

[20] See Uetsuki (2005), pp.56–57. "*Lenders generally prefer to restore the shareholder-of-record status on the fiscal year–end date to retain the rights attached to the lent shares. In Japan, where cross-shareholding relationships are common, many corporate lenders place particular importance on maintaining their name on the shareholder register. Consequently, there is strong demand to have shares returned before the fiscal year-end so that the registered name can be restored. Borrowers, on the other hand, must repurchase the shares in the market by the record date to return them. However, because many such buybacks occur during fiscal months, market supply becomes tight, shares become scarce, and prices rise. As a result, borrowers face significantly higher costs when attempting to source shares from the market.*" (Original text in Japanese.)

pressure on prices. Against this institutional backdrop, the study provides empirical evidence on the interaction between the securities lending market and the equity market around fiscal year-end in Japan.

3. Data

The sample for this study consists of all firms listed on the First Section of the Tokyo Stock Exchange (TSE) between April 2010 and March 2021. Stock-level characteristics, including prices and dividends, are obtained from Nikkei QUICK's Astra Manager. Data on securities lending transactions are provided by S&P Global (formerly IHS Markit)[21], while bid and ask quote data are retrieved from Refinitiv Datastream. The ownership data are sourced from Nikkei QUICK, while average tenure data are obtained from S&P Global. On November 21, 2011, the TSE revised the closing time of its morning trading session; our analysis does not adjust for this change in trading hours. Furthermore, although the TSE shifted from a T+3 to a T+2 settlement cycle on July 16, 2019, the majority of our sample predates this change. Accordingly, and for consistency, we maintain the T+3 settlement convention throughout the analysis. For the purposes of this study, we further construct a merged dataset aligning securities lending transaction dates with the corresponding settlement dates in the equity market.

3.1. Variable Construction

This section describes the definitions of the key variables. All other variables not covered in

[21] S&P Global (formerly IHS Markit) collects daily self-reported data from more than 100 trading participants in the securities lending market. Dixon et al. (2021) use data from Financial Information Service (FIS) Astec Analytics (formerly SunGard). Duong et al. (2017) compare both FIS and Markit datasets and note that there is essentially no material difference between them. See p. 2359, footnote 5: "*In unreported results, we find significant correlation for the key variables across the two datasets (Markit and SunGard): 80% for the shorting demand and about 86% for the lending fees.*"

this section are defined in the Appendix.

3.1.1. Stable Shareholder Ratio

Miyajima and Kuroki (2007) discuss the evolution of the stable shareholder ratio—defined as the proportion of shares held by banks, insurance companies, and non-financial corporations relative to total shares outstanding among listed firms—over the period from 1987 to 2002. They show that the stable shareholder ratio declined steadily from the mid-1990s, with the pace of decline accelerating after 1999, ultimately dropping to 27.1% from 45.8% by 2002.

We use the same definition for the stable shareholder ratio, and replicate their analysis for the period from 2011 to 2020. The report on the average stable shareholder ratio is reported in Table 1. We construct the variable *Cross_Share* by summing the number of shares owned by financial institutions and domestic corporations. Overall, the stable shareholder ratio exhibits a declining trend over our sample period. However, a slight increase in the ownership ratio of domestic corporations is observed from 2019. In addition, the shareholdings of the government and individuals have risen over the past decade. This increase is likely attributable to the Bank of Japan's ETF purchasing program[22] and the expansion of the NISA (Nippon Individual Savings Account[23]) tax-exempt investment scheme.

3.1.2. Lending Supply from Stable Shareholders

In the previous subsection, we reported the recent trends in the stable shareholder ratio in Japan. We now focus on the proportion of shares loaned by stable lenders and its evolution over time. For example, short sellers typically wish to repurchase shares at their preferred timing and therefore seek to avoid unexpected recalls by lenders. Similarly, borrowers that utilize stock

[22] Since December 2010, the Bank of Japan has implemented its policy of purchasing index-linked exchange-traded funds (ETFs), thereby increasing the proportion of equities held as underlying assets of these ETFs.

[23] NISA (Nippon Individual Savings Account): A tax-advantaged investment scheme in Japan, launched in January 2014, that exempts capital gains and dividends from taxation for retail investors up to a certain limit.

loans for financing purposes prefer not to face frequent turnovers in their lending counterparties.

Figure 4a shows the annual trends in the volume of shares lent by stable lenders. The solid line represents all listed firms, while the dashed line represents the constituent stocks of the Nikkei 225 index. Overall, shares lent by stable shareholders account for approximately 70–80% of total lending volume, and this share has been increasing over time.

Figure 4b plots the daily changes in loaned quantity over the 30-day window surrounding the recall date. The vertical solid line indicates the recall date(t=0), and the dashed line denotes the record date. The volume of shares on loan declines gradually beginning roughly 30 days prior to the recall event and starts to increase moderately thereafter. This pattern reflects a market practice specific to Japan known as “refinancing,” wherein callable loans—which cannot extend beyond the fiscal year-end—are replaced with non-callable loans. As a result, callable loans vanish from the lending market by the third week of the fiscal year end. Accordingly, a decline (or increase) in the stable shareholder ratio is expected to lead to a rise (or fall) in the frequency of fee spikes, as discussed later.

3.2. Lending / Short Selling Activities around Recall Dates

As noted in the previous subsection, the practice of “refinancing activities” intensifies toward the fiscal year-end in Japan’s securities lending market. As the record date approaches, the demand for non-callable loans increases significantly, leading to higher levels of demand concentration among both lenders and borrowers, as illustrated in Figure 5 (based on data from S&P Global).

3.2.1. Lender / Borrower Concentration

Lender Concentration is an index that measures the distribution of lending activity across lenders on a scale from 0 to 1, and a low value indicates a larger number of lenders with smaller

loan balances. Similarly, *Borrower Concentration* measures the distribution of borrowing activity, where lower values indicate a greater number of borrowers with smaller loan balances. In Figure 5a, the blue line represents *Lender Concentration*, while the red line represents *Borrower Concentration*. *Lender Concentration* rises ahead of the stock recall date, with this increase continuing through the record date. *Borrower Concentration* rises gradually toward the record date. After the record date, both concentration measures decline. *Lender Concentration* begins rising earlier than does *Borrower Concentration*. This likely reflects the fact that recalls of callable shares are typically initiated by lenders, who seemingly anticipate looming shortages in the supply of lendable shares before borrowers do.

In contrast, *Inventory Concentration*, which measures the concentration of available lendable shares, increases as the record date approaches. A higher value indicates that inventory is increasingly concentrated among the smaller number of lenders. Figure 5b shows that *Inventory Concentration* begins to rise approximately two weeks before the record date, peaks around the event, and then drops sharply. This reflects the influx of newly available callable shares from lenders on the first business day of the following month, which rapidly expands the supply of lendable shares in the lending market.

3.2.2. Lending / Short Selling Activities around Recall Dates

Figure 6 illustrates the dynamics of securities lending and short selling activity around the recall date. In this study, we define the recall date, T=0, as seven business days prior to the record date, which is the final trading day of the month. This definition reflects a market convention in which many lenders assign the term date for loan repayment one week before the record date when lending callable shares. This practice is grounded in a conservative strategy aimed at ensuring the timely recovery of policy-held shares, and in some brokerage firms, this scheduling is automated within their booking systems. As seen in Figure 5a earlier,

Lender Concentration also increases toward this recall date.

The plotted data reveal pronounced spikes in the minimum fee, transaction count, and short loan value around the recall date. In contrast, the short selling value exhibits greater volatility, indicating less stability in short selling activity during this period. Moreover, consistent with findings by Dixon et al. (2021), both shares on loan and shares available spike as the record date approaches. However, in the case of Japanese equities, this trend begins earlier—approximately 15 days in advance—showing a more gradual rise (or decline) in the plotted data compared to U.S. markets.

Table 2 reports the summary statistics, while Table 3 presents the correlation matrix among the variables used in our empirical analysis. The lower-left portion of Table 3 displays Pearson correlation coefficients, and the upper-right portion presents Spearman rank correlations. Focusing on the *Fee* variable in Table 2, we observe that the median (50th percentile) fee is 62.5 basis points, whereas the mean is substantially higher at 206.68 bp (approximately 2%). As noted by Miura and Shimizu (2025), this difference can be attributed to the premium charge rate (PCR), or "*gyaku-hibu*"—a short selling cost uniquely found in Japan—which is annualized and added on top of the standard lending fee, thereby elevating the average fee level. Moreover, Table 3 shows that the correlation between *Fee* and *CrossShare* (the shareholding ratio of major shareholders) is -0.08, indicating that higher levels of cross-shareholding are associated with lower lending fees. Correlations among the other variables are generally low, suggesting that multicollinearity is not a substantive concern in our analysis.

4. Empirical Results

This section presents the results of the empirical analysis. First, we use an event study approach to examine the dynamics of securities lending and short selling activities around the recall date.

Next, we employ probit models and panel regressions to identify the determinants of loan fees and their sudden increase (quantity spikes) in the securities lending market around the recall date. Finally, using an instrumental variable approach (two-stage least squares; 2SLS), we investigate how such recall behavior—motivated by the desire to retain shareholder rights—affects liquidity and the price formation of loaned shares in the equity market.

4.1. Event Study

4.1.1. Lending / Short Selling Activities around Recall Dates

We begin our analysis by examining trading activities in the securities lending market around the recall date. Prior studies have documented substantial increases in lending fees and short-selling volume around the record date (Thornock, 2013; Dixon et al., 2021). In this study, we define the recall date as the event day (t=0) and analyze market dynamics in its vicinity. Specifically, we estimate a regression model incorporating an event-day dummy variable and event fixed effects for characteristics such as firm and dividend, setting the recall date as t=0, and around the recall date; that is, seven days before and after the event (t−7,t+7) then examine its impact on trading activities over the window from t−7 to t+7.

Specifically, we follow Dixon et al. (2021) to estimate the following regression model:

$$LA_{it} = \alpha + \sum_{\Delta=-7}^{7} \beta^{T+\Delta} D_{it}^{T+\Delta} + event\ FE + \varepsilon_{it}, \quad (1)$$

$$SSA_{it} = \alpha + \sum_{\Delta=-7}^{7} \beta^{T+\Delta} D_{it}^{T+\Delta} + event\ FE + \varepsilon_{it}, \quad (2)$$

where the dependent variables comprise two categories: measures related to the lending market (*LA*, as in equation1) and those capturing short-selling activity (*SSA*, as in equation2), respectively. Panel A includes variables associated with lending activities (*LA*), such as *Fee, Min_Fee, SharesOnLoan, SharesAvailable, and Lender/Borrower/Inventory Concentration—*

key indicators derived from S&P Global's securities lending dataset. On the other panel, Panel B includes variables representing short-selling activities (*SSA*), such as *Transaction Count*, *Short Loan Value* (Yen), and *Short Selling Value* (Yen), which capture various dimensions of short-selling behavior.

The analysis is conducted at the firm-day level, with observations indexed by firm *i* and day *t*. The event dummy D_{it} takes a value of one for observations made between seven days before and after the recall date (t=0), or [t−7, t+7], allowing us to examine the short-term effect of recall activity on lending and short-selling activities.

Table 4 presents the regression results. In Panel A, we report the results from the regression estimated using Eq. 1. We observe substantial increases in the lending fee (*Fee*), minimum lending fee (*Min_Fee*), and the value of shares lent (*Shares on Loan*) during the ±4-day window around the recall date. This pattern suggests that short covering activities intensify during this period, despite elevated borrowing costs. During the period in which lenders recall callable securities, refinancing demand shifts sharply from callable to non-callable issues across the entire market. Short sellers who receive a recall notice from lenders attempt to maintain their positions even at the cost of paying elevated fees (*Fee*), tightening the supply of non-callable securities and consequently increasing borrowing fees. The increase in the minimum lending fee (*Min_Fee*) indicates that even GC stocks—typically associated with low lending fees—experience increased borrowing demand during this period. Moreover, the increase in the value of shares on loan (*Shares on Loan*) runs counter to the decline predicted by Diamond and Verrecchia (1987). This pattern reflects the fact that refinancing transactions become particularly active in Japan around recall dates, leading to an expansion of borrowed positions in non-callable securities.

Conversely, the value of shares available (*Shares Available*) and the degree of lender/borrower concentration (*Lender Concentration* and *Borrower Concentration*) both

declines significantly from the recall date through the record date. This decline reflects a supply contraction associated with share recalls, which reduces the participation of major lenders and borrowers in the market. Additionally, inventory concentration increases steadily from the cum-day to the record date, indicating that lending inventory becomes increasingly concentrated among a smaller number of lenders, thereby exacerbating supply shortages in the lending market.

Next, we examine the regression results for short-selling activities in Panel B. Both the number of new transactions (*Transaction Count*) and the value of shares on loan for short selling (*Short Loan Value*) increase markedly from the recall date through to the record date, again suggesting intensified short covering activities despite elevated borrowing costs. In contrast, the value of short-selling transactions (*Short Selling Value*), exhibits fluctuations within the ±7-day window around the recall date. Notably, on the recall date itself, the coefficient is positive (10.19), although not statistically significant. This result suggests that even during periods of high short-selling activity, short-sellers may be temporarily constrained on the recall date due to supply limitations due to lenders reclaiming loaned shares.

4.1.2. Market Quality Measures around Recall Dates

The analysis then turns to market quality in the equity market around the recall date. The estimation framework in this section follows Eq.1 and 2, except that the dependent variable is a measure of *Market Quality* (*MQ*) in the equity market. *MQ* is measured using key indicators of trading cost and liquidity, such as the bid-ask spread (*PQS, QS*), Turnover ratio (*Turnover*), and the Amihud (2002) illiquidity measure (*ILLIQ*). Event fixed effects for characteristics such as firm and dividend are the same as in Eq.1 and 2. In addition, we conduct subsample analyses for *General Collateral* (*GC*) and *Special Collateral* (*SC*) stocks, which reflect differences in fee levels, as the prior studies document that the effect of lending fees on market quality differs

from one group to another. Based on these considerations, we estimate the following regression model:

$$MQ_{it} = \alpha + \sum_{\Delta=-7}^{7} \beta^{T+\Delta} D_{it}^{T+\Delta} + event\ FE + \varepsilon_{it}, \quad (3)$$

Table 5 Panel A presents the results of the regression analysis estimated in Eq.3. First, we focus on *PQS*. The results indicate a statistically significant widening of the spread in the days leading up to the recall date, relative to non-event periods. Consistent with prior literature (e.g., Glosten and Milgrom,1985; Easley and O'Hara,1987), this finding suggests heightened information asymmetry and increased trading costs. Next, turnover shows a significant increase within the ±4-day window surrounding the recall date. This pattern indicates that short-selling activity remains steady, despite rising borrowing costs. By contrast, *ILLIQ* does not exhibit a statistically significant change.

Subsequently, Table 5 Panel B reports the subsample analysis by *GC* and *SC* stocks to examine how differences in lending fee levels affect market quality measures. Since *ILLIQ* was not statistically significant in the preceding analysis, it is omitted from the current specification. For *GC* stocks, both *PQS* and Turnover begin to increase significantly approximately five days before the recall date. This pattern suggests that even securities that typically command low lending fees experience heightened refinancing demand during this period, resulting in increased trading activity, greater information asymmetry, and higher transaction costs. In contrast, *SC* stocks exhibit significant declines around the recall date. Because borrowers generally prioritize the repayment of high-fee stocks in securities lending transactions, callable stocks tend to be returned to lenders during the recall period. This repayment behavior temporarily reduces trading volume and lowers borrowing costs for *SC* stocks, consistent with the observed decrease in market activity.

4.2. Probit Analysis and Panel Regression

In the previous subsection, we examined trading activity in the securities lending market and market quality (*MQ*) in the equity market around the period of lending recalls. The analysis revealed that during the ±4-day window surrounding the recall date, lending fees (*Fee*) increased sharply, and the concentration of lendable inventory among a limited number of lenders led to increased supply constraints. Despite elevated borrowing costs, short covering activity accelerated, while short selling remained active.

Thornock (2013) argues that the likelihood of extreme spikes in lending fees is associated with greater inefficiency in the lending market, leading to the deterioration in equity market quality. Similarly, Dixon et al. (2021) document abnormal increases in loan volumes prior to recall dates. These findings raise the following question: what factors contribute to spikes in lending fees and loan quantities? This subsection focuses on *Fee Spike* and *Quantity Spike* and examines their determinants.

4.2.1. Fee Spike

To identify the determinants of fee spikes in the securities lending market, we estimate the following empirical model, based on Thornock (2013):

$$\Pr(Fee\ Spike)_{it} = \alpha + \beta_1 Recall[-4,4]_{it} + \beta_2 Fiscal_{it} + \beta Controls_{it} + \beta Recall_{it} \times Controls_{it} + \varepsilon, \quad (4)$$

where the dependent variable, Pr(*Fee Spike*), is a binary indicator that takes the value of 1 if the lending fee for stock *i* on day *t* increases by 100 basis points or more compared to the previous trading day (*t*−1), and 0 otherwise. *Recall* [−4,4] is an event dummy that equals 1 if the observation falls within a four-day window before or after the recall date, and 0 otherwise. *Fiscal_flag* is a dummy variable that equals 1 if the stock is subject to fiscal year-end closing in the given month, and 0 otherwise. Control variables include *Lender, Borrower,* and *Inventory Concentration* ratios, as well as interaction terms between these variables and the event dummy.

Eq.4. is estimated using both a linear probability model (LPM) and a logit regression approach.

Table 6 presents the results of the probit analysis estimated in Eq.4. The results indicate that the likelihood of a *fee spike* significantly increases within the 4-day window surrounding the stock recall date. This effect is particularly pronounced for firms whose fiscal period ends in the current month, as they are more likely to initiate recalls to secure shareholder status, leading to tighter securities-lending supply, stock shortages, and ultimately higher lending fees. Moreover, higher *Borrower Concentration* around the recall date is associated with a deterioration in supply-demand balance, further increasing the probability of a *fee spike.*

In contrast, the coefficient on *Inventory Concentration* is significantly negative, suggesting that the more lending inventory is dispersed across a larger number of smaller lenders, the likelier *Fee Spikes* occur. As discussed earlier, it is common practice in the Japanese securities lending market to engage in "refinancing transactions," wherein callable shares are substituted with non-callable shares in the lead-up to the fiscal year-end. Consequently, during the third week of the fiscal year end—the typical recall week—callable shares are largely absent from the lending pool. Furthermore, a decline in the stable shareholder ratio—defined as the combined shareholdings of financial institutions and domestic corporations—is shown to be associated with an increase in the probability of *fee spikes*.

4.2.2. Quantity Spike

To identify the determinants of *Quantity Spikes* in the securities lending market, we estimate the following empirical model, based on Dixon et al. (2021):

$$Quantity\ Spike_{it} = \alpha + \beta_1 Recall[-4,4]_{it} + \beta_2 Fiscal_{it} + \beta_3 Div\_Yield_{it} + \beta Controls_{it} + \beta Recall_{it} \times Controls_{it} + \varepsilon, \quad (5)$$

where the *Quantity Spike* is defined as the surge in shares on loan and is calculated as the difference between the lending volume on the recall date and the average lending volume from

30 to 6 days prior to the recall date. The variable *Recall* is a dummy that equals 1 if the observation falls within the four-day window surrounding the recall date, and 0 otherwise. *Fiscal_flag* is defined in the same manner as in Eq.4., taking the value of 1 if the firm's fiscal year-end falls within the given month, and 0 otherwise.

Additionally, we introduce a new variable, *Div_Yield*, defined as the dividend yield of stock i, calculated as annual dividends per share divided by the reference price, multiplied by 100. Dixon et al. (2021) argues that shifts in lending supply and demand are influenced by dividend taxation, with the impact being more pronounced for high-dividend stocks. In contrast, this study focuses not only on tax-related incentives but also on recall activities initiated for the purpose of restoring shareholders of record status. Therefore, both the *Fiscal_flag* and *Div_Yield* are included in the regression to compare their effects. Control variables include *Lender, Borrower,* and *Inventory Concentration* measures, along with their interaction terms with the event dummy.

Figure 7 illustrates the abnormal increase in average shares on loan prior to recall dates for each year from 2010 to 2020. The left axis reports the average number of shares on loan, calculated as the difference between the number of shares on loan on the recall date and the average daily number of shares on loan from t−30 to t−6 relative to the recall date. The right axis depicts the abnormal increase as a percentage, defined as the ratio of the increase in shares on loan to the average number of shares on loan during the t−30 to t−6 window. As shown in the figure, average lending volume temporarily declined around 2014, but has trended upward steadily thereafter.

Table 7 presents the results of the panel regression estimated in Eq.5. The coefficient on the recall dummy is significantly positive, indicating that the likelihood of a *Quantity Spike* increases during the four-day window surrounding the recall date. Both the fiscal year end dummy (*Fiscal_flag*) and the dividend yield (*Div_Yield*) also exhibit significantly positive

effects on the occurrence of quantity spikes. Moreover, the coefficient on the large-shareholder ownership ratio (*Cross_Share*) is significantly positive, suggesting that in Japan, recalls motivated by the need to restore shareholder-of-record status play a more dominant role than dividend-tax-related incentives, which are emphasized in Dixon et al. (2021).

This subsection has empirically examined the determinants of *Fee Spikes* and *Quantity Spikes* in the securities lending market. The results indicate that *Fee Spikes* tend to occur more frequently for stocks whose fiscal year ends in the current month, as recalls driven by the need to restore shareholder-of-record status tighten lending supply and lead to temporary stock shortages, thereby increasing borrowing fees. Moreover, the degree of *Borrower Concentration* increases around recall dates, worsening the supply–demand imbalance and further elevating the likelihood of *Fee Spikes*. In contrast, *Inventory Concentration* exhibits a significantly negative coefficient, suggesting that when a larger number of lenders hold relatively small inventories, *Fee Spikes* become more likely. As discussed earlier, refinancing transactions—where callable loans are replaced with non-callable ones—are a common practice in Japan's lending market. Consequently, during the third week of fiscal year end, which corresponds to the recall period, callable securities are rarely observed in available lending inventories. Furthermore, a decline in the stable-shareholder ratio—measured by the combined holdings of domestic financial institutions and corporations—correlates with a higher incidence of *Fee Spikes*.

To summarize, the finding that seasonal recalls likely tighten the supply and shortages of lendable shares—thereby increasing lending fees and significantly raising the probability of *Quantity Spikes*—suggests that there exists a "DOUT" (outward demand shift), as defined by Dixon et al. (2021) and Cohen (2007).

4.3. Instrumental Variable Method (Two-Stage Least Squares)

In the previous section, we examined the determinants of *Fee Spikes* and *Quantity Spikes* and confirmed that both are triggered by the onset of stock-lending recalls. In this section, we focus on *Quantity Spikes*. As noted in prior research, this demand shift is induced by recalls initiated for the purpose of restoring shareholder-of-record status, and—because it involves the physical retrieval of shares—its effects are expected to manifest more clearly in quantities than in prices. However, *Quantity Spikes* are the variables originating from the securities-lending market and may therefore be endogenous. When examining their effect on stock returns, it is challenging to rule out the possibility that these variables are correlated with the error term, which should be exogenous. Specifically, it remains unclear whether spikes in the securities lending market affect stock returns, or conversely, whether fluctuations in stock returns trigger such spikes—raising concerns of reverse causality. To address this potential endogeneity, this section employs an instrumental variable approach, specifically the Two-Stage Least Squares (2SLS) estimation.

4.3.1. Return

Building on the results of the previous subsection, this analysis examines how *Quantity Spikes* in the securities lending market affect stock returns, while addressing the potential endogeneity of lending-related variables.

As an instrumental variable, we use the *Cross_Share* ratio, which represents the ownership share held by major shareholders. This variable is correlated with lending variables but does not directly affect stock returns except through the lending market, making it a plausible instrument. The rationale lies in the prohibition of "naked short selling," which requires short sellers to borrow shares prior to selling them. Consequently, while the availability of lenders strongly influences lending-market conditions, it does not directly

transmit to equity market returns without passing through the lending channel. For instance, even if temporary recalls occur for the purpose of restoring shareholder registration—as often observed in Japan—reducing lending supply in the short term, this does not directly impact stock prices outside the lending mechanism. For these reasons, *Cross_Share* is expected to function as a valid and appropriate instrumental variable in this setting. Furthermore, the validity of the analysis is checked using the Stock-Yogo (2005) weak instrumental variable (IV) test. The F-statistic test value is 3280.04 for *Quantity Spike*. This value exceeded the critical values indicated by Stock-Yogo (2005), confirming that the instrumental variables are sufficiently robust and suitable for the analysis.

We estimate the following 2SLS model. The first and second stages are estimated in Eq.6 and Eq.7, respectively:

$$Quantity\ Spike_{it} = \alpha + \delta_1 Recall[-4,4]_{it} + \delta_2 Fiscal_{it} + \delta_3 Div\_Yield_{it} + \delta_4 Cross\_Share_{it} + \delta Controls_{it} + \delta Recall_{it} \times Controls_{it} + \varepsilon, \quad (6)$$

$$Return_{it} = \alpha + \beta_1 \widehat{Quantity\ Spike}_{it} + \beta_2 Recall[-4,4]_{it} + \beta_3 Fiscal_{it} + \beta_4 Div\_Yield_{it} + \beta Controls_{it} + \beta Recall_{it} \times Controls_{it} + \varepsilon, \quad (7)$$

Table 8 presents the results of the 2SLS estimation based on Eq.6. and 7. The *Quantity_Spike* model shows that while the effect of *Quantity Spike* on ordinary days is −0.00685, it rises to −0.00685 + 0.0278 = +0.02095 (2.095%) during the recall window. This suggests that *Quantity_Spike* (instrumented by *Cross_Share*) is positively correlated with daily returns. The results imply that recalls increase the frequency of *Quantity_Spike* events, and the accompanying short-covering pressure tends to drive stock prices upward.

Taken together, these results suggest that Japan's end-of-fiscal-period recall practices—driven by the desire of lenders to restore shareholder registration—reduce lending supply and trigger short-covering behavior, ultimately pushing up stock prices by approximately 2% during the four-day period surrounding the recall date.

These findings empirically illustrate the linkage between Japan's securities-lending

market and the equity market around fiscal year-end, operating through a mechanism rooted in Japan's unique recall practices. In contrast to the predictions of prior theoretical work, short-selling activity in the Japanese market does not decline in response to rising borrowing costs; instead, the number of short positions increases sharply from the recall date through the record date. This pattern arises because lenders initiate recalls at fiscal year-end to restore shareholder-of-record status. Faced with a recall, short sellers attempt to maintain their positions despite higher costs, generating market-wide demand to refinance from callable into non-callable shares. As this refinancing demand becomes concentrated in a short window, the supply of non-callable shares tightens and borrowing fees increase further. Short sellers who are unable to refinance are forced to close their positions in response to the recall, triggering short covering and exerting upward pressure on stock prices.

5. Conclusion

This study examines the relationship between stock lending recalls and the transfer of ownership rights, empirically analyzing how lenders' recall behavior around the fiscal year end affects liquidity in the underlying equity market and the prices of loaned shares. In Japan, many institutional lenders recall their loaned shares approximately seven days before the record date of the settlement month to retain shareholder registration. This market practice, rooted in Japan's long-standing practice of cross-shareholding, extends beyond a mere administrative formality and has tangible implications for the prices of loaned stocks in the equity market. Because most Japanese firms designate the final business day of the fiscal year end as the record date, these recalls occur in a highly predictable and synchronized manner. Accordingly, such "seasonal recalls" can be regarded as exogenous shocks, serving as quasi-natural experimental identification.

Using an event study approach, we first analyze lending and short-selling activities

around recall dates. The results show that recalls lead to higher concentration of trading activities among both lenders and borrowers, increased inventory concentration, and tighter lending supply. The contraction of supply stimulates short-covering activity despite increasing borrowing costs, while short-selling activity tends to decline temporarily on the recall date itself. Moreover, we observe that bid–ask spreads widen and stock turnover increases around the recall date, suggesting a deterioration in market quality driven by heightened information asymmetry and higher trading costs despite increased trading volume in the equity market. When we perform subsample analysis, dividing the sample by *GC* and *SC* stocks, to assess how the effects of recalls differ by lending fee levels, the effect is found to be particularly more pronounced among *GC* stocks. Even for stocks that typically carry low lending fees (*GC* stocks), refinancing demand increases during this period, leading to higher short-selling activity. This surge is accompanied by increased information asymmetry and higher transaction costs. By contrast, *SC* stocks exhibit a significant decline in the fee around the recall date. In the lending markets, borrowers generally tend to return the loaned stock with higher fee first. As a result, during recall periods, callable positions are closed out more rapidly for *SC* stocks, leading to a temporary contraction in trading volume and a corresponding decline in lending fees.

Next, we perform probit and panel regression analyses to identify the determinants of lending fee and quantity spikes. We find that, for firms with fiscal year-end record dates, recalls aimed at restoring shareholder registration significantly tighten lending supply and increase borrowing fees through temporary shortages of lendable shares. Rising borrower concentration further worsens supply–demand imbalances, increasing the likelihood of fee spikes. In contrast, inventory concentration exhibits a significantly negative coefficient, implying that fee spikes are more likely when lending inventory is fragmented across many small lenders. In Japan, refinancing from callable to non-callable contracts is a common market practice, and callable

inventories tend to be scarce in the lending market during the third week of fiscal year end (the "recall week"). Consistent with this, we find that a lower share of stable ownership—typically held by domestic institutions or corporate cross-shareholders—is associated with a higher incidence of fee spikes. Additionally, the results for quantity spikes suggest that, in the Japanese context, recall motives related to shareholder registration play a more dominant role than the dividend taxation effects emphasized in prior studies.

Finally, to address potential endogeneity of lending-market variables, we employ a two-stage least squares (2SLS) estimation to assess the causal effects of quantity spikes on stock returns. The results indicate that seasonal recalls at fiscal year-end reduce lending supply and intensify short-covering activity, ultimately pushing up stock prices by approximately 2% within the four-day window surrounding the recall date.

In the Japanese equity market, we observe a notable departure from the predictions of Diamond and Verrecchia (1987): even as borrowing costs increase, short-selling activity does not decline. Instead, the number of short-selling positions increases sharply from the stock-lending recall date through the record date. This pattern is not consistent with the existing theoretical framework and, as this study argues, is driven by Japan's unique shareholder right restoration recall practice. At fiscal period-end, lenders initiate recalls to restore shareholder-of-record status. In response, short sellers attempt to maintain their positions despite higher borrowing fees, creating market-wide demand to refinance positions from callable into non-callable shares. This concentrated demand severely constrains the supply of non-callable securities, further pushing up lending fees. Investors who are unable to secure substitute shares to borrow are forced to repurchase the stock to meet the recall, generating short covering and upward pressure on prices. Against this institutional backdrop, this study provides empirical evidence that Japan's fiscal-year-end recall practice creates a systematic link between the securities-lending market and the equity market—an interaction that stands in contrast to

standard theories of short-selling constraints.

The primary contribution of this study lies in its novel focus on the impact of lenders' recall-induced short-covering behavior on liquidity in the equity market and the price formation of loaned shares, rather than the conventional view that securities lending is primarily driven by short-selling demand. In practice, not all stock loans are used for short-selling purposes; many transactions are conducted for financing, collateral, or other non-short-selling motives. However, empirical research examining how such non-short-selling lending activity affects market outcomes remains limited. In this respect, this study complements existing literature by offering new evidence from a different dimension of the lending market.

Furthermore, by situating the analysis within Japan's institutional context—specifically, the practice of cross-shareholding and the lender's recall behavior for shareholder registration—this study provides an original and contextually grounded perspective. This institutional lens deepens our understanding of how the securities lending market interacts with the equity market.

The finding that seasonal recalls impose supply constraints in the lending market and exerts a measurable impact on price formation carries important implications for regulators and market participants alike. Even if the results presented in this study indicate a positive effect on stock prices, it remains true that the refinancing-related costs borne by market participants are substantial. In this market practice, refinancing transactions impose a significant operational burden on lending desks, and the long-standing practice whereby lenders initiate large-scale recalls at the fiscal year-end is arguably reaching a point where reconsideration is warranted. Future policy design, risk management, and trading strategies should recognize that the lending and equity markets are closely interconnected and cannot be analyzed in isolation. Strengthening the integrated understanding of these two markets—and their feedback effects—remains an important avenue for future research.

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6. Figures and Tables

Figure 1: Participants in Japan's Securities Lending Market

This figure illustrates the relationships among participants in Japan's securities lending market.There are three main types of participants: lenders, borrowers, and brokers. Lenders include life insurance companies, trust banks managing pension funds, investment management firms, foreign custodians, and the Japan Securities Finance Co. (JSF), all of which supply lendable securities to the market. Borrowers consist of institutional investors such as hedge funds as well as retail investors, who borrow shares primarily for short-selling and settlement purposes. Brokers, acting as intermediaries, arrange stock loans for client short sales and also engage in financing and collateral transactions, thereby serving both sides of the lending and borrowing market. In Japan, in addition to institutional securities lending, there exist general negotiable margin transactions (NMTs) and standardized margin transactions (SMTs), both of which are mainly used by retail investors. Notably, the SMT is a margin trading framework unique to Japan, under which stock borrowing is conducted through the Japan Securities Finance Co. (JSF). For further institutional details, see Miura and Shimizu (2025).

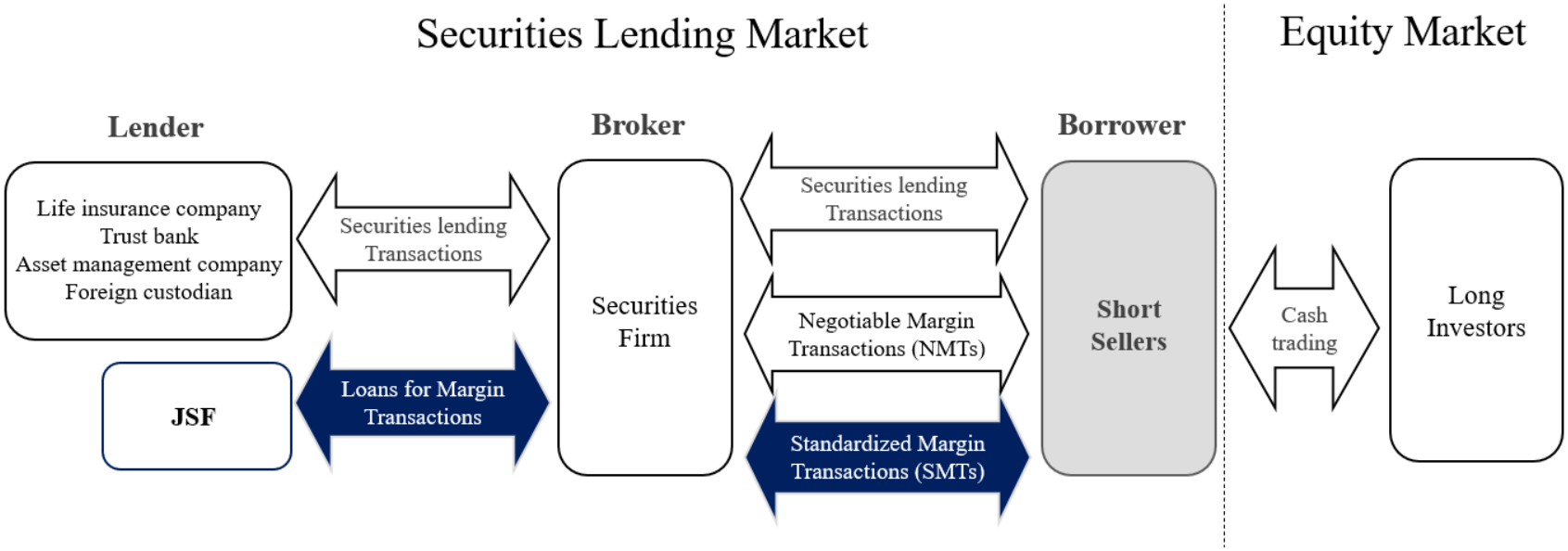

Figure 2: Average Tenure by Month
This chart shows the trend in the average lending period (the weighted average number of days from the start date to the end date of a transaction).The average lending period is approximately 160 calendar days, suggesting that in many cases, the borrowed shares are returned within half a year, resulting in the ownership being transferred back from the borrower by the record date.

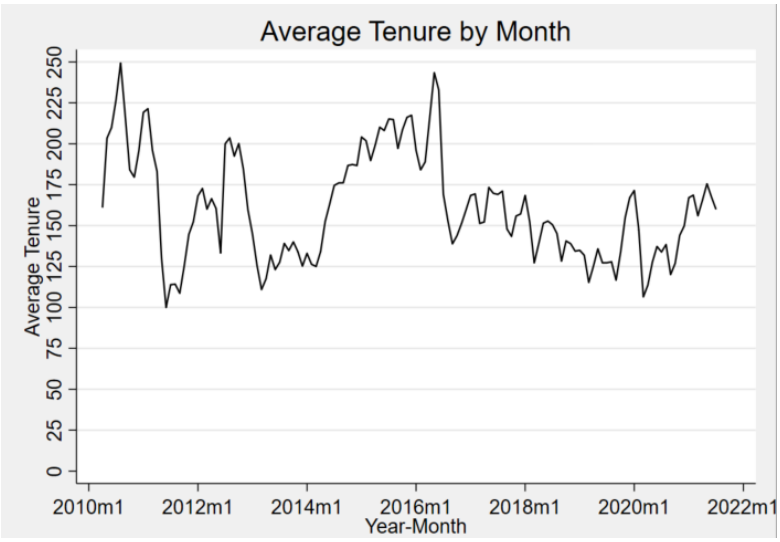

Figure 3: *Empty Voting*
This diagram illustrates the mechanism of "*empty voting*" described by Hu and Black (2007). First, Party A (the original owner) enters into a securities lending transaction with Party B. Meanwhile, Party B, wishing to exercise voting rights at the next shareholders' meeting, borrows a large number of shares. Simultaneously, Party B hedges against stock price fluctuation risk by entering into a derivative transaction with Party C. After exercising the voting rights, Party B promptly returns the shares to Party A. This behavior—exercising voting rights without bearing stock price fluctuation risk—disconnects voting rights from economic incentives. Consequently, it risks hindering rational decisions aimed at enhancing corporate value, potentially leading to damage to corporate value and infringement of other shareholders' interests.

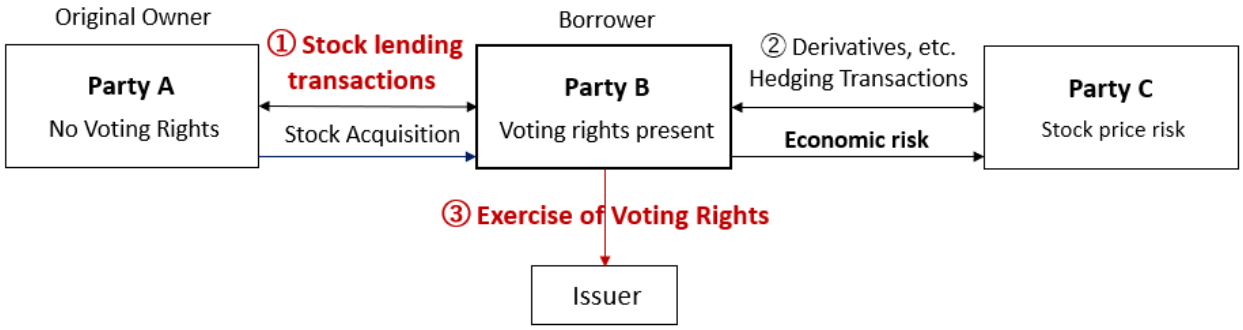

Figure 4a: Stable of Loan from Stable Lender
This figure shows the annual trends in the volume of shares lent by stable lenders. The solid line represents all listed firms, while the dashed line represents constituent stocks of the Nikkei 225. Overall, shares lent by stable shareholders account for approximately 70–80% of total lending volume, and this share has been increasing over time.

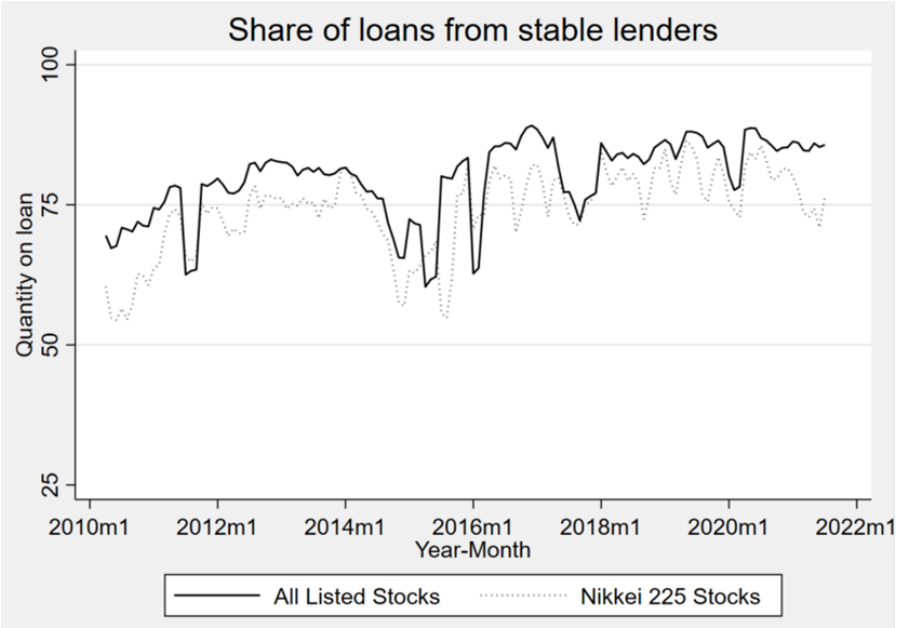

Figure 4b: Share of Loans from Stable Lenders around Recall Dates
This figure plots the daily changes in loaned quantity over the 30-day window surrounding the recall date. The vertical solid line indicates the recall date, and the dashed line denotes the record date. The volume of shares on loan declines gradually beginning roughly 30 days prior to the recall event and increases sharply thereafter.

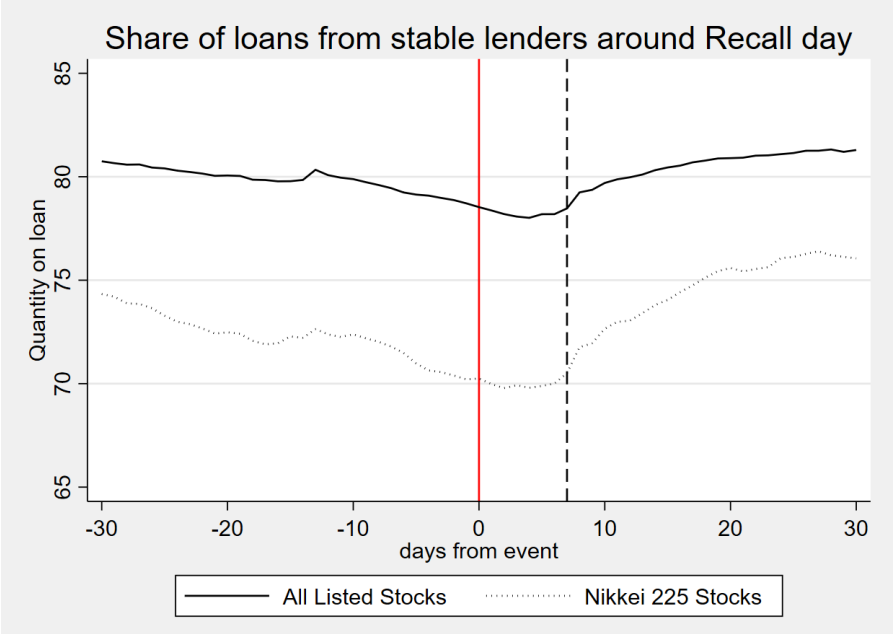

Figure 5a: Lender & Borrower Concentration around Recall Dates
This figure shows the blue line represents *Lender Concentration,* while the red line represents *Borrower Concentration*. Both measures rise as the record date approaches; however, *Lender Concentration* increases earlier than *Borrower Concentration*. This likely reflects the fact that recalls of callable shares are typically initiated by lenders, who consequently perceive looming supply shortages earlier than borrowers.

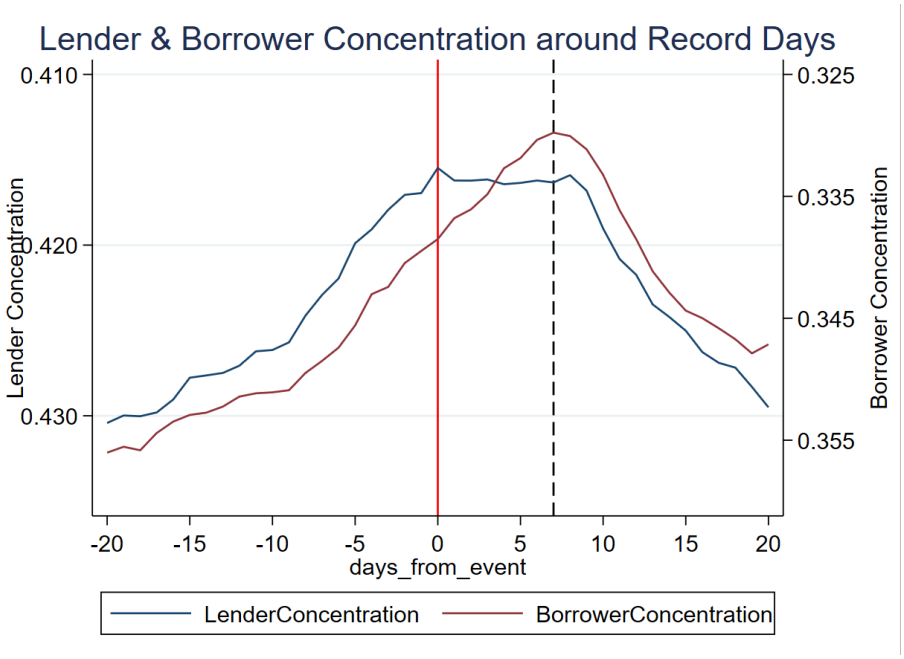

Figure 5b: Inventory Concentration around Recall Dates
This figure shows that *Inventory Concentration* begins to rise approximately two weeks before the record date, peaks around the event, and then drops sharply. This reflects the influx of newly available callable shares from lenders on the first business day of the following month, which rapidly alleviates supply constraints in the lending market.

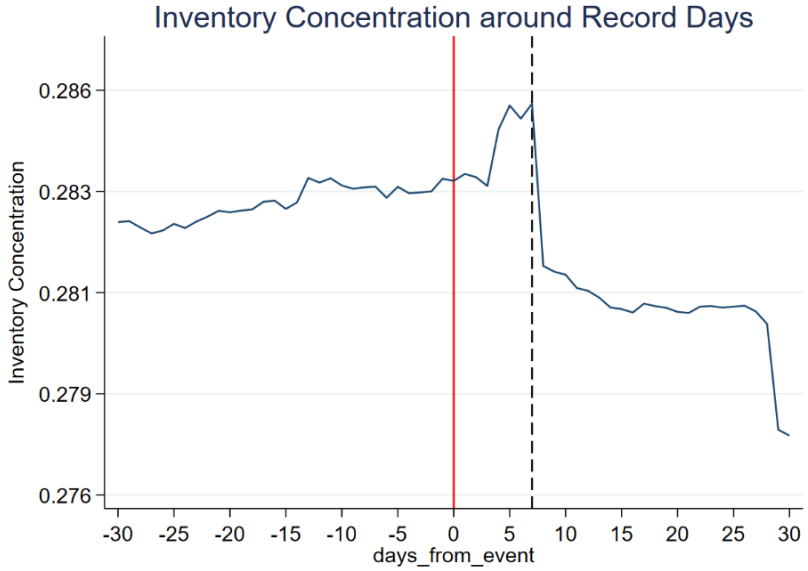

Figure 6: Lending / Short Selling Activities around Recall Dates

These figures illustrate the dynamics of securities lending and short selling activity around the recall date. In this study, we define the recall date as T+0, corresponding to seven business days prior to the record date, which is the final trading day of the month. This definition reflects a market convention in which many lenders assign the term date for loan repayment one week before the record date when lending callable shares.

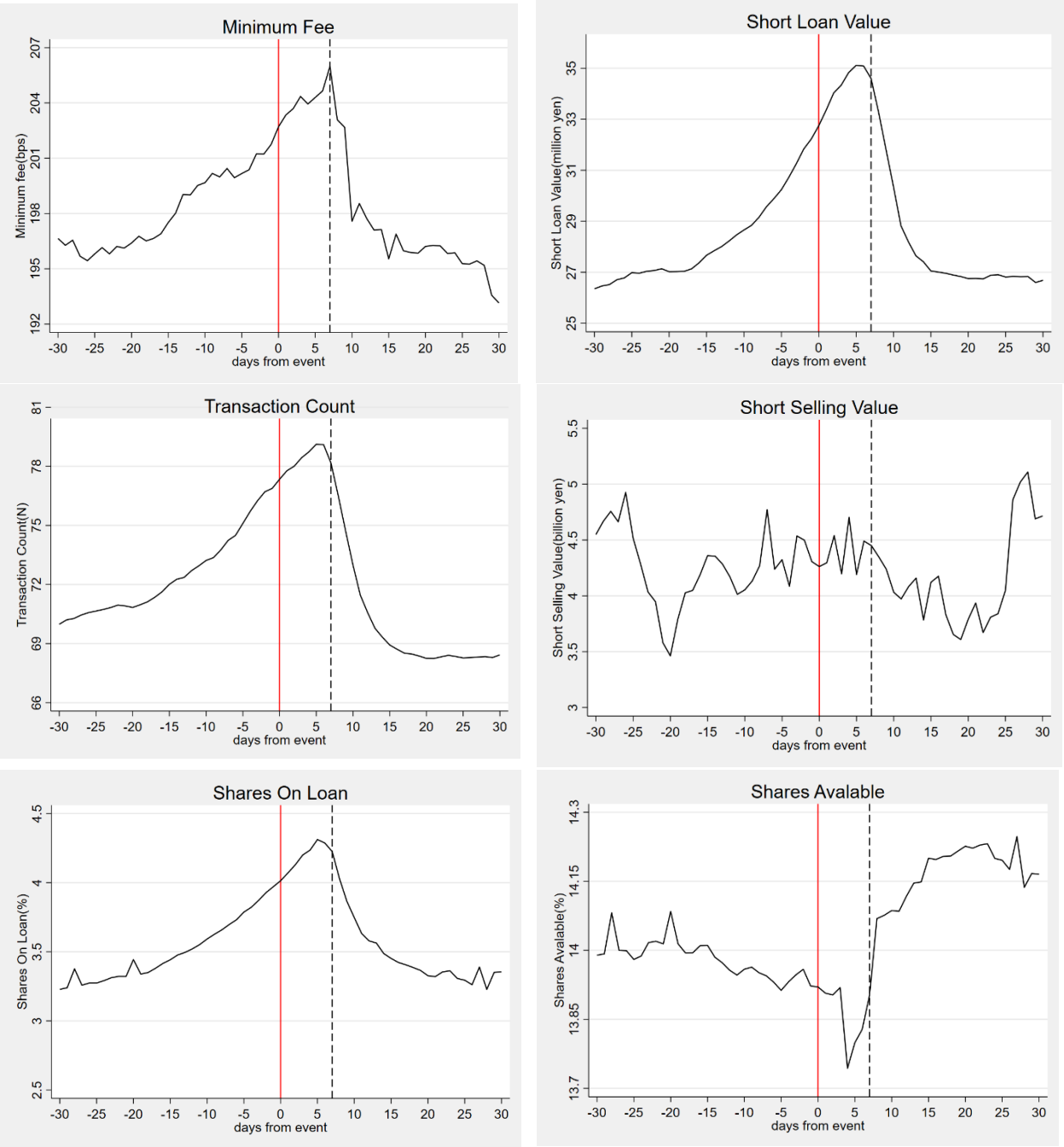

Figure 7: Quantity Spike Trends before Recall Dates
This figure shows the abnormal increase in average shares on loan prior to recall dates for each year from 2010 to 2020, following Dixon et al.(2021). The left axis reports the average number of shares on loan, calculated as the difference between the number of shares on loan on the recall date and the average number of shares on loan from t−30 to t−6 relative to the recall date. The right axis depicts the abnormal increase as a percentage, defined as the ratio of the increase in shares on loan to the average level of shares on loan during the t−30 to t−6 window. As shown in the figure, average lending volume temporarily declined around 2014, but has trended upward steadily thereafter.

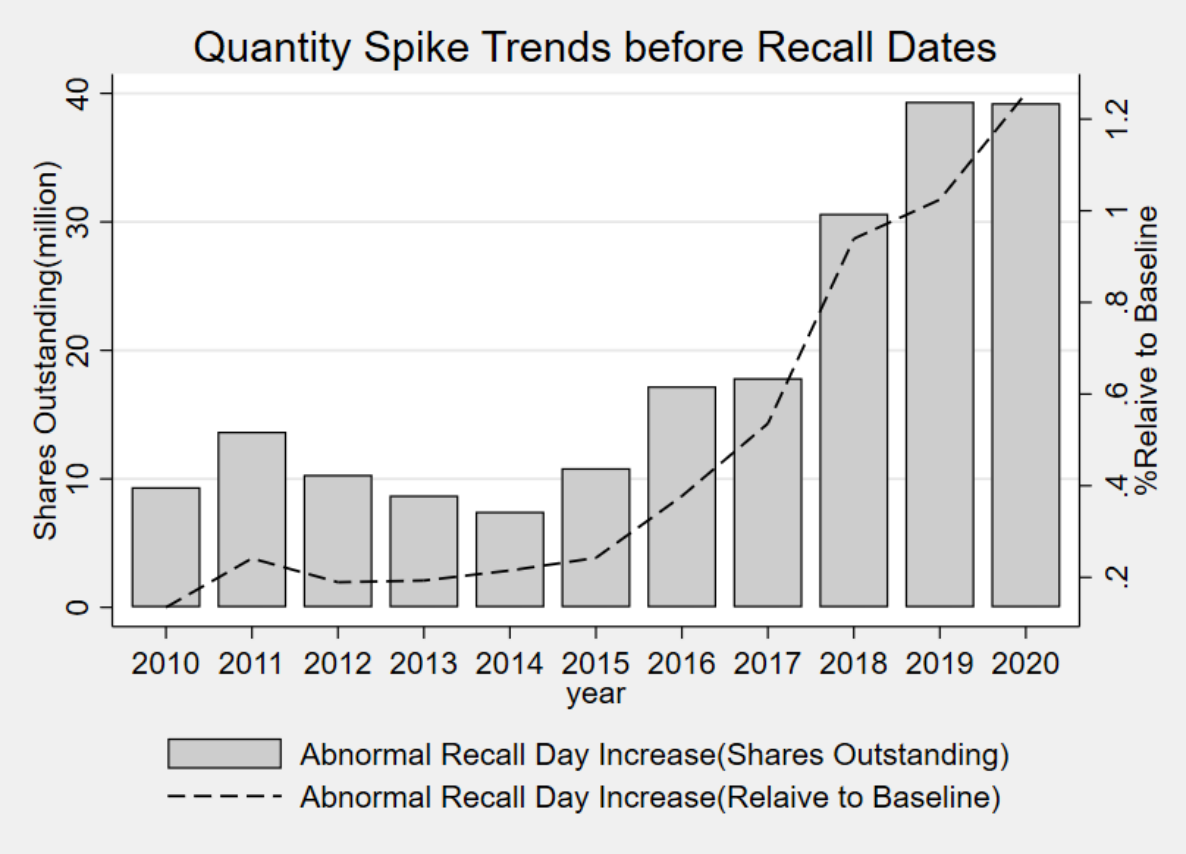

Table 1: Stable Shareholder Ratio

This figure shows the average stable shareholder ratio for the period from 2011 to 2020. We construct the variable *Cross_Share* by summing the ownership shares of financial institutions and domestic corporations. Overall, the stable shareholder ratio exhibits a declining trend over this period. However, a slight increase in the ownership ratio of domestic corporations is observed beginning in 2019. In addition, the shareholdings of the government and individuals have risen over the past decade.

year	n_firms	Average Tenure (days)	Cross_Share	(change)	Financial Institutions	(change)	Other corporations	(change)	Government	(change)	Securities Firms	(change)	Foreign corporations	(change)	Individuals and Others	(change)
2010	1,682	204	48.44		24.94		23.50		1.37		1.23		12.30		37.89	
2011	1,802	150	47.10	-1.3	23.41	-1.5	23.69	0.2	1.34	-0.0	1.28	0.1	12.29	-0.0	39.28	1.4
2012	1,857	176	46.52	-0.6	22.49	-0.9	24.03	0.3	1.94	0.6	1.43	0.2	12.05	-0.2	40.03	0.8
2013	1,915	130	45.94	-0.6	21.67	-0.8	24.27	0.2	2.62	0.7	1.63	0.2	12.43	0.4	40.08	0.0
2014	1,977	161	45.68	-0.3	21.34	-0.3	24.34	0.1	2.83	0.2	1.74	0.1	14.06	1.6	38.61	-1.5
2015	2,029	207	45.44	-0.2	21.14	-0.2	24.30	-0.0	2.98	0.1	1.86	0.1	15.15	1.1	37.67	-0.9
2016	2,072	181	45.50	0.1	21.44	0.3	24.06	-0.2	3.58	0.6	1.72	-0.1	15.30	0.1	37.49	-0.2
2017	2,101	161	45.78	0.3	21.86	0.4	23.92	-0.1	3.34	-0.2	1.81	0.1	15.68	0.4	36.74	-0.8
2018	2,133	144	46.49	0.7	22.68	0.8	23.80	-0.1	3.38	0.0	1.73	-0.1	16.41	0.7	35.34	-1.4
2019	2,171	133	47.08	0.6	23.23	0.5	23.85	0.1	3.14	-0.2	1.64	-0.1	15.90	-0.5	35.33	-0.0
2020	2,181	134	47.27	0.2	23.22	-0.0	24.05	0.2	2.95	-0.2	1.62	-0.0	15.56	-0.3	35.46	0.1
2021	3,940	166	43.44	-3.8	17.01	-6.2	26.43	2.4	2.77	-0.2	2.08	0.5	11.69	-3.9	43.16	7.7

Table 2: Summary Statistics

This table reports summary statistics of the variables used in our empirical analysis. Each variable's definition is provided in the Appendix.

	Time horizon: 2010–2021								
Variable	Mean	SD	p5	p10	p25	p50	p75	p90	p95
Fee(bp)	206.68	260.31	37.5	41.86	50	62.5	300	585.71	742.86
Average Tenure(day)	160.44	144.13	32.18	44.28	71.2	118.98	200.25	318.28	423.13
Transaction Count(cases)	69	95	3	6	16	40	86	162	232
Lender Concentration	0.43	0.29	0	0.13	0.23	0.37	0.59	1	1
Borrower Concentration	0.35	0.23	0.13	0.15	0.2	0.28	0.44	0.69	0.9
Inventory Concentration	0.29	0.22	0.11	0.11	0.14	0.21	0.34	0.59	0.89
Shares On Loan(%)	3.57	5.05	0.12	0.25	0.7	1.78	4.41	8.97	13.03
Shares Avalable(%)	14.04	10.62	1.35	2.77	6.26	12.42	20	27.35	31.68
Cross_Share	46.24	16.77	15.1	22.94	35.92	47.43	57.92	67.01	72.18
Government_Own(%)	2.48	8.35	0.01	0.01	0.01	0.05	0.71	4.08	12.98
Financial_Institution_Own(%)	22.16	12.41	3.76	6.45	12.28	21.01	31.24	39.47	43.35
Brokers_Own(%)	1.65	1.74	0.24	0.36	0.62	1.11	2.11	3.58	4.77
Other_Corporations_Own(%)	24.11	16.71	2.51	4.87	10.73	21.18	34.34	48.43	56.32
Foreign_Corporations_Own(%)	14.34	12.84	0.67	1.34	4.03	11.06	21.33	32.18	38.95
Individual_Own(%)	37.77	19.65	10.8	14.27	22.61	35.01	50.59	65.61	75.18
N(dividends)	18,872		N(firms)	3,942					

Table 3: Correlations

This table reports correlations among the variables used in our empirical analysis. Each variable's definition is provided in the Appendix. The bottom left half of the table shows Pearson's correlation coefficients, and the upper right half shows Spearman's rank correlation coefficients. Values reported in parentheses indicate negative correlations.

	Fee	*Average Tenure*	*Transaction Count*	*Lender Concentration*	*Borrower Concentration*	*Inventory Concentration*	*Shares On Loan*	*Shares Avalable*	*Cross_Share*	*Government_Own*	*Financial_Institution_Own*	*Brokers_Own*	*Other_Corporations_Own*	*Foreign_Corporations_Own*	*Individual_Own*
Fee	1.00	0.14	-0.25	0.23	0.22	0.44	0.00	-0.52	0.07	-0.02	-0.19	-0.13	0.28	-0.49	0.32
Average Tenure	0.10	1.00	-0.30	0.15	0.14	0.31	-0.25	-0.27	0.20	-0.04	0.06	-0.15	0.22	-0.29	0.14
Transaction Count	0.11	-0.11	1.00	-0.53	-0.67	-0.39	0.74	0.37	-0.13	0.03	0.04	0.11	-0.22	0.30	-0.14
Lender Concentration	0.13	0.07	-0.33	1.00	0.40	0.35	-0.35	-0.33	0.13	-0.04	-0.06	-0.10	0.21	-0.24	0.10
Borrower Concentration	0.17	0.31	-0.35	0.32	1.00	0.27	-0.38	-0.30	0.05	-0.05	-0.12	-0.05	0.16	-0.24	0.13
Inventory Concentration	0.50	0.26	-0.21	0.27	0.39	1.00	-0.09	-0.63	0.20	-0.00	-0.15	-0.19	0.41	-0.69	0.47
Shares On Loan	0.37	-0.13	0.59	-0.24	-0.18	0.02	1.00	0.16	-0.15	-0.08	-0.12	0.04	-0.08	0.03	0.08
Shares Avalable	-0.35	-0.25	0.18	-0.30	-0.28	-0.44	0.12	1.00	-0.16	-0.02	0.18	0.20	-0.38	0.79	-0.57
Cross_Share	-0.06	0.15	-0.09	0.09	-0.00	0.01	-0.14	-0.19	1.00	-0.06	0.58	-0.19	0.64	-0.22	-0.40
Government_Own	-0.07	-0.10	-0.00	-0.05	-0.05	-0.12	-0.03	0.19	-0.43	1.00	-0.09	-0.18	-0.03	-0.10	-0.02
Financial_Institution_Own	-0.34	0.01	0.03	-0.09	-0.17	-0.30	-0.15	0.15	0.59	-0.30	1.00	0.01	-0.17	0.20	-0.43
Brokers_Own	-0.05	-0.12	0.02	-0.10	-0.07	-0.08	0.09	0.18	-0.18	-0.06	-0.02	1.00	-0.23	0.27	-0.09
Other_Corporations_Own	0.26	0.16	-0.14	0.19	0.16	0.30	-0.02	-0.37	0.63	-0.22	-0.25	-0.19	1.00	-0.45	-0.02
Foreign_Corporations_Own	-0.36	-0.25	0.07	-0.23	-0.26	-0.49	-0.03	0.75	-0.24	0.04	0.15	0.24	-0.43	1.00	-0.63
Individual_Own	0.37	0.14	0.03	0.14	0.24	0.45	0.16	-0.54	-0.45	-0.21	-0.47	-0.09	-0.09	-0.60	1.00

The bottom left harf of the table shows Pearson's correlation coefficients and the upper right half shows Spearman's rank correlation coefficients.

Table 4: Lending / Short Selling Activities around Recall Dates

These tables report the results from Eq.1. in Panel A and from Eq.2. in Panel B. Definitions of the dependent variables are provided in the Appendix. T-14 to T+0 are indicator variables that take the value of 1 for observations corresponding to each day from 14 days before the dividend record date (T-14) through the record date (T+0), and 0 otherwise. All models include firm- and dividend fixed effects. ***, **, and * indicate significance at 0.1%, 1%, and 5%, respectively. t-stats are reported in parentheses.

Panel A:

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	***Panel A : Lending Activities***						
	Fee(bp)	*Min_Fee(bp)*	*Shares OnLoan(%)*	*Shares Avalable(%)*	*Lender Concentration*	*Borrower Concentration*	*Inventory Concentration*
T-14	1.352**	1.671***	0.268***	-0.116***	-0.00582***	-0.000251	0.00172***
	(3.06)	(3.70)	(20.51)	(-4.77)	(-3.84)	(-0.17)	(8.32)
T-13	0.823	0.898	0.303***	-0.127***	-0.00843***	-0.00121	0.00130***
	(1.80)	(1.94)	(22.37)	(-5.24)	(-5.46)	(-0.78)	(6.03)
T-12	0.843	1.061*	0.356***	-0.145***	-0.0131***	-0.00425**	0.00159***
	(1.78)	(2.18)	(24.28)	(-5.97)	(-8.35)	(-2.70)	(7.48)
T-11	1.255**	1.475**	0.392***	-0.124***	-0.0133***	-0.00862***	0.00144***
	(2.66)	(3.07)	(26.69)	(-5.12)	(-8.18)	(-5.52)	(6.58)
T-10	1.896***	2.115***	0.440***	-0.109***	-0.0141***	-0.00865***	0.00142***
	(3.97)	(4.41)	(28.59)	(-4.56)	(-8.62)	(-5.48)	(6.36)
T-9	1.631***	1.810***	0.492***	-0.0979***	-0.0159***	-0.0124***	0.00144***
	(3.54)	(3.84)	(30.05)	(-3.95)	(-9.49)	(-7.61)	(6.39)
T-8	2.287***	2.476***	0.535***	-0.134***	-0.0160***	-0.0142***	0.00172***
	(4.80)	(5.13)	(31.12)	(-5.71)	(-9.46)	(-8.50)	(7.66)
T-7(Recall day)	2.958***	3.245***	0.567***	-0.147***	-0.0186***	-0.0160***	0.00175***
	(6.33)	(6.82)	(31.35)	(-6.19)	(-10.86)	(-9.53)	(7.84)
T-6	3.509***	3.869***	0.625***	-0.157***	-0.0178***	-0.0192***	0.00182***
	(7.53)	(8.26)	(32.30)	(-6.54)	(-10.24)	(-11.18)	(8.03)
T-5	4.361***	4.634***	0.694***	-0.150***	-0.0175***	-0.0190***	0.00173***
	(7.40)	(7.84)	(33.52)	(-6.15)	(-9.83)	(-10.91)	(7.21)
T-4	4.617***	4.910***	0.763***	-0.132***	-0.0205***	-0.0210***	0.00154***
	(7.79)	(8.23)	(34.11)	(-5.35)	(-11.18)	(-11.83)	(6.14)
T-3 (Cum day)	4.551***	4.630***	0.797***	-0.306***	-0.0214***	-0.0252***	0.00299***
	(7.63)	(7.70)	(33.66)	(-11.85)	(-11.65)	(-13.84)	(9.02)
T-2 (Ex-day)	4.956***	4.973***	0.866***	-0.257***	-0.0224***	-0.0276***	0.00329***
	(8.25)	(8.19)	(34.71)	(-9.72)	(-11.87)	(-14.97)	(9.98)
T-1	5.289***	5.100***	0.849***	-0.226***	-0.0229***	-0.0293***	0.00285***
	(8.54)	(8.15)	(34.53)	(-8.77)	(-12.30)	(-15.73)	(8.69)
T+0 (Record day)	7.957***	8.087***	0.784***	-0.260***	-0.0206***	-0.0296***	0.00531***
	(13.46)	(13.42)	(32.53)	(-9.61)	(-10.82)	(-15.87)	(16.41)
Constant	210.6***	206.3***	3.395***	13.98***	0.325***	0.289***	0.275***
	(2344.45)	(2320.10)	(797.40)	(2361.62)	(953.31)	(850.16)	(5378.54)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dividend FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2,539,995	2,539,995	2,498,406	2,498,406	2,541,825	2,541,825	2,541,825
R-squared	0.697	0.689	0.479	0.644	0.214	0.214	0.630

t statistics in parentheses

*** p<0.001, ** p<0.01, * p<0.05

Panel B: (cont'd)

	(8)	(9)	(10)
Dependent variable	***Panel B : Short Selling Activity***		
	Transactions Count(N)	*Short Loan Value(Yen)*	*Short Selling Value(Yen)*
T-14	3.549***	194.9***	82.04***
	(22.71)	(8.70)	(4.63)
T-13	3.804***	228.4***	27.00**
	(22.72)	(9.69)	(2.68)
T-12	4.404***	262.4***	77.77***
	(23.68)	(10.70)	(3.95)
T-11	5.061***	313.3***	6.674
	(24.48)	(11.45)	(0.55)
T-10	5.605***	369.2***	83.77***
	(24.56)	(12.03)	(4.84)
T-9	6.036***	426.2***	77.38***
	(24.22)	(12.54)	(4.48)
T-8	6.167***	465.2***	33.01*
	(22.62)	(12.71)	(2.55)
T-7(Recall day)	6.592***	514.6***	10.19
	(22.12)	(13.13)	(0.75)
T-6	7.027***	578.8***	2.904
	(21.07)	(13.74)	(0.21)
T-5	7.193***	643.0***	82.19***
	(19.72)	(14.50)	(5.11)
T-4	7.586***	670.4***	-5.732
	(19.27)	(14.70)	(-0.47)
T-3 (Cum day)	7.881***	719.3***	66.42***
	(18.72)	(14.78)	(5.49)
T-2 (Ex-day)	8.220***	745.2***	-15.24
	(18.20)	(14.99)	(-1.37)
T-1	8.138***	740.4***	58.46*
	(17.47)	(14.76)	(2.42)
T+0 (Record day)	7.212***	664.2***	11.45
	(16.10)	(14.07)	(0.78)
Constant	70.90***	2640.3***	692.2***
	(965.54)	(289.34)	(315.18)
Firm FE	Yes	Yes	Yes
Dividend FE	Yes	Yes	Yes
N	2,540,124	2,540,124	2,541,359
R-squared	0.487	0.661	0.730

t statistics in parentheses

*** p<0.001, ** p<0.01, * p<0.05

Table 5: Market Quality Measures around Recall Dates

This table shows Panel A results from Eq. 3. Definitions of the dependent variables are provided in the Appendix. *T-14* to *T+0* are indicator variables that take the value of 1 for observations corresponding to each day from 14 days before the dividend record date (*T-14*) through the record date (*T+0*), and 0 otherwise. All models include firm- and dividend fixed effects. ***, **, and * indicate significance at 0.1%, 1%, and 5%, respectively. t-stats are reported in parentheses.

Panel A:

	(1)	(2)	(3)	(4)
Dependent variable	*PQS*	*QS*	*Turnover*	*ILLIQ*
T-14	-0.000339***	-0.423***	0.00958	0.489*
	(-12.72)	(-5.92)	(1.09)	(2.14)
T-13	-0.000281***	-0.316***	0.0127	0.407*
	(-11.29)	(-4.99)	(1.62)	(2.18)
T-12	0.0000555*	-0.0581	0.0418***	0.455
	(2.12)	(-0.81)	(4.66)	(1.83)
T-11	0.000372***	0.317**	0.0113	0.421
	(7.75)	(3.23)	(1.37)	(1.62)
T-10	0.0000991**	-0.0598	0.0377***	0.469
	(2.62)	(-0.89)	(6.76)	(1.57)
T-9	0.000118***	0.417*	0.0448***	0.426
	(3.63)	(2.21)	(5.22)	(1.49)
T-8	0.00000817	0.177*	0.0353***	0.436
	(0.28)	(2.25)	(3.32)	(1.49)
T-7(Recall day)	-0.0000646*	0.160*	0.0404*	0.509
	(-2.33)	(2.43)	(2.55)	(1.60)
T-6	-0.000104	-0.283	0.0390*	0.528
	(-1.39)	(-0.69)	(2.47)	(1.55)
T-5	0.0000206	0.138	0.0377**	0.535
	(0.82)	(1.83)	(2.98)	(1.53)
T-4	0.000115***	0.311***	0.0502**	0.557
	(3.72)	(4.64)	(3.18)	(1.51)
T-3 (Cum day)	0.00132***	1.980***	0.141***	0.591
	(30.09)	(12.62)	(11.65)	(1.47)
T-2 (Ex-day)	0.000463***	0.558***	0.0435***	0.555
	(13.82)	(6.65)	(5.92)	(1.30)
T-1	0.000395***	0.671***	-0.00428	0.544
	(12.32)	(6.29)	(-0.86)	(1.28)
T+0 (Record day)	0.00150***	1.917***	-0.0314***	0.656
	(27.79)	(15.50)	(-3.55)	(1.38)
Constant	0.00500***	6.208***	0.490***	2.160***
	(45.58)	(137.43)	(58.18)	(4.10)
Firm FE	Yes	Yes	Yes	Yes
Dividend FE	Yes	Yes	Yes	Yes
N	2,526,549	2,526,549	2,493,952	2,341,872
R-squared	0.294	0.688	0.078	0.083

t statistics in parentheses

*** p<0.001, ** p<0.01, * p<0.05

Table 5: Market Quality Measures around Recall Dates

Panel B presents subsample results for GC and SC stocks. T-14 to T+0 are indicator variables that take the value of 1 for observations corresponding to each day from 14 days before the dividend record date (T-14) through the record date (T+0), and 0 otherwise. All models include firm- and dividend fixed effects. ***, **, and * indicate significance at 0.1%, 1%, and 5%, respectively. t-stats are reported in parentheses

Panel B:

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	*PQS*		*QS*		*Turnover*	
Sample cut	***GC***	***SC***	***GC***	***SC***	***GC***	***SC***
T-14	-0.000297***	-0.000354***	-0.426***	-0.372***	0.0233	0.000540
	(-7.25)	(-10.06)	(-3.74)	(-4.70)	(1.56)	(0.05)
T-13	-0.000245***	-0.000287***	-0.222**	-0.330***	0.0349*	-0.00156
	(-6.81)	(-9.20)	(-2.66)	(-4.12)	(2.16)	(-0.24)
T-12	0.000201***	-0.0000150	0.205***	-0.167	0.0468***	0.0382**
	(4.91)	(-0.48)	(3.89)	(-1.49)	(7.37)	(3.12)
T-11	0.000445***	0.000333***	0.291**	0.359**	0.0199	0.00540
	(6.12)	(6.50)	(2.78)	(2.94)	(1.90)	(0.62)
T-10	0.000193***	0.0000393	0.0287	-0.0844	0.0475***	0.0309***
	(4.95)	(0.74)	(0.33)	(-0.99)	(4.24)	(3.44)
T-9	0.000207***	0.0000569	0.307*	0.493	0.0290*	0.0518**
	(5.14)	(1.23)	(2.14)	(1.80)	(2.33)	(3.10)
T-8	0.000142***	-0.0000720	0.314***	0.109	0.0153	0.0437*
	(3.86)	(-1.89)	(3.83)	(1.10)	(1.23)	(2.24)
T-7(Recall day)	0.000142**	-0.000182***	0.418***	0.0442	0.0489***	0.0336
	(2.66)	(-5.46)	(4.76)	(0.60)	(5.28)	(1.55)
T-6	0.000105	-0.000221	0.399***	-0.616	0.0458**	0.0332
	(1.93)	(-1.94)	(4.49)	(-0.99)	(3.10)	(1.88)
T-5	0.000134***	-0.0000521	0.521**	-0.0326	0.0221*	0.0435*
	(3.46)	(-1.45)	(3.17)	(-0.38)	(2.56)	(2.40)
T-4	0.000299***	0.00000861	0.629***	0.189*	0.0619***	0.0429*
	(5.63)	(0.23)	(6.80)	(2.55)	(4.59)	(2.36)
T-3 (Cum day)	0.00199***	0.000949***	2.971***	1.462***	0.183***	0.118***
	(24.77)	(19.32)	(10.73)	(11.20)	(11.18)	(9.85)
T-2 (Ex-day)	0.000546***	0.000411***	0.871***	0.403***	0.0728***	0.0280**
	(9.71)	(9.88)	(4.99)	(4.12)	(6.54)	(3.25)
T-1	0.000648***	0.000254***	1.120***	0.440**	0.000253	-0.00623
	(11.18)	(6.89)	(7.70)	(3.28)	(0.02)	(-0.79)
T+0 (Record day)	0.00166***	0.00139***	1.853***	1.994***	-0.0504***	-0.0236*
	(19.24)	(22.03)	(13.97)	(14.06)	(-4.26)	(-2.08)
Constant	0.00478***	0.00514***	6.364***	6.109***	0.451***	0.513***
	(56.32)	(53.15)	(145.15)	(242.46)	(76.56)	(83.23)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Dividend FE	Yes	Yes	Yes	Yes	Yes	Yes
N	938,628	1,587,848	938,628	1,587,848	938,628	1,587,848
R-squared	0.399	0.273	0.723	0.681	0.079	0.099

t statistics in parentheses

*** p<0.001, ** p<0.01, * p<0.05

Table 6: Probit Analysis around Recall Dates – Fee Spike

Table 6 reports the results from linear probability models (LPM), logit models with random effects (RE) and with fixed effects (FE). The dependent variable, Pr(*Fee Spike*), is a binary indicator that takes the value of 1 if the lending fee for stock *i* on day *t* increases by 100 basis points or more compared to the previous trading day (*t−1*), and 0 otherwise. *Recall* [-4, 4] is an event dummy that equals 1 if the observation falls within a four-day window before or after the recall date, and 0 otherwise. *Fiscal_flag* is a dummy variable that equals 1 if the stock is subject to fiscal year-end closing in the given month, and 0 otherwise. Control variables include *Lender, Borrower,* and *Inventory Concentration* ratios, as well as interaction terms between these variables and the event dummy. Consistent with common "refinancing" practices, callable shares largely disappear from the lending pool during the typical recall week. A lower stable shareholder ratio is likewise associated with a higher probability of *Fee Spikes.*

Dependent variable	Pr(Fee>100bp)				
	LPM	Logit Model with RE		Logit Model with FE	
			marginal effects		marginal effects
	(1)	(2)	(3)	(4)	(5)
Recall	0.000694*	0.174***	0.00177***	0.173***	0.0390***
	(2.39)	(5.32)	(5.26)	(5.22)	(5.20)
Fiscal_flag	0.00169***	0.171***	0.00174***	0.173***	0.0392***
	(8.31)	(9.96)	(9.64)	(10.06)	(9.99)
Lender Concentration	0.00236***	0.241***	0.00244***	0.235***	0.0531***
	(12.03)	(21.90)	(18.94)	(21.32)	(20.34)
*Recall*Lender Concentration*	0.000846	0.0234	0.000238	0.0237	0.00537
	(1.89)	(0.65)	(0.65)	(0.66)	(0.66)
Borrower Concentration	-0.000894***	-0.0924***	-0.000938***	-0.0885***	-0.0200***
	(-4.59)	(-7.55)	(-7.44)	(-7.19)	(-7.21)
*Recall*Borrower Concentration*	0.000361	0.0844*	0.000856*	0.0793*	0.0179*
	(0.72)	(2.17)	(2.16)	(2.04)	(2.04)
Inventory Concentration	0.00336**	0.214***	0.00217***	0.153***	0.0347***
	(2.68)	(7.22)	(7.28)	(5.07)	(4.97)
*Recall*Inventory Concentration*	-0.000360	-0.325***	-0.00329***	-0.318***	-0.0720***
	(-0.29)	(-3.98)	(-3.96)	(-3.87)	(-3.86)
Cross_Share	-0.000207***	-0.0146***	-0.000148***	-0.0152***	-0.00344***
	(-6.49)	(-20.84)	(-17.88)	(-18.99)	(-24.36)
Constant	0.0172***	-4.847***			
	(10.78)	(-112.52)			
/lnsig2u		0.541***			
		(15.43)			
N	5,162,243	5,162,243	5,162,243	4,562,342	4,562,342
R-squared (from LPM)	0.0003				

t statistics in parentheses

*** p<0.001, ** p<0.01, * p<0.05

Table 7: Empirical Analysis around Recall Dates – Quantity Spike

Table 7 reports panel regression results from Eq. 5. The *Quantity Spike* is defined as the surge in shares on loan and is calculated as the difference between the lending volume on the recall date and the average lending volume from 30 to 6 days prior to the recall date. The variable *Recall* is a dummy that equals 1 if the observation falls within the four-day window surrounding the recall date, and 0 otherwise. *Fiscal_flag* is defined in the same manner as in Eq.4. Additionally, we introduce a new variable, *Div_Yield*, defined as the dividend yield of stock *i,* calculated as annual dividends per share divided by the reference price, multiplied by 100. This study focuses not only on tax-related incentives but also on recall activities initiated for the purpose of restoring shareholders of record status. Therefore, both the *Fiscal_flag* and *Div_Yield* are included in the regression to compare their effects. Control variables include Lender, Borrower, and *Inventory Concentration* measures, along with their interaction terms with the event dummy.

Dependent variable	*Quantity Spike*			
	(1)	(2)	(3)	(4)
Recall	11.71***	11.74***	11.67***	30.67***
	(10.24)	(10.24)	(10.22)	(10.62)
Fiscal_flag	9.416***	9.369***	9.305***	9.390***
	(11.83)	(11.78)	(11.75)	(11.73)
Div_Yield	1.209***	1.227***	1.150***	1.131***
	(3.58)	(3.57)	(3.39)	(3.35)
Cross_Share		0.190**	0.170**	0.170**
		(3.18)	(2.69)	(2.69)
Lender Concentration			-2.046***	-1.059*
			(-4.69)	(-2.40)
Borrower Concentration			-1.906***	-1.331***
			(-8.02)	(-6.07)
Inventory Concentration			-0.0984	3.164***
			(-0.13)	(3.57)
*Recall*Lender Concentration*				-13.98***
				(-10.30)
*Recall*Borrower Concentration*				-7.711***
				(-8.70)
*Recall*Inventory Concentration*				-45.13***
				(-9.95)
N	5,362,555	5,342,943	5,342,942	5,342,942
R-squared	0.007	0.008	0.008	0.012

t statistics in parentheses

*** p<0.001, ** p<0.01, * p<0.05

Table 8: Empirical Analysis around Recall Dates – Return

Table 8 reports the second-stage results from the 2SLS estimation Eq. 6–7. This analysis examines how *Quantity Spikes* in the securities lending market affect stock returns, while addressing the potential endogeneity of lending-related variables. As an instrumental variable, we use the *Cross_Share* ratio, which represents the ownership share held by major shareholders. This variable is correlated with lending variables but does not directly affect stock returns except through the lending market, making it a plausible instrument. The rationale lies in the prohibition of "naked short selling," which requires short sellers to borrow shares prior to selling them. Consequently, while the availability of lenders strongly influences lending-market conditions, it does not directly transmit to equity market returns without passing through the lending channel. For instance, even if temporary recalls occur for the purpose of restoring shareholder registration reducing lending supply in the short term, this does not directly impact stock prices outside the lending mechanism. For these reasons, *Cross_Share* is expected to function as a valid and appropriate instrumental variable in this setting.

2 stage least squares

Dependent variable	*Quantity_Spike*	*Return*
	the first stage	the second stage
Quantity_pred		**-0.00685*** **
		(-5.43)
*Recall*Quantity_pred*		**0.0278*** **
		(34.99)
Recall	30.67***	-0.557***
	(182.53)	(-11.36)
Fiscal_flag	9.390***	-0.163***
	(96.22)	(-12.86)
Div_Yield	1.131***	-0.0800***
	(41.32)	(-43.59)
Lender Concentration	-1.059***	0.0139***
	(-17.36)	(4.75)
*Recall*Lender Concentration*	-13.98***	0.287***
	(-63.27)	(12.48)
Borrower Concentration	-1.331***	0.00572
	(-21.06)	(1.77)
*Recall*Borrower Concentration*	-7.711***	0.119***
	(-33.58)	(7.77)
Inventory Concentration	3.164***	0.258***
	(17.04)	(31.46)
*Recall*Inventory Concentration*	-45.13***	0.861***
	(-96.31)	(12.42)
Cross_Share (IV)	0.170***	
	(33.80)	
Constant	-6.225***	0.164***
	(-24.26)	(38.49)
N	5,342,942	5,210,972
R-squared	0.012	0.002

t statistics in parentheses

*** p<0.001, ** p<0.01, * p<0.05

Appendix: Variable Definitions 1

Firm characteristics			
Variable	Unit	Definition	Source
PQS	%	bid-ask spread	Dataetream
QS	yen	bid-ask spread	Dataetream
Turnover	%	Turnover ratio. Calculated by dividing the trading volume by number of shares issued.	QUICK
ILLIQ	%	Amihud's ILLIQ as a liquidity indicator. we will use the monthly ILLIQ, which is the average of the absolute value of the daily return divided by the trading value on the day, on a monthly basis.	QUICK
Short Selling Value	yen	Short selling transaction value (excluding new margin sales) Recorded from April 1, 2015; limited to exchange trading	QUICK
Div_Yield	%	Dividend yield. Dividend scaled by cum-day price.	QUICK
Cross_Share	%	The proportion of shares held by banks, insurance companies, and non-financial corporations relative to total shares outstanding among listed firms.	QUICK
Government_Own	%	All ownership ratios are measured as a fraction of total shares held by round-lot shareholders. Shareholding ratio of the central and local governments.	QUICK
Financial_Institution_Own	%	Shareholding ratio of financial institutions.	QUICK
Brokers_Own	%	Shareholding ratio of securities firms.	QUICK
Other_Corporations_Own	%	Shareholding ratio of domestic corporations.	QUICK
Foreign_Corporations_Own	%	Shareholding ratio of foreign corporations and other foreign investors.	QUICK
Individual_Own	%	Shareholding ratio of individual investors and others.	QUICK

Appendix: Variable Definitions 2

Lending market conditions from S&P Global (formerly IHS Markit)			
Variable	Unit	Definition	Source
Fee	bps	Yen-weighted average indicative lending fee charged across all loans outstanding for a given stock-day annualized in basis points.	S&P Global
Fee Spike		A binary indicator that takes the value of 1 if the lending fee for stock i on day t increases by 100 basis points or more compared to the previous trading day (t−1), and 0 otherwise.	S&P Global
Quatity Spike	%	The surge in shares on loan and is calculated as the difference between the lending volume on the recall date and the average lending volume from 30 to 6 days prior to the recall date.	S&P Global
Average Tenure	days	The weighted average number of days from start date to present for all transactions.Using the Averagetenure held by Markit.	S&P Global
Transaction Count	cases	Number of transactions from all start dates.Using the transactioncount held by Markit.	S&P Global
Lender Concentration		A value between 0 and 1 to measure the distribution of lender value on loan. A very small number indicates a large number of lenders with low value on loan and 1 indicates a single lender with all the value on loan. 0 means no value on loan	S&P Global
Borrower Concentration		A value between 0 and 1 to measure the distribution of borrower demand. A very small number indicates a large number of borrowers with low borrowed values and 1 indicates a single borrower with all the broker demand. 0 means no borrower demand	S&P Global
Inventory Concentration		A value between 0 and 1 to measure the distribution of inventory. A very small number indicates a large number of lenders with low inventory and 1 indicates a single lender with all the inventory. 0 means no inventory	S&P Global
Shares On Loan	%	Yen value of shares lent divided by firm market cap.	S&P Global
Shares Avalable	%	Yen value of shares available for lending divided by firm market cap.	S&P Global
Short Loan Value	yen	Value of securities on loan with dividend trading and financing trades removed	S&P Global