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Pham, Thu Phuong and Singh, Harminder and Vu, Van Hoang

Curtin University, Australia and IPAG Business School, France, Deakin University, Australia, RMIT, Australia

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Thu Phuong Pham†
Harminder Singh‡
Van Hoang Vu§

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JEL classification: G14, G24.

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† School of Accounting, Economics and Finance, Curtin University, Perth, WA 6102, Australia & IPAG Business School, Paris, France. Email: thuphuong.pham@curtin.edu.au;
‡ Faculty of Business and Law, Deakin University, Burwood, VIC 3125, Australia. Email: harminder.singh@deakin.edu.au;
§ *Corresponding author*. School of Economics, Finance and Marketing, RMIT University, Melbourne 3000, VIC, Australia. Email van.vu@rmit.edu.au.

The Impact of Bank Loan Announcements on Stock Liquidity

Abstract

We examine the impact of bank loan announcements on stock liquidity. Using a comprehensive loan announcement sample over 14 years in Australia, we find that effective spreads and realized spreads of borrowers' stocks fall after the announcements. The findings suggest these announcements send positive signals about borrowers to the market that increases liquidity provision, and reduce transaction costs, leading to improved liquidity for borrowers' stocks. This liquidity improvement is more pronounced following announcements of new loans than loan renewals. Overall, our findings provide practical implications for firm managers in the financing decision-making process and market participants in trading strategy adjustment.

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1 Introduction

Banks play an important role as transmitters of information in financial markets. Theoretical models such as Diamond (1984) and Fama (1985) highlight that banks can gain access to information not available to other market participants. The information advantage of banks comes from their role as information producers (Campbell and Kracaw, 1980; Leland and Pyle, 1977) and delegated monitors (Diamond, 1984, Kang and Liu, 2008); and through a long-term business relationship with the borrower (Bharath et al., 2011). Since banks are more informed than other market participants, a bank's decision to lend to a corporate borrower should be seen as a positive signal to the borrower. Although there is a large literature on the effect of bank loan announcements on stock price (Aintablian and Roberts, 2000; Billett, Flannery, and Garfinkel, 1995; Fery et al., 2003; James, 1987; Mosebach, 1999; Slovin, Johnson and Glascock, 1992), the effect of bank loan announcements on stock liquidity is largely unexplored. Our study aims at filling this gap.

We focus on stock liquidity as it is one of the most important features of the financial markets. Stock liquidity influences costs of capital (Amihud and Mendelson, 1986; Amihud, Hameed, Kang, and Zhang, 2015), investor confidence, and the efficiency of firm resource allocation (Chordia, Roll, and Subrahmanyam, 2001). Higher stock liquidity also improves price efficiency (Chordia, Roll, and Subrahmanyam, 2008), enhances firm value (Fang, Noe, and Tice, 2009), facilitates corporate governance by blockholders (Norli, Ostergaard and Schindele, 2015; Edmans, Fang and Zur, 2013); reduces default risk (Brogaard, Dan and Ying, 2017); mitigates extreme tax avoidance (Chen, Ge, Louis and Zolotoy, 2019); encourage dividend payouts (Jiang, Ma, and Shi, 2017) and cash holdings (Nyborg and Wang, 2021). Given the crucial role of liquidity in a well-functioning financial market and corporate performance, it is important to understand how stock liquidity is affected by bank loan announcements.

Although the literature agrees that information disclosure might affect stock liquidity, the direct impact of bank loan announcements on stock liquidity is inconclusive with three different potential predictions. The first stream of research shows that bank loan announcements provide additional credible information confirming the borrower's credit quality, which helps reduce the information asymmetry problem between the borrowing firm and outside investors (Maskara and Mullineaux, 2011; Balakrishnan, Billings, Kelly, and Ljungqvist, 2014; Bischof and Daske, 2013). This reduction in information asymmetry leads to an improvement in liquidity (Glosten and Milgrom, 1985; Kyle, 1985; Brockman and Chung, 2003; Lang, Lins, and Maffett, 2012).

The second stream of research suggests that banks may be negligent in approving loan applications because banks can offload risky loans in the secondary loan markets (Wang and Xia 2014; Shan, Tang, and Winton 2019; Parlour and Plantin, 2008). Thus, market participants will not perceive bank loan announcements as a positive signal about the borrowers' financial health. Accordingly, this suggests bank loan announcements do not have any impact on the borrower's stock liquidity.

The third stream of research implies that bank loan announcements could lower the liquidity of the borrower's stock. Commercial banks tend to have access to privileged information about their borrowers; hence have potential influence on the borrower's stock price by trading through its asset management arm, which can increase information asymmetry for the investors in the borrower's stock. This creates disincentives for other investors to trade in this stock, thus may lower its liquidity (Dass and Massa 2011). Kahn and Winton (1998) also argue that a bank loan announcement signals the presence of an informed trader that may increase information asymmetry leading to higher adverse selection costs for existing investors in the borrower's equity, which subsequently worsen the borrower stock liquidity (Glosten and Milgrom, 1985). These lines of studies suggest that bank loan announcements might discourage

investors to trade in the borrowers' stocks, which will lower their stock liquidity. Thus, these conflicting predictions based on the current literature warrant the need for empirical research on the direct effect of bank loan announcements on the borrower's stock liquidity.

Using a comprehensive sample of bank loan announcements over 14 years in Australia, we examine the impact of these announcements on borrowers' stock liquidity. We further consider the differential effects of new loans versus the renewal of existing loans. Our study provides a comprehensive analysis of the effect of bank loan announcements on various aspects of stock liquidity, including the effective spread, relative effective spread, realized spread, relative realized spread, and price impact. Hasbrouck (2009) finds that the correlations between these measures are low, indicating that these measures reflect different aspects of liquidity. Thus, we employ a wide range of liquidity measures to address the concern that liquidity is multi-faceted, and that there is no single measure that best represents stock liquidity (Kyle, 1985, Hasbrouck, 2009).

The Australian market provides an ideal setting, compared to the other international markets, for examining the impact of bank loan announcements on borrowers' stock liquidity for several reasons. First, in Australia, market-sensitive information must be disclosed to the Australian Securities Exchange (ASX) *immediately* once the entity becomes aware of the information.[1] The information must not be given to anyone else and it will be released on ASX's Market Announcement Platform to ensure quick and broad dissemination to all sections of the market (ASX, 2013).[2] In contrast, in other countries, generally, announcements of loan financings are voluntary at the firm borrowers' discretion (Maskara and Mullineaux, 2011)[3]. Thus, the unique disclosure requirement by the ASX allows us to have a cleaner empirical

[1] See the Listing Rule 3.1
[2] https://www.asx.com.au/documents/rules/Guidance_Note_8.pdf
[3] The exception to this rule would be a loan "that arises other than in the ordinary course of doing business" (Maskara and Mullineaux, 2011).

experiment to study the effect of real-time information disclosure on stock liquidity, which could overcome the self-reporting bias caused by voluntary disclosure in the existing literature. Second, our sample covers all Australian firms receiving bank loans regardless of the size of the borrowers, which can mitigate the potential issue that only small firms announce bank loans publicly, as is the case in the U.S. (Maskara and Mullineaux, 2011). Third, the long sample period of 14 years allows us to examine the relationship between information disclosure and stock liquidity across multiple economic conditions, which complements Bischof and Daske (2013) who focus on information disclosure during the Eurozone sovereign crisis only.

In our study, we find an improvement in the liquidity of borrower's stock after loan announcements. More specifically, transaction costs for borrowers' stocks reduce, which is consistent with higher competition among liquidity providers of these stocks after the announcement. The findings on the improvement in liquidity for borrowers' stocks following the bank loan announcements hold even after we control for other determinants of liquidity, including trading volume, stock price, stock volatility, and market capitalization, as well as other potential firm-level determinants such as ownership structure and analyst coverage. Our findings are robust when we include trading day fixed effects to control for any unexpected variation or special events other than the bank loan announcements.

Further analyses indicate that the improvement in liquidity is stronger following announcements of new loans, compared to announcements of loan renewals. This finding supports Best and Zhang (1993) and suggests that new loans signal positive information regarding the borrower's prospect, which stems from banks' screening activity. Moreover, we find that there is a greater improvement in liquidity following the loan announcements for firms with negative cumulative abnormal returns (CARs) than for firms with positive CARs.

Our study contributes to the current literature in several ways. First, we contribute to the literature on the determinants of stock liquidity by identifying bank loan announcements as an

important additional factor affecting stock liquidity. Prior work emphasizes the importance of firm or managerial characteristics such as ownership structure (Brockman, Chung, and Yan (2009); Ng et al. (2016)); the quality of corporate governance (Chung, Elder, and Kim (2010); Jain, Jiang, and Mekhaimer (2016)), CEOs' education background (Pham (2020)), competitive pressure (Kale and Loon (2011)) in explaining the variations in stock liquidity across firms. To the best of our knowledge, we are the first to provide comprehensive evidence on the importance of bank certification, as conveyed through the loan announcements, on borrowers' stock liquidity.

Second, our paper contributes to the broad literature on the effect of disclosure regulations or announcements on stock liquidity. Many researchers use liquidity as an outcome variable to understand the economic consequences of several regulations such as disclosure requirements (e.g., Bushee and Leuz, 2005; Bischof and Daske, 2013) or the passage of Bribery law (Kim et al., 2020). On the macro front, Chung et al. (2013) report that liquidity decreases after monetary policy announcements in the U.S. markets. Liquidity also changes following firm-specific announcements such as share purchases (Barclay and Smith, 1988; Brockman and Chung, 2001; Cook, Krigman and Leach, 2004; Ginglinger and Hamon, 2007; Miller and McConnell, 1995; Hillert, Maug, and Obernberger, 2016); equity offerings (Balachandran et al. (2012) and Kothare (1997)); or dividend announcements (Graham, Koski, and Loewenstein (2006)). By connecting the two streams of banking and financial markets literature, we extend the current literature by analyzing the impact of bank loan announcements on the liquidity of borrowers' stocks. Given the importance of stock liquidity for trading strategies, corporate decisions, and outcomes, our research not only adds to the academic literature but also provides practical implications for firm managers in the financing decision-making process as well as for market participants in trading strategy adjustment.

Our study is also related to two existing studies, Balakrishnan et al. (2014) and Bischof and Daske (2013). However, we differ from them in the following ways. First, the type of information disclosure in our setting is mandatory rather than voluntary as in Balakrishnan et al. (2014). Second, unlike quarterly earnings guidance that is disclosed after some time delay (Balakrishnan et al., 2014), bank loan announcements in our setting are disclosed immediately under the ASX's continuous disclosure requirement. Lastly, while Bischof and Daske (2013) focus on information disclosure during the Eurozone sovereign crisis, the type of events in our setting, loan announcements, allows us to examine the relation between information disclosure and stock liquidity across multiple economic conditions, beyond crisis events.

The rest of the paper is organized as follows. Section 2 reviews the related literature and discusses our empirical predictions. Section 3 presents the data and methodology. Section 4 provides the summary statistics, while Section 5 discusses the main results and implications. Section 6 concludes.

2 Literature Review and Hypothesis Development

2.1 Bank as an Information Transmission Channel to Financial Markets

Banks play a special role in the financial system because they resolve information asymmetry. The monitoring role of banks can improve the efficiency of corporate decisions and in turn, increase the market value of borrowing firms (Kang and Liu, 2008). Bank lending also helps improve the quality of the firm's projects by reducing the management's incentive to default strategically or to invest sub-optimally (Holmstrom and Tirole, 1997; Jensen, 1986). Given that managers cannot perfectly communicate their information to capital market participants (Myers and Majluf, 1984), banks play a very important intermediating role between investors and firms. Investors may seek confirmation of a firm's quality by relying on a loan announcement because they believe that the lender is diligent about identifying good

firms, and has access to proprietary information that is unavailable to the general public (Cook, Schellhorn, and Spellman, 2003).

Bilateral information exchange between a bank and its borrower is much more exclusive and confidential compared to information gathered in public markets. Monitoring and screening activities allow banks to mitigate agency problems stemming from information asymmetries in the lender-borrower relationship (Fama, 1985; Diamond, 1984). Such a privileged situation gives an added information advantage to banks. It is well-documented that liquidity improves when information asymmetry declines (Glosten and Milgrom, 1985). Recent empirical literature documents a positive association between public information and liquidity in stock markets (Balakrishnan et al., 2014). Announcing a bank loan brings new information into the market, which may lead to lowering the information asymmetry between a borrowing firm and its investors (Maskara and Mullineaux, 2011) and resulting in improvements in the liquidity of borrowers' stocks.

While lending, banks perform governance activities such as monitoring and screening. Among these activities, monitoring is considered one of the bank's most distinctive and important activities, as banks play the role of delegated monitors (Diamond, 1984, Kang and Liu, 2008). Such monitoring leads to improvement in governance that improves stock liquidity (Chung et al., 2010) because the stock market perceives loan announcements, especially in the case of new loans, as a step in the direction of better governance and better shareholder protection. Chung (2006) shows that American Depositary Receipts of companies operating in countries with stronger shareholder protection mechanisms exhibit narrower spreads. Liquidity providers may post wider spreads for stocks of poorly governed companies because they face greater adverse selection problems in such stocks (Glosten and Milgram, 1985). For the same reason, the price impact of trades (Kyle, 1985) may be greater for the stocks of companies with poor governance structures. Overall, this line of literature implies that the existence of a bank

lender improves the information environment of the borrower, thus improving the borrower's stock liquidity. Therefore, we formalize this argument in Hypothesis 1a below:

Hypothesis 1a: *Stock liquidity increases after a loan announcement is announced.*

On the other hand, one might argue that, due to the existence of secondary market trading of loans and the market for credit protection, banks may be lax in screening loan applications as well as monitoring their borrowers' business operations (Wang and Xia 2014; Shan, Tang, and Winton 2019). Parlour and Plantin (2008) present a theoretical model showing that banks have lower incentives to monitor a borrower when they can use a liquid loan market to offload risky loans. In this scenario, the information content of loan announcements might not be valuable to equity market participants. This implies that loan announcements do not affect stock liquidity, as expressed in Hypothesis 1b below:

Hypothesis 1b: *There is no change in stock liquidity following a loan announcement.*

Other studies argue that the presence of a private lender might increase adverse selection costs, which in turn impedes liquidity (Copeland and Galai, 1983; Easley and O'Hara, 1987; Glosten and Harris, 1988). For instance, Kahn and Winton (1998) argue that a bank loan announcement signals the presence of an informed trader – the bank. Dass and Massa (2011) find evidence that banks trade on their borrower's stock through their subsidiaries or asset-management arms. Massoud, Nandy, Saunders, and Song (2011) find evidence that lending syndicate participants use the information advantage obtained from the loan negotiation process to trade in the borrower's stocks. Specifically, hedge fund lenders short-sell the borrower's stocks in the weeks before a covenant violation is announced.

Hypothesis 1c: *Borrower's stock liquidity decreases following a loan announcement.*

2.2 New Loans versus Loan Renewals

Existing literature finds that market participants might react differently to announcements of new loans versus announcements of loan renewals. Best and Zhang (1993) contend that banks apply different efforts to reducing information asymmetry depending on borrowers' characteristics and existing information. They further suggest that the information banks produce is useful only if limited public information is available, or if the indicators from other sources are noisy. This indicates that new loan announcements contain more valuable information than announcements of loan renewal. Similarly, Fama (1985) hypothesizes that only new announcements regarding loan renewals and not loan initiations reveal information to the market. Following these arguments, we hypothesize that the effect of loan announcements on stock liquidity is stronger for new loan announcements, relative to announcements of loan renewal:

Hypothesis 2a: *The effect of loan announcements on stock liquidity is stronger for new loan announcements.*

In contrast, Lummer and McConnell (1989) argue that banks learn about their borrowers over time through business relationships. This line of reasoning suggests that if there is to be a stock price response to announcements of bank loans, the effect should be observed around announcements of revisions of loans rather than of new loans. Consistent with this argument, they show that a significant stock price reaction is only associated with the announcement of existing loan revisions rather than new loans. In a similar spirit, Mikkelson and Partch (1986)

find a significant positive borrower abnormal return for revolving facilities. Accordingly, if bank information is credible only through a period of lending relationship, the effect of loan announcements on stock liquidity will be stronger for a loan renewal. We present this argument in Hypothesis 2b below:

Hypothesis 2b: *The effect of loan announcements on stock liquidity is stronger for loan renewal announcements.*

Finally, Slovin, Johnson, and Glascock (1992) show that equity prices react significantly to both loan initiations and renewals, but only for small firms. We differ from Slovin et al. (1992) in that we examine the reaction in market liquidity in both small and large firms.

3 Data and methodology

We manually collect bank loan announcements between 2000 to 2013 from the Australian Company Announcements database, provided by the Securities Industry Research Centre of Asia-Pacific (SIRCA). For each loan announcement, we collect information on the announcement date, information on the borrowing company, the identity of the lender(s), the size and duration of the loan, and whether the loan is a new or revised credit agreement. We remove bank loan announcements that are contaminated by any confounding corporate events such as dividend declarations, acquisitions or divestitures, litigation, earnings announcements, or other forms of capital raising. We exclude events for that we do not have information about the lender types. Finally, one firm may make several bank loan announcements during our sample period. We, therefore, require that announcements by the same company must be at least 28 days apart to be included in our sample. Our final dataset includes 502 bank loan announcements in the period from 1999 to 2013.

We obtain intraday data of all investigated stocks of borrowers in the ASX from January 1999 to December 2014 to allow at least one year before and after the event dates. The intraday trades and quotes are provided by Thomson Reuters Tick History (TRTH) through SIRCA. The dataset includes only the stocks with intraday trade and quote data, including prices, volumes, bid, and ask sizes.[4] We aggregate multiple trades occurring at the same time (stamped to the millisecond) into a single trade, for which the trade size becomes the aggregated total value of the individual aggregated trades, and price becomes the volume-weighted average price, following Gouriéroux, Jasiak and Le Fol (1999).

To capture the effect of the bank loan announcements on stock liquidity, we follow Dang, Michayluk, and Pham (2018) methodology to consider different sub-samples that require at least 90- and 180-day gaps between consecutive announcements of the same firm. The loan announcement day is defined as trading day 0. If the bank loan was announced after the close of a trading day, then the next trading day is defined as Day 0. Each sub-sample is further split into three 90-trading-day window periods: (1) the pre-period is from trading day −1 to −90, Post-period 1 is from trading day + 1 to +90 and (3) Post-period 2 is from trading day +91 to +180. All analyses are repeated on the two post-period sub-samples, and the results are identical. Thus, we present the results of the 180-day gap sub-sample for brevity[5].

Using intraday data, we estimate various forms of spreads to measure liquidity, including absolute and percentage effective spreads, absolute and percentage realized spreads, as well as price impact of trades scaled by either traded value or volume. The results are identical for both scales of traded value and traded volume. To conserve space, we present trade-value-weighted spread measures only.

[4] We exclude non-positive price and size, non-positive ask price and bid price.
[5] The results for the 90-day gap sample are available upon request.

Effective spread measures the execution costs of roundtrip liquidity demanding trades. The absolute measurement is estimated as twice the absolute difference between the execution price and the mid-point price prevailing just before the trade, where the mid-point price is the average of the best bid and best ask price just before the trade. The percentage effective spread is the absolute effective spread scaled by the prevailing mid-point price at the trade.

We also estimate temporary components of effective spread, which is measured by realized spreads. This proxy captures how much profit the liquidity suppliers would make on the trade. We estimate the absolute realized spreads as twice the distance between the execution price of trades and the midpoint prices prevailing five minutes later. The relative realized spread is computed as the absolute proxy divided by the initial midpoint price.

The absolute price impact of trades is estimated as the difference between the effective spread and the five-minute realized spread. The relative measure of price impact is scaled by the prevailing mid-point price at the trade.

All our measures of stock liquidity are consistent with prior literature (see, for example, Beber and Pagano, 2013; Dang et al., 2018). These measures are estimated for each trade, and we take the daily traded value weighted average to derive the proxies at the stock-day level.

We employ univariate analysis to evaluate any changes in trading activity and liquidity following the bank loan announcements. We compare the pre- and post-event liquidity metrics for each event using t-tests and Wilcoxon signed-rank tests to examine if the paired mean and median in each post-period are significantly different from the pre-period.

Similar to Boehmer et al. (2013) and Dang et al. (2018), we also perform panel regression analyses to examine whether the changes in liquidity measures are attributable to bank loan announcements. As the investigated period spans over 14 years, we include trading day fixed effects to control for any unexpected variation or special events other than the bank loan announcement, which may affect stock liquidity. The baseline model is defined as:

$$Y_{it} = \alpha_t + \beta\ ANNOUNCEMENT_{it} + \gamma\ X_{it} + \varepsilon_{it}, \quad (1)$$

where Y_{it} is alternative measures of liquidity for a stock having bank loan announcement of firm i on day t. Specifically, the liquidity measures are trade-value-weighted spread, trade-value-weighted relative effective spread, trade-value-weighted realized spread, trade-value-weighted relative realized spread at the five-minute interval, trade-value-weighted market impact at the five-minute interval, and trade-value-weighted relative market impact at the five-minute interval. $ANNOUNCEMENT_{it}$ is an indicator variable set equal to zero for the Pre-period and one for the Post-periods. X_{it} is a set of the following control variables including daily trading volume (*TRADE_VOL*), market capitalization (*MCAP*), price volatility (*VOLA*), the inverse of daily volume-weighted average share price (*VWAP*). The regressions are estimated with trading day fixed effects and robust standard errors clustered by trading days.

Our selection of control variables follows Boehmer et al. (2013) and Dang et al. (2018), who show that stock liquidity is dependent on range-based price volatility, trading activity, and market capitalization. The range-based price volatility (*VOLA*) is estimated as the difference between the highest and the lowest trade prices of individual stock in a day, scaled by the volume-weighted average trade price of the stock in the day. Trading activity (*TRADE_VOL*) is defined as the daily trading volume for each firm-day that is the total number of shares traded in the day for each firm (Chordia, Roll, and Subrahmanyam, 2001). Loughran and Schultz (2005) further document that the inverse of the stock price as well as firm characteristics may impact stock liquidity. Thus, we also include the inverse of daily volume-weighted average share price (*VWAP*) and firm-level control variables in the regressions.

Consistent with Loughran and Schultz (2005), we also control for the firm-level variables that may affect stock liquidity. These include insider holdings (*INSIDER_PRO*), which is the proportion of shares held by insiders over total shares outstanding; substantial shareholdings (*SUBSTANTIAL_PRO*), defined as the proportion of substantial shareholdings over total shares

outstanding; the proportion of the top 20 shareholding (*TOP20_PRO*), defined as the proportion of shares from the top 20 shareholders over total shares outstanding, and analyst coverage (*ANALYST*), defined as the number of analysts covering the stock. The analyst coverage data is obtained from Institutional Brokers Estimate System (I/B/E/S). The details on shareholdings are collected from the SIRCA Corporate Governance database.

4 Summary Statistics

Table 1 reports the descriptive statistics of our dataset over three 90-trading day window periods. For each stock, we compute the time-series average over each sub-period. We then estimate cross-sectional means for each proxy, including daily trading volume, trading value, six measures of liquidity, value-weighted average price, range-based price volatility, and market capitalization. Our results show the increases in daily trading volume of the number of shares from the Pre-period to both Post-periods. We also find a significant reduction in the standard deviation in both the Post-periods as compared to the Pre-period. Loan announcements indirectly bring more information about the borrowers' financial credibility, and this additional information may reduce the uncertainty, which is evident from the reduction in the standard deviation of volume.

Our descriptive statistics suggest a decline of trade-value-weighted relative effective spread in basis points but only in Post-period 1. The same pattern is documented for trade-value-weighted relative realized spread. Both these spreads show improvements in liquidity up to 90 days after the loan announcement. There is a consistent improvement in trade-value-weighted price impact. We observe a decline in the market capitalization in both Post-periods as compared to the Pre-period.

[Insert Table 1 here]

5 Empirical Results

5.1 Effect of Bank Loan Announcements on Stock Liquidity of Borrowing Firms

5.1.1 Univariate Analysis

In this section, we examine the overall impact of bank loan announcements on the liquidity of borrowers' stocks. Table 2 shows the changes in the average and median of six liquidity measures around the bank loan announcements for the full sample between the Pre-period and two subsequent Post-periods. The liquidity measures are (1) trade-value-weighted effective spread, (2) trade-value-weighted effective relative spread, (3) trade-value-weighted realized spread, (4) trade-value-weighted relative realized spread, (5) trade-value-weighted price impact, and (6) trade-value-weighted relative price impact. For each liquidity measure, we compute the differences between Post-period 1 and the Pre-period (Panel A) and between the Post-period 2 and the Pre-period (Panel B). The t-tests and Wilcoxon sign rank tests examine whether the differences in the paired means and medians, respectively, are equal to zero.

Panel A of Table 2 indicates some improvements in liquidity during the 90 days following a loan announcement. The improvements are evident as there is a reduction in median values of trade-value-weighted effective spread in dollar value, as well as a reduction in dollar value of trade-value-weighted realized spread. Our results do not show changes in price impact. An examination of the impact of bank loan announcements for a relatively longer window (+91, +180 days) provides a similar improvement in liquidity with a larger magnitude than for the first 90 days after the news release (see Panel B of Table 2). The mean and median differences reflect a wide dispersion in effects, suggesting the distribution in effects may be highly skewed with some very large increases affecting the mean.

Overall, our univariate results suggest that loan announcements lead to lower transaction costs and narrower liquidity providers' revenues, indicating improved liquidity of borrowers'

stocks. This is consistent with the prediction under Hypothesis 1a. The liquidity improvement is more profound in the longer windows following the announcement. An explanation for this improvement is that announcing a loan can lower information asymmetry between a borrowing firm and its investors (Maskara and Mullineaux 2011), which subsequently reduces the spreads and hence improves the liquidity of borrowers' stocks.

[Insert Table 2 here]

A potential concern with our conclusion is that event studies on bank loan announcements may be subject to a sample selection bias whereby small firms or firms with high information asymmetry are more likely to announce their bank loans (Maskara and Mullineaux, 2011). We address this concern by showing that our sample firms are representative of firms traded in Australia and not dominated by small firms as follows.

First, in the U.S., firms are not mandated to announce loans, hence, small firms or firms with high information asymmetry may be more likely to announce their bank loans, resulting in a possible sample selection bias in the US study context. This is not a concern in our Australian sample because, by regulations, Australian firms must disclose market-sensitive information to the ASX immediately upon the entity's becoming aware of the information. Since corporate loans are considered market-sensitive information in Australia and given that our sample covers all Australian firms announcing their bank loans during the investigated period, our sample is unlikely to suffer the small sample selection bias.

Second, we provide empirical evidence of this by collecting data from Compustat Global and compute the statistics for market capitalization at the end of the fiscal years throughout 1999 to 2014 that we use in our empirical analysis. We find that the mean, median, 25th percentile, and 75th percentile of market capitalization (in million AUD) for all Australian firms over our sample period of 1999 to 2014 are \$1,652.64, \$2,922.10, \$786.69, and \$1622.40, respectively. Given that the firms in our samples have the average market capitalization of

$1,271, $1,260, and $1,239 million for the Pre-period, Post-period 1, and Post-period 2, respectively, we find that our sample firms are representative of the universe of Australian firms and not dominated by very small firms. This help to alleviate the concern of sample selection bias raised in Maskara and Mullineaux (2011).

5.1.2 Regression Analysis

We further perform a regression analysis to examine the impact of loan announcements on liquidity following Equation (1) described in the earlier section. The estimation results are presented in Table 3. Panel A reports the regression results without corporate characteristics as control variables, and Panel B shows the estimation results considering the potential impact of firm-level control variables.

Results in Panel A of Table 3 show that announcements of bank loans (*ANNOUNCEMENT*) have a negative relation with all spread measures (Models 1 to 4). The coefficient estimates of both effective spread measures in dollar value and percentage are negative and statistically significant (Models 1 and 2), suggesting a reduction in transaction costs or an improvement in the liquidity of borrowers' stocks following the bank loan announcements. The estimated coefficients of both absolute and relative realized spreads in Models 3 and 4 are also negative and statistically significant, indicating lower realized spreads on borrowers' stocks after the announcement. Realised spreads proxy for earnings to liquidity providers of borrowers' stocks. Thus, the documented lower realized spreads indicate that the market for trading borrowers' stock has become more competitive (see Hendershott and Jones (2005)). This is consistent with the explanation that the loan announcements bring more information to the market, and such additional information gives assurance to investors to trade in the borrower's stocks. Subsequently, this increases liquidity provision, reduces transaction costs, and hence improves the liquidity of the borrower's stocks.

The trade-value-weighted relative price impact at the five-minute interval is a measure of the amount of information in trades (Hendershott and Jones, 2005). Thus, the higher the price impact, the more prices will move toward the trade direction, leading to a reduction in ex-post transaction costs. The estimated coefficients of *ANNOUNCEMENT* in Models 5 and 6 are positive and statistically significant, implying a higher amount of information in trades in the post-period. Together with the lower effective spreads and realized spreads in the post-period documented earlier, the results of Models 5 and 6 suggest bank loan announcements increase the information of trades, resulting in lower trading costs; hence, improving the borrower's stock liquidity.[6]

In Panel B of Table 3, we further control for firm-level characteristics such as insider holding, the proportion of substantial holdings, the top shareholder fraction, and analyst coverage[7]. Our regression results are still similar across all proxies of stock liquidity and price impact, except for the absolute effective spread. The estimated coefficients of the bank loan announcement dummy variables (*ANNOUNCEMENT*) remain negative and statistically significant in three of four models with effective spreads and realized spreads proxies as dependent variables (Models 2 – 4). The estimations of *ANNOUNCEMENT* in the models with price impacts as dependent variables are positive and statistically significant (Models 5 - 6), which is in line with our previous findings.

Overall, the regression results show that bank loan announcements improve stock liquidity by reducing transaction costs, lowering revenues of liquidity providers, and increasing

[6] As an alternative measure of liquidity, we also employ the daily Amihud (2002) illiquidity measure.

[7] As a robustness check, we use analyst dispersion as another measure for information asymmetry at the firm level. We then compute the analyst dispersion measure as the standard deviation of these estimates. We match the monthly analyst dispersion measure with the daily liquidity data for each stock in our sample. For 136,000 daily observations in our sample, we have data for analyst dispersion only for 2,172 days. One reason for the lack of analyst dispersion data could be that there are a large number of small firms in Australia with a relatively small number of analysts following. Because of the small number of earnings estimates, the standard deviation calculation returns null values. Nevertheless, we find qualitatively similar results when controlling for analyst dispersion.

the information of trades. This finding is consistent with the results reported in Table 2, and with Hypothesis 1a.

[Insert Table 3 here]

5.2 Effects of New Loans and Renewal of Existing Loan Announcements on Borrower's Stock Liquidity

In this section, we discuss the findings of empirically testing Hypotheses 2a and 2b regarding the effect of new loan announcements and loan renewal announcements. While new loans signal to the market that the borrower is credit worthy (Best and Zhang, 1993; Fama, 1985), loan renewals reveal information the bank obtains over a period of lending relationship (Lummer and McConnell, 1989). We are interested in examining whether there is more information content in new loan announcements (Hypothesis 2a) or renewal announcements (Hypothesis 2b).

Similar to the previous sections, we first conduct a univariate analysis separately for new loan announcements and loan extension announcements. Panel A of Table 4 reports the results for Post-period 1 (the [+0, +90] day time window). We find that, for new loan announcements, the median values of both the trade-value-weighted effective spreads and realized spreads become narrower and are statistically significant (*Wilcoxon* = −6345 and −4559.5, respectively). This suggests an improvement in liquidity following new loan announcements. For loan renewal announcements, we find a reduction only in trade-value-weighted effective spread.

Panel B presents the univariate results for Post-period 2 [window (+91, +180)]. We find similar results to those reported in Panel A. There is a significant reduction in the effective spreads and realised spreads following new loan announcements. This is not the case for loan renewal announcements.

Overall, our univariate results suggest that liquidity improves following new loan announcements, consistent with Hypothesis 2a. We do not find results in support of Hypothesis 2b.

The differences between the mean and median statistics test results as well as between the liquidity measures in percentages and in dollar value reflect a wide dispersion in effects, suggesting the distribution in effects may be highly skewed with some large decreases in large stocks. Thus, we perform multivariate regressions control for other determinants of liquidity to investigate whether the different responses of stock liquidity to announcements of new loans versus loan renewals hold.

[Insert Table 4 here]

Following Hasan, Hoi, Wu, and Zhang (2014), we construct two interaction terms between the bank loan announcement dummy variable and dummies indicating the loan types. Specifically, we estimate the following regression equation:

$$Y_{it} = \alpha_t + \beta_1\, ANNOUNCEMENT_{it} \times NEW_{it} + \beta_2\, ANNOUNCEMENT_{it} \times RENEWAL_{it} + \gamma\, X_{it} + \varepsilon_{it}, \quad (2)$$

where $ANNOUNCEMENT_{it}$ is an indicator variable set equal to zero for the Pre-period and one for the Post-period; NEW_{it} is a dummy variable which equals one for new loans and zeroes otherwise; $RENEWAL_{it}$ is a dummy variable which equals one for loan renewals and zeroes otherwise; X_{it} is a set of the control variables described in Section 3. We further include trading day fixed effects, similar to the previously reported analyses.

The estimation results are reported in Table 5. We find that the estimated coefficients of $ANNOUNCEMENT_{it} \times NEW_{it}$ are statistically significant and carry the expected signs in all models of Table 5 (negative for the spread measures (Models 1 to 4) and positive for the price impact measures (Models 5 and 6). The results suggest that the liquidity of borrowers' stocks improves following an announcement of new loans. In contrast, the coefficient estimates of

$ANNOUNCEMENT_{it} \times RENEWAL_{it}$ are statistically significant and positive for all spread measures (Models 1 to 4) and negative for the absolute price impact (Model 5). The findings indicate higher transaction costs and higher revenues for liquidity providers associated with the announcement of loan renewals in comparison to the announcement of new loans. The effect of the announcement of loan renewal on price impact is documented only when using the absolute measure. This effect disappears when we consider the relative measures of price impact, which is adjusted to take into account the variations of stock prices across a large sample size. Furthermore, we test whether the coefficient estimates for $ANNOUNCEMENT_{it} \times NEW_{it}$ and $ANNOUNCEMENT_{it} \times RENEWAL_{it}$ are equal. The reported F-statistics and associated p-value for these tests show that the coefficient estimates for these two interaction variables are statistically different in all six models.

Overall, these findings suggest that the liquidity improvement of loan announcements is driven by new loans rather than loan renewal. This is consistent with the results in Table 4 and with Hypothesis 2a. These findings lend support to the certification argument (Best and Zhang, 1993; Fama, 1985) that posits that new loan announcements signal the creditworthiness of the borrowing company.

[Insert Table 5 here]

5.3 Additional Analyses

In this section, we conduct additional tests to further understand the dynamics of stock liquidity following loan announcements. First, while existing literature provides evidence of significant stock price reaction following bank loan announcements (Best and Zhang, 1993; Fama, 1985; James, 1987; Maskara et al., 2011), existing evidence focuses on the US setting. We revisit this question in the Australian context and discuss the findings in Section 5.3.1.[8] Second, we

[8] We thank a referee for suggesting this analysis.

consider the impact of loan announcements on liquidity separately for announcements with positive versus negative price reactions.[9]

5.3.1 Effect of bank loan announcements on stock returns

With respect to the CAR estimation, we collect the daily closing prices of individual stocks adjusted for corporate actions (dividends and stock splits) from Datastream. Our market benchmark is the All Ordinary Index. We collect the daily closing prices adjusted for corporate actions of the index from Datastream. Following Billet et al. (1995), we first compute daily returns as:

$$R_{i,t} = \ln(\frac{P_{i,t}}{P_{i,t-1}}), \tag{3}$$

where $R_{i,t}$ denotes the return on stock i on day t; $P_{i,t}$ denotes the adjusted closing price of stock i on day t, and $P_{i,t-1}$ denotes the adjusted closing price of stock i on day $t-1$. We compute the daily market returns in a similar manner.

To compute the CARs, we first use the market model to estimate individual stock betas:

$$R_{i,t} = \alpha + \beta R_{m,t} + \varepsilon_{\mathrm{it}} , \tag{4}$$

where $R_{i,t}$ is the return on stock i on day t and $R_{m,t}$ is the return on the market index, which is the All Ordinary Index in our case, on day t. Our estimation window spans 200 days, from day −250 to day −51 before the event date. Using α and β estimated from Equation (4), we then compute the daily abnormal returns for individual stocks as follows:

$$AR_{it} = R_{it} - (\alpha + \beta R_{mt}). \tag{5}$$

From the daily abnormal returns, we compute the cumulative abnormal returns for four windows: [0,1], [-1,1], [-2,2], and [-5,5].

[9] One might argue that specific loan purposes and loan characteristics such as loan covenants and collateral might affect the borrower stocks' liquidity if such information is publicly available. However, due to the limitation of our hand-collected data, we are unable to observe the details of the loan contract terms mentioned above. We, therefore, leave this to future research.

Table 6 shows the Cumulative Abnormal Return (CAR) for the whole sample and the new loans and loan renewals. Columns 1 and 2 of table 2 show the mean and the median of the CAR estimates for all stocks in our sample. For the median values, we perform the Wilcoxon signed-rank test to test whether the median CAR is different from zero. The market responds quite positively for the immediate [0, 1] window after the loan announcement, and for the extended windows returns are still positive and significant but they are less than the immediate period [0, 1] window. Overall, we observe the markets react positively to bank loan announcements, consistent with prior studies (Billett, Flannery, and Garfinkel 1995; Lummer and McConnell 1989; Preece and Mullineaux 1996).

We further examine the market reaction to different types of announcements. Columns 3 and 4 document the CARs surrounding new loan announcements and renewal of loan announcements, respectively. We find that the market reacts more positively to announcements of new loans relative to loan extensions, which is in line with Best and Zhang (1993), who reports that new loan announcements may convey positive information about the borrower, though Lummer and McConnell (1989) show that announcement of new banks loans have no signaling effect. The difference between our results and those of Lummer and McConnell (1989) can be attributable to our source of bank loan announcements which is a direct feed from the Australian Securities Exchange, which is disseminated quickly to the market participants[10]. Overall, our CAR results show that the market responds positively to the announcement of loans by banks and especially in the case of new loans.

[Insert Table 6 here]

[10] See Lummer and McConnell (1989) for details of collecting information on loan being new or renewed.

5.3.2 Liquidity Effect in Events with Positive versus Negative CARs

In this section, we further explore the effect of bank loan announcements on stock liquidity across events with positive and negative CARs.

We examine the effect of bank loan announcements on stock liquidity for positive and negative CAR events by estimating the following regression:

$$Y_{it} = \alpha_t + \beta_1\, ANNOUNCEMENT_{it} \times NEG_{it} + \beta_2 ANNOUNCEMENT_{it} \times POS_{it} + \gamma\, X_{it} + \varepsilon_{it}, \quad (6)$$

where NEG_{it} is an indicator variable that equals one for stocks experiencing negative CAR[0,1] in the post-period of a loan announcement and zeroes otherwise; POS_{it} is an indicator variable that equals one for stocks having positive CAR[0,1] in the post-period of a loan announcement, and zeroes otherwise; X_{it} is a vector of control variables, as defined under Equation (1) above. We also include trading day fixed effects in this analysis.

[Insert Table 7 here]

The empirical results indicate that the liquidity effect of bank loan announcements is significantly improved for firms experiencing negative abnormal returns. The coefficient estimates of $ANNOUNCEMENT_{it} \times NEG_{it}$ are negative and statistically significant for all four spread measures (Models 1 to 4), and are significantly positive for both the price impact measure (Models 5 and 6). The estimated coefficients of $ANNOUNCEMENT_{it} \times POS_{it}$ are statistically significant for all four models of spread measures (Models 1 to 4), but carry opposite signs to the interaction variable $ANNOUNCEMENT_{it} \times NEG_{it}$. The F-statistics and associated p-values show that the estimated coefficients of the two interaction variables are not statistically equal in five of six models (Models 1 to 5).

Overall, we find lower transaction costs and liquidity providers' revenues for stocks suffering negative CAR, indicating a greater improvement in liquidity for these stocks than for stocks having positive CAR following the loan announcement. Our explanation for this finding

is that when the market participants perceive bank loan announcements as positive news, indicated by positive CAR, buying activities will somewhat dominate trading. However, negative CAR following bank loan announcements suggests a larger difference of opinions among investors, which leads to more buyers and sellers willing to trade than with positive CAR. Thus, stock liquidity improves more for stocks with negative CAR than positive CAR. The difference in the impact of bank loan announcements on price impact for the two groups of negative versus positive CARs is weak and not statistically significant.

5.3.3 Robustness Checks

In this section, we report additional robustness checks to ensure our results are not driven by model or proxy selection. First, following Dang et al. (2018), we include trading day fixed effects in our regression analysis. We find that our results (reported in models 1 to 6 of Table 8) remain consistent when we include both trading day and stock fixed effects. In addition, to ensure our results are robust to other measures of liquidity, we use the Amihud (2002) illiquidity measure as an alternative proxy for liquidity.[11] We compute the daily Amihud measure as the ratio of the absolute value of daily return to daily trading volume. The Amihud ratio reflects the extent to which stock prices are resilient to large order flows. More liquid stocks have a greater ability to absorb large trading volumes, thus having lower price movements at any given number of trades. As a result, a larger value for the Amihud ratio indicates a *lower* level of liquidity. We estimate our baseline regression results with the Amihud measure and report the results in model 7 of Table 8. For presentation purposes, we scale the Amihud measure by multiplying it by 1,000,000. We find a reduction in the Amihud ratio after a loan announcement, suggesting that stock liquidity improves following a bank loan

[11] We thank a referee for suggesting this analysis.

announcement. This is consistent with the results documents in our baseline model (and consistent with our main argument).

[Insert Table 8 here]

Moreover, non-tabulated analysis shows that there is heterogeneity in stock liquidity across different industries. Consequently, to ensure that our results are not driven by industry-specific differences in the key variables of interest, we further control for industry fixed effects in our baseline regression. [12]

We report the results of this test in Table 9. In Panel A, we use the Global Industry Classification Standard (GICS) to define the industries. There are 10 GICS industries, including Consumer Discretionary, Consumer Staples, Energy, Financials, Health Care, Industrials, Information Technology, Materials, Telecommunications, and Utilities. We find that our results are unchanged if we control for GICS industry fixed effects.

In Panel B, we consider a more granular industry classification using the Standard Industry Code (SIC) instead of the GICS. There are 25 different SIC industries. Panel B shows that our main findings are also robust to controlling for SIC industry fixed effects. Overall, the results reported in Table 9 indicate that our findings are not driven by industry-level differences across sample firms.

[Insert Table 9 here]

6 Conclusion

This study is the first to comprehensively examine the impact of bank loan announcements on the liquidity of borrowers' stocks. Utilizing the large sample of all Australian firms announcing bank loans over 14 years, we find a significant improvement in the borrowers' stock liquidity following bank loan announcements, as shown by the reductions in various bid-ask spread

[12] We are grateful for a referee for suggesting this insight.

measures and the increases in the price impact of trades. Our findings indicate that bank loan announcement increases competition between liquidity providers of borrowers' stocks, leading to lower transaction costs for these stocks.

We further document the differential effects of bank loan announcements on liquidity for new loans versus loan renewals and stocks having negative versus positive announcement-period abnormal returns. The improvement in borrowers' stock liquidity is more pronounced for new loans and stocks having negative announcement-period abnormal returns. Overall, our findings show that the benefits of bank loan announcements are not only constrained to improvement in stock prices, as documented in the extant literature but also extend to stock liquidity – one of the most important quality dimensions of stock markets. Our study highlights that banks' lending decisions have a significant effect on the quality of the secondary market for borrowers' stocks.

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Tables

Table 1: Summary Statistics

This table reports the summary statistics of trades on firms with bank loan announcements from January 1999 to December 2014. The pre-period is from 90 days to one day before the event date. Post-period 1 refers to the period from day 1 to day 90 after the event date, and Post-period 2 refers to the period from day 91 to day 180 after the event date. All variables are aggregated to the daily frequency. All continuous variables are winsorized at the 1st and 99th percentiles.

Variables	*Number of stocks*	***Pre-period***		***Post-period 1***		***Post-period 2***	
		Mean	*STD*	*Mean*	*STD*	*Mean*	*STD*
Number of trades	327	329	607	351	619	351	619
Daily trading volume (shares)	327	1,415,678	2,812,140	1,503,051	2,764,086	1,462,436	2,480,902
Daily trading value ($)	327	3,187,545	8,726,663	3,164,710	8,490,068.70	3,106,619	8,288,770
Trade-value-weighted Effective Spread ($)	327	0.01	0.03	0.01	0.02	0.01	0.03
Trade-value-weighted Relative Effective Spread (bps)	327	240.80	283.60	233.70	255.60	246.00	277.70
Trade-value-weighted Realised Spread ($)	327	0.02	0.03	0.02	0.02	0.02	0.03
Trade-value-weighted Relative Realised Spread (bps)	327	251	286	242	255	253	275
Value Weighted Average Price	327	2.34	4.35	2.28	4.37	2.25	4.29
Relative range-based Volatility	327	0.03	0.02	0.04	0.02	0.04	0.02
Trade-value-weighted Price Impact	327	-0.00	0.01	-0.00	0.01	-0.00	0.01
Trade-value-weighted Relative Price Impact	327	-10.36	34.80	-8.82	30.90	-7.13	31.50
Range-based Volatility	327	0.03	0.02	0.04	0.02	0.04	0.02
Market Capitalization	327	1271	3294	1260	3366	1239	3294

Table 2: Changes in Liquidity Following Bank Loan Announcements – Univariate Analysis

This table presents results for the changes in liquidity following bank loan announcements. The liquidity measures are Trade-value-weighted Effective Spread; Trade-value-weighted Relative Effective Spread; Trade-value-weighted Realised Spread; Trade-value-weighted Relative Realised Spread; Trade-value-weighted Price Impact; and Trade-value-weighted Relative Price Impact. "Pre-period" corresponds to the period from day -90 to day -1 with day 0 is the announcement date. We present results for two post periods: [+1, +90] and [+91, +180]. "t-statistics" and "Wilcoxon" present the test-statistics for the difference in mean and median values for the Pre-period and the Post-periods.

Panel A: Using Window [+1, +90] as Post-Loan Announcement Period

	Means				Medians			
Variables	Pre-period	Post-period	Difference	t-Statistics	Pre-period	Post-period	Difference	Wilcoxon
Trade-value-weighted Effective Spread ($)	0.01543	0.01395	-0.00148	-1.37	0.0081	0.00798	-0.00012	-11613.00***
Trade-value-weighted Relative Effective Spread (bps)	219.4	211.4	-8	-1.24	111.3	112.1	0.8	18.00
Trade-value-weighted Realised Spread ($)	0.01945	0.01766	-0.00179	-1.45	0.00934	0.00836	-0.00098	-8826.50**
Trade-value-weighted Relative Realised Spread (bps)	230	220.1	-9.8	-1.42	118.5	120.3	1.7	52.00
Trade-value-weighted Price Impact	-0.00402	-0.0037	0.00031	1.17	-0.00003	-0.00003	0.00001	2428.00
Trade-value-weighted Relative Price Impact	-10.6	-8.8	1.8	1.27	-0.39091	-0.5492	-0.15828	-232.00

Panel B: Using Window [+91, +180] as Post-Loan Announcement Period

	Means				Medians			
Variables	Pre-period	Post-period	Difference	t-Statistics	Pre-period	Post-period	Difference	Wilcoxon
Trade-value-weighted Effective Spread ($)	0.01543	0.01447	-0.00097	-0.79	0.0081	0.00758	-0.00052	-16384.50***
Trade-value-weighted Relative Effective Spread (bps)	219.4	222.1	2.7	0.29	111.3	116.3	5	3073.00
Trade-value-weighted Realised Spread ($)	0.01945	0.01824	-0.00121	-0.87	0.00934	0.00821	-0.00113	-14231.50***
Trade-value-weighted Relative Realised Spread (bps)	230	229.8	-0.2	-0.02	118.5	121.2	2.7	2280.00
Trade-value-weighted Price Impact	-0.00402	-0.00377	0.00025	0.75	-0.00003	-0.00001	0.00003	4031.50*
Trade-value-weighted Relative Price Impact	-10.6	-7.7	2.8	1.43	-0.39091	-0.15353	0.23738	65.50

Table 3: Changes in Liquidity Following Bank Loan Announcements – Regression Analysis

This table presents results for the changes in liquidity following bank loan announcements using the following regression:

$$Y_{it} = \alpha_t + \beta ANNOUNCEMENT_{it} + \gamma X_{it} + \varepsilon_{it},$$

where Y_{it} is an alternative measure of transaction costs and its components for bank loan announcement i at day t. The liquidity measures are: Trade-Value-Weighted Effective Spread (Model 1); Trade-value-weighted Relative Effective Spread (Model 2); Trade-value-weighted Realised Spread (Model 3); Trade-value-weighted Relative Realised Spread (Model 4); Trade-value-weighted Price Impact (Model 5); and Trade-value-weighted Relative Price Impact (Model 6). $ANNOUNCEMENT_{it}$ is an indicator variable set equal to zero for the Pre-period and one for the Post-periods. X_{it} is a set of the following control variables including daily volume (*TRADE_VOL*), market capitalization (*MCAP*), price volatility (*VOLA*), and the inverse of daily volume-weighted average share price (*VWAP*). Panel A reports the estimates without corporate characteristics as control variables. Panel B reports the results with corporate characteristics as additional control variables, including *INSIDER_PRO* is the proportion of shares held by insiders over total shares outstanding; *SUBSTANTIAL_PRO* is the proportion of substantial shareholdings over total shares outstanding; *TOP20_PRO* is the proportion of shares from the top 20 shareholders over total shares outstanding; *ANALYST* is the number of analysts from I/B/E/S. The regressions are estimated based on the panel dataset using a time-fixed effect approach with robust standard errors clustered by dates. All continuous variables are winsorized at the 1st and 99th percentiles. T-statistics are reported in parentheses. The symbols ***, **, * denote statistical significance at 1%, 5%, and 10% levels.

Panel A: Without Corporate Characteristics as Control Variables

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
ANNOUNCEMENT	-0.000211**	-5.520993***	-0.000457***	-7.561311***	0.000152**	1.662037**
	[-2.03]	[-3.78]	[-3.59]	[-4.87]	[2.57]	[2.51]
TRADE_VOL	-0.000000***	-0.000011***	-0.000000***	-0.000010***	0.000000***	-0.000001***
	[-54.17]	[-46.72]	[-67.21]	[-40.36]	[56.19]	[-6.39]
VWAP	-0.000212***	12.542094***	-0.000243***	12.122068***	0.000033***	0.529009***
	[-77.98]	[197.25]	[-70.05]	[155.70]	[28.05]	[13.59]
VOLA	-0.043889***	357.364594***	-0.000432	520.791199***	-0.041208***	-192.708359***
	[-18.57]	[9.41]	[-0.14]	[12.83]	[-33.45]	[-10.14]
MCAP	0.000000***	-0.018480***	0.000003***	-0.017630***	-0.000002***	-0.001094***
	[11.15]	[-89.42]	[57.00]	[-82.41]	[-85.25]	[-12.67]
CONSTANT	0.016028***	162.083527***	0.016719***	166.671036***	-0.000745***	-1.989726***
	[129.32]	[91.30]	[102.83]	[89.59]	[-11.50]	[-2.58]
DATE FE	YES	YES	YES	YES	YES	YES
DATE CLUSTER	YES	YES	YES	YES	YES	YES
OBSERVATIONS	136,000	136,000	136,000	136,000	136,000	136,000
R-SQUARED	0.116	0.528	0.163	0.483	0.235	0.050

Panel B: With Corporate Characteristics as Additional Control Variables

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
ANNOUNCEMENT	-0.000043	-2.832242**	-0.000312**	-4.894199***	0.000226***	1.765238***
	[-0.38]	[-2.30]	[-2.06]	[-3.66]	[2.98]	[2.70]
TRADE_VOL	-0.000000***	-0.000005***	-0.000000***	-0.000005***	0.000000***	-0.000000***
	[-33.03]	[-22.65]	[-52.07]	[-19.72]	[51.93]	[-3.05]
VWAP	-0.000230***	12.354576***	-0.000242***	12.057687***	0.000015***	0.418946***
	[-39.20]	[107.88]	[-34.07]	[89.34]	[6.55]	[6.50]
VOLA	-0.047051***	237.485016***	0.013698***	508.084473***	-0.058601***	-293.667908***
	[-14.40]	[5.35]	[3.18]	[10.53]	[-31.68]	[-12.64]
MCAP	0.000001***	-0.005411***	0.000003***	-0.004652***	-0.000002***	-0.000767***
	[33.09]	[-31.62]	[57.84]	[-26.38]	[-69.85]	[-9.78]
INSIDER_PRO	0.006359***	66.529800***	0.007335***	69.292366***	-0.000624***	-1.740831
	[10.99]	[13.74]	[10.26]	[13.23]	[-2.87]	[-0.90]
SUBSTANTIAL_PRO	0.003813***	36.770687***	0.004076***	36.796276***	-0.000226*	1.180717
	[22.47]	[21.25]	[18.31]	[19.97]	[-1.74]	[1.35]
TOP20_PRO	-0.001349***	-40.812923***	-0.000733***	-38.118492***	-0.000551***	-3.162261***
	[-8.87]	[-25.67]	[-3.71]	[-22.71]	[-4.79]	[-4.13]
ANALYST	-0.000457***	-9.563692***	-0.000152***	-9.292219***	-0.000334***	-0.445382***
	[-33.15]	[-73.54]	[-8.72]	[-66.69]	[-34.03]	[-7.38]
CONSTANT	0.015962***	176.967621***	0.014626***	175.460327***	0.001215***	3.790907***
	[77.30]	[84.02]	[54.69]	[78.20]	[10.51]	[3.75]
DATE FE	YES	YES	YES	YES	YES	YES
DATE CLUSTER	YES	YES	YES	YES	YES	YES
OBSERVATIONS	91,563	91,563	91,563	91,563	91,563	91,563
R-SQUARED	0.153	0.518	0.191	0.480	0.283	0.075

Table 4: Changes in Liquidity Following New Loans or Renewal of Existing Loan Announcements – Univariate Analysis

This table presents results for the changes in liquidity following the announcements of new loans versus the renewal of existing loans. The liquidity measures are Trade-value-weighted Effective Spread; Trade-value-weighted Relative Effective Spread; Trade-value-weighted Realised Spread; Trade-value-weighted Relative Realised Spread; Trade-value-weighted Price Impact; and Trade-value-weighted Relative Price Impact. "Pre-period" corresponds to the period from day -90 to day -1 with day 0 is the announcement date. We present results for two post periods: [+1, +90] and [+91, +180]. "t-statistics" and "Wilcoxon" present the test-statistics for the difference in mean and median values for the Pre-period and the Post-periods. All continuous variables are winsorized at the 1st and 99th percentiles.

Panel A: Using Window [+1, +90] as Post-Loan Announcement Period

		Means				Medians			
Loan category	Variables	Pre-period	Post-period	Difference	t-Statistics	Pre-period	Post-period	Difference	Wilcoxon
Renewal	Trade-value-weighted Effective Spread ($)	0.02	0.02	0	-1.26	0.01	0.01	0	-794.00*
Renewal	Trade-value-weighted Relative Effective Spread (bps)	286.1	262.6	-23.4	-1.56	163.1	171.4	8.3	-361.50
Renewal	Trade-value-weighted Realised Spread ($)	0.02	0.02	0	-1.30	0.01	0.01	0	-702.50
Renewal	Trade-value-weighted Relative Realised Spread (bps)	293.3	267.4	-25.9	-1.65	168.3	168.4	0	-231.50
Renewal	Trade-value-weighted Price Impact	0	0	0	0.58	0	0	0	11.00
Renewal	Trade-value-weighted Relative Price Impact	-7.2	-4.7	2.5	0.90	0	0	0	-36.00
New	Trade-value-weighted Effective Spread ($)	0.01	0.01	0	-1.09	0.01	0.01	0	-6345.00**
New	Trade-value-weighted Relative Effective Spread (bps)	197.2	194.3	-2.9	-0.41	95.3	94.4	-0.9	1224.50
New	Trade-value-weighted Realised Spread ($)	0.02	0.02	0	-1.17	0.01	0.01	0	-4559.50*
New	Trade-value-weighted Relative Realised Spread (bps)	208.9	204.4	-4.5	-0.59	99.2	102.1	2.9	767.50
New	Trade-value-weighted Price Impact	0	0	0	1.06	0	0	0	1809.00
New	Trade-value-weighted Relative Price Impact	-11.7	-10.1	1.5	0.95	-2.2	-2.3	-0.1	-83.50

Panel B: Using Window [+91, +180] as Post-Loan Announcement Period

Loan category	Variables	Means				Medians			
		Pre-period	Post-period	Difference	t-Statistics	Pre-period	Post-period	Difference	Wilcoxon
Renewal	Trade-value-weighted Effective Spread ($)	0.02	0.02	0	1.00	0.01	0.01	0	-855.00*
Renewal	Trade-value-weighted Relative Effective Spread (bps)	286.1	279.2	-6.8	-0.38	163.1	161.6	-1.5	-437.50
Renewal	Trade-value-weighted Realised Spread ($)	0.02	0.02	0	1.18	0.01	0.01	0	-615.50
Renewal	Trade-value-weighted Relative Realised Spread (bps)	293.3	287.9	-5.3	-0.27	168.3	163.4	-4.9	-521.50
Renewal	Trade-value-weighted Price Impact	0	0	0	-1.26	0	0	0	-125.00
Renewal	Trade-value-weighted Relative Price Impact	-7.2	-8.7	-1.5	-0.36	0	0	0	-196.00
New	Trade-value-weighted Effective Spread ($)	0.01	0.01	0	-1.02	0.01	0.01	0	-9792.50***
New	Trade-value-weighted Relative Effective Spread (bps)	197.2	203	5.8	0.54	95.3	98.9	3.6	3776.50
New	Trade-value-weighted Realised Spread ($)	0.02	0.02	0	-1.27	0.01	0.01	0	-8879.00***
New	Trade-value-weighted Relative Realised Spread (bps)	208.9	210.4	1.6	0.14	99.2	107.3	8.1	3334.50
New	Trade-value-weighted Price Impact	0	0	0	1.83	0	0	0	3455.50*
New	Trade-value-weighted Relative Price Impact	-11.7	-7.4	4.3	1.89	-2.2	-2.7	-0.5	801.00

Table 5: Changes in Liquidity Following New Loans versus Renewal of Existing Loan Announcements – Regression Analysis

This table presents results for the changes in liquidity following the announcements of new loans versus the renewal of existing loans using the following regression:

$$Y_{it} = \alpha_t + \beta_1\, ANNOUNCEMENT_{it} \times NEW_{it} + \beta_2\, ANNOUNCEMENTit \times RENEWAL_{it} + \gamma\, X_{it} + \varepsilon_{it},$$

where Y_{it} is an alternative measure of transaction costs and its components for bank loan announcement i at day t. The liquidity measures are: Trade-value-weighted Effective Spread (Model 1); Trade-value-weighted Relative Effective Spread (Model 2); Trade-value-weighted Realised Spread (Model 3); Trade-value-weighted Relative Realised Spread (Model 4); Trade-value-weighted Price Impact (Model 5); and Trade-value-weighted Relative Price Impact (Model 6). $ANNOUNCEMENT_{it}$ is an indicator variable set equal to zero for the Pre-period and one for the Post-period. $RENEWAL_{it}$ is a dummy variable that equals one for loan renewals and zeroes otherwise, NEW_{it} is a dummy variable that equals one for new loans and zeroes otherwise. X_{it} is a set of the following control variables including daily volume (*TRADE_VOL*), market capitalization (*MCAP*), price volatility (*VOLA*), the inverse of daily volume-weighted average share price (*VWAP*), the proportion of shares held by insiders over total share outstanding (*INSIDER_PRO*), the proportion of substantial shareholdings over total shares outstanding (*SUBSTANTIAL_PRO*), the proportion of shares from the TOP 20 shareholders over total shares outstanding (*TOP20_PRO*); the number of analysts from I/B/E/S (*ANALYST*). The regressions are estimated based on the panel dataset using trading day fixed effects with robust standard errors clustered by dates. All continuous variables are winsorized at the 1st and 99th percentiles. T-statistics are reported in parentheses. The symbols ***, **, * denote statistical significance at 1%, 5%, and 10% levels.

(see next page)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
ANNOUNCEMENT×NEW	-0.000602***	-5.446033***	-0.001156***	-8.717142***	0.000497***	2.703246***
	[-5.51]	[-4.48]	[-7.83]	[-6.70]	[6.24]	[4.05]
ANNOUNCEMENT×RENEWAL	0.001739***	5.505921**	0.002378***	7.301238***	-0.000640***	-1.227070
	[7.61]	[2.49]	[8.13]	[3.03]	[-5.81]	[-1.10]
TRADE_VOL	-0.000000***	-0.000005***	-0.000000***	-0.000005***	0.000000***	-0.000000***
	[-32.31]	[-22.55]	[-51.65]	[-19.51]	[51.82]	[-3.25]
VWAP	-0.000232***	12.344087***	-0.000245***	12.042345***	0.000016***	0.422710***
	[-40.04]	[108.37]	[-35.19]	[89.77]	[7.15]	[6.59]
VOLA	-0.045593***	244.305588***	0.015899***	518.060303***	-0.059310***	-296.115601***
	[-14.00]	[5.49]	[3.70]	[10.74]	[-31.91]	[-12.74]
MCAP	0.000001***	-0.005347***	0.000003***	-0.004558***	-0.000002***	-0.000790***
	[34.39]	[-31.43]	[58.83]	[-26.10]	[-70.24]	[-10.03]
INSIDER_PRO	0.006297***	66.239929***	0.007242***	68.868408***	-0.000594***	-1.636807
	[11.07]	[13.77]	[10.32]	[13.26]	[-2.75]	[-0.84]
SUBSTANTIAL_PRO	0.003770***	36.570908***	0.004011***	36.504082***	-0.000205	1.252411
	[21.84]	[20.93]	[17.71]	[19.55]	[-1.58]	[1.43]
TOP20_PRO	-0.001262***	-40.405857***	-0.000602***	-37.523113***	-0.000593***	-3.308344***
	[-8.22]	[-25.26]	[-3.02]	[-22.17]	[-5.15]	[-4.33]
ANALYST	-0.000422***	-9.401618***	-0.000100***	-9.055169***	-0.000351***	-0.503545***
	[-30.19]	[-68.31]	[-5.56]	[-61.49]	[-34.72]	[-8.06]
CONSTANT	0.015672***	175.610199***	0.014188***	173.474960***	0.001356***	4.278043***
	[72.54]	[80.43]	[50.75]	[74.50]	[11.44]	[4.15]
F- STATISTICS (ANNOUNCEMENT×NEW= ANNOUNCEMENT×RENEWAL)	114.67	28.37	158.16	52.51	117.34	13.42
	114.67	28.37	158.16	52.51	117.34	13.42
P-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003
DATE FE	YES	YES	YES	YES	YES	YES
DATE CLUSTER	YES	YES	YES	YES	YES	YES
OBSERVATIONS	91,563	91,563	91,563	91,563	91,563	91,563
R-SQUARED	0.155	0.518	0.193	0.480	0.284	0.075

Table 6: Price reaction to bank loan announcements

This table presents the results for the cumulative abnormal returns (CAR) for four periods: [0,1], [-1,+1], [-2, +2], and [-5, 5] for all the announcements (we report the mean values in model 1 and median values in model 2), and announcements of new loans or renewal of existing loans (models 3 and 4).

	Whole sample mean	Whole sample median	New loans	Loan extension
CAR(0,1)	0.0151	0.0040	0.0162	0.0117
	(5.28)***	(14,440.5)***	(4.88)***	(2.1)**
CAR(-1,1)	0.0132	0.0044	0.0137	0.0115
	(4.45)***	(12,667.5)***	(4.04)***	(1.91)*
CAR(-2,2)	0.0148	0.0047	0.0164	0.0100
	(4.04)***	(10,541.5)***	(3.96)***	(1.29)
CAR(-5,5)	0.0129	0.0032	0.0135	0.0108
	(2.28)**	(5,273.5)	(2.15)**	(0.88)

Table 7: Liquidity Effect in Positive versus Negative CAR Sub-samples

This table presents results for the changes in liquidity for stocks experiencing positive versus negative announcement abnormal returns following the announcements using the following regression:

$$Y_{it} = \alpha_t + \beta_1\, ANNOUNCEMENT_{it} \times NEG_{it} + \beta_2\, ANNOUNCEMENT_{it} \times POS_{it} + \gamma\, X_{it} + \varepsilon_{it},$$

where Y_{it} is an alternative measure of transaction costs and its components for bank loan announcement i at day t. The liquidity measures are: Trade-value-weighted Effective Spread (Model 1); Trade-value-weighted Relative Effective Spread (Model 2); Trade-value-weighted Realised Spread (Model 3); Trade-value-weighted Relative Realised Spread (Model 4); Trade-value-weighted Price Impact (Model 5); and Trade-value-weighted Relative Price Impact (Model 6). $ANNOUNCEMENT_{it}$ is an indicator variable set equal to zero for the Pre-period and one for the Post-period. NEG_{it} is an indicator variable that equals one for stocks experiencing negative CAR[0,1] in the post-period of a loan announcement and zeroes otherwise; POS_{it} is an indicator variable that equals one for stocks having positive CAR[0, 1] in the post-period of a loan announcement and zeroes otherwise. X_{it} is a set of the following control variables, including daily volume (*TRADE_VOL*), the inverse of daily volume-weighted average share price (*VWAP*), price volatility (*VOLA*), market capitalization (*MCAP*), the proportion of shares held by insiders over total share outstanding (*INSIDER_PRO*), the proportion of substantial shareholdings over total shares outstanding (*SUBSTANTIAL_PRO*), the proportion of shares from the top 20 shareholders over total shares outstanding (*TOP20_PRO*); the number of analysts from I/B/E/S (*ANALYST*). The regressions are estimated based on the panel dataset using a time-fixed effect approach with robust standard errors clustered by dates. T-statistics are reported in parentheses. The symbols ***, **, * denote statistical significance at 1%, 5%, and 10% levels.

(see next page)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
ANNOUNCEMENT×NEG	-0.000838***	-15.101315***	-0.001619***	-17.599194***	0.000518***	1.911296***
	[-6.20]	[-10.30]	[-8.93]	[-11.07]	[5.71]	[2.66]
ANNOUNCEMENT×POS	0.000565***	6.556934***	0.000688***	4.828577***	0.000002	1.653463**
	[4.14]	[5.05]	[3.82]	[3.42]	[0.03]	[2.23]
TRADE_VOL	-0.000000***	-0.000005***	-0.000000***	-0.000005***	0.000000***	-0.000000***
	[-31.68]	[-21.51]	[-50.70]	[-18.66]	[51.69]	[-3.06]
VWAP	-0.000236***	12.264944***	-0.000251***	11.964870***	0.000017***	0.420013***
	[-39.51]	[106.46]	[-35.00]	[88.14]	[7.47]	[6.52]
VOLA	-0.047692***	227.583054***	0.012643***	497.830719***	-0.058365***	-293.550049***
	[-14.57]	[5.12]	[2.93]	[10.29]	[-31.58]	[-12.61]
MCAP	0.000001***	-0.005396***	0.000003***	-0.004636***	-0.000002***	-0.000767***
	[33.11]	[-30.91]	[57.85]	[-25.80]	[-69.80]	[-9.79]
INSIDER_PRO	0.006448***	67.910591***	0.007482***	70.722221***	-0.000657***	-1.757269
	[11.15]	[14.07]	[10.45]	[13.53]	[-3.00]	[-0.90]
SUBSTANTIAL_PRO	0.003860***	37.494160***	0.004153***	37.545456***	-0.000243*	1.172105
	[23.09]	[22.15]	[19.00]	[20.80]	[-1.88]	[1.34]
TOP20_PRO	-0.001387***	-41.396973***	-0.000795***	-38.723297***	-0.000537***	-3.155308***
	[-9.21]	[-26.63]	[-4.09]	[-23.57]	[-4.67]	[-4.12]
ANALYST	-0.000454***	-9.526155***	-0.000148***	-9.253349***	-0.000335***	-0.445828***
	[-32.89]	[-72.47]	[-8.45]	[-65.80]	[-34.15]	[-7.41]
CONSTANT	0.015968***	177.051331***	0.014635***	175.547012***	0.001213***	3.789911***
	[77.37]	[84.29]	[54.75]	[78.37]	[10.49]	[3.75]
F-STATISTICS						
(ANNOUNCEMENT×NEG	88.24	300.51	132.55	273.45	33.27	0.15
= ANNOUNCEMENT×POS)						
P-Value	0	0	0	0	0	0.6953
DATE FE	YES	YES	YES	YES	YES	YES
DATE CLUSTER	YES	YES	YES	YES	YES	YES
OBSERVATIONS	91,563	91,563	91,563	91,563	91,563	91,563
R-SQUARED	0.154	0.519	0.192	0.481	0.283	0.075

Table 8: Controlling for firm fixed effects and using the Amihud ratio as an additional liquidity measure

This table presents results for the changes in liquidity following bank loan announcements using the following regression:

$$Y_{it} = \alpha_t + \beta ANNOUNCEMENT_{it} + \gamma X_{it} + \varepsilon_{it},$$

where Y_{it} is an alternative measure of transaction costs and its components for bank loan announcement i at day t. The liquidity measures are: Trade-Value-Weighted Effective Spread (Model 1); Trade-value-weighted Relative Effective Spread (Model 2); Trade-value-weighted Realised Spread (Model 3); Trade-value-weighted Relative Realised Spread (Model 4); Trade-value-weighted Price Impact (Model 5); and Trade-value-weighted Relative Price Impact (Model 6). $ANNOUNCEMENT_{it}$ is an indicator variable set equal to zero for the Pre-period and one for the Post-periods. X_{it} is a set of the following control variables including daily volume (*TRADE_VOL*), market capitalization (*MCAP*), price volatility (*VOLA*), and the inverse of daily volume-weighted average share price (*VWAP*). The regressions are estimated based on the panel dataset using date and firm fixed effects with robust standard errors clustered by dates. All continuous variables are winsorized at the 1st and 99th percentiles. T-statistics are reported in parentheses. The symbols ***, **, * denote statistical significance at 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ANNOUNCEMENT	-0.0004	-13.0336	-0.0007	-15.6994	0.0002	1.8976	-0.0932
	(-5.48)***	(-11.51)***	(-8.70)***	(-13.24)***	(3.97)***	(2.90)***	(-4.56)***
TRADE_VOL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(-9.88)***	(-3.08)***	(-5.81)***	(1.10)	(-2.06)**	(-8.36)***	(-17.55)***
VWAP	0.0025	-21.5751	0.0037	-19.8953	-0.0012	-1.3743	-0.0498
	(19.09)***	(-19.98)***	(23.30)***	(-16.77)***	(-12.19)***	(-3.00)***	(-2.43)**
VOLA	0.0184	563.6174	0.0547	768.7718	-0.0356	-222.0498	-6.0462
	(14.56)***	(14.80)***	(29.65)***	(18.92)***	(-29.99)***	(-10.45)***	(-8.26)***
MCAP	0.0000	0.0100	0.0000	0.0099	0.0000	-0.0002	0.0000
	(-14.18)***	(6.28)***	(-9.94)***	(5.82)***	(-2.25)**	(-0.29)	(-1.55)
CONSTANT	0.0093	235.1964	0.0089	232.2939	0.0005	5.0134	1.503
	(56.44)***	(115.07)***	(41.13)***	(111.14)***	(3.02)***	(4.91)***	(43.02)***
DATE FE	YES	YES	YES	YES	YES	YES	YES
DATE CLUSTER	YES	YES	YES	YES	YES	YES	YES
FIRM FE	YES	YES	YES	YES	YES	YES	YES
N	136,000	136,000	136,000	136,000	136,000	136,000	131,719
R2	0.6795	0.6162	0.7058	0.5788	0.494	0.0677	0.2685

Table 9: Controlling for industry fixed effects

This table presents results for the changes in liquidity following bank loan announcements using the following regression:

$$Y_{it} = \alpha_t + \beta ANNOUNCEMENT_{it} + \gamma X_{it} + \varepsilon_{it},$$

where Y_{it} is an alternative measure of transaction costs and its components for bank loan announcement i at day t. The liquidity measures are: Trade-Value-Weighted Effective Spread (Model 1); Trade-value-weighted Relative Effective Spread (Model 2); Trade-value-weighted Realised Spread (Model 3); Trade-value-weighted Relative Realised Spread (Model 4); Trade-value-weighted Price Impact (Model 5); and Trade-value-weighted Relative Price Impact (Model 6). $ANNOUNCEMENT_{it}$ is an indicator variable set equal to zero for the Pre-period and one for the Post-periods. X_{it} is a set of the following control variables including daily volume (*TRADE_VOL*), market capitalization (*MCAP*), price volatility (*VOLA*), and the inverse of daily volume-weighted average share price (*VWAP*). The regressions are estimated based on the panel dataset using a date and indusrty fixed effects with robust standard errors clustered by dates. In Panel A, we define industries using the GICS codes. In Panel B, we use the SIC codes for industries. All continuous variables are winsorized at the 1st and 99th percentiles. T-statistics are reported in parentheses. The symbols ***, **, * denote statistical significance at 1%, 5%, and 10% levels.

Panel A: GICS industry classifications

	(1)	(2)	(3)	(4)	(5)	(6)
ANNOUNCEMENT	-0.0002	-7.2247	-0.0005	-9.6572	0.0002	1.9185
	(-2.21)**	(-3.96)***	(-4.01)***	(-5.10)***	(3.11)***	(2.87)***
TRADE_VOL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(-8.95)***	(-25.41)***	(-9.44)***	(-22.22)***	(0.77)	(-10.25)***
VWAP	0.0027	-20.3713	0.005	-18.0623	-0.0021	-2.4036
	(60.01)***	(-85.17)***	(94.77)***	(-69.94)***	(-90.34)***	(-24.44)***
VOLA	-0.05	867.2934	-0.01	1014.4743	-0.0383	-170.7496
	(-23.04)***	(15.00)***	(-3.80)***	(17.40)***	(-31.82)***	(-8.68)***
MCAP	0.0000	-0.0108	0.0000	-0.0121	0.0000	0.001
	(-51.63)***	(-28.33)***	(-48.00)***	(-30.42)***	(7.67)***	(8.08)***
CONSTANT	0.0114	257.0237	0.0091	256.4013	0.002	3.9134
	(95.98)***	(97.07)***	(61.21)***	(96.10)***	(29.10)***	(4.89)***
DATE FE	YES	YES	YES	YES	YES	YES
DATE CLUSTER	YES	YES	YES	YES	YES	YES
N	133,228	133,228	133,228	133,228	133,228	133,228
R2	0.2356	0.1863	0.4067	0.1724	0.446	0.046

Panel B: SIC industry classifications

	(1)	(2)	(3)	(4)	(5)	(6)
ANNOUNCEMENT	-0.0002	-5.646	-0.0005	-7.6865	0.0002	1.6334
	(-2.32)**	(-3.15)***	(-3.95)***	(-4.12)***	(3.04)***	(2.47)**
TRADE_VOL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(-5.96)***	(-25.87)***	(-6.87)***	(-22.66)***	(0.68)	(-10.37)***
VWAP	0.003	-18.7705	0.0053	-16.2946	-0.0021	-2.5012
	(61.25)***	(-68.83)***	(93.55)***	(-56.05)***	(-84.64)***	(-22.75)***
VOLA	-0.0488	811.6915	-0.0106	963.2745	-0.0367	-177.4934
	(-23.08)***	(14.90)***	(-4.10)***	(17.45)***	(-30.98)***	(-9.10)***
MCAP	0.0000	-0.0140	0.0000	-0.0158	0.0000	0.0014
	(-54.29)***	(-27.28)***	(-48.69)***	(-29.30)***	(5.50)***	(7.54)***
CONSTANT	0.0113	257.9041	0.0091	257.3116	0.002	3.9367
	(91.95)***	(102.69)***	(58.81)***	(101.27)***	(28.88)***	(4.96)***
DATE FE	YES	YES	YES	YES	YES	YES
DATE CLUSTER	YES	YES	YES	YES	YES	YES
N	135,967	135,967	135,967	135,967	135,967	135,967
R2	0.2445	0.2221	0.4123	0.2068	0.4484	0.0493

Data Availability Statement

The data that support the findings of this study are available from the Securities Industry Research Centre of Asia-Pacific (SIRCA) and Datastream. Restrictions apply to these data's availability, which was used under license for this study. Data will be provided upon request with the permission of SIRCA and Datastream.