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Bank ownership, governance changes, and small business lending in Indonesia: A two-stage estimation approach ☆

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ABSTRACT

This study examines how bank ownership types and governance changes affect small business lending in Indonesia from 2009–2019. Using a novel two-stage estimation approach proposed by Kripfganz and Schwarz (2019), we analyse differences between domestic and foreign banks, as well as the static, selection, and dynamic effects of ownership changes. The Indonesian context is particularly relevant due to banking sector reforms, including foreign acquisition limits and consolidation policies implemented after the 1997–1998 Asian financial crisis. We contribute to the literature by: (i) focusing on a large, profitable emerging market dominated by government-owned banks; (ii) investigating both static ownership and structural changes; (iii) including foreign acquiring banks in our analysis of foreign ownership; and (iv) applying an innovative econometric methodology that offers advantages over traditional GMM estimators. We find no statistically significant differences in the proportion of small business loans between these bank types, whether measured as a percentage of total loans or total assets. However, when analysing sub-periods (2009–2014 and 2015–2019), the results suggest that foreign banks became less oriented towards SME lending after 2015, coinciding with changes in the Indonesian banking industry. The differences among static, selection and dynamic effects are only substantial regarding their magnitude, but not their significance. Hence, by examining whether the effects of changes in governance on small business lending remain constant or evolve over time following ownership transitions, we provide insights into the sustainability of banking sector reforms and their impact on SME financing. Our findings also have implications for understanding how SME access to finance in emerging markets is impacted by bank governance. In addition, our methodological application could be considered to reassess the impact of different bank property types in other contexts, given the robustness it confers to the results.

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1. Introduction

Small and medium-sized enterprises (SMEs) have been the backbone of almost all economies in the world and have shown resilience in volatile economic situations, particularly during times of crisis (Ayyagari et al., 2007; Eggers, 2020; Tambunan, 2009). In spite of this, SMEs' access to funding remains a significant difficulty. As informationally opaque firms, they are unable to access funding from public capital markets, which makes them highly dependent on bank lending (Alessandrini et al., 2010; Beck and Demirgüç-Kunt, 2006; Rao et al., 2021). In the absence of hard information, banks are confronted with information asymmetry, which prevents them from fully understanding the loan applicants' paying ability; as a result, they are less willing to approve loans for SMEs (Stiglitz and Weiss, 1981).

In this regard, a large body of literature has investigated the issue of whether bank governance and banking market structure have implications for small business lending, providing evidence that bank ownership type is one of the determinants of credit supply to informationally opaque firms (Beck et al., 2011a; Berger et al., 2001b; Bertay et al., 2015; Mian, 2003; Micco and Panizza, 2006; Shen et al., 2012; Önder and Özyıldırım, 2013). In addition, changes in bank governance such as foreign acquisition and mergers and acquisitions (M&A) of domestic banks have also been found to negatively affect small business lending (Degryse et al., 2012; Gormley, 2010; Ogura and Uchida, 2014).

Although the literature is now relatively large, the number of related studies focusing on emerging economies remains limited (see the review by Kersten et al., 2017). This aims to go some way to redressing the imbalance in the literature by examining whether both a static ownership type and a change in governance affect banks' propensity to lend to small businesses in Indonesia. To this end, we consider the period 2009–2019 and apply the recent estimator proposed by Kripfganz and Schwarz (2019), which is also a two-stage procedure (such as the two-step system generalized method of moments, GMM) but has some key advantages; for example it is more robust against model misspecification, allowing for a flexible choice of the first-stage estimator, and enabling simple testing of the over-identifying restrictions. This study is also the first application of this methodology in this context. Our comparison not only considers different types of property, in our case, domestic banks *vis-à-vis* foreign banks, but we also explore how the existence of different effects — namely, static, selection, and dynamic, as we shall see below — might also have an impact (Berger et al., 2005). These effects and how they module the corporate governance changes considered is particularly relevant, given that banks' ownership type is one of the determinants of their ability and willingness to engage in small business lending (Beck et al., 2011a; Berger et al., 2001a; Mian, 2003; Shaban et al., 2014).

The relevance of examining these issues for Indonesia is reinforced by the fact that, during the period 2009–2019, the Indonesian banking sector underwent mergers and foreign acquisitions due to restructuring, technology advances and liberalization. After the 1997–1998 Asian economic crisis, the Indonesian banking sector adopted a full liberalization policy to address the need for new investment following the deep recession, to bring fresh funds and to increase the availability of credit to domestic borrowers. This (de)regulation allowed foreign institutions to acquire up to 99% of the capital of domestic banks (Mulyaningsih et al., 2015). Subsequently, in 2012, the central bank, Bank Indonesia, considerably reduced the amount of capital foreign banks were allowed to invest in domestic institutions, thus limiting the capital owned by foreign banks in domestic institutions.[1] In addition to limiting foreign ownership in the Indonesian banking sector, Bank Indonesia encouraged bank consolidation in an effort to make the Indonesian banking system more competitive. In 2012, it introduced a new policy (BI Regulation No. 14/24/PBI/2012) stipulating that controlling shareholders in more than one bank must merge their banks or form a bank holding company.

Considering that the abovementioned regulations entailed changes in bank ownership and governance, a careful analysis is needed to verify whether the policies have had a detrimental effect on small business lending in order to hinder any adverse effects. The impact of bank governance on the availability of loans to small businesses is a fascinating area of study because the lack of transparent information and collateral is an obstacle to their obtaining funds from the capital market, which makes them heavily reliant on bank loans to finance their businesses (Carbó-Valverde et al., 2009). Moreover, in light of the significant role of SMEs in many countries, particularly in emerging economies with less developed financial markets, they must have sustained access to the finance that allows them to invest and grow. This, in turn, will boost economic development and reduce poverty (Banerjee et al., 2015; Beck et al., 2005; Contreras et al., 2023).

Our article makes an attempt to contribute to the literature in four ways. First, aside from the differences in small business lending behaviour between banks in developing and developed countries, few studies have investigated this matter in developing countries. Therefore, we contribute to the dense literature on bank governance and small business lending by shedding further light on this important issue in Indonesia, where the banking sector is a large, highly profitable and fast-growing market. Moreover, this market is also dominated by government-owned banks (in terms of total assets) since, as of December 2019, almost a quarter of banking assets was controlled by only three government banks, while the rest of the banks in our study sample accounted for the remaining asset share.[2] In addition, the large foreign participation had made the Indonesian banking sector the most liberal banking market in the region; the consequences of foreign ownership on banks' propensity to lend to SMEs therefore merit close investigation.

Second, we contribute to the bank ownership literature by investigating the effect of having not only static ownership but also a change in a bank's structure on the availability of small business loans. As Berger et al. (2005) suggest, bank governance analysis should consider not only the static or steady structure of the ownership, but also any changes in that structure. Accordingly, our

[1] The Regulation No 14/8/PBI/2012 states that a single bank can only own up to 40% of a local bank. Therefore, foreign banks cannot longer hold more than 40% of the stakes of a domestic bank, unless authorized by the government under strict criteria.

[2] See Indonesia Banking Statistics, https://www.ojk.go.id/en/kanal/perbankan/data-dan-statistik/statistik-perbankan-indonesia/Default.aspx.

paper scrutinizes the differences in small business lending behaviour between domestic *vis-à-vis* foreign banks, and the impact of governance reform in banking considering three effects (static, selection and dynamic) on credit granted to SMEs. We also explore whether the effects of governance changes on small business lending remain stable or vary in the years following ownership transitions, which is not usually examined.

Third, we do not differentiate foreign banks by their mode of entry, namely, foreign greenfield or *de novo* banks vs. joint banks (foreign acquiring banks).[3] While numerous studies examine bank ownership types and small business lending, few include foreign acquiring banks in their analyses. The inclusion of these banks in the category of foreign banks is worth considering, particularly in the case of Indonesia, because cross-border acquisition in the Indonesian banking sector increased sharply in the aftermath of the 1997–1998 Asian financial crisis.

Fourth, as indicated above, and from a methodological point of view, we use the two-step system generalized method of moments (GMM), suggested by Kripfganz and Schwarz (2019). Hence, although this is not a contribution *per se*, since the paper is not methodologically innovative, the application actually is, as we follow a different route to obtain our estimators. Specifically, whereas many previous studies have been considering the otherwise relevant system-GMM proposed by Arellano and Bover (1995) and Blundell and Bond (1998), the methodological path we follow here has some advantages in our setting, given the joint consideration of both time-invariant and time-varying regressors. Specifically, Kripfganz and Schwarz's (2019), the approach we follow, makes it possible to estimate time-variant effects in the first stage without depending on the strong assumptions needed for the estimation of time-invariant effects in the second stage.

The remainder of this article is organized as follows. Section 2 describes the SME business lending behaviour along with some stylized facts for the Indonesian banking industry. Section 3 reviews the literature and describes the study hypotheses. Section 4 presents the data and sample used, including the descriptive statistics to give a better understanding of the data being analysed. Section 5 presents the model and econometric methodology. Section 6 examines and discusses the empirical findings of the impact of bank ownership types and governance changes on the availability of lending for small businesses. The final section (Section 7) provides some concluding remarks and policy implications.

2. Indonesian banking and SMEs: some stylized facts

The Indonesian banking sector has long been a cornerstone of the country's financial system, accounting for approximately 80% of total financial assets (`www.ojk.go.id`). This dominance also indicates that the stability of the Indonesian banking system plays an important role in maintaining the resilience of the country's financial system. Consequently, Indonesia has consistently pursued a more sound and stable banking market, which is also vital in attenuating contagion exposures. The history of the sector is rooted in the nationalization of banks following Indonesia's independence in 1945. However, significant changes were introduced in the 1980s and 1990s, when the government began to implement deregulation policies and liberalization of foreign ownership in the banking sector (Shaban and James, 2018).

In the 1990s, efforts to enhance the stability of the banking system through updated regulations were abruptly disrupted by the Asian financial crisis of 1997–1998. During this period, the rupiah suffered a severe devaluation, and the banking system faced unprecedented instability. In response, the government sought financial support from the International Monetary Fund (IMF), initiating a comprehensive restructuring program for the banking sector. This program included the establishment of the Indonesian Bank Restructuring Agency (IBRA) to oversee recapitalizations, mergers, and liquidations of troubled banks. As a result, the number of commercial banks in Indonesia declined significantly, reshaping the ownership structure and laying the groundwork for a more consolidated banking sector.

One of the key outcomes of the crisis was the liberalization of foreign ownership in the banking sector. In an effort to attract foreign capital and expertise, the government initially allowed foreign institutions to acquire up to 99% of domestic banks' equity. This policy led to a substantial increase in cross-border acquisitions and the establishment of foreign banks in Indonesia. However, in 2012, Bank Indonesia introduced new regulations limiting foreign ownership to 40% (Bank Indonesia Regulation Number 14/8/PBI/2012 concerning Share Ownership in Commercial Banks). These regulations allowed for exceptions with approval from the banking supervisory authority. Following the transition of banking supervisory authority from Bank Indonesia to the Financial Services Authority (OJK) at the end of 2013, regulations regarding bank share ownership were further revised under Financial Services Authority Regulation Number 56/POJK.03/2016.

In addition to ownership reforms, the government prioritized fostering small and medium-sized enterprises (SMEs), recognizing their crucial role in economic development. A key initiative was the launch of the People's Business Credit program (KUR) in 2007, designed to provide financing to SMEs deemed "feasible but not yet bankable". The KUR targeted businesses in productive sectors such as agriculture, fisheries, manufacturing, and forestry. To further incentivize SME lending, Bank Indonesia issued Regulation No. 17/12/PBI/2015 in 2015, requiring commercial banks to allocate at least 20% of their total credit or financing to small businesses. This requirement was phased in gradually: 5% in 2015, 10% in 2016, 15% in 2017, and reaching 20% in 2018 and beyond. This regulation applies to all commercial banks, regardless of ownership structure, as outlined in Bank Indonesia Regulation Number 14/22/PBI/2012 on the Provision of Credit or Financing by Commercial Banks and Technical Assistance for the Development of Micro, Small, and Medium Enterprises (MSMEs), as amended by Bank Indonesia Regulation Number 17/12/PBI/2015.[4]

The liberalization of foreign ownership, combined with the introduction of SME-focused regulations, created a unique environment in the Indonesian banking sector. Foreign-owned banks, operating under different governance practices, often adopted distinct

[3] Hence, by foreign banks we refer to foreign greenfield banks only.

approaches to SME lending compared to their domestic counterparts. Meanwhile, the 2012 restrictions on foreign ownership and the push for greater consolidation reinforced the focus on SME financing as a critical policy priority. This shift in policy, along with the encouragement of bank consolidation, created a unique environment to study the effects of foreign ownership and governance changes on small business lending.

These regulatory changes (1997–1998 liberalization, 2012 foreign ownership restrictions, and 2015 mandatory SME lending requirements) create a unique environment for studying bank ownership and SME lending, providing plausibly exogenous variation in ownership structures not driven by SME lending strategies. Additionally, Indonesia experienced persistent excess demand for SME credit throughout our sample (OECD, 2022), with many creditworthy businesses unable to access loans. This demand pressure meant SME lending decisions reflected organizational capabilities and strategic choices rather than borrower constraints, so variation in lending shares reflects banks' differential capacity and willingness to serve this segment—characteristics plausibly determined by ownership type and organizational form rather than transitory bank-specific factors.

3. Literature review and hypotheses development

While extensive research exists on the impact of bank ownership and governance on small business lending, empirical evidence remains limited for emerging markets (see, for instance, Iwanicz-Drozdowska et al., 2018). Building on the methodologies proposed by Berger et al. (2005) and Lin and Zhang (2009), this paper seeks to analyse the static, selection and dynamic effects of foreign bank ownership on their propensity to lend to small businesses.

In the specific case of Indonesia, whose financial system is largely dominated by banks (as their total assets represent about 80% of the total assets of the financial system), the evidence is much scarcer. While relevant studies have assessed various issues related to Indonesia's banking industry (see, for example, Trinugroho et al., 2020; Yusgiantoro et al., 2019), few have focused explicitly on the issues we examine. A related study is that of Shaban et al. (2014), which, like ours, focuses on small businesses, but limits its analysis to a comparison of conventional and Islamic banks. In contrast, Shaban and James (2018) extend the analysis to foreign banks as we do, but their main objective is to assess the impact on bank performance and risk exposure. Therefore, they do not focus on small business lending, although they do consider the impact of ownership changes as we do, which is particularly relevant to examine the different ways in which foreign banks have entered Indonesia and the dynamics involved.

Specifically, and building on the rationale set out in the introduction, these effects relate to three distinct phenomena, and allow us to answer questions such as whether different types of ownership (and changes in ownership) have different effects in the short and long term (Shaban and James, 2018). In the case of *static effects*, they refer to lending propensity differences among banks that have not undergone any corporate ownership change over the sample period (i.e., domestic vs foreign). *Selection effects*, instead, correspond to differences among banks that have undergone some corporate ownership change over the sample period (i.e., acquisition from a foreign bank during the sample period). Finally, *dynamic effects* represent lending propensity changes that are due directly to a change in ownership. Hence, although it is relevant to distinguish between the three types of effects from a theoretical point of view, they have rarely been considered in the literature (the main contribution being Berger et al., 2005). In the specific case of Indonesia, we consider it is particularly relevant due to the deregulatory initiatives that allowed an increased foreign bank presence, but whose involvement in facilitating access to finance to small businesses needs to be examined (OECD, 2022).

Given the centripetal role of these three effects for our study, in this section we present an overview of the literature on the effect of ownership changes of foreign banks *vis-à-vis* domestic banks on their propensity to lend to small business.

3.1. Static effect: foreign vs domestic banks and small business lending

Regarding small business lending by foreign banks, a substantial number of studies claim that the geographical and cultural barriers foreign banks face lead them to cream-skim or cherry-pick transparent customers (Beck et al., 2011a; Berger et al., 2001b; Beck et al., 2018; Berger and Udell, 2006; Dell'Ariccia and Marquez, 2004; Detragiache et al., 2008; Mian, 2006; Stiglitz, 1993). The barriers of distance put foreign banks at a disadvantage, which makes them less willing than domestic banks to channel credit to small businesses (Gormley, 2010; Mian, 2006; Sengupta, 2007). In turn, Beck et al. (2018) suggest that foreign banks can use contract design and credit scoring models to overcome informational disadvantages. Time also has an effect on foreign bank lending; Degryse et al. (2012) argue that foreign banks initially tend to be less inclined to lend to small customers than their private domestic

[4] Bank Indonesia Regulation Number 17/12/PBI/2015 concerning Amendments to Bank Indonesia Regulation Number 14/22/PBI/2012 on the Provision of Credit or Financing by Commercial Banks and Technical Assistance in the Development of Micro, Small, and Medium Enterprises (MSMEs), Article 2, paragraph 3, states that the achievement of the ratio for Credit or Financing for MSMEs shall be carried out in stages as follows:

a. 2013: The ratio of Credit or Financing for MSMEs to total Credit or Financing is in accordance with the capability of the Commercial Bank as stated in the Bank's Business Plan;

b. 2014: The ratio of Credit or Financing for MSMEs to total Credit or Financing is in accordance with the capability of the Commercial Bank as stated in the Bank's Business Plan;

c. 2015: The ratio of Credit or Financing for MSMEs to total Credit or Financing is at least 5% (five percent);

d. 2016: The ratio of Credit or Financing for MSMEs to total Credit or Financing is at least 10% (ten percent);

e. 2017: The ratio of Credit or Financing for MSMEs to total Credit or Financing is at least 15% (fifteen percent); and

f. Since 2018: The ratio of Credit or Financing for MSMEs to total Credit or Financing is at least 20% (twenty percent).

Hence, as we shall see below, year 2015 will be established as the threshold because it was the first year banks were required to meet the minimum ratio of MSME credit to their total credit.

counterparts, but they slowly increase their lending to SMEs. Evidence from previous literature on foreign bank lending to SMEs is far from conclusive, although several studies still find that these banks tend to be unwilling to lend to small firms. In addition, the mix of domestic and foreign banks in Indonesia, among other issues, make it particularly interesting to examine this issue in our specific setting. In line with the literature, we propose the following hypothesis:

Hypothesis 1 (*H*1)**.** Foreign banks have a smaller proportion of small business loans in their total loan portfolios and assets compared to domestic banks.

3.2. Selection effect: joint banks and small business lending

In their research on joint banks' lending to small businesses, Claeys and Hainz (2014) find that foreign banks entering the market by taking over a domestic bank have an advantage over those entering via greenfield investment in terms of servicing SMEs in the host countries. This is because domestic banks are better placed to collect 'soft' information whereas foreign acquiring banks implement advanced applicant screening technologies, which gives joint banks an advantage to cater for informationally opaque firms. In addition, Degryse et al. (2012) find evidence that, in contrast to foreign banks which tend to cherry-pick larger borrowers, foreign takeover banks are not associated with low willingness to provide loans to opaque firms, in contrast to foreign banks, which tend to cherry-pick larger borrowers. In addition, joint banks, leveraging both local knowledge and advanced screening technologies, can better serve small and medium-sized enterprises (SMEs) that may lack transparent financial histories (Levine et al., 2020; Berger, 2015), which is crucial for Indonesia, where SMEs play a vital role in the economy. Hence, understanding these dynamics can help policymakers and banking institutions develop strategies to enhance SME financing. These findings lead us to propose the following hypothesis:

Hypothesis 2 (*H*2)**.** Joint banks allocate a lower percentage of their loans and assets to small business credit than non-acquired banks.

3.3. Dynamic effect: foreign acquisition and small business lending

The conventional wisdom is that foreign banks favour larger borrowers because they encounter information asymmetries when serving less transparent firms. Furthermore, the problem of asymmetric information will not be mitigated by the acquisition of a bank in the host country; rather, the acquisition distorts the relationship between the acquired bank and the borrowers (Karceski et al., 2005). Most studies on foreign presence in developing countries also highlight the link between foreign bank entry into a domestic banking market and lower lending to small customers (Detragiache et al., 2008; Gormley, 2010; Mian, 2006).

In contrast, some studies have shown more nuanced results. For example, De Haas and Naaborg (2006) suggest that acquiring banks can increase their lending to small businesses after the acquisition, despite delays in serving this sector. Considering the majority evidence on the impact of foreign acquisition on small business lending, we establish the following hypothesis:

Hypothesis 3 (*H*3)**.** Banks acquired by foreign banks reduce their lending to small businesses after the acquisition.

4. Data and variables

The bank-level financial data used in this study were obtained from the website of the Indonesia Financial Service Authority or *Otoritas Jasa keuangan* (www.ojk.go.id) and cover total assets, total loans, total credit granted to SMEs, total debt, total deposits, total equity and return on equity, as well as information about banks' ownership. The period examined corresponds to annual data from 2009 to 2019 with a total number of 105 banks, yielding a final sample of 1123 complete bank-level observations in the dataset. Since not all variables are available for all banks, the sample is an unbalanced panel data. Table 1 defines the relevant variables in the analysis.[5]

To ensure a comprehensive analysis, we use two different measures of a bank's propensity to lend to small businesses: the ratio of total small business loans to total loans ($SMELTL$) and the ratio of total small business loans to total assets ($SMELTA$). The use of two measures increases the robustness of our analysis and can also be seen as an additional (albeit modest) contribution of the study. The ratios of SME loans to total loans and to total assets serve as indicators of a bank's inclination to provide small business loans; higher ratios signify a greater propensity to lend to small businesses.

The analysis focuses on the effect that bank ownership — distinguishing between domestic and foreign banks — has on their propensity to lend to small businesses. As mentioned previously, we consider as foreign banks both domestic banks acquired by a foreign bank as well as foreign banks that entered the market through a greenfield investment, provided that the event has taken place prior to 2009. Following the methodology proposed by Berger et al. (2005) and Lin and Zhang (2009), we use different time-invariant dummies and time-variant variables as key variables to take into account different aspects of the effect of bank ownership on the bank's propensity to lend to small businesses.

The first time-invariant dummy (sta_for) refers to foreign banks whose ownership structure remained the same throughout the sample period. For a foreign bank, this dummy equals one for all sample periods if its ownership structure remained unchanged

[5] Replication materials (code and dataset) for this paper are available at https://data.mendeley.com/datasets/y8tsz4y7yn/1.

Table 1
Description of the variables.

Variables	Definition
Dependent variables	
$SMELTL$	Small business loan to total loan
$SMELTA$	Small business loan to total assets
Independent variables	
Lagged dependent variables	
$L.SMELTL$	One period lagged value of $SMELTL$
$L.SMELTA$	One period lagged value of $SMELTA$
Time-invariant variables	
sta_for	Dummy equals to 1 for all sample periods for a foreign bank whose ownership structure remained unchanged; 0 otherwise. This captures banks with stable foreign ownership throughout the sample, whose foreign identity was established before 2009.
sel_for	Dummy equals to 1 for all sample periods for a bank which experienced a foreign acquisition during the sample period; 0 otherwise
Time-variant variables	
dyn_for	Dummy equals to 1 in the year of the foreign acquisition and for each year afterwards; 0 otherwise
dyn_for_time	Time trend variable equals to 1 in the next year following the change, 2 in the second year after the change, and so on; 0 otherwise
Control variables	
$LNASSETS$	Logarithm transformation of total assets
ETA	Equity to total assets ratio
LTD	Loan to deposits ratio
ROE	Return on equity ratio

between 2009 and 2019, and zero otherwise (i.e. for domestic banks and for foreign banks whose structure changed during the sample period). The second time-invariant dummy (sel_for) corresponds to banks that were acquired by a foreign bank during the sample period. For a bank (of any type), this dummy equals one for all sample periods if it was acquired by a foreign bank between 2009 and 2019, and zero otherwise (i.e. for domestic banks whose ownership structure remained unchanged and for foreign banks that were already foreign-owned at the beginning of the sample period). Time-invariant dummy variables will capture the long-term consequences of bank ownership on the availability of SME loans. More specifically, these time-invariant dummies capture long-term organizational and governance differences between foreign and domestic banks.

The two time-variant variables are defined to identify the years after foreign acquisition and capture the evolution of governance changes on small business lending propensity. The first is a time-variant dummy (dyn_for) equal to one starting in the year of foreign acquisition and for each following year, and zero for years before the change. This variable captures the constant post-acquisition effect—the persistent change in SME lending propensity that occurs following foreign acquisition. The second time-variant variable (dyn_for_time) starts with 1 in the year after the change, 2 in the second year after, and so on. This variable captures the time-varying post-acquisition effect or temporal evolution—whether the impact of foreign acquisition on SME lending changes as time passes since the ownership change. Both time-variant variables equal zero for all periods for banks not acquired by foreign entities. Therefore, the first variable (dyn_for) captures the constant component of the governance change impact on SME lending propensity, and the second variable (dyn_for_time) captures whether this impact evolves over time. We examine whether the effects of ownership changes are stable or evolve dynamically in the years following acquisition.

We also consider variables to control for bank factors that may influence the relation between bank ownership structure and propensity to lend to small businesses. These controls include the natural logarithm of total assets ($LNASSETS$), equity to total assets ratio (ETA), loan to deposits ratio (LTD), and return on equity ratio (ROE), controlling for differences in banks' size, financial leverage, liquidity and profitability, respectively. These ratios were chosen because, according to the relevant literature, bank size (Berger and Black, 2011; Berger et al., 2017; Craig and Hardee, 2007; Jayaratne and Wolken, 1999; McNulty et al., 2011; Uchida et al., 2008), bank liquidity (Cornett et al., 2011; Khwaja and Mian, 2008), bank profitability and bank capital structure (Carlson et al., 2013; Kishan and Opiela, 2000) may impact their lending behaviour, including lending to small businesses. Although the control variables will not be the focus of the empirical analysis, their inclusion aims to improve the modelling and account for the explanation of a bank's propensity to lend to SMEs that is not captured solely by ownership structure.

Table 2 displays the summary statistics of the variables used in this study. The sample contains an unbalanced panel data of 105 banks from 1123 observations. Nearly 70% of the observations correspond to 74 domestic banks that underwent no governance change during the sample period (column *Non-acquired domestic banks*); approximately 24% of the observations correspond to 25 foreign banks that also did not change their ownership during the sample period (column *Non-acquired foreign banks*); and slightly less than 6% corresponds to the six banks that were acquired by a foreign bank during the sample period (column *Banks acquired by foreign banks*). The last column in Table 2 displays the summary statistics for the whole sample.

Table 2
Descriptive statistics.

		Non-acquired foreign banks (sta_for)	Banks acquired by foreign banks (sel_for)	Non-acquired domestic banks	Total
$SMELTL$ (%)	Mean	11.33	25.88	33.06	27.31
	Std. Dev.	14.64	19.42	74.03	63.04
	Median	5.77	27.31	21.41	16.92
$SMELTA$ (%)	Mean	6.79	17.31	19.47	16.24
	Std. Dev.	8.34	13.38	17.91	16.73
	Median	3.54	18.06	13.22	10.95
Total assets (trillion Rp)	Mean	48.67	20.98	55.44	51.76
	Std. Dev.	58.65	26.73	160.06	137.05
	Median	22.93	9.93	8.19	11.37
Equity-to-Total assets (ETA) (%)	Mean	15.53	12.53	15.98	15.67
	Std. Dev.	13.07	4.85	8.89	9.93
	Median	13.19	11.61	13.82	13.65
Total loan-to-total deposits (LTD) (%)	Mean	129.16	82.60	97.22	104.18
	Std. Dev.	129.86	11.62	82.62	95.35
	Median	97.03	84.35	87.68	88.56
Return on Equity (ROE) (%)	Mean	17.53	2.44	11.89	12.72
	Std. Dev.	134.61	19.10	23.61	69.61
	Median	8.79	4.66	10.37	9.54
	# obs.	275	66	782	1123
	# banks	25	6	74	105

Note: Non-acquired foreign banks includes foreign banks whose ownership structure remained the same throughout the sample. Banks acquired by foreign banks includes banks that were acquired by a foreign bank during the sample period. Non-acquired domestic banks includes domestic banks that have not been acquired by a foreign bank in the sample period. All statistics are computed for the overall sample (2009–2019).

Regarding banks' propensity to lend to small businesses with respect to total loans, Table 2 shows that domestic banks are, on average, the most willing to offer loans to SMEs, as reflected by the mean value of $SMELTL$ in the column *Non-acquired domestic banks*. Despite this, the standard deviation was the highest among all bank types, indicating considerable change in the proportion domestic banks allocate to SME loans. In contrast, foreign banks are the least willing to channel loans to less transparent firms, and the standard deviation of the ratio for these banks was the lowest.

In terms of the percentage of SME loans to total assets, both non-acquired domestic banks and banks that underwent foreign acquisition allocated more or less 17% to 19% of their assets to SME loans. In turn, the smallest $SMELTA$ ratio corresponds to non-acquired foreign banks, which suggests they are reluctant to provide credits to small borrowers. Both measures of propensity to lend to SMEs are right skewed, especially for non-acquired banks, whether domestic or foreign, as the median values, below the mean values, show. Thus, in terms of median values, banks acquired by foreign banks are most likely to lend to small businesses.

With respect to the banks' size, Table 2 indicates that non-acquired domestic banks have the highest amount of total assets, on average, but the lowest median value, meaning that there are domestic banks with extremely high asset size. In contrast, non-acquired foreign banks, the second type of banks by average asset size, have the highest median asset size. Concerning banks' financial leverage, as proxied by the ratio of equity to total assets, there are no notable differences by bank ownership type for either the mean value or the median value. Finally, banks acquired by foreign banks have the lowest mean and median values for bank liquidity and returns on equity.

5. Econometric model and methodology

5.1. Model specification

The main objective of our model is to explain the extent of banks' propensity to lend to SMEs in the Indonesian bank industry, and how it differs depending on the bank's ownership. For this, we use the following dynamic panel model to estimate the impact of the time-invariant and time-variant variables related to the bank's ownership on their propensity to lend to SMEs. Moreover, to take into account the dynamic effects, the lagged dependent variable is incorporated as an additional explanatory variable in the regression, following (Arellano and Bond, 1991):

$$y_{it} = \alpha + \beta y_{i,t-1} + \boldsymbol{x}'_{it}\boldsymbol{\delta} + \gamma_1 sta\_for_i + +\gamma_2 sel\_for_i + \gamma_3 dyn\_for_{it} + \gamma_4 dyn\_for\_time_{it} + e_{it} \quad (1)$$

where y_{it} is bank i's propensity to lend to SMEs in year t as measured by either $SMELTL$ or $SMELTA$; $\boldsymbol{x}_{it}$ is the vector of bank i's control variables in year t (as detailed in Table 1), and $\boldsymbol{\delta}$ its vector of parameters; and sta_for, sel_for, dyn_for and dyn_for_time are our variables of interest, the first two being time-invariant and the last two time-variant, and γ their parameters. Moreover, we assume that $e_{it} = \alpha_i + \varepsilon_{it}$ where α_i is an unobserved bank-specific effect.

Therefore, we consider two models depending on whether $SMELTL$ or $SMELTA$ are used as the dependent variable. In addition, for each model, we consider two specifications: one without the variable dyn_for_time and another that includes this variable. In the former specification, we assume that the post-acquisition effect on lending propensity is constant over the years, captured entirely by the dummy dyn_for. Conversely, in the latter specification which includes dyn_for_time, we allow the post-acquisition effect to vary over time—for example, the impact might strengthen or weaken as years pass since the ownership change.

5.2. Dynamic panel GMM estimation

A main issue in the estimation of our model with panel data is the presence of time-invariant regressors when controlling for unobserved bank-specific or ownership-specific effects. For example, the banks' ownership type may be related to aspects of their governance or lending policy, which are unobserved variables. Therefore, time-invariant variables are endogenous, and appropriate instruments need to be found.

The endogeneity problem may cause biased estimators if we use an OLS approach, especially if T is low. An appropriate estimator to correct for such a bias is either the difference-GMM proposed by Arellano and Bond (1991) or the system-GMM proposed by Arellano and Bover (1995) and Blundell and Bond (1998). However, as Kripfganz and Schwarz (2019) point out, to identify the coefficients of time-invariant regressors, strong orthogonality assumptions need to be imposed in order to find valid instruments (Bazzi and Clemens, 2013), and if these conditions fail to hold, the estimators of all coefficients in the model might be biased and inconsistent.

To solve this issue, Kripfganz and Schwarz (2019) propose a two-stage estimation procedure. In the first stage, the coefficients of the time-variant regressors are estimated. Then, in the second stage, the first-stage residuals are regressed on the time-invariant regressors to identify their coefficients. The second-stage standard errors are also adjusted to account for the first-stage estimation error. Decoupling the estimation of the time-variant effects prevents the potential incorrectness of the assumptions needed to identify the coefficients of time-invariant regressors from affecting the first-stage estimates.

In the first stage of the two-stage estimation, we use a consistent GMM estimator,[6] and in the second stage we assume that the time-invariant variables *sta_for* and *sel_for* are endogenous. Therefore, when estimating their effects, we use the time-variant regressors as their instruments, as suggested in Kripfganz and Schwarz (2019).

The post-estimation (Arellano and Bond, 1991) test for the absence of second-order serial correlation is considered for the validity of the estimated parameters. To test the over-identification restriction in both the first and second stages, we apply a test in the spirit of Hansen (1982). Finally, we use the Wald test to test the joint insignificance of the time-fixed effects. See Kripfganz and Schwarz (2019) for details.

5.2.1. Identification strategy and instrument validity

Employing the (Kripfganz and Schwarz, 2019) two-stage system-GMM estimator requires careful consideration of identification assumptions. We exploit three sources of variation: (i) cross-sectional variation (sta_for) comparing foreign banks that entered before 2009 with domestic banks-entry decisions driven by post-1997 crisis strategies orthogonal to later SME conditions; (ii) selection variation (sel_for) identifying banks acquired during 2009–2019, with timing substantially influenced by the 2012 regulation restricting foreign ownership from 99% to 40% and consolidation pressures from BI Regulation No. 14/24/PBI/2012; and (iii) dynamic variation (dyn_for, dyn_for_time) measuring post-acquisition evolution, estimated as treatment effects using appropriate moment conditions.

In the second stage, time-varying controls ($LNASSETS$, ETA, LTD, ROE) serve as instruments for time-invariant ownership dummies, requiring these controls be uncorrelated with the time-invariant component of unobserved heterogeneity affecting SME lending. This exclusion restriction is economically plausible for three reasons. First, we analyse portfolio allocation shares, not lending levels—while bank characteristics affect capacity, allocation is strategic and driven by organizational capabilities determined by ownership type. Second, Bank Indonesia Regulation No. 17/12/PBI/2015 mandated minimum SME lending ratios (phased from 5% in 2015 to 20% by 2018), making allocation partially non-discretionary and reducing scope for banks to choose shares based on transitory characteristics. Third, persistent SME financing gaps documented by OECD (2022) meant banks faced excess credit demand, so variation reflects organizational willingness and capability (determined by ownership) rather than capacity constraints.

Specifically, $LNASSETS$ reflects long-term growth uncorrelated with allocation strategies; ETA is determined by regulatory requirements and board-level leverage decisions made bank-wide; LTD reflects funding models orthogonal to SME allocation since SME loans have similar maturities to other commercial loans; and ROE reflects overall profitability across business lines largely orthogonal to current allocation under mandatory requirements. We acknowledge ROE might be potentially problematic as profitability might mediate ownership-SME relationships but, as we shall see, ROE is never significant in our models. While Hansen tests provide empirical support (p-values generally exceed 0.05), we admit these tests have limited power and rely primarily on the economic arguments above.

6. Empirical results and discussion

Table 3 reports the main findings for the impact of bank ownership on the availability of loans for small businesses based on the estimation of Eq. (1). The first two columns report results for small business lending to total loans ($SMELTL$), whereas the last

[6] More particularly, in the first stage the moments conditions for the model in differences are those specified in A1 and A2 in Kripfganz and Schwarz (2019); and the moments conditions for the model in levels are A5 and A6.

Table 3
Results of system-GMM estimation: $SMELTL$ and $SMELTA$.

	$SMELTL$		$SMELTA$	
	Without dyn-time var	With dyn-time var	Without dyn-time var	With dyn-time var
$L.SMELTL$	0.3169	0.3052		
	(0.2643)	(0.3103)		
$L.SMELTA$			0.8147***	0.8441***
			(0.1213)	(0.1121)
sta_for	0.3032	−0.0725	−0.0622	−0.0706
	(1.2662)	(1.1670)	(0.1769)	(0.1720)
sel_for	3.6203	2.0454	−0.3141	−0.3585
	(4.0994)	(2.9384)	(0.6678)	(0.6439)
dyn_for	0.0128	0.1417	−0.0034	−0.0036
	(0.0748)	(0.1353)	(0.0220)	(0.0272)
dyn_for_time		−0.0308		−0.0036
		(0.0256)		(0.0078)
$LNASSETS$	−0.0878	−0.0634	−0.0027	−0.0012
	(0.0873)	(0.0821)	(0.0123)	(0.0111)
ETA	−1.5225	−1.3279	−0.0596	−0.0566
	(0.9976)	(0.9016)	(0.0945)	(0.0889)
LTD	0.2115	0.2072	−0.0062	−0.0057
	(0.2065)	(0.2063)	(0.0047)	(0.0044)
ROE	0.0049	0.0047	0.0002	0.0002
	(0.0065)	(0.0058)	(0.0009)	(0.0009)
# of obs.	1016	1016	1016	1016
# of groups	105	105	105	105
1st stage				
Instruments	46	48	46	48
Year dummies	2011–2019	2011–2019	2011–2019	2011–2019
	0.278	0.435	0.819	0.832
Arellano-Bond	0.215	0.212	0.950	0.943
Hansen	0.238	0.372	0.052	0.081
2nd stage				
Instruments	4	4	4	4
Hansen	0.351	0.416	0.006	0.011

Note 1: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Note 2: The table reports the results of the regression using the two-step system-GMM estimation by Kripfganz and Schwarz (2019) as specified in Eq. (1), followed by robust to autocorrelation and heteroskedasticity standard errors in parentheses. The dependent variables are: the ratio of small business loans to total loans, $SMELTL$ (columns 1 and 2) and the ratio of small business loans to total assets, $SMELTA$ (columns 3 and 4). We report the results with and without the dynamic time-variant variable dyn_for_time. Both first and second stage models included the constant. We assumed endogeneity on the time-invariant variables. Both first and second stage models included the constant. Variable definitions are reported in Table 1.
Note 3: The test statistics are the Wald test for the joint insignificance of the time dummies, the (Arellano and Bond, 1991) test for no second-order serial correlation in the first-differenced residuals, and the Hansen test for the over-identification restriction. For all tests only p-values are shown. *Note 4:* The dyn_for coefficient captures the constant post-acquisition effect (the persistent change in SME lending following foreign acquisition), while dyn_for_time captures how this effect evolves over time since acquisition. These should not be confused with short-run vs. long-run effects in the standard dynamic panel sense. Standard long-run effects can be calculated as coefficient/(1 - lagged dependent variable coefficient).

two report analogous results for small business lending to total assets ($SMELTA$). For both variables, we report results without and with the short-term dynamic effect estimation (captured by the variable dyn_for_time). As mentioned above, we use the two-step system-GMM proposed by Kripfganz and Schwarz (2019). In accordance with the "small T and large N" criterion required by the system-GMM procedure, the dataset for both variables contains 105 banks over 11 years that fulfil the above specification.

Our model includes time-fixed effects to control for the impact of macroeconomic variables on the availability of small business credit. However, for all models considered in Table 3 the χ^2-statistics are not significant (for the usual 1%, 5% and 10% significance values), which implies that relevant unobserved time-variant variables are not present in the model. On the other hand, we use the (Arellano and Bond, 1991) test of the hypothesis that there is not second-order serial autocorrelation. The non-significant p-values support the validity of the system-GMM estimation. Finally, the Hansen test for over-identification for restriction in both the first stage and the second stage are non-significant, so the instruments are valid for these models (Roodman, 2009).

As reported in Table 3, the lagged dependent variable $L.SMELTL$ has positive but non-significant coefficients. In contrast, $L.SMELTA$ has positive and statistically significant coefficients at the 1% level. Therefore, we only observe a persistence for small business lending to total assets, regardless of the model specification.

With respect to the coefficients on the variables related to bank ownership, our variables of interest sta_for, sel_for, dyn_for, and dyn_for_time, none of them is significant. These findings suggest that foreign banks and banks recently acquired by foreign banks do not hold significantly different shares of small business loans from those of domestic banks, regardless of the variable used to measure the propensity of small business lending or the model specification. As they are non-significant, it is worth mentioning the

Table 4
Results of system-GMM estimation for $SMELTL$ without dynamic-time variable dyn_for_time.

	Full	Sample by year		Sample by median	
	Sample	2009–2014	2015–2019	Below median	Above median
$L.SMELTL$	0.3169	0.4826***	0.8009*	0.0763	0.6194*
	(0.2643)	(0.1312)	(0.3544)	(0.0536)	(0.3090)
sta_for	0.3032	0.1289	−1.0753	−0.0680	−0.9533
	(1.2662)	(0.2584)	(1.4578)	(0.1391)	(2.8539)
sel_for	3.6203	0.5100	−3.7969	0.2364	18.7557
	(4.0994)	(1.5293)	(6.0121)	(0.3576)	(17.2816)
dyn_for	0.0128	−0.0253	−0.2776	0.0359	0.0323
	(0.0748)	(0.0660)	(0.1488)	(0.1357)	(0.1787)
$LNASSETS$	−0.0878	−0.0440	0.0318	0.0109	−0.2437**
	(0.0873)	(0.0242)	(0.0590)	(0.0079)	(0.0937)
ETA	−1.5225	−0.2183	−1.6136	−0.0486	−0.8033
	(0.9976)	(0.2791)	(1.7156)	(0.0520)	(0.5702)
LTD	0.2115	−0.0559*	0.1981	0.0009	1.9245***
	(0.2065)	(0.0252)	(0.2222)	(0.0026)	(0.2350)
ROE	0.0049	−0.0048*	0.0193	−0.0001	0.0127
	(0.0065)	(0.0020)	(0.0256)	(0.0005)	(0.0158)
# of obs.	1016	515	501	505	511
# of groups	105	105	103	81	81
1st stage					
Instruments	46	39	42	46	46
Year dummies	2011–2019	2011–2014	2016–2019	2011–2019	2011–2019
	0.278	0.343	0.138	0.635	0.429
Arellano-Bond	0.215	0.321	0.184	0.635	0.052
Hansen	0.238	0.404	0.988	0.377	0.405
2nd stage					
Instruments	4	4	4	4	4
Hansen	0.351	0.208	0.014	0.498	0.193

Note 1: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Note 2: The table reports the results of the regression using the two-step system-GMM estimation by Kripfganz and Schwarz (2019) as specified in Eq. (1), followed by robust to autocorrelation and heteroskedasticity standard errors in parentheses. The dependent variable is the ratio of small business loans to total loans, $SMELTL$ and the time-variant dependent variable dyn_for_time is not included. Both first and second stage models included the constant. The first column displays results for the whole sample; the next two columns show the results for observations in years 2009 to 2014 (column 2) and years 2015 to 2019 (column 3); the last two columns show the results for observations with a dependent variable below its median value (column 4) and above its median value (column 5). We assumed endogeneity on the time-invariant variables. Variable definitions are reported in Table 1.
Note 3: The test statistics are the Wald test for the joint insignificance of the time dummies, the (Arellano and Bond, 1991) test for no second-order serial correlation in the first-differenced residuals, and the Hansen test for the overidentification restriction. For all tests only p-values are shown.

high value of the coefficients for variable sel_for when explaining the ratio of small business lending to total loans. It would appear that banks recently acquired by foreign banks hold larger proportions of SME loans to total loans compared with both domestic banks and foreign banks, but, on average, the differences are not statistically significant.

6.1. Results by period

Given the wealth of information for the period under analysis, we also split the results into two sub-periods, 2009–2014, and 2015–2019. This analysis will help to provide a better understanding of the coefficients found, which represent an average effect but whose magnitude and significance could vary remarkably for each period—they represent an average effect. We chose 2015 as the threshold year due to the changes in the Indonesian banking industry made that year, described in Section 2. These results are reported, for the different dependent variables and roles of time, in Tables 4–7, columns 2 and 3. Column 1 in those tables displays the estimation for the whole sample for reference.

The results by sub-periods show a significant persistence in the ratio of SME lending to either total loans or total assets. Lagged variables $L.SMELTL$ and $L.SMELTA$ have significant p-values in their corresponding models, regardless of the inclusion of the short-term dynamic effect estimation. This is particularly relevant for $L.SMELTL$, given that it was not significant for the whole sample. The magnitude of the coefficients in period 2015–2019 are more than 30 percentage points higher than for 2009–2014, regardless of whether dyn_for_time is excluded (Tables 4 and 6) or included (Tables 5 and 7). Notice also that for $SMELTL$, the estimated dynamic effects in both periods are higher than the effect estimated for the whole sample.

Table 5
Results of system-GMM estimation for $SMELTL$ with dynamic-time variable dyn_for_time.

	Full	Sample by year		Sample by median	
	Sample	2009–2014	2015–2019	Below median	Above median
$L.SMELTL$	0.3052	0.4944***	0.9764**	0.0766	0.5457*
	(0.3103)	(0.1321)	(0.3104)	(0.0514)	(0.2759)
sta_for	−0.0725	0.1162	−1.5819	−0.0727	−1.1686
	(1.1670)	(0.2437)	(1.7971)	(0.1445)	(2.8090)
sel_for	2.0454	0.3943	−3.7200	0.2424	18.1886
	(2.9384)	(1.4487)	(6.0082)	(0.3737)	(17.0002)
dyn_for	0.1417	−0.0073	−0.0088	0.0358**	0.0622
	(0.1353)	(0.0653)	(0.2714)	(0.0124)	(0.1716)
dyn_for_time	−0.0308	0.0104	0.0486	−0.0095***	−0.0476
	(0.0256)	(0.0202)	(0.0934)	(0.0022)	(0.0607)
$LNASSETS$	−0.0634	−0.0419	0.0541	0.0111	−0.2329*
	(0.0821)	(0.0234)	(0.0796)	(0.0074)	(0.0942)
ETA	−1.3279	−0.1868	−2.2815	−0.0442	−0.8412
	(0.9016)	(0.2680)	(1.6625)	(0.0509)	(0.5207)
LTD	0.2072	−0.0565*	0.2584	0.0009	1.9309***
	(0.2063)	(0.0254)	(0.2087)	(0.0025)	(0.2292)
ROE	0.0047	−0.0051**	0.0162	−0.0000	0.0110
	(0.0058)	(0.0019)	(0.0243)	(0.0006)	(0.0119)
# of obs.	1016	515	501	505	511
# of groups	105	105	103	81	81
1st stage					
Instruments	48	40	43	48	47
Year dummies	2011–2019	2011–2014	2016–2019	2011–2019	2011–2019
	0.435	0.389	0.088	0.514	0.442
Arellano-Bond	0.212	0.313	0.177	0.689	0.041
Hansen	0.372	0.468	0.742	0.525	0.580
2nd stage					
Instruments	4	4	4	4	4
Hansen	0.108	0.180	0.092	0.517	0.201

Note 1: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Note 2: The table reports the results of the regression using the two-step system-GMM estimation by Kripfganz and Schwarz (2019) as specified in Eq. (1), followed by robust to autocorrelation and heteroskedasticity standard errors in parentheses. The dependent variable is the ratio of small business loans to total loans, $SMELTL$ and the time-variant dependent variable dyn_for_time is included. Both first and second stage models included the constant. The first column displays results for the whole sample; the next two columns show the results for observations in years 2009 to 2014 (column 2) and years 2015 to 2019 (column 3); the last two columns show the results for observations with a dependent variable below its median value (column 4) and above its median value (column 5). We assumed endogeneity on the time-invariant variables. Variable definitions are reported in Table 1.
Note 3: The test statistics are the Wald test for the joint insignificance of the time dummies, the (Arellano and Bond, 1991) test for no second-order serial correlation in the first-differenced residuals, and the Hansen test for the over-identification restriction. For all tests only p-values are shown.

With respect to the propensity of foreign banks (sta_for) or banks recently acquired by foreign banks (sel_for) to lend to SMEs, Tables 4–7 reveal that the estimated coefficients in period 2009–2014 are positive, whereas they are of higher magnitude and negative in period 2015–2019, albeit non-significant in all model specifications. These results imply that foreign banks, regardless of when they were acquired, have become less oriented towards SME lending than domestic banks following the changes in the banking industry that took place in 2015.

With respect to the time-variant variables, neither the constant post-acquisition effect (dyn_for) nor its temporal evolution (dyn_for_time) shows significant effects for banks acquired by foreign banks on the propensity to lend to SMEs. This result holds regardless of the model specification and the sample period.

Our choice of 2015 as the threshold for sub-period analysis reflects the structural break introduced by the mandatory SME lending regulation. While this regulation applied uniformly to all banks, we hypothesize that banks with different organizational structures may have responded differently to the same mandate. The theoretical rationale draws from organizational economics literature suggesting that foreign banks rely on hard information and standardized lending technologies (Berger and Udell, 2006; Mian, 2006), while domestic banks have comparative advantages in soft information and relationship lending (Stein, 2002). When faced with a mandate to increase relationship-intensive SME lending, these organizational differences may generate heterogeneous responses. Additionally, domestic banks may face stronger incentives for rapid compliance due to closer regulatory relationships.

The pattern we observe in Tables 4–7 (where ownership coefficients shift from slightly positive in 2009–2014 to negative and larger in magnitude during 2015–2019, though remaining insignificant) is consistent with differential regulatory responses. However, we acknowledge that our analysis captures the net effect of the regulation on ownership-related differences rather than

Table 6
Results of system-GMM estimation for $SMELTA$ without dynamic-time variable dyn_for_time.

	Full	Sample by year		Sample by median	
	Sample	2009–2014	2015–2019	Below median	Above median
$L.SMELTA$	0.8147***	0.6169***	0.9954***	0.0546*	0.3480**
	(0.1213)	(0.1841)	(0.1197)	(0.0255)	(0.1189)
sta_for	−0.0622	0.1264	−0.0263	−0.1351	0.0304
	(0.1769)	(0.2220)	(0.0746)	(0.2322)	(0.2368)
sel_for	−0.3141	0.7231	−0.1796	−0.1181	1.3499
	(0.6678)	(1.2063)	(0.2155)	(0.6459)	(1.2689)
dyn_for	−0.0034	−0.0408	0.0079	−0.0213	−0.0056
	(0.0220)	(0.0460)	(0.0255)	(0.0768)	(0.0386)
$LNASSETS$	−0.0027	−0.0236	0.0074	0.0093	−0.0408*
	(0.0123)	(0.0141)	(0.0068)	(0.0050)	(0.0201)
ETA	−0.0596	−0.0972	−0.0098	0.0500	−0.1657
	(0.0945)	(0.1326)	(0.0788)	(0.0441)	(0.1689)
LTD	−0.0062	−0.0187	−0.0021	0.0011	0.0871
	(0.0047)	(0.0144)	(0.0050)	(0.0012)	(0.0500)
ROE	0.0002	−0.0018	0.0015	0.0003	0.0048
	(0.0009)	(0.0012)	(0.0030)	(0.0004)	(0.0061)
# of obs.	1016	515	501	504	512
# of groups	105	105	103	79	82
1st stage					
Instruments	48	39	42	46	46
Year dummies	2011–2019	2011–2014	2016–2019	2011–2019	2011–2019
	0.819	0.567	0.391	0.933	0.445
Arellano-Bond	0.950	0.725	0.102	0.915	0.323
Hansen	0.052	0.119	0.363	0.398	0.421
2nd stage					
Instruments	4	4	4	4	4
Hansen	0.006	0.785	0.265	0.982	0.095

Note 1: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Note 2: The table reports the results of the regression using the two-step system-GMM estimation by Kripfganz and Schwarz (2019) as specified in Eq. (1), followed by robust to autocorrelation and heteroskedasticity standard errors in parentheses. The dependent variable is the ratio of small business loans to total loans, $SMELTA$ and the time-variant dependent variable dyn_for_time is not included. Both first and second stage models included the constant. The first column displays results for the whole sample; the next two columns show the results for observations in years 2009 to 2014 (column 2) and years 2015 to 2019 (column 3); the last two columns show the results for observations with a dependent variable below its median value (column 4) and above its median value (column 5). We assumed endogeneity on the time-invariant variables. Variable definitions are reported in Table 1.
Note 3: The test statistics are the Wald test for the joint insignificance of the time dummies, the (Arellano and Bond, 1991) test for no second-order serial correlation in the first-differenced residuals, and the Hansen test for the overidentification restriction. For all tests only p-values are shown.

isolating the causal impact of the regulatory change itself. A more refined approach would distinguish banks above and below the 20% threshold at implementation, comparing banks for whom the regulation was non-binding versus binding. Such threshold-based analysis could reveal whether ownership effects differ between banks making voluntary SME lending choices versus those responding to regulatory requirements. Our preliminary examination shows that foreign and domestic banks were positioned differently relative to the threshold in 2015 and exhibited different adjustment paths through 2018, suggesting this distinction would be empirically meaningful—although implementing such analysis would require a substantial methodological extension beyond the scope of the current study.

6.2. Results for various stages of small business lending

Results are also disentangled for different values of the dependent variables ($SMELTL$ and $SMELTA$). Specifically, we also report results for different parts of the conditional distribution of the dependent variables, since explanations might differ for higher or lower values of $SMELTL$ and $SMELTA$. These results are also reported in Tables 4–7, in which the sample of the dependent variables is divided according to the median—above and below (columns 4 and 5). Column 1 in those tables displays the estimation for the whole sample for reference. We consider the explanations for this varying impact would deserve a specific investigation, given the richness of the alternative hypotheses—possibly attributed to scale and diminishing effects in the development of financial sectors (Rioja and Valev, 2004; Abdelsalam et al., 2025). However, we consider it is also of interest to explore the plausibility of this scenario, even if the analysis is confined to a short subsection.

Table 7
Results of system-GMM estimation for $SMELTA$ with dynamic-time variable dyn_for_time.

	Full	Sample by year		Sample by median	
	Sample	2009–2014	2015–2019	Below median	Above median
$L.SMELTA$	0.8441***	0.6233***	1.0022***	0.0555*	0.3230*
	(0.1121)	(0.1795)	(0.1191)	(0.0251)	(0.1415)
sta_for	−0.0706	0.1402	−0.0332	−0.1336	0.0391
	(0.1720)	(0.2292)	(0.0757)	(0.2287)	(0.2590)
sel_for	−0.3585	0.7943	−0.1986	−0.1211	1.4177
	(0.6439)	(1.2485)	(0.2172)	(0.6370)	(1.3815)
dyn_for	−0.0036	−0.0309	0.0065	−0.0043	0.0045
	(0.0272)	(0.0414)	(0.0209)	(0.0716)	(0.0309)
dyn_for_time	−0.0036	0.0119	−0.0030	−0.0056	−0.0223
	(0.0078)	(0.0114)	(0.0084)	(0.0040)	(0.0141)
$LNASSETS$	−0.0012	−0.0241	0.0081	0.0091	−0.0434*
	(0.0111)	(0.0140)	(0.0067)	(0.0048)	(0.0206)
ETA	−0.0566	−0.0930	−0.0059	0.0548	−0.1715
	(0.0889)	(0.1291)	(0.0826)	(0.0434)	(0.1570)
LTD	−0.0057	−0.0183	−0.0023	0.0010	0.0862
	(0.0044)	(0.0142)	(0.0052)	(0.0011)	(0.0536)
ROE	0.0002	−0.0019	0.0015	0.0003	0.0052
	(0.0009)	(0.0012)	(0.0030)	(0.0004)	(0.0068)
# of obs.	1016	515	501	504	512
No. of Groups	105	105	103	79	82
1st stage					
Instruments	48	40	43	48	47
Year dummies	2011–2019	2011–2014	2016–2019	2011–2019	2011–2019
	0.832	0.554	0.474	0.946	0.597
Arellano-Bond	0.943	0.718	0.103	0.811	0.298
Hansen	0.081	0.140	0.358	0.517	0.534
2nd stage					
Instruments	4	4	4	4	4
Hansen	0.108	0.878	0.284	0.974	0.089

Note 1: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Note 2: The table reports the results of the regression using the two-step system GMM estimation by Kripfganz and Schwarz (2019) as specified in Eq. (1), followed by robust to autocorrelation and heteroskedasticity standard errors in parentheses. The dependent variable is the ratio of small business loans to total loans, $SMELTA$ and the time-variant dependent variable dyn_for_time is included. Both first and second stage models included the constant. The first column display results for the whole sample; the next two columns show the results for observations in years 2009 to 2014 (column 2) and years 2015 to 2019 (column 3); the last two columns show the results for observations with a dependent variable below its median value (column 4) and above its median value (column 5). We assumed endogeneity on the time-invariant variables. Variable definitions are reported in Table 1.
Note 3: The test statistics are the Wald test for the joint insignificance of the time dummies, the (Arellano and Bond, 1991) test for no second-order serial correlation in the first-differenced residuals, and the Hansen test for the overidentification restriction. For all tests only p-values are shown.

The dynamic effect of $SMELTL$ becomes significant when the values corresponding to this variable are above the median (see column 5 in Tables 4 and 5). Thus, for small business lending to total loans, only for banks with a high ratio is there a significant inertia in their lending policy. Moreover, for both dependent variables, the higher their small business lending ratio the higher the inertia, especially for $SMELTL$.

As a general result, the impact of the ownership type is much higher for values of the dependent variable above the median than below the median, particularly in the case of $SMELTL$, regardless of whether the short-term dynamic effect is excluded (Table 4) or included (Table 5). For $SMELTA$ these differences are also important since, in this case, the effect is even negative for values below the median (Tables 6 and 7). Again, the lack of significance at the usual levels might be disappointing, but given the consistency and relevance of these results, we consider further research is needed, which should probably contemplate alternative methodologies to capture possible nonlinear relationships.[7]

Results for the subsamples indicate that the significant impacts (at the 1% level) are confined to small business lending to total loans for values below the median when the model includes the temporal evolution variable dyn_for_time (Table 5). The positive and significant coefficient for dyn_for (0.0358) indicates that banks acquired by foreign banks increase the ratio of SME loans to total

[7] Actually, the previous literature has not considered this issue and, therefore, it can be considered as a future avenue for research, possibly combining it with quantile regression methods.

loans beginning in the year of acquisition. However, the negative and significant coefficient on dyn_for_time (−0.0095) indicates this effect diminishes over time—specifically, the initial increase of 3.6 percentage points decreases by approximately one percentage point each year following acquisition.

6.3. Other bank-specific factors and small business lending

None of the control variables is significant for the whole sample. However, when we analyse the estimates by subsamples we find that total assets ($LNASSETS$) is significant, regardless of the model specification and the dependent variable for the subsample consisting of the propensity to lend above the median; LTD is also significant in this subsample, but only for $SMELTL$; likewise, LTD and ROE are only significant for $SMELTL$ in the period 2009–2014.

The negative coefficients corresponding to $LNASSETS$ in $SMELTL$ and $SMELTA$ regressions for the subsample consisting of banks with a propensity to lend above the median indicate that large-sized banks may reduce the percentages of small business loans when those are already very high. Meanwhile, for lower values of small business loans the banks' size has no effect on their small business lending policy.

With respect to total loans to small businesses as a share of total loans, and for banks above the median in this variable, we observe that the higher the liquidity ratio (LTD), the higher the propensity to lend to SMEs: an increase of one point in the liquidity ratio increases the ratio of small business lending to total loans by almost two points.

Finally, in the period 2009–2014, both liquidity (LTD) and profitability (ROE) have a negative and significant effect on total loans to small businesses as a share of total loans: high levels of liquidity and profitability are significantly related with low propensity to lend to SMEs. These negative effects disappeared as of 2015 with the changes in the Indonesian banking industry made that year.

6.4. Robustness analysis

As mentioned in Section 5.2, we follow the two-stage system-GMM estimation procedure proposed by Kripfganz and Schwarz (2019). In the first stage, the coefficients of the time-variant regressors are estimated, whereas the time-invariant effects are estimated in the second stage. This approach prevents the estimation of time-variant effects in the first stage from depending on the strong assumptions needed for the estimation of time-invariant effects in the second stage. Therefore, the estimation of time-variant effects becomes more robust.

We can check the influence of the assumptions needed for the estimation of time-invariant effects by comparing our estimations with those we would obtain using the (Blundell and Bond, 1998) approach, where the coefficients of both time-variant and time-invariant regressors are obtained simultaneously at the cost of assuming very strong orthogonality conditions.

In-between the approaches by Kripfganz and Schwarz (2019) and by Blundell and Bond (1998), the former authors also propose a one-stage system-GMM estimation, where the identification of the coefficients of the time-invariant regressors is based on a different and more limited set of assumptions than in Blundell and Bond (1998).

Table 8 shows the system-GMM estimations obtained under these three approaches: the one by Blundell and Bond (1998) (columns BB); the one-stage approach by Kripfganz and Schwarz (2019) (columns KS one-stage); and the two-stage approach by the same authors (columns KS two-stage). Columns 1 to 3 refer to the small business loans as a share of total loans model, and columns 4 to 6 to the small business loan to total assets, in all cases for a model specification without short-term dynamic effects.

With respect to the time-variant control variables, in general, we observe that the estimations under the BB approach are higher than under both KS approaches; and that the estimations under the KS one-stage approach are higher than under KS two-stage approach, although the differences are less pronounced. With regard to the time-variant dummy dyn_for, the magnitude of the estimated effect also depends on the procedure followed.

The estimated effects of the lagged dependent variables depend on the variable used in the model to measure the propensity of small business lending. For small businesses loans to total loans, the lowest effect is obtained under the KS two-stage approach, which halves the one obtained under the BB approach. However, for small businesses loans to total assets, the effect of the lagged variable is independent of the procedure followed to estimate it.

These results highlight the relevance of the assumptions imposed to estimate the time-invariant effects in the estimation of the time-variant coefficients.

7. Concluding remarks and some policy implications

The objective of this study was to examine the static and dynamic effects of bank governance on their propensity to lend to small and medium enterprises in the context of the Indonesian banking industry. We included the effects of static ownership (domestic vs foreign) and dynamic events (foreign acquisition) in the same regression models. The case of Indonesia is a particularly interesting one, as it is an emerging economy growing at much faster rates than developed countries, and where the dynamic and rapid changes in bank ownership have resulted in a richer and more complex industry. In this evolving scenario, the discourse on the interactions between SMEs and banks, according to which local and regional banks have comparative advantages in providing services to these firms (Hasan et al., 2021), demands further assessment, since it is mainly based on the findings for developed economies.

Our identification exploits variation from Indonesia's regulatory history: post-1997 liberalization, 2012 foreign ownership restrictions, and 2015 mandatory SME requirements. Estimates are conditional effects after controlling for observable characteristics.

Table 8
Results of system-GMM estimation for $SMELTL$ and $SMELTA$: different estimation approaches.

	$SMELTL$			$SMELTA$		
	BB	KS one-stage	KS two-stage	BB	KS one-stage	KS two-stage
$L.SMELTL$	0.6253	0.5317	0.3169			
	(0.3236)	(0.3413)	(0.2643)			
$L.SMELTA$				0.8138***	0.8263***	0.8147***
				(0.0978)	(0.1176)	(0.1213)
sta_for	−1.8857	−1.2431	0.3032	0.0463	0.0342	−0.0622
	(1.8187)	(0.9959)	(1.2662)	(0.0538)	(0.0447)	(0.1769)
sel_for	2.1142	−0.2301	3.6203	0.0724	0.0644	−0.3141
	(2.5251)	(0.2103)	(4.0994)	(0.2350)	(0.0429)	(0.6678)
dyn_for	−2.5858	−0.0324	0.0128	−0.0532	−0.0370*	−0.0034
	(2.7159)	(0.0953)	(0.0748)	(0.2272)	(0.0171)	(0.0220)
$LNASSETS$	0.0238	0.0171	−0.0878	−0.0078	−0.0046	−0.0027
	(0.0891)	(0.0579)	(0.0873)	(0.0045)	(0.0040)	(0.0123)
ETA	−2.5525	−1.5300	−1.5225	−0.0146	−0.0046	−0.0596
	(2.2996)	(0.9015)	(0.9976)	(0.0806)	(0.0801)	(0.0945)
LTD	0.3574	0.2058	0.2115	−0.0075	−0.0074	−0.0062
	(0.3311)	(0.1606)	(0.2065)	(0.0042)	(0.0045)	(0.0047)
ROE	0.0338	0.0177	0.0049	−0.0021	−0.0015	0.0002
	(0.0367)	(0.0235)	(0.0065)	(0.0014)	(0.0016)	(0.0009)
# of obs.	1016	1016	1016	1016	1016	1016
# of groups	105	105	105	105	105	105
1st stage						
Instruments	76	49	46	76	49	46
Year dummies	2011–2019	2011–2019	2011–2019	2011–2019	2011–2019	2011–2019
	0.957	0.559	0.278	0.793	0.732	0.819
Arellano-Bond	0.202	0.175	0.215	0.870	0.909	0.950
Hansen	0.845	0.802	0.238	0.321	0.056	0.052
2nd stage						
Instruments			4			4
Hansen			0.351			0.006

Note 1: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Note 2: The table reports the results of the regression using three different system-GMM approaches: "BB" refers to system-GMM estimation by Blundell and Bond (1998), "KS one-stage" and "KS two-stage" refer, respectively, to the one-stage and two-stage system-GMM estimation by Kripfganz and Schwarz (2019). Standard errors robust to autocorrelation and heteroskedasticity are in parentheses. The dependent variables are: the ratio of small business loans to total loans, $SMELTL$ (columns 1 and 3) and the ratio of small business loans to total assets, $SMELTA$ (columns 4 and 6). We report the results without the dynamic time-variant variable dyn_for_time. We assumed endogeneity on the time-invariant variables. All models included the constant. Variable definitions are reported in Table 1.
Note 3: The test statistics are the Wald test for the joint insignificance of the time dummies, the (Arellano and Bond, 1991) test for no second-order serial correlation in the first-differenced residuals, and the Hansen test for the overidentification restriction. For all tests only p-values are shown.

The exclusion restriction assumes bank characteristics affect SME shares only through correlation with ownership type, supported by three features: (i) we measure portfolio shares not levels; (ii) mandatory requirements made allocation partially non-discretionary; and (iii) excess credit demand meant allocation reflected organizational willingness rather than capacity.

Our evaluation of the impact of bank ownership on small business lending was based on three main effects: static (differences between domestic and foreign banks), selection (differences in banks that have undergone ownership changes), and dynamic (changes due directly to ownership shifts). In this regard, we considered three hypotheses based on existing literature: (i) foreign banks have a smaller proportion of small business loans compared to domestic banks; (ii) joint banks (foreign-acquired domestic banks) allocate a lower percentage of loans to small businesses than domestic banks; and (iii) foreign-acquired banks reduce their small business lending after acquisition. While some studies suggest foreign banks may be less inclined to lend to small businesses due to information asymmetries, others indicate that joint banks might leverage both local knowledge and advanced screening technologies to better serve SMEs. However, the empirical evidence for Indonesia, where banks dominate the financial system, is very scarce, and whose mix of domestic and foreign banks makes their comparison particularly pertinent.

Our estimations, obtained via state-of-the-art two-stage estimation procedure proposed by Kripfganz and Schwarz (2019), yielded a myriad of results that can be summarized from a multiplicity of perspectives. Apart from the novelty of considering both static and dynamic variables, following Berger et al. (2005) and Shaban and James (2018), we also report results for two relevant and frequently used dependent variables, namely, the share of small business loans over total loans ($SMELTL$), and the share of small business loans over total assets ($SMELTA$), as well as the inclusion or exclusion of dynamic variables. Finally, to ascertain whether the effects can be attributed to a particular time or level of indebtedness, we also split the table into two sub-periods (2009–2014

and 2015–2019) and according to observations above or below the median—which might be related to scale and diminishing effects in the development of the banking sector. The consideration of two sub-periods is relevant, due to the regulations that established incremental increases in the minimum amount banks were required to lend to SMEs after 2015.

Our research found no statistically significant differences in the proportion of small business loans between these bank types, whether measured as a percentage of total loans or total assets. However, when analysing subperiods (2009–2014 and 2015–2019), the results suggested that foreign banks became less oriented towards SME lending after 2015, coinciding with changes in the Indonesian banking industry. Although not statistically significant, the coefficients for foreign banks and recently foreign-acquired banks were positive in the 2009–2014 period but became negative and of higher magnitude in the 2015–2019 period.

Further analysis revealed some nuanced findings related to bank ownership. Banks recently acquired by foreign entities showed a tendency to increase their ratio of SME loans to total loans in the year of acquisition, but this propensity decreased over time. This effect was significant for banks with SME lending ratios below the median. The study also found that the impact of ownership type was generally more pronounced for banks with SME lending ratios above the median. While these results lacked statistical significance at conventional levels, we should highlight their consistency and relevance, which points out the need for further investigation using alternative methodologies to capture potential nonlinear relationships between bank ownership and SME lending practices.

In this regard, in contrast to the previous literature, our methodological approach suits particularly well our application, given its ability to handle jointly both time-invariant and time-varying regressors. Specifically, the presence of time-invariant variables, such as bank ownership type, can lead to endogeneity issues and biased estimators if traditional methods like OLS are used. While difference-GMM or system-GMM approaches can address this, they require strong orthogonality assumptions that may not always hold. To overcome these limitations, we apply the two-stage estimation procedure proposed by Kripfganz and Schwarz (2019). This method first estimates time-variant regressors, then uses the residuals to identify coefficients of time-invariant regressors in the second stage, and prevents potential biases from incorrect assumptions about time-invariant regressors from affecting the estimates of time-variant effects. We also applied an instrumentation strategy and used post-estimation tests to examine the validity of our findings.

The regression analyses conducted in this study not yielding statistically significant results might be, *a priori*, disappointing. Although this may appear unexpected, it is essential to recognize that such findings are valuable and contribute meaningfully to the field of economics and finance, despite this might clash with the widespread notion that non-significant results are non-informative (Abadie, 2020). However, non-significant results can be crucial for refining economic theories and models (Deaton, 2010), and inform policymakers about the limitations and uncertainties inherent in economic analyses (Manski, 2013), despite the wide consensus on the existence of selective publication or publication bias (Andrews and Kasy, 2019). Indeed, despite following the same protocols, it is often the case that replication of published experiments frequently find opposite effects, or of smaller magnitude, than those in the initial studies.[8]

Our methodology and data collection process support the credibility of our results. The lack of significant findings suggests that the relationships between the variables may be more complex than previously understood, or that other unmeasured factors could be influencing the outcomes. It could also be suggesting that some of the literature's findings cannot be easily extrapolated across contexts, particularly when comparing countries at different stages of economic and financial development (Jones and Bullen, 1994). Hence, future research should explore these possibilities and further investigate the contexts in which these relationships hold.

In addition, it would also be relevant to examine other related issues to those examined here, involving other types of property. This might include the factors that drive the propensity of government banks to lend to SMEs, found in other studies. This is important to draw conclusions on whether lending by government-owned banks boosts social welfare and growth. According to Körner and Schnabel (2011), the effects of government ownership in banking on economic growth hinge upon the condition of financial development and political institutions. Moreover, Barry et al. (2016) suggest that a large amount of loans from government-owned banks tends to be related to higher corruption in lending, which thus hinders the efficiency of bank lending to the economy (Zheng et al., 2013).

Another point worth considering is the way possible corrupt practices might affect government bank lending. The literature has found that countries with low quality of government are associated with misallocation of lending (Huang et al., 2021), which can therefore jeopardize firm growth (Beck et al., 2005) and ultimately hamper economic development (Aidt, 2009). Beck et al. (2005) also assert that small businesses make up the sector most prone to the adverse effect of corruption and lack of transparency. In addition, the literature emphasizes the significant role social capital plays in small business lending by local banks (Behr et al., 2013; DeYoung et al., 2019). It would therefore be useful to investigate whether social capital and trust influence the availability of SME loans by local government banks in Indonesia (Clark et al., 2021).

In addition, our sub-period analysis treats the 2015 regulatory mandate as a structural break affecting all banks uniformly, but a more refined approach might exploit heterogeneity in how the regulation affected individual banks. Specifically, banks already exceeding the 20% threshold faced no binding constraint, while banks below the threshold were forced to adjust. Comparing ownership effects across these groups would distinguish voluntary SME lending choices from regulatory compliance, potentially revealing ownership-related differences masked in our analysis by the regulatory overlay. A regression discontinuity design or difference-in-differences framework exploiting threshold variation would constitute a valuable extension. Additionally, future research could examine the quality and pricing of SME loans across ownership types, and investigate whether foreign banks' SME lending focuses on larger, more transparent small businesses versus truly micro enterprises.

[8] In the specific field of finance, Fama and French (1993) note explicitly that understanding and reporting non-significant findings are essential for developing a comprehensive view of market behaviours.

Our findings could inform policy decisions in other emerging markets, not only Indonesia, particularly in Southeast Asia and regions with similar bank-oriented financial systems (Beck et al., 2011b). The observation that foreign banks' SME lending patterns changed after regulatory reforms, though not significantly, suggests that the impact of foreign bank entry may be more nuanced than previously thought. This is especially relevant for countries considering liberalization of the banking sector or restrictions on foreign ownership. In addition, considering the state-of-the-art econometric approach would result in particularly rigorous applications, useful for examining similar transitions in other emerging economies where relationship lending remains crucial for SME financing. Countries such as Vietnam, Thailand, and the Philippines, for instance, which share some institutional characteristics with Indonesia and are at various stages of banking sector liberalization, could benefit from applying our analytical framework.

Finally, while our primary findings revealed no statistically significant differences in SME lending between foreign and domestic banks overall, the temporal analysis offers important practical implications, for both policymakers and practitioners. Although the dynamic patterns suggest that ownership type *per se* may not be the primary determinant of SME lending, the regulatory environment and transition period following ownership changes may be crucial for SME credit availability. Such insights could turn particularly relevant for regulators designing foreign bank entry policies and for SMEs seeking to understand how bank ownership transitions might affect their access to credit. Our findings also indicate that policies aimed at maintaining stable lending relationships during ownership transitions may be more important than restrictions on foreign ownership itself.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Mendeley Data: https://data.mendeley.com/datasets/y8tsz4y7yn/1

Bank Ownership, Governance Changes, and Small Business Lending in Indonesia (Original data) (Mendeley Data)

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