

# **Do Foreign Creditors Increase Bank Liquidity? Evidence at Bank and Loan Level**

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## **Abstract**

Foreign creditors have a greater incentive to monitor bank liquidity, as they have higher information asymmetry and more challenges in asset recovery. Using unique datasets at the bank and loan level in Indonesia, an emerging market with a high portion of foreign creditors' exposure, this study shows that foreign creditors increase bank liquidity. Further examination suggests that foreign creditors' positive influence on bank liquidity is more likely through quantity and price disciplines than liquidity covenants. At the bank level, this study tests and shows that foreign creditors increase their exposure in banks with higher liquidity. At the loan level, this study exhibits that foreign creditors monitor and charge more interest on banks with higher liquidity risk. The results imply that foreign creditors hold higher liquidity to maintain foreign creditors' exposure with lower interest. Next, this study reveals that government ownership and foreign creditors' home-country characteristics of geographical distance affect foreign creditors' influence on bank liquidity.

**Keywords:** Banks, Foreign Creditors, Liquidity, Cross-Border Financing

**JEL Classification:** G21, G32, G15

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## 1. Introduction

The nature of the banking industry, which gathers unfixed-term funds from depositors and provides fixed long-term loans to borrowers, makes it more sensitive to liquidity risk. The World Bank data show that the banking industry's external debts are higher than the external debts of the total non-banking sectors, indicating that the banking industry relies more on cross-border financing to maintain its liquidity than any other sector.<sup>1</sup> However, research addressing the impact of foreign creditors on bank liquidity remains scant, despite studies showing the influence of foreign creditors at cross-border loan characteristics (e.g., Bae & Goyal, 2009; Beyhaghi, Dai, Saunders, & Wald, 2021) and a country level (Hahm, Shin, & Shin, 2013; Nguyen, Diaz-Rainey, Roberts, & Le, 2021).

In contrast, various studies have demonstrated the influence of foreign shareholders on firms' performance (e.g., Aggarwal, Erel, Ferreira, & Matos, 2011), including in firms' liquidity (An, Chen, Li, & Yin, 2021). In the banking industry, previous studies suggested that foreign ownership tends to reduce bank risk-taking (e.g., Bonin, Hasan, & Wachtel, 2005; Berger, Hasan, & Zhou, 2009; Shaban & James, 2018), including liquidity risk (Cheng, Geng, & Zhang, 2016). Hence, this study aims to address this research gap by examining the influence of foreign creditors on domestic bank liquidity within an emerging economy.

Foreign creditors are distinct from their domestic counterparts primarily due to the increased information asymmetry they face regarding domestic borrowers, a challenge exacerbated by geographical distances that complicate information gathering (e.g., Mian, 2006; Agarwal & Hauswald, 2010; Knyazeva & Knyazeva, 2012; Pappas & Xu, 2023). To manage their loan risk effectively, foreign creditors may prefer lending to domestic banks, which possess more localized and detailed information about domestic borrowers, rather than lending directly to these borrowers. This preference aligns with the delegated monitoring theory proposed by Diamond (1984), which argues that it is more efficient for creditors to rely on intermediary institutions capable of centralizing monitoring costs and distributing risks more effectively than if the creditors were to lend directly to borrowers. Consequently, to minimize monitoring costs and loan risks, foreign creditors might find it strategically advantageous to channel their funds

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<sup>1</sup> Data from the World Bank show that foreign creditors' exposure in the G20 countries' banking industry was more than USD 21 trillion at the end of 2021.

through domestic banks that lend to domestic borrowers, rather than engaging in direct lending themselves.<sup>2</sup>

The banking industry provides a unique setting to examine foreign creditors' influence on liquidity risk. Under the ideal condition, banks use deposits and capital from retail depositors and shareholders to meet the demand for their loan disbursements. Nevertheless, when deposit growth cannot follow loan growth and shareholders cannot provide additional capital, banks use non-deposit funds, including debt and securities from wholesale creditors, to increase their liquidity. Because non-deposit funds are important for banks to maintain their loan growth, banks, to some extent, are more dependent on wholesale individual non-deposit creditors than retail depositors in mitigating their liquidity mismatch. Gropp and Heider (2010) suggest that banks increase debt and securities from non-depositors to create new loans, and further study from Chen, Goldstein, Huang, and Vashishtha (2022) shows that wholesale creditors are positively associated with bank liquidity. The liquidity risk also becomes more crucial in the banking industry due to the risk contagion (Georg, 2013; Eross, Urquhart, & Wolfe, 2016) and becomes more sensitive during crisis periods (e.g., Cornett, McNutt, Strahan, & Tehranian, 2011; Chen, Chen, & Huang, 2021).

Building on the premise that foreign creditors monitor bank liquidity risk, this study aligns with the market discipline literature, which centers on understanding how various stakeholders, including creditors, monitor and influence bank risk-taking behaviors. Flannery (2001) highlights that creditors can influence their borrowers by shaping the borrowers' perception that heightened risk-taking may lead to restricted future funding availability and increased funding costs or through quantity and price disciplines, respectively. Prior studies showed that creditors exercise discipline on banks with higher liquidity risk (Martinez Peria & Schmukler 2001; Beyhaghi, D'Souza, & Roberts, 2014), as they are considered to put more interest on liquidity as it would directly influence banks' ability to repay their debts.

Compared to other stakeholders analyzed in prior market discipline studies, foreign creditors are uniquely positioned with stronger incentives to monitor and influence bank risk-taking. This heightened vigilance stems from their increased information asymmetry and larger exposures not covered by deposit insurance systems. The distinct characteristics of foreign

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<sup>2</sup> While domestic creditors also reap benefits from the delegated monitoring model, the significantly higher monitoring costs incurred by foreign creditors due to geographical and informational barriers make this approach particularly beneficial for them. It provides an efficient solution to the challenges they face in directly assessing and managing the risks associated with lending to domestic borrowers in foreign markets.

creditors reinforce their tendency to encourage lower risk-taking in banks, particularly for two key reasons. First, foreign creditors' asset recovery in the event of a borrower's default is more challenging due to geographical distance and differences in legal systems (Iacoviello & Minetti, 2006). This distance adds complexity and uncertainty to the recovery process, necessitating more stringent risk management. Second, banks in emerging markets often have lower governance standards than banks in developed countries (e.g., Berger, Hasan, & Zhou, 2009; Shaban & James, 2018). These lower standards heighten the need for foreign creditors to exercise more rigorous oversight and influence to mitigate liquidity risks.

This study further examines the impact of the government-owned bank on the association between foreign creditors and bank liquidity risk. Building on the political theory of La Porta, Lopez-De-Silanes, & Shleifer (2002), previous research has shown that government ownership in banks can lead to amplified risk-taking behaviors (e.g., Iannotta, Nocera, & Sironi, 2007; 2013; Dong, Meng, Firth, & Hou, 2014; Cheng, Geng, & Zhang, 2016). On the other hand, studies have also noted that stakeholder monitoring tends to be less stringent in government-owned banks (Nier & Baumann, 2006; Distinguin, Kouassi, & Tarazi, 2013). Given the heightened incentive of foreign creditors to monitor and influence bank risk-taking, a potential area of conflict arises between the interests of the government and foreign creditors in these banks. This intersection presents an intriguing area for investigation, particularly in bank liquidity risk.

Last, this study explores whether creditors' home country characteristics of geographical distance impact the association between foreign creditors and bank liquidity risk. Geographical distance matters in collecting borrower information and monitoring borrower performance (e.g., Agarwal & Hauswald, 2010; Knyazeva & Knyazeva, 2012). Hence, creditors require stricter loan contracts, higher interest rates, and smaller loan amounts for borrowers located in a longer distance (e.g., Bellucci, Borisov, & Zazzaro, 2013; Hollander & Verriest, 2016; Kärnä, Manduchi, & Stephan, 2021). As cross-border loans between creditors and borrowers from countries that share similar cultures have greater amounts and lower interest rates (Giannetti & Yafeh, 2012; Pappas & Xu, 2023), the related characteristics between creditors and borrowers' countries (i.e., geographical distance) could increase information collection and improve the effectiveness of creditors' monitoring role. Using foreign creditors' exposure at a country level, Nguyen, Diaz-Rainey, Roberts, and Le (2021) mentioned that foreign creditors with a lower distance from their borrowers have a higher monitoring role.

This study explores foreign creditors' role in the Indonesian banking industry. According to data from the Bank for International Settlements (BIS), the Indonesian banking industry has one of the highest cross-border debts among emerging countries, indicating that the Indonesian banking industry is more reliant on funding from foreign creditors. One of the reasons why the Indonesian banking industry increased the non-deposit funds from foreign creditors is to mitigate the liquidity risk because of the stronger loan growth during the 2010s. Prior studies also showed that market discipline exists in the Indonesian banking industry amid the limited deposit guarantee (e.g., Hadad, Agusman, Monroe, Gasbarro, & Zumwalt, 2011; Saheruddin & Soedarmono, 2022). The deposit insurance system in Indonesia covers deposits up to IDR 2 billion<sup>3</sup>, while non-deposit funding, including foreign creditors' exposure in loans received, securities, and interbank are excluded from the deposit insurance system.

To examine the causal effect of foreign creditors on bank liquidity, this study uses an approach equivalent to a generalized difference-in-differences approach, where treatment and control banks are banks with and without foreign creditors, respectively. To mitigate the heterogeneity between the treatment and control banks, this study matches the sample with entropy balance and Propensity Score Matching (PSM) and tests for the parallel trend assumption. Supporting the hypothesis that foreign creditors have higher incentives to influence bank liquidity, the results show that bank liquidity increases after having foreign creditors.

This study further examines the three channels of how foreign creditors influence bank liquidity via liquidity covenant, quantitative, and price disciplines. First, the results suggest that foreign creditors do not require banks to maintain a higher liquidity threshold as a covenant. Next, at the bank level, this study investigates whether foreign creditors exercise quantity discipline on banks with higher liquidity risk. Employing static and dynamic panel data settings, this study exhibits that banks hold higher liquidity as foreign creditors' exposures to the banks increase. Furthermore, at the loan level, this study tests and shows that foreign loan creditors monitor bank liquidity and charge higher interest to banks with higher liquidity risk. The results suggest that foreign creditors may influence liquidity through banks' perception that with higher liquidity they can maintain or increase foreign creditors' exposure with lower interest.

Regarding bank ownership, the results at the bank and loan level provide evidence that foreign creditors' influence on bank liquidity only exists at non-government banks, indicating that foreign creditors exercise weaker discipline in government banks' liquidity risk as those banks

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<sup>3</sup> IDR2 billion is around USD132 thousand with the exchange rate at the end of 2021.

have implicit guarantees from the government. Moreover, consistent with prior studies, this study shows that foreign creditor distance from domestic banks matters, as creditors from Southeast Asia countries, have a positive association with bank liquidity, while the association is not consistent for creditors from outside the region or with longer distances from Indonesia.

This study contributes to market discipline, bank ownership, and cross-border financing literature. First, based on the agency theory of creditor monitoring role and prior market discipline studies of specific types of creditor discipline (e.g., Goldberg & Hudgins, 1996; Berger & Turk-Ariss, 2015; Chen, Goldstein, Huang, & Vashishtha, 2022), this study provides evidence that bank liquidity increases after they have foreign creditors, and foreign creditors' exposures are associated with lower liquidity risk. Next, this study adds to the bank ownership and risk-taking literature (e.g., Saunders, Strock, & Travlos, 1990; Laeven & Levine, 2009) by showing a weaker foreign creditor discipline toward government banks' liquidity risk, which confirms the creditors' perception that government banks have an implicit guarantee from the government (Distinguin, Kouassi, & Tarazi, 2013; Lapteacru, 2019). Finally, extending previous studies that creditors' home-country characteristics influence cross-border loans (e.g., Bae & Goyal, 2009; Beyhaghi, Dai, Saunders, & Wald, 2021) and bank stability (Nguyen, Diaz-Rainey, Roberts, & Le, 2021), this study reveals that creditors' home-country geographical distance influences the role of foreign creditors on bank liquidity.

The remainder of this study is as follows: Section 2 reviews the related literature, while Section 3 explains the institutional background in Indonesia. After the methodology in Section 4, this study discusses the empirical results and conclusions in Sections 5 and 6, respectively.

## **2. Literature Review**

### **The role of creditors and market discipline**

Diamond's (1984) delegated monitoring theory posits that banks, as intermediaries, connect creditors and borrowers more efficiently through centralized monitoring and risk diversification, offering a cost-effective way to oversee borrowers. This model is particularly pertinent for foreign creditors who face higher information asymmetry compared to domestic borrowers. The centralized monitoring function of banks can, therefore, be especially advantageous for foreign creditors, more so than for their domestic counterparts. Thus, the

delegated monitoring theory lays the theoretical groundwork for the heightened involvement of foreign creditors in the domestic banking sector.

Within this framework of banks' delegated monitoring to mitigate information asymmetry between creditors and borrowers, there also exists asymmetry between creditors and bank managers. The agency theory by Jensen and Meckling (1976) highlights that creditors play a crucial role in the dynamic between managers and shareholders. Berger and Udell (2006) provide empirical support for the application of agency theory within the banking industry. Their findings indicate that banks with higher leverage tend to be more valuable, suggesting that creditors can influence managerial decisions to align more closely with shareholder interests. On the other side, there is a potential for managers to engage in riskier ventures that align with their interests, often benefiting shareholders, particularly when the latter do not contribute additional capital to buffer against foreseeable excessive risks. This risk transfer to bank creditors underscores the importance of their monitoring function in overseeing bank performance (Acharya & Ryan, 2016).

The role of creditors in monitoring the banking industry is further scrutinized within the scope of market discipline literature. Several studies show the significant impact of creditors in imposing discipline, employing both quantity and price mechanisms. Specifically, creditors can implement quantity discipline on banks that engage in excessive risk-taking by retracting their funds (e.g., Goldberg & Hudgins, 1996; Hasan, Jackowicz, Kowalewski, & Kozłowski; 2013; Berger & Turk-Ariss, 2015; Bennett, Hwa, & Kwast, 2015; Chen, Goldstein, Huang, & Vashishtha, 2022). Alternatively, they may exert price discipline by imposing higher interest rates on riskier banks (e.g., Hadad, Agusman, Monroe, Gasbarro, & Zumwalt, 2011; Beyhaghi, D'Souza, & Roberts, 2014). These empirical findings demonstrate how stakeholders affect banks' perceptions that excessive risk-taking could restrict bank funding and raise funding costs.

Bank liquidity is an important indicator of bank risk-taking monitoring extensively by stakeholders. Chen, Goldstein, Huang, and Vashishtha (2022) show that wholesale creditors are positively associated with bank higher liquid assets, while Martinez Peria and Schmukler (2001) and Beyhaghi, D'Souza, and Roberts (2014) provide evidence that banks with higher liquidity risk compensate with more expensive deposits and debts. Those studies suggest that creditors monitor and influence bank liquidity through quantity and price disciplines.

The nature of creditors also significantly influences market discipline. Creditors who are not protected by deposit insurance demonstrate a higher propensity to monitor and influence bank risk-taking compared to insured creditors (e.g., Goldberg & Hudgins, 1996; Nier & Baumann, 2006; Hadad, Agusman, Monroe, Gasbarro, & Zumwalt, 2011). Additionally, creditors holding bank securities in secondary financial markets can exert timely discipline through the yields of these securities (e.g., Balasubramnian & Cyree, 2014; Zhang, Song, Sun, & Shi, 2014). Another category of creditors extensively studied is banks themselves. Distinguin, Kouassi, and Tarazi (2013) found that banks with higher reliance on interbank funding tend to engage in less risk-taking behaviors. This discipline is logical since uninsured creditors, who bear more risk in the event of a bank's failure, are more vigilant in their risk monitoring. In contrast, creditors operating in financial markets and bank creditors often have access to more comprehensive information about bank conditions than private or non-bank creditors, enabling them to make more informed decisions. These insights show the diverse ways in which different types of creditors contribute to market discipline, with each group exerting influence based on their level of risk exposure and access to information about the banks' performance.

Another factor that influences market discipline is bank ownership. Prior studies showed evidence of the association between bank ownership and risk-taking (e.g., Saunders, Strock, & Travlos, 1990; Laeven & Levine, 2009). La Porta, Lopez-De-Silanes, and Shleifer (2002) mentioned that from the political theory perspective, a government could drive government-owned banks to fund unprofitable projects for political reasons and therefore increase government-owned banks operating and insolvency risks (e.g., Iannotta, Nocera, & Sironi, 2007; 2013; Dong, Meng, Firth, & Hou, 2014; Cheng, Geng, & Zhang, 2016). However, despite the evidence showing that government banks have higher risk-taking, implicit guarantees from the government (Nier & Baumann, 2006; Hadad, Agusman, Monroe, Gasbarro, & Zumwalt, 2011), weaken depositor and creditor discipline in government banks (Distinguin, Kouassi, & Tarazi, 2013; Lapteacru, 2019).

### **Foreign creditors and cross-border loan**

Unlike the creditor types traditionally examined in market discipline studies, creditors from countries different from those of the borrowers face heightened information asymmetry. This increased asymmetry results primarily from the challenges associated with collecting borrower information across borders (e.g., Mian, 2006; Agarwal & Hauswald, 2010). The nature of the distances between foreign creditors and domestic borrowers—encompassing geographical,

economic, legal, and cultural aspects—emphasizes the differences between the creditors' home countries and the borrowers' host countries. Such distances manifest in various ways, influencing the relationship between foreign creditors and domestic borrowers (e.g., Giannetti & Yafeh, 2012; Beyhaghi, Dai, Saunders, & Wald, 2021; Pappas & Xu, 2023). These factors collectively contribute to the unique challenges and dynamics that foreign creditors encounter in their interactions with domestic banking sectors.

Prior studies show that country characteristics of foreign creditors matter in the loan contracts, including in the determination of the loan amount, interest, and period. Cross-border loans between creditors and borrowers from countries with similar cultures have greater amounts and lower interest rates (Giannetti & Yafeh, 2012; Pappas & Xu, 2023), suggesting that country characteristics similarity (e.g., culture, geographic) between borrowers and creditors may positively impact cross-border loans. As geographical distance matters in collecting borrower information and monitoring borrower performance (e.g., Agarwal & Hauswald, 2010; Knyazeva & Knyazeva, 2012), it impacts loan characteristics (e.g., Cerutti, Hale, & Minoiu, 2015; Beyhaghi, Dai, Saunders, & Wald, 2021), including loan contracts, interest rates, and amounts (e.g., Bellucci, Borisov, & Zazzaro, 2013; Hollander & Verriest, 2016; Kärnä, Manduchi, & Stephan, 2021). Using foreign creditors' exposure at a country level, Nguyen, Diaz-Rainey, Roberts, and Le (2021) mentioned that foreign creditors with a lower distance from their borrowers have a higher monitoring role and increase bank stability. On the other side, Hahn, Shin, and Shin (2013) found that higher foreign creditors' exposure at a country level contributes to financial vulnerability during currency, credit, and stock market crises.

### **3. Institutional Setting**

As the country with the fourth-largest population, Indonesia's Gross Domestic Product (GDP) is predicted to be 4th in the world by 2050 (Hawkksworth, Clarry, & Audino, 2017). However, as in many emerging markets, Indonesia's financial market deepening is still shallow, and the financial sector is dominated by commercial banks. Data in Table 1 show that compared to the banking industry in other peer G20 emerging countries, the banking industry in Indonesia relatively has higher capital and return on assets, with ample liquidity and manageable loan risk. The robust and stable banking industry today is the result of the effort of the industry and the regulator to rebuild the industry after it was severely damaged by the Asian Monetary Crisis during the late 1990s. However, more than a decade after the crisis, the Indonesian banking

industry did not optimally execute its intermediation function, as indicated by the loan-to-deposit ratio below 75% at the end of 2010. Hence, to increase loan growth, the Central Bank of Indonesia asked the banking industry to increase its loan-to-deposit ratio. The Indonesian banking industry increased its loan growth, which eventually raised its loan-to-deposit ratio to more than 95% just before the COVID-19 period. To mitigate the liquidity risk because the loan growth was higher than the deposit growth, banks then increased their non-deposits, including from foreign creditors.

Table 1

#### Cross-Border Debt Securities Ratio and Bank Indicators in G20 Emerging Countries

Anecdotal evidence indicates that funding from foreign creditors plays a crucial role in supporting the funding structure and loan growth of Indonesian banks. Non-government banks have been known to utilize low-interest<sup>4</sup>, short-term debt from foreign creditors to ensure sufficient liquidity and to meet impending debt obligations (Sari, 2014). On the other side, government banks have frequently issued global bonds as a strategy to maintain stable and less volatile capital structures (Sidik, 2021). Further, these anecdotal reports highlight instances where global bonds issued by Indonesian banks were substantially oversubscribed, often by more than four times the issued amount. Such high subscription rates not only reflect the attractiveness of these investment opportunities but also underscore the significance of foreign capital in bolstering the financial stability and growth of Indonesian banks.

Another factor enhancing the appeal of the Indonesian banking industry to foreign creditors is the presence of foreign shareholders in many private national banks. This trend potentially increases foreign creditors' confidence in the industry. Beyond private national banks, the banking sector in Indonesia is also segmented into state-owned banks and regional development banks. State-owned banks, controlled by the central government, and regional development banks, overseen by provincial governments, are often perceived to be under significant governmental influence. Notably, the combined total assets of these government-owned banks account for over 43% of the total assets in the Indonesian banking industry. This substantial proportion shows the significant role government banks play in the nation's financial landscape.

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<sup>4</sup> The sample data in this study show that there are insignificant loan interest differences between debts from foreign and domestic creditors.

## 4. Methodology

### 4.1. Data

This study employs both bank and loan-level data to analyze foreign creditors' influence on bank liquidity. The quarterly data are from reports submitted by banks to the Indonesia Financial Services Authority (FSA), spanning from 2011 to 2021. The sample comprises 95 commercial conventional banks collectively holding over 86% of the industry's total assets at the end of 2021. The loan data are from the loan-received reports submitted by banks to FSA. The reports include information of the creditor's home country, dates of loan initiation and maturity, interest rates, and loan amounts. This study identifies 7,352 unique loans extended to the banks within the observation periods. All bank and loan-level data are winsorized at the top and bottom 0.1% percentile.

Banks are categorized as foreign-owned if their annual reports list the names of foreign shareholders. Conversely, government banks are defined as those owned by central and provincial governments. This study categorizes foreign creditors' home countries in Southeast Asia as countries with relatively close geographical distance from Indonesia compared to countries outside the region. In addition to the bank and loan data from the Indonesia FSA, the macroeconomic indicators are from the Central Bank of Indonesia and Indonesia Statistics.

### 4.2. Empirical Model

#### 4.2.1. Bank level

First, this study employs a difference-in-differences design by running the regression in Equation 1.

Equation 1

$$\begin{aligned} LIQUIDITY_{b,q} &= \alpha_0 + \beta_1 POST\_FC_{b,q} + \beta_2 FOREIGN\_OWNER_{b,q} + \beta_3 SIZE_{b,q} \\ &+ \beta_4 EQUITY_{b,q} + \beta_5 LOAN_{b,q} + \beta_6 ROA_{b,q} + \beta_7 NPL_{b,q} + \beta_8 GROWTH_q \\ &+ \beta_9 INFLATION_q + \beta_{10} CURRENCY_q + \beta_{11} COVID19_q + Bank\ FE \\ &+ Year\ FE + \varepsilon_{b,q} \end{aligned}$$

The dependent variable,  $LIQUIDITY_{b,q}$ , is bank  $b$  indicator of liquidity in period  $q$ , captured by the liquid assets to total assets. The variable of interest,  $POST\_FC$ , is a dummy variable, equal to one after the banks have foreign creditors for the first time and zero otherwise. The

coefficient of *POST\_FC* is expected to be positive, indicating foreign creditors existence increases bank liquidity. *FOREIGN\_OWNER* is a dummy variable, one for banks with foreign ownership and zero otherwise. *SIZE* and *EQUITY* are bank size and equity to total assets, respectively. *LOAN* is total loans to total assets to control for bank loans. The next variables are return on assets (*ROA*), and non-performing loan ratio (*NPL*). Following Hadad, Agusman, Monroe, Gasbarro, and Zumwalt (2011), this study uses GDP growth (*GROWTH*) to capture economic growth. Next, customer price index growth to control inflation (*INFLATION*), and IDR to USD growth (*CURRENCY*) to control the foreign exchange rate. Last but not least, *COVID19* is a dummy variable equal to one during the COVID-19 outbreak. This study also uses bank and year-fixed effects to control time-invariant bank and year-specific variables. Appendix A provides definitions of all the variables, and Appendix B provides the prior studies that employed those variables.

Next, this study employs panel data regression in Equation 2 to examine the influence of foreign creditors' exposure on bank liquidity. The empirical model is closely similar to the equations used in the market discipline literature from Hassan, Karels, and Peterson (1994), Nier and Baumann (2006), and Distinguin, Kouassi, and Tarazi (2013).

#### Equation 2

$$\begin{aligned}
 LIQUIDITY_{b,q} &= \alpha_0 + \beta_1 CREDITORS\_FOREIGN_{b,q} \\
 &+ \beta_2 FOREIGN\_OWNER_{b,q} + \beta_3 SIZE_{b,q} + \beta_4 EQUITY_{b,q} + \beta_5 LOAN_{b,q} \\
 &+ \beta_6 ROA_{b,q} + \beta_7 NPL_{b,q} + \beta_8 GROWTH_q + \beta_9 INFLATION_q \\
 &+ \beta_{10} CURRENCY_q + \beta_{11} COVID19_q + Bank\ FE + Year\ FE + \varepsilon_{b,q}
 \end{aligned}$$

In addition to the variable in Equation 1, the main variable of interest, *CREDITORS\_FOREIGN*, is non-deposit foreign creditors' exposure to total non-deposit.<sup>5</sup> The coefficient of *CREDITORS\_FOREIGN* is expected to be positive, indicating that foreign creditors exercise quantity discipline by decreasing their exposures in banks with higher liquidity risk and vice versa. Equation 2 runs on the observations of banks with foreign creditors' exposures.

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<sup>5</sup> Following Goldberg and Hudgins (1996) and Bennett, Hwa, and Kwat (2015), this study uses the ratio of the specific creditors' exposure to the total creditor exposures.

### 4.2.2. Loan level

To support the results that foreign creditors monitor bank liquidity at the bank level data, this study examines whether loan foreign creditors charge more interest for banks with higher liquidity risk. Loan received is the biggest contributor to non-deposit funding in the Indonesian banking industry, mostly from foreign creditors. Unlike creditors who buy bank securities, creditors who directly loan their funds to the borrowers have more access to influence the loan contract. This study employs Equation 3 on pooled banks' loan received data to examine the impact of bank liquidity risk on the loan's interest. Prior studies in market discipline literature use equations similar to Equation 3 to capture creditors' reactions to bank risks, as banks exercise discipline by charging higher interest on banks with excessive risk-taking (e.g., Hadad, Agusman, Monroe, Gasbarro, & Zumwalt, 2011; Beyhaghi, D'Souza, & Roberts, 2014).

Equation 3

$$\begin{aligned} INTEREST_{l,b,q} &= \alpha_0 + \beta_1 LIQUIDITY_{b,q} + \beta_2 LOAN\_AMOUNT_{l,b,q} \\ &+ \beta_3 LOAN\_PERIOD_{l,b,q} + \beta_4 FOREIGN\_OWNER_{b,q} + \beta_5 SIZE_{b,q} \\ &+ \beta_6 EQUITY_{b,q} + \beta_7 LOAN_{b,q} + \beta_8 ROA_{b,q} + \beta_9 NPL_{b,q} + \beta_{10} GROWTH_q \\ &+ \beta_{11} INFLATION_q + \beta_{12} CURRENCY_q + \beta_{13} COVID19_q + Bank\ FE \\ &+ Year\ FE + \varepsilon_{l,b,q} \end{aligned}$$

The dependent variable in Equation 3,  $INTEREST_{l,b}$  is the loan-received interest spread of loan  $l$  of bank  $b$ , at the time of issuance  $q$ . The interest spread is between the loan-received interest and the US government bonds' yield on the respective period in the month when the loan received was issued.<sup>6</sup> In addition to the variables in Equations 1 and 2, Equation 3 has two control variables at the loan level,  $LOAN\_AMOUNT$  is the natural logarithm of the loan received amount, and  $LOAN\_PERIOD$  is the loan received period in months. To support the assumption that foreign creditors monitor liquidity risk and thus are associated with lower bank risk-taking, the coefficient of  $LIQUIDITY$  is expected to be negative, meaning foreign creditors charge more loan interest on banks with higher liquidity risks. Equation 3 runs on the observations of banks with foreign creditors' exposures.

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<sup>6</sup> Because the US government bonds provide more complete yields maturity, the final observations are only loans in USD currency which comprise 89.10% total loan received. This study also tests loans with USD and IDR currencies which account for 97.51% of the total loan received, and the results are the same. However, the yield maturities of the Indonesian government bonds are not as complete as the US government bonds.

## 5. Empirical Results

### 5.1 Descriptive Statistics

Table 2 shows the descriptive statistics at the bank level. The data show that the average of liquid assets to total assets is 0.201, with the average of foreign creditors of 0.409. Creditors from Southeast and outside Southeast Asia share relatively the same exposure with an average of 0.226 and 0.269, respectively. The observations have a moderate loan risk, captured by the mean of *LOAN* and *NPL* of 0.612 and 0.027, respectively. The banking industry also has higher profitability with a *ROA* of 0.018. In the observation period, the economic *GROWTH* and *INFLATION* are around 0.04, with the positive sign of *CURRENCY* meaning the Indonesian Rupiah depreciated during the observation period. Table 3 shows a negative correlation between *LIQUIDITY* and *LOAN*, as banks use their liquid assets to meet their loan demands, while *ROA* negatively correlates with *NPL*. The GDP growth and *CURRENCY* depreciation are positively correlated with *INFLATION*, while GDP growth and *INFLATION* contracted during the COVID-19 outbreak.

Table 2

Bank Level Descriptive Statistics

Table 3

Bank Level Correlation Matrix

Table 4 shows the descriptive statistics on the loan level data. The average loan interest rate spread (*INTEREST*) is 0.029, with the mean of the natural logarithm of the *LOAN\_AMOUNT* of 25.42, or around IDR267 billion<sup>7</sup>, and the average and median *LOAN\_PERIOD* of 14 and 12 months, respectively, which are still in short periods, indicating the funds are needed to mitigate liquidity mismatch risk. Table 5 shows the correlation matrix at the loan level data. Bigger banks (*SIZE*) tend to have smaller loan amounts and shorter loan periods, while banks with foreign shareholders (*FOREIGN\_OWNER*) have bigger loan amounts with longer periods.

Table 4

Loan Level Descriptive Statistics

Table 5

Loan Level Correlation Matrix

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<sup>7</sup> IDR267 billion is around USD17.6 million with the exchange rate at the end of 2021.

## 5.2 Results Discussion

### Post Foreign Creditors and Bank Liquidity

The results in Table 6 show that banks maintain higher liquidity after having foreign creditors. This study employs entropy balancing and PSM to mitigate the heterogeneity between the treatment and control banks and the results in the second and third columns are consistent. Next, to corroborate the difference-in-differences results, this study tests for the parallel trend assumption by showing the treatment banks' condition in the periods four to one semester before having foreign creditors. Supporting the parallel trend assumption, Table 7 exhibits that before having foreign creditors, treatment banks had lower liquidity, and their liquidity increased gradually only after three semesters they had foreign creditors for the first time. The results show robust evidence that foreign creditors have a positive influence on bank liquidity.

Table 6  
Post Foreign Creditors and Bank Liquidity:  
Matching Sample

Table 7  
Post Foreign Creditors and Bank Liquidity:  
Parallel Trend Assumption and Liquidity Covenant

This study further investigates how foreign creditors influence bank liquidity. First, foreign creditors can require banks to maintain higher liquidity through covenants. In the condition that foreign creditors ask banks to meet the minimum liquidity threshold to increase confidence in their cross-border loan repayments, banks would directly increase their liquidity after they have cross-border loans. Nevertheless, Table 7 shows that until two semesters after banks have foreign creditors, there is no significant increase in bank liquidity, and the liquidity has started to improve from the third semester. With the average and median of the loan periods, which are around 12–14 months, the results indicate that foreign creditors do not require banks to maintain higher liquidity using loan covenants. Hence, foreign creditors may use other channels, which are quantity and price discipline, to positively influence bank liquidity.

Next, this study shows that government ownership and the distance between foreign creditors and domestic banks in Indonesia affect foreign creditors' influence on bank liquidity. Table 8 provides evidence that the positive influence of foreign creditors only exists in non-government banks and for creditors from Southeast Asian countries. The results support the hypothesis that bank ownership and creditor home-country distance matter in affecting foreign creditors' influence on bank liquidity. Since the results in Table 7 indicate that foreign creditors influence

bank liquidity via their monitoring activities and not through the loan covenant, the reasons why bank ownership and creditors' home-country distant matter in the association between foreign creditors and bank liquidity are discussed further in the next section.

Table 8  
Post Foreign Creditors and Bank Liquidity:  
Bank Ownership and Creditor Home-Country Regions

### **Bank level Foreign Creditors' Exposure and Bank Liquidity**

In this section, this study examines whether foreign creditors influence bank liquidity through quantity discipline by using banks' perception that with higher liquidity they can maintain or increase foreign creditors' exposure. The results presented in Table 9 show that banks with greater foreign creditors' exposure maintain higher liquidity. These support the notion that foreign creditors have a higher incentive to monitor bank liquidity, as they face higher information asymmetry, are not protected by deposit insurance systems, and are more difficult to recover default assets. Concerning the economic significance, this study infers that the increase of foreign creditors' exposure by 1% increases liquid assets to total assets by around 4%. However, the positive association between foreign creditors' exposure and lower liquidity exists only in non-government banks. The results suggest that foreign creditors' positive influence on government bank liquidity is not as strong as in non-government banks, consistent with prior studies that found that implicit government support may weaken creditors discipline in government banks (Nier & Baumann, 2006; Distinguin, Kouassi, & Tarazi, 2013; Lapteacru, 2019).

Table 9  
Foreign Creditors' Exposure and Bank Liquidity:  
Government and Non-Government Banks

The results in Table 10 show that creditors' home-country characteristics influence the association between foreign creditors and liquidity risk. The results show that foreign creditors from Southeast Asia countries have a positive association with liquidity, while there is no association between foreign creditors from the region outside Southeast Asia and bank liquidity. Since Southeast Asia countries are in the same region as Indonesia and have shorter geographical distances from Indonesia; these findings are in line with prior studies that geographical distance matters in collecting information and monitoring borrowers (Agarwal & Hauswald, 2010; Knyazeva & Knyazeva, 2012; Nguyen, Diaz-Rainey, Roberts, & Le, 2021).

Extending those studies at the loan and country levels, this study provides new evidence that geographical distance influences creditor discipline on bank liquidity.

Table 10  
Foreign Creditors' Exposure and Bank Liquidity:  
Creditor Home-Country Regions

### **Loan Level Interest and Bank Liquidity**

In this section, this study examines whether loan foreign creditors influence bank liquidity through price discipline. The loan-level results support the main findings by giving evidence that foreign creditors monitor bank risk-taking by charging higher interest to banks with excessive liquidity risk. The results in Table 11 show that foreign loan creditors exercise discipline on bank risk-taking, as they charge higher interest for banks with higher liquidity risk. The findings are in line with the market discipline through price mechanism at the loan level (e.g., Beyhaghi, D'Souza, & Roberts, 2014). However, consistent with the results at the bank level, the association between bank liquidity and loan-received interest only exists in non-government banks, suggesting that foreign creditors are more sensitive to bank liquidity risk-taking in non-government banks than in government banks (Distinguin, Kouassi, & Tarazi, 2013; Lapteacru, 2019).

Table 11  
Loan Interest and Bank Liquidity:  
Government and Non-Government Banks

The results at the loan level confirm the results at the bank level: creditors' home country characteristics influence foreign creditors' monitoring role on bank liquidity risk. The results in Table 12 show that foreign creditors from Southeast Asia charge higher interest for banks with excessive liquidity risk, consistent with the results at the bank level. The greater economic significance for creditors from Southeast Asia countries indicates that geographical distance matters in collecting information and monitoring borrowers (Agarwal & Hauswald, 2010; Knyazeva & Knyazeva, 2012; Nguyen, Diaz-Rainey, Roberts, & Le, 2021).

Table 12  
Loan Interest and Bank Liquidity:  
Creditor Home-Country Regions

### 5.3 Additional Tests

In the first additional test, this study examines foreign creditors' influence on bank liquidity only for banks that have foreign creditors for the first time in the observation periods. The results in Table 13 are consistent with the main results.

Table 13  
Post Foreign Creditors and Bank Liquidity:  
Excluding Banks with Foreign Creditors Before the Observation Periods

Next, this study examines the observations without creditors from countries with the largest portion of exposure in the Indonesian banking industry, which is Singapore. Creditors from Singapore have around 45% of the total exposure of foreign creditors in the Indonesian banking industry. The results in Table 14 are consistent with the main results.

Table 14  
Post Foreign Creditors and Bank Liquidity:  
Excluding Foreign Creditors from Singapore

In addition to the static panel data, prior studies in the Indonesia banking industry employed dynamic panel data with the Generalized Method of Moment (GMM) estimator to further mitigate the endogeneity issue (e.g., Hadad, Agusman, Monroe, Gasbarro, & Zumwalt, 2011; Saheruddin & Soedarmono, 2022). Hence, this study also employs a dynamic data panel with the system GMM estimator from Arellano and Bover (1995) and Blundell and Bond (1998), which is the next development of the GMM of Arellano and Bond (1991).<sup>8</sup> The results in Table 15 show that bank foreign creditors' exposure is positively associated with bank liquidity. The results are also consistent with the main result, that the association only exists for non-government banks.

Table 15  
Foreign Creditors' Exposure and Bank Liquidity:  
Dynamic Panel Data

## 6. Conclusion

Based on the agency theory that foreign creditors have a higher incentive to monitor bank risk-taking, the delegated monitoring theory that foreign creditors would benefit more from the

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<sup>8</sup> This study uses the two-step system GMM. As discussed by Hadad, Agusman, Monroe, Gasbarro, and Zumwalt (2011), the estimations of the first step are more efficient, while the estimations of the second step are more robust.

centralizing monitoring function of the domestic banks, and empirical evidence that creditors exercise discipline on excessive bank risk-taking, this study aims to examine the association between foreign creditors and bank liquidity, the ownership structure of the banks, and the geographical distance of the foreign creditors' home countries that affect this association.

The propensity of foreign creditors to monitor and influence bank risk-taking is considered to be heightened when the borrower bank operates in emerging markets. This is largely because banks in these markets are often perceived to have lower standards and governance than those in developed countries. Consequently, the Indonesian banking industry with its increasing reliance on funding from foreign creditors amidst robust and stable loan growth over the last decade, presents an ideal context to examine foreign creditors' role in bank liquidity. Furthermore, despite the implementation of a deposit insurance system in Indonesia, existing research indicates that creditors continue to play a disciplinary role in the Indonesian banking sector. Therefore, the Indonesian banking sector's dynamics, characterized by its emerging market status, evolving dependency on foreign funding, and existing creditor discipline, offer a distinctive backdrop to explore the impact of foreign creditors on bank liquidity risk.

Leveraging a unique dataset encompassing both bank and loan-level information, this study provides evidence of foreign creditors causal effect on bank liquidity. Further examination suggests that the liquidity covenant in cross-border financing is not the reason for banks maintaining higher liquidity after foreign creditors place their funds in the banks. At the bank level, this study tests and shows foreign creditors increase their exposure in banks with higher liquidity, indicating foreign creditors monitor and exercise quantity discipline. At the loan level, the results show foreign loan creditors impose higher interest rates on banks exhibiting excessive liquidity risk, highlighting their active role in exercising price discipline on bank risk-taking behaviors. Hence, as foreign creditors exercise quantity and price discipline, banks hold higher liquidity to maintain or increase their foreign creditors' exposure with lower interest in the future.

Moreover, this study reports a diminished effect of foreign creditor discipline in government-owned banks, potentially due to implicit government guarantees (Nier & Baumann, 2006; Hadad, Agusman, Monroe, Gasbarro, & Zumwalt, 2011). Extending beyond the loan-level analysis of foreign creditors' home country impact on cross-border financing (e.g., Giannetti & Yafeh, 2012; Beyhaghi, Dai, Saunders, & Wald, 2021), this study reveals that the association between foreign creditors' exposure and reduced liquidity is more pronounced when the

creditors originate from countries geographically closer to domestic banks. These highlight the nuanced influence of foreign creditors' home country characteristics in shaping their engagement in cross-border banking activities.

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**Appendix A**  
Variable Definition

Variable	Definition
<b>Bank Level</b>	
<i>POST_FC</i>	A dummy variable with a value of one after the banks having foreign creditors for the first time.
<i>POST_FC_SOUTHEAST_ASIA</i>	A dummy variable with a value of one after the banks having foreign creditors from Southeast Asia for the first time.
<i>POSTI_FC_NON_SOUTHEAST_ASIA</i>	A dummy variable with a value of one after the banks having foreign creditors from Non-Southeast Asia for the first time.
<i>LIQUIDITY</i>	The ratio of liquid assets to total assets.
<i>CREDITORS_FOREIGN</i>	The ratio of the non-deposit foreign creditors' exposure to total non-deposit.
<i>CREDITORS_SOUTHEAST_ASIA</i>	The ratio of the non-deposit foreign creditors' exposure from southeast Asia countries to total non-deposit.
<i>CREDITORS_NON_SOUTHEAST ASIA</i>	The ratio of the non-deposit foreign creditors' exposure from non-southeast Asia to total non-deposit.
<i>SIZE</i>	Natural log of total assets.
<i>EQUITY</i>	The ratio of total equities to total assets.
<i>LOAN</i>	The ratio of total loans to total assets.
<i>ROA</i>	The ratio of net income to the average of total assets.
<i>NPL</i>	The ratio of non-performing loans to total loans.
<i>FOREIGN_OWNER</i>	A dummy variable with a value of one for banks owned by foreign shareholders and zero otherwise.
<b>Loan Level</b>	
<i>INTEREST</i>	The loan-received interest spread.
<i>LOAN_AMOUNT</i>	Natural logarithm of loan received amount.
<i>LOAN_PERIOD</i>	Loan received period.
<b>Macroeconomic Indicator</b>	
<i>GROWTH</i>	Gross Domestic Product year-on-year growth.
<i>INFLATION</i>	Customer price index year-on-year growth.
<i>CURRENCY</i>	Foreign exchange IDR to USD year-on-year growth.
<i>COVID19</i>	A dummy variable with a value of one for the Covid-19 period and zero otherwise.

## Appendix B

### Variables and Prior Studies

Variable	Prior Studies
<b>Bank Level</b>	
<i>LIQUIDITY</i>	Martinez Peria and Schmukler (2001). Hadad, Agusman, Monroe, Gasbarro, and Zumwalt (2011). Chen, Goldstein, Huang, and Vashishtha (2022).
<i>CREDITORS_FOREIGN</i>	Goldberg and Hudgins (1996). Bennett, Hwa, and Kwat (2015).
<i>FOREIGN_OWNER</i>	Hadad, Agusman, Monroe, Gasbarro, and Zumwalt (2011).
<i>SIZE</i>	Goldberg and Hudgins (1996). Hadad, Agusman, Monroe, Gasbarro, and Zumwalt (2011). Chen, Goldstein, Huang, and Vashishtha (2022).
<i>EQUITY</i>	Hadad, Agusman, Monroe, Gasbarro, and Zumwalt (2011). Chen, Goldstein, Huang, and Vashishtha (2022).
<i>LOAN</i>	Goldberg and Hudgins (1996). Saheruddin and Soedarmono (2022).
<i>ROA</i>	Martinez Peria and Schmukler (2001). Chen, Goldstein, Huang, and Vashishtha (2022).
<i>NPL</i>	Martinez Peria and Schmukler (2001). Chen, Goldstein, Huang, and Vashishtha (2022). Saheruddin and Soedarmono (2022).
<b>Loan Level</b>	
<i>INTEREST</i>	Beyhaghi, D'Souza, and Roberts (2014). Beyhaghi, Dai, Saunders, & Wald, 2021).
<i>LOAN_AMOUNT</i>	Beyhaghi, D'Souza, and Roberts (2014). Beyhaghi, Dai, Saunders, & Wald, 2021).
<i>LOAN_PERIOD</i>	Beyhaghi, Dai, Saunders, & Wald (2021). Beyhaghi, D'Souza, and Roberts (2014) classify banks based on the loan period
<b>Macroeconomic Indicator</b>	
<i>GROWTH</i>	Hadad, Agusman, Monroe, Gasbarro, and Zumwalt (2011).
<i>INFLATION</i>	Hadad, Agusman, Monroe, Gasbarro, and Zumwalt (2011).
<i>CURRENCY</i>	Hadad, Agusman, Monroe, Gasbarro, and Zumwalt (2011).
<i>COVID19</i>	Berger and Demirgüç-Kunt (2021) showed why the Covid-19 outbreak is different from the other crises.

## Appendix C

### Covariate Balance After Entropy Balancing and Propensity Score Matching (PSM)

	Before Entropy			After Entropy		
	Treatment	Control	Difference	Treatment	Control	Difference
SIZE	30.868	29.249	1.619***	30.868	30.860	0.004
EQUITY	0.147	0.170	-0.023***	0.147	0.147	-0.000
LOAN	0.608	0.618	-0.010**	0.608	0.609	-0.000
NPL	0.027	0.026	0.001	0.027	0.027	-0.000
ROA	0.018	0.018	0.000	0.018	0.018	0.000

	Before PSM			After PSM		
	Treatment	Control	Difference	Treatment	Control	Difference
SIZE	30.868	29.249	1.619***	30.713	29.342	1.370***
EQUITY	0.147	0.169	-0.023***	0.148	0.168	-0.020***
LOAN	0.608	0.618	-0.010**	0.607	0.616	-0.009**
NPL	0.027	0.026	0.001	0.027	0.026	0.001
ROA	0.018	0.018	0.000	0.018	0.013	-0.000

The variable descriptions are available in Appendix A.

**Table 1**

Cross-Border Debt Securities Ratio and Bank Indicators in G20 Emerging Countries

No.	Country	Debt & Security Cross-Border Ratio	Regulatory Capital	Liquidity Ratio <sup>9</sup>	ROA	NPL
1.	India	0.56%	15.42%	11.16%	0.21%	9.23%
2.	Mexico	23.93%	19.33%	64.98%	0.73%	2.09%
3.	South Africa	2.41%	17.54%	14.43%	0.62%	3.89%
4.	Indonesia	38.94%	23.31%	38.18%	0.91%	2.43%

The ratio of cross-border debt securities to total debt securities data is from the Bank for International Settlements (BIS). The other ratios are from the Federal Reserve ST. Louis.

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<sup>9</sup> The liquidity ratio is from liquid assets to total deposits and short-term funding.

**Table 2**

## Bank Level Description Statistics

	N	MEAN	SD	MIN	P25	P50	P75	MAX
LIQUIDITY	4353	0.201	0.101	0.054	0.127	0.177	0.246	0.559
CREDITORS_FOREIGN	1823	0.409	0.339	0	0.066	0.363	0.700	1
CREDITORS_SOUTHEAST_ASIA	1295	0.226	0.284	0	0.004	0.112	0.322	1
CREDITORS_NON_SOUTHEAST	1545	0.269	0.307	0	0.008	0.129	0.483	1
FOREIGN_OWNER	4354	0.455	0.498	0	0	0	1	1
SIZE	4353	30.342	1.620	26.726	29.266	30.305	31.373	34.481
LOAN	4353	0.612	0.130	0.158	0.551	0.640	0.703	0.806
NPL	4354	0.027	0.023	0	0.010	0.023	0.037	0.130
ROA	4354	0.018	0.017	-0.052	0.009	0.019	0.029	0.056
GDP	4354	0.046	0.025	-0.053	0.049	0.051	0.056	0.071
INFLATION	4354	0.042	0.019	0.013	0.030	0.037	0.054	0.084
CURRENCY	4349	0.048	0.084	-0.113	-0.011	0.035	0.103	0.260
COV19	4354	0.152	0.359	0	0	0	0	1

The variable descriptions are available in Appendix A.

**Table 3**  
Bank Level Correlation Matrix

	LIQUIDITY	CREDITORS_FOREIGN	SIZE	TOTAL_LOAN	NPL	ROA	FOREIGN_OWNER	GDP	INFLATION	CURRENCY	COV19
LIQUIDITY	1										
CREDITORS_FOREIGN	0.0826***	1									
SIZE	-0.322***	-0.216***	1								
LOAN	-0.532***	-0.0259	0.261***	1							
NPL	-0.175***	0.0150	-0.0499*	0.0653**	1						
ROA	0.0653**	-0.00325	0.262***	0.0117	-0.479***	1					
FOREIGN_OWNER	0.00873	0.267***	-0.320***	-0.0227	-0.0971***	-0.0915***	1				
GDP	0.100***	-0.0415	-0.106***	0.0769**	-0.120***	0.147***	-0.0273	1			
INFLATION	0.0913***	0.00485	-0.127***	0.0973***	-0.174***	0.165***	-0.0215	0.413***	1		
CURRENCY	0.0110	0.0325	-0.0416	0.0920***	-0.159***	0.0719**	0.00164	0.130***	0.576***	1	
COV19	-0.0502*	0.0448	0.105***	-0.144***	0.159***	-0.169***	0.00774	-0.730***	-0.549***	-0.179***	1

The variable descriptions are available in Appendix A. \* p < .10, \*\* p < .05, \*\*\* p < .01.

**Table 4**

## Loan Level Description Statistics

	N	MEAN	SD	MIN	P25	P50	P75	MAX
INTEREST	7352	0.029	0.029	0.001	0.008	0.015	0.051	0.095
LIQUIDITY	7352	0.151	0.055	0.055	0.117	0.140	0.171	0.490
LOAN_AMOUNT	7352	25.418	2.485	18.421	24.398	26.334	27.236	29.634
LOAN_PERIOD	7352	14.747	14.625	1	6	12	21	83
FOREIGN_OWNER	7352	0.611	0.487	0	0	1	1	1
SIZE	7352	18.557	1.733	14.666	17.235	18.213	20.477	20.877
EQUITY	7352	0.159	0.042	0.067	0.139	0.150	0.172	0.426
LOAN	7352	0.704	0.088	0.202	0.655	0.696	0.755	0.970
ROA	7352	0.024	0.012	-0.045	0.018	0.024	0.030	0.066
NPL	7352	0.023	0.012	0	0.017	0.024	0.031	0.150
GROWTH	7352	0.044	0.027	-0.053	0.049	0.051	0.055	0.071
INFLATION	7352	0.041	0.018	0.013	0.030	0.035	0.048	0.084
CURRENCY	7352	0.046	0.076	-0.113	-0.010	0.033	0.088	0.261
COVID19	7352	0.136	0.343	0	0	0	0	1

The variable descriptions are available in Appendix A.

Notes: To identify each loan issued by the banks, this study uses loans with the start date the same as the reporting date and consequently drops duplicate loans based on the bank identity, currency, creditor country, and interest. To only focus on loans with significant amounts, this study drops loans that are less than IDR100 million or equal to around USD6600.

**Table 5**

Loan Level Correlation Matrix

	INTEREST	LIQUIDITY	LOAN_ AMOUNT	LOAN_ PERIOD	FOREIGN_ OWNER	SIZE	EQUITY	LOAN	ROA	NPL	GROWTH	INFLA TION	CUR RENCY	COVID 19
INTEREST	1													
LIQUIDITY	-0.00938	1												
LOAN_AMOUNT	-0.0638***	0.119***	1											
LOAN_PERIOD	-0.134***	0.144***	0.301***	1										
FOREIGN_OWNER	0.0404***	0.148***	0.403***	0.486***	1									
SIZE	-0.112***	-0.234***	-0.329***	-0.425***	-0.877***	1								
EQUITY	0.00212	0.00983	-0.0785***	0.0453***	0.254***	-0.435***	1							
LOAN	0.127***	-0.214***	0.178***	0.238***	0.338***	-0.254***	-0.0832***	1						
ROA	0.0717***	-0.0684***	-0.178***	-0.0873***	-0.286***	0.188***	0.386***	-0.140***	1					
NPL	-0.0728***	-0.0645***	-0.286***	-0.258***	-0.306***	0.299***	-0.127***	-0.188***	-0.169***	1				
GROWTH	-0.0496***	0.149***	0.194***	0.173***	0.274***	-0.323***	0.0278*	0.0897***	0.0773***	-0.166***	1			
INFLATION	0.358***	0.151***	0.171***	0.152***	0.336***	-0.383***	0.0233*	0.249***	0.0984***	-0.203***	0.402***	1		
CURRENCY	0.218***	-0.0635***	0.0138	-0.0258*	0.125***	-0.134***	-0.0561***	0.172***	0.0349**	-0.164***	0.0432***	0.549***	1	
COVID19	0.0809***	-0.152***	-0.341***	-0.215***	-0.364***	0.401***	-0.0657***	-0.150***	-0.0638***	0.244***	-0.783***	-0.501***	-0.111***	1

The variable descriptions are available in Appendix A. \* p < .10, \*\* p < .05, \*\*\* p < .01.

**Table 6**

Post Foreign Creditors and Bank Liquidity:  
Matching Sample

	(1) Baseline	(2) Entropy Balanced	(3) PSM
POST_FC	0.032*** (2.99)	0.040*** (3.34)	0.031** (2.57)
FOREIGN_OWNER	-0.014 (-1.12)	-0.032** (-1.99)	-0.020 (-1.38)
SIZE	-0.029*** (-3.30)	-0.030*** (-3.30)	-0.004 (-0.33)
EQUITY	-0.060 (-1.02)	-0.039 (-0.56)	-0.000 (-0.00)
LOAN	-0.563*** (-12.75)	-0.569*** (-13.78)	-0.651*** (-10.72)
NPL	0.335** (2.50)	0.219 (1.58)	0.092 (0.55)
ROA	0.284 (1.52)	0.200 (0.95)	-0.375 (-0.97)
GDP	0.302*** (6.23)	0.279* (1.94)	-0.747 (-1.07)
INFLATION	-0.101 (-1.45)	-0.137 (-0.98)	0.215 (1.59)
CURRENCY	0.014 (1.18)	-0.007 (-0.13)	0.001 (0.04)
COV19	-0.073*** (-4.40)	-0.081*** (-4.88)	-0.136*** (-4.46)
constant	1.485*** (5.09)	1.518*** (4.84)	0.812** (2.16)
Bank Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes
R2	0.752	0.790	0.740
N	4348	4348	4087

This table presents the results of bank liquidity after the banks have foreign creditors for the first-time regression with bank liquidity as the dependent variable and post foreign creditors (POST\_FC) as the variable of interest in the independent variables. Standard errors are clustered at the bank level. The variable descriptions are available in Appendix A. \* p < .10, \*\* p < .05, \*\*\* p < .01.

**Table 7**

Post Foreign Creditors and Bank Liquidity:  
Parallel Trend Assumption and Liquidity Covenant

	(1) Four Semesters Before	(2) Three Semesters Before	(3) Two Semesters Before	(4) One Semester Before	(5) In the Semester	(6) One Semester After	(7) Two Semesters After	(8) Three Semesters After	(9) Four Semesters After
POST_4SEMESTERS									0.023** (2.21)
POST_3SEMESTERS								0.019** (2.06)	
POST_2SEMESTERS							0.012 (1.41)		
POST_1SEMESTER						0.000 (0.00)			
IN_SEMESTER					-0.014* (-1.73)				
PRE_1SEMESTER				-0.027*** (-3.23)					
PRE_2SEMESTERS			-0.023** (-2.53)						
PRE_3SEMESTERS		-0.030*** (-3.17)							
PRE_4SEMESTERS	-0.021*** (-3.05)								
Constant and Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.757	0.758	0.757	0.757	0.757	0.756	0.757	0.757	0.758
N	4348	4348	4348	4348	4348	4348	4348	4348	4348

This table presents the results of bank liquidity after the banks have foreign creditors for the first-time regression with bank liquidity as the dependent variable and post (POST\_S), in the semester (IN\_S), and pre (PRE\_S) foreign creditors as the variable of interest in the independent variables. Standard errors are clustered at the bank level.

\* p < .10, \*\* p < .05, \*\*\* p < .01.

**Table 8**

Post Foreign Creditors and Bank Liquidity:  
Bank Ownership and Creditor Home-Country Regions

	(1) Full Sample	(2) Government Banks	(3) Non-Government Banks	(4) Creditors from Southeast Asia	(5) Creditors from Non-Southeast Asia
POST_FC	0.032*** (2.99)	-0.007 (-0.52)	0.037*** (3.26)		
POST_FC_ SOUTHEAST_ASIA				0.024* (1.74)	
POST_FC NON_SOUTHEAST_ASIA					0.002 (0.12)
Constant & Control	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effect	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes
R2	0.759	0.795	0.442	0.758	0.756
N	4348	1217	3131	4348	4348

This table presents the results of bank liquidity after the banks have foreign creditors for the first-time regression with bank liquidity as the dependent variable and post foreign creditors (POST\_FC) as the variable of interest in the independent variables. In the table, banks are classified as government and non-government banks, while the foreign creditors are classified based on their region, from Southeast Asia and Non-Southeast Asia. Standard errors are clustered at the bank level. The variable descriptions are available in Appendix A. \* p < .10, \*\* p < .05, \*\*\* p < .01.

**Table 9**

Foreign Creditors' Exposure and Bank Liquidity:  
Government and Non-Government Banks

	(1) Full Sample	(2) Government Banks	(3) Non-Government Banks
CREDITORS_FOREIGN	0.043*** (3.31)	0.036 (1.51)	0.043*** (3.21)
FOREIGN_OWNER	-0.062** (-2.63)	0.000 (.)	-0.063** (-2.63)
SIZE	-0.028* (-1.80)	0.108*** (4.34)	-0.029* (-1.86)
LOAN	-0.427*** (-6.24)	-0.337** (-3.07)	-0.424*** (-6.01)
NPL	0.075 (0.40)	1.229** (2.39)	0.068 (0.36)
ROA	-0.211 (-0.75)	1.422* (1.93)	-0.217 (-0.77)
GROWTH	0.190** (2.60)	0.003 (0.02)	0.217*** (2.71)
INFLATION	-0.080 (-0.77)	0.137 (0.45)	-0.085 (-0.76)
CURRENCY	0.033 (1.62)	0.010 (0.25)	0.032 (1.46)
COV19	-0.041* (-1.74)	-0.183*** (-5.28)	-0.038 (-1.53)
constant	1.358*** (2.95)	-3.225*** (-3.92)	1.398*** (3.01)
Bank Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes
Adj.R2	0.380	0.675	0.373
N	1823	187	1636

This table presents the results of bank liquidity risk and foreign creditors' exposure regression with bank risks as the dependent variable and foreign creditors' exposure as the variable of interest in the independent variables. Standard errors are clustered at the bank level. The variable descriptions are available in Appendix A. \* p < .10, \*\* p < .05, \*\*\* p < .01.

**Table 10**

Foreign Creditors' Exposure and Bank Liquidity:  
Creditor Home-Country Regions

	(1) Full Sample	(2) Foreign Creditors from Southeast Asia	(3) Foreign Creditors from Non-Southeast Asia
CREDITORS_FOREIGN	0.048*** (3.52)		
CREDITORS_ SOUTHEAST_ASIA		0.046*** (3.78)	
CREDITORS_ NON_SOUTHEAST_ASIA			0.022 (1.31)
Constant & Control	(3.76)	(3.44)	(3.22)
Bank Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes
R2	0.709	0.702	0.733
N	1823	1295	1545

This table presents the results of bank liquidity risk and foreign creditors' exposure regressions with bank liquidity risk as the dependent variable and foreign creditors' exposure based on creditor countries' region as the variable of interest in the independent variables. Standard errors are clustered at the bank level. The variable descriptions are available in Appendix A. \* p < .10, \*\* p < .05, \*\*\* p < .01.

**Table 11**

Loan Interest and Bank Liquidity:  
Government and Non-Government Banks

	(1) Full Sample	(2) Government Banks	(3) Non-Government Banks
LIQUIDITY	-0.041 <sup>***</sup> (-2.78)	-0.013 (-0.29)	-0.043 <sup>**</sup> (-2.60)
LOAN_AMOUNT	-0.001 <sup>***</sup> (-3.78)	-0.001 <sup>**</sup> (-6.57)	-0.002 (-1.47)
LOAN_PERIOD	-0.000 <sup>**</sup> (-2.63)	-0.000 (-1.69)	-0.000 <sup>***</sup> (-2.83)
FOREIGN_OWNER	-0.041 <sup>**</sup> (-2.06)	0.000 (.)	0.002 (0.26)
SIZE	-0.007 (-1.43)	-0.040 (-1.18)	-0.013 <sup>**</sup> (-2.12)
EQUITY	-0.063 (-1.23)	0.248 <sup>*</sup> (3.97)	-0.154 <sup>**</sup> (-2.76)
LOAN	0.007 (0.58)	-0.010 (-0.11)	-0.002 (-0.20)
ROA	-0.148 (-0.85)	-0.897 (-1.87)	-0.020 (-0.12)
NPL	0.017 (0.27)	-0.403 (-1.21)	0.115 (1.24)
GROWTH	-0.092 <sup>***</sup> (-3.80)	-0.061 (-2.05)	-0.018 (-0.17)
INFLATION	0.257 <sup>***</sup> (3.35)	0.440 <sup>**</sup> (8.58)	0.197 <sup>***</sup> (3.47)
CURRENCY	-0.028 <sup>***</sup> (-4.76)	-0.007 (-1.05)	-0.025 <sup>***</sup> (-3.23)
COVID19	0.005 (1.20)	0.011 (2.66)	0.024 <sup>**</sup> (2.44)
constant	0.230 <sup>**</sup> (2.23)	0.856 (1.17)	0.322 <sup>***</sup> (2.83)
Bank Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes
R2	0.515	0.482	0.567
N	7352	2751	4601

This table presents the results of foreign loan interest and bank liquidity risk regressions with foreign loan interest as the dependent variable and bank liquidity risk as the variable of interest in the independent variables. Standard errors are clustered at the bank level. The variable descriptions are available in Appendix A. \* p < .10, \*\* p < .05, \*\*\* p < .01.

**Table 12****Loan Interest and Bank Liquidity:  
Creditor Home-Country Regions**

	(1) Full Sample	(2) Foreign Creditors from Southeast Asia	(3) Foreign Creditors from Non-Southeast Asia
LIQUIDITY	-0.041*** (-2.78)	-0.059*** (-3.24)	-0.036 (-1.28)
Constant & Control	Yes	Yes	Yes
Bank Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes
R2	0.515	0.642	0.401
N	7352	3674	3650

This table presents the results of foreign loan interest and bank liquidity risk regressions with foreign loan interest as the dependent variable and bank liquidity risk as the variable of interest in the independent variables, based on creditor countries' regions. Standard errors are clustered at the bank level. The variable descriptions are available in Appendix A. \* p < .10, \*\* p < .05, \*\*\* p < .01.

**Table 13**

Post Foreign Creditors and Bank Liquidity:  
Excluding Banks with Foreign Creditors Before the Observation Periods

	(1) Baseline	(2) Entropy	(3) PSM	(4) Government Banks	(5) Non-Government Banks	(6) Creditors from Southeast Asia	(7) Creditors from Non- Southeast Asia
POST_FC	0.032*** (3.01)	0.042*** (3.52)	0.030** (2.41)	0.001 (0.05)	0.032*** (2.90)		
CREDITORS_ SOUTHEAST_ASIA						0.034* (1.76)	
CREDITORS_NON_ SOUTHEAST_ASIA							0.002 (0.09)
Constant & Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.744	0.807	0.732	0.866	0.679	0.752	0.749
N	2413	2413	2318	701	1712	2413	2413

This table presents the results of bank liquidity after the banks have foreign creditors for the first-time regression with bank liquidity as the dependent variable and post foreign creditors (POST\_FC) as the variable of interest in the independent variables. In the table, banks are classified as government and non-government banks, while the foreign creditors are classified based on their region, from Southeast Asia and Non-Southeast Asia. The sample in the table excludes banks with foreign creditors before the observation periods. Standard errors are clustered at the bank level. The variable descriptions are available in Appendix A. \* p < .10, \*\* p < .05, \*\*\* p < .01.

**Table 14****Post Foreign Creditors and Bank Liquidity:  
Excluding Foreign Creditors from Singapore**

	(1) Full Sample	(2) Government Banks	(3) Non-Government Banks
POST_FC_EX_SG	0.030** (2.56)	-0.007 (-0.52)	0.036*** (2.72)
Constant & Control	Yes	Yes	Yes
Bank Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes
R2	0.758	0.881	0.681
N	4348	1217	3131

This table presents the results of bank liquidity after the banks have foreign creditors for the first-time regression with bank liquidity as the dependent variable and post foreign creditors excluding creditors from Singapore (POST\_FC\_EX\_SG) as the variable of interest in the independent variables. The sample excludes creditors from Singapore. Standard errors are clustered at the bank level. The variable descriptions are available in Appendix A. \* p < .10, \*\* p < .05, \*\*\* p < .01.

**Table 15**

## Bank Level Liquidity Risk Dynamic Model

	(1) Full Sample	(2) Government Banks	(3) Non-Government Banks
LIQUIDITY (Q-1)	0.402*** (19.03)	0.960 (0.83)	0.386*** (14.74)
CREDITORS_FOREIGN	0.030*** (5.65)	-0.413 (-0.77)	0.032** (2.16)
FOREIGN_OWNER	-0.010 (-0.90)	- -	0.031 (1.18)
SIZE	-0.012*** (-7.09)	0.286 (1.03)	-0.013*** (-3.46)
EQUITY	-0.135*** (-5.67)	-3.649 (-1.40)	-0.091 (-1.14)
LOAN	-0.253*** (-20.13)	-2.800* (-1.91)	-0.210*** (-7.33)
NPL	-0.154*** (-2.75)	0.316 (0.13)	-0.181* (-1.71)
ROA	-0.268*** (-2.92)	42.852 (1.26)	-0.424*** (-3.24)
GDP	0.198*** (14.44)	0.382 (0.14)	0.237*** (10.21)
INFLATION	-0.017 (-0.72)	-2.486 (-1.29)	0.003 (0.06)
CURRENCY	0.025*** (10.25)	0.004 (0.02)	0.024*** (5.13)
COV19	0.004*** (3.03)	-0.142* (-1.68)	0.007*** (2.81)
constant	0.662*** (12.10)	-8.244 (-0.89)	0.594*** (5.28)
Wald Test	Chi2(12) 7747.10***	Chi2(11) 1681.23***	Chi2(12) 14394.91***
Sargan Test	Chi (615) 55.804	Chi2(329) 0.000	Chi2(615) 44.449
Arr-Bond Test AR(1)	-4.591***	-0.682	-4.167***
Arr-Bond Test AR(2)	1.228	-	1.049
N	1778	180	1598

This table presents the regression results of bank liquidity risk and foreign creditors' exposure with bank liquidity risk as the dependent variable and foreign creditors' exposure as the variable of interest in the independent variables. The results are from the two-step GMM estimation system. The system GMM estimation is effective when the Sargan test and the Arrelano-Bond test AR (2) are not rejected. The variable descriptions are available in Appendix A. \* p < .10, \*\* p < .05, \*\*\* p < .01.