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Impact of Foreign Ownership on Market Power: Do Regional Banks Behave Differently in ASEAN Countries?*

Canan Yildirim^a
Rennes School of Business

Adnan Kasman^b
Adnan Menderes Üniversitesi

Fazelina Sahul Hamid^c
Universiti Sains Malaysia

Abstract

The change in crossborder financial intermediation and rise in regional banking have consequences for competitive conduct in emerging countries' banking markets. Using data from the Association of Southeast Asian Nations countries' banks during 2011–2018, we examine the nexus between foreign ownership and banks' market power by controlling for the heterogeneity of foreign banks concerning their countries of origin (advanced vs. emerging and regional vs. nonregional). We find that the increasing presence of foreign banks from advanced countries is associated with lower bank market power because of higher marginal costs and lower price–cost margins of the domestic banks. However, the increasing presence of emerging countries' banks is associated with higher bank market power because of lower marginal costs and prices of domestic lenders. Our findings have implications for policies regarding bank competitiveness and promoting regional banking integration because domestic banks conduct differently under increased participation levels of advanced and emerging country foreign banks.

Keywords: Bank market power; Foreign ownership; Regional banks; ASEAN

JEL classification: F23, F36, G21, L10

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1. Introduction

The changing patterns of crossborder financial intermediation and rise of regional banking in the aftermath of the global financial crisis (GFC) have been noted previously (see e.g., Claessens, 2017; Cull et al., 2018; World Bank, 2018). In particular, banks in emerging countries have expanded in their home regions, and advanced countries' lenders have retreated to their home markets in the GFC aftermath, thereby giving well-capitalized and larger emerging-market banks further opportunities for accelerated regional and global growth. However, research on the implications of the aforementioned movements for the resulting market structure and competitive conduct in the emerging markets' banking sectors is scarce. Our study addresses this gap in the literature.

Bank competitiveness has significant implications for the efficiency and stability of the banking industry. Therefore, extant literature has examined competitive conduct and its determinants in the banking industry (see e.g., Fungáčová et al., 2010; Efthyvoulou and Yildirim, 2014; Agoraki et al., 2020). A particular stream of the literature focuses on the impact of foreign ownership on bank market power (Delis et al., 2016; Alexakis and Samantas, 2020). Although existing studies have produced ambiguous findings on the nexus between foreign ownership and bank market power, recent research highlights the growing heterogeneity of foreign banks pertaining to their countries of origin (Van Horen, 2007; Pelletier, 2018). Foreign banks are not homogenous concerning their internationalization strategies, business models, and home markets; therefore, they show different performances across different markets (Havrylchyk and Jurzyk, 2011; Claessens and Van Horen, 2012). Foreign banks from advanced countries may perform better in foreign and diverse countries because of their firm-level cost and revenue advantages arising from "globally best banking technology and know-how" (Claessens, 2017, p. 35) and better home country regulations and institutions (Berger et al., 2000; Claessens and Van Horen, 2012). Meanwhile, banks from emerging countries may have competitive advantages in environments culturally and institutionally closer to their home markets (Van Horen, 2007). Compared with foreign banks from advanced countries, they may be better at collecting and using soft information and serve more opaque borrowers efficiently (Claessens, 2017).

The preceding discussion underlines the need for new research into the nexus between foreign ownership and bank market power that takes a more granular approach to control for the heterogeneity of foreign banks pertaining to their countries of origin (advanced vs. emerging and regional vs. nonregional). Therefore, our study analyzes the effect of foreign ownership on individual bank market power in the Association of Southeast Asian Nations (ASEAN) banking systems in the post-GFC period.

The ongoing progress toward regional integration and the recent changes in the region's foreign bank population render the ASEAN banking systems an ideal setting to investigate the nexus between market power and foreign ownership by leveraging the resulting heterogeneity among foreign banks in the region. The withdrawal of European banks, largely dominating the crossborder activity in the pre-GFC years, created opportunities for the regional banking groups to step in and rendered the bulk of intermediation intraregional in the Asia-Pacific area (Remolona and Shim, 2015). Contributing to these trends have been the ongoing initiatives to further ASEAN intraregional trade and financial integration. Since the Asian financial crisis, regional financial integration has been progressing significantly in the ASEAN, and the creation of the ASEAN Economic Community (AEC) in 2015 and the ASEAN Banking

Integration Framework are expected to accelerate that progress in the coming years (Almekinders et al., 2015).

We take the following approaches in analyzing the impact of foreign ownership on market power. First, we estimate Lerner indices as a proxy for the individual bank's market power and then investigate foreign ownership's effect on bank market power. The Lerner index measures a bank's ability to set prices higher than marginal costs and hence allows us to examine the two channels through which foreign ownership can influence bank market power: the own effect of ownership and the spillover effect. The own effect of ownership relates to foreign banks having different levels of market power compared with domestically owned banks. Meanwhile, the spillover effect refers to the impact of the overall level of foreign bank participation in the system on individual banks' market power. Furthermore, we study the underlying sources of the two effects on bank market power: changing prices or marginal costs—the components of the Lerner index. Second, we examine whether the two channels of influence operate differently given the heterogeneities among foreign banks in the region because of their country of origin. Therefore, in our models, we differentiate among foreign banks originating from advanced countries, regional emerging countries, and nonregional emerging countries.

We contribute to the literature on the link between banking market power and foreign ownership in two ways: First, post-GFC transformations in crossborder banking have allowed several banks from emerging countries to become key players in their home regions and other emerging markets.¹ However, the reasons for and implications of the recent rise of regional banking are not well understood. Moreover, little is known about the emerging banking groups' increasing role in international financial intermediation. Limited existing research on regional banks suggests that they might have informational and efficiency advantages over "conventional" foreign banks originating from advanced countries and local banks (Léon, 2016; Zins and Weill, 2018). Subsequently, these advantages might help them achieve relatively higher margins. Accordingly, our study contributes to a better understanding of how the nexus between market power and foreign ownership depends on a foreign bank's country of origin. Second, in response to the newly introduced regulations in the aftermath of the GFC, bank business model transformations are expected to have substantial implications for the host country's market competitiveness (Kumar and Gulati, 2019; Alexakis and Samantas, 2020). For example, the resulting so-called conventional global bank withdrawals could negatively affect the emerging host country's market competitiveness (Hryckiewicz and Kozłowski, 2018). Therefore, our study's findings have essential policy implications for developing policies to ensure competitive and robust banking systems under the new global banking regime created in the aftermath of the GFC.

Finally, in light of the financial integration occurring in the ASEAN region and the greater emphasis placed on the role of regional banks, our study analyzes the impact of these changes on the ASEAN banking system competition. Although some recent studies have examined the evolution of banking competition and integration in the ASEAN countries, they have failed to reach conclusive results. For example, Zhang and Matthews (2019) found convergence toward

¹See, for example, He et al. (2019) and Kabongo and Okpara (2019) for the recent internationalization of banks from China and Africa, respectively.

a monopolistic competitive market structure and suggested that financial integration has been moderately successful. However, Ventouri (2018) reported no clear sign of the convergence of competitiveness across the region. Focusing on banking integration among the ASEAN-6, Ha et al. (2020) found that all the countries, excluding Singapore, have low levels of banking integration. However, none of these studies have considered the impact of foreign ownership explicitly and the increasing penetration of regional banks on competitive behavior in the region's banking sectors.²

By way of preview, our results show varying degrees of market power across the countries with no common trend during the sample period. Regarding the relationship between foreign ownership and market power, the results show that foreign-owned banks and domestically owned banks do not have significantly different market power levels. For the spillover effect, we find that it has a significant impact on bank market power, with the impact direction depending on the foreign bank's country of origin. Moreover, the increasing presence of advanced countries' banks creates a downward pressure on the bank market power, whereas a higher presence of foreign banks from emerging countries is associated with higher market power. Additional analysis reveals that the negative spillover effect of the increased presence of advanced countries' foreign banks on the market power is derived from higher marginal costs and lower price–cost margins of the domestic banks. This finding may suggest that domestic banks are either inefficient or focusing more on market segments that are costly to serve; they cannot adjust their prices accordingly. By contrast, the positive spillover effect of the increased presence of emerging countries' foreign banks on the market power appears to be primarily because of lower marginal costs and prices of domestic lenders. This result can be attributed to the fact that emerging countries' foreign banks are competing with domestic banks in similar market segments and that domestic banks are forced to improve their efficiency to survive. Finally, the results show that the spillover effect from the presence of emerging country's banks does not depend on their regional origin. This suggests that foreign banks originating from the ASEAN countries do not have an advantage over other emerging-country banks.

The rest of the paper is organized as follows: Section 2 provides a brief review of the ASEAN banking industry. Section 3 reviews the literature on the impact of ownership and foreign bank penetration on bank market power. Section 4 describes the empirical models and the data employed. Section 5 reports the empirical results. Finally, Section 6 provides a discussion of the study's conclusions.

2. Overview of the ASEAN banking industry

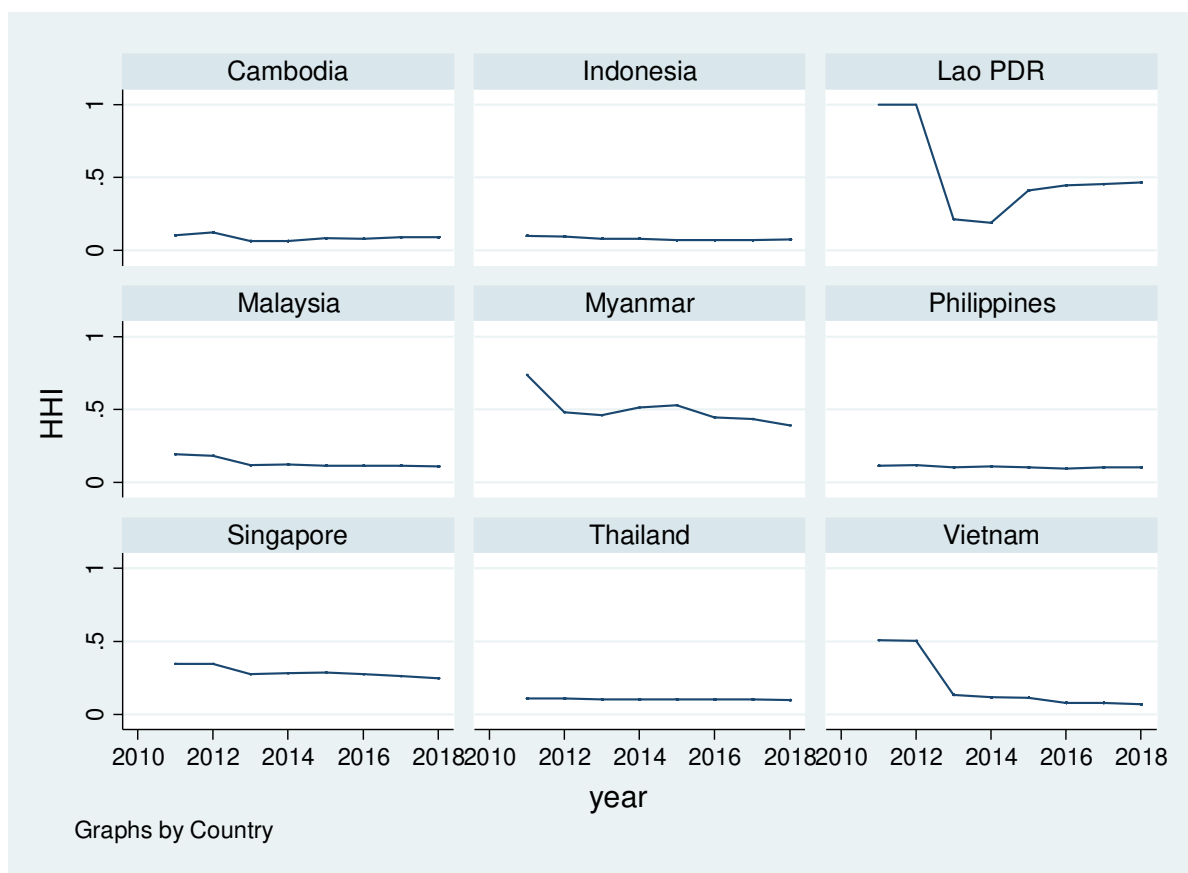
A wide divergence concerning economic and financial development exists among the ASEAN economies (Almekinders et al., 2015). Indonesia, Malaysia, Thailand, Philippines, and Singapore (the ASEAN-5) have more developed banking sectors compared with the other members. Therefore, wide gaps exist in prudential regulation, financial stability infrastructure, and capacity building. Local banks in the ASEAN are more focused on retail banking and more reliant on deposit funding. Banking penetration is higher in Thailand (78%), Malaysia

²As exceptions, two studies were conducted in the context of Indonesia: Mulyaningsih et al. (2015) reported that foreign de nova banks display more competitive behavior than local counterparts, and Shaban and James (2018) showed that banks acquired by regional foreign banks registered efficiency gains.

(81%), and Singapore (96%) than in Indonesia (36%), the Philippines (31%), Vietnam (31%), and Cambodia (22%) (Wijeratne et al., 2018). This finding indicates the future growth potential in the region's banking sector and underlines the region's attractiveness for foreign participation. Stronger bank fundamentals and limited opportunities that some banks experienced in expanding locally because of domestic market saturation encouraged the regions' banks, particularly from Malaysia and Singapore, to expand regionally and banks from Thailand to expand to the Greater Mekong subregion (Wu et al., 2018).

The ASEAN countries also vary in terms of foreign bank entry policies. For example, Malaysia, Thailand, and Vietnam have more stringent rules and do not allow greenfield investment entry (ASEAN Secretariat and the World Bank, 2015). Limits on foreign ownership in local bank acquisitions also differ among the countries; some allow 100% ownership, whereas others only allow up to 30%. Moreover, some countries impose limits on foreign-owned subsidiary banks by restricting the number of branches and off-premises automated teller machines they can operate. Foreign ownership of banks in the ASEAN has traditionally been dominated by non-ASEAN banks (Sahay et al., 2015). However, regional financial integration has encouraged freer capital accounts and greater ASEAN-based foreign participation in the financial market. For example, Ha et al. (2020) showed that crossborder banking in the ASEAN-6 increased sharply during 1996–2016.

The restructuring in the ASEAN-5 countries after the Asian financial crisis and the adopted liberalization policy have changed the banking sector's market structure. Figure 1 shows the evolution of concentration in the ASEAN markets as measured by the Herfindahl–Hirschman index (HHI), which is calculated in terms of market shares in total assets. We can see that the banking sector concentration is more volatile in Lao PDR, Myanmar, and Vietnam during the period, thereby reflecting the changes that occurred in their respective banking industries. Meanwhile, banking sector concentration in Singapore remained higher than the rest of its ASEAN-5 counterparts.



Source: Authors' own calculations.

Note: The HHIs are calculated in terms of market shares in total assets.

Fig. 1. The Herfindahl–Hirschman Index

3. Related literature

Foreign bank ownership may affect banks' competitive behavior or market power through two primary channels: the own effect of ownership and the spillover effect (Peria and Mody, 2004; Delis et al., 2016).

Foreign-owned banks may have different levels of market power because of several underlying mechanisms. Compared with domestically owned banks, foreign-owned banks may have lower costs because of superior managerial skills and procedures spread over more resources (Berger et al., 2000). Furthermore, by providing sophisticated and tailor-made and/or wider variety services that raise revenues or by undertaking higher risk/higher return investments because of crossborder risk diversification benefits, they may have higher revenues through superior investment or risk management skills (Berger et al., 2000; Alexakis and Samantas, 2020). They can derive competitive and informational advantages due to their parents' access to international markets, better-diversified financing, customer bases, and strong brand names (de Haas and van Lelyveld, 2010; Buch et al., 2013). Meanwhile, foreign banks may have higher costs or lower revenues because of distance-related organizational diseconomies or other disadvantages attributable to being foreign (e.g., costs associated with adjustments to diverse institutional environments) (Berger et al., 2000; Miller and Parkhe,

2002).³ Geographical and institutional distance creates additional costs to foreign banks in collecting and transferring soft information within the organization (Mian, 2006; Berger et al., 2001). Therefore, whether foreign-owned banks have higher or lower market power than domestically owned banks is a priori not clear and must be established empirically.

The indirect or spillover effect of foreign bank participation on the market power of the host country may take effect through technology transfer and productivity spillovers (Goldberg, 2007). The local banks' managerial efficiency and organizational structure can be enhanced through advanced techniques and skills introduced by foreign banks (Claessens et al., 2001; Chen and Zhu, 2019). Therefore, higher levels of foreign bank presence may reduce the market power of all the individual banks if more efficient foreign banks provide services at more competitive prices, take market share away from inefficient local banks, and hamper local bank's ability in obtaining higher margins due to economies of scale or scope (Berger et al., 2000; Manlagñit, 2011). However, foreign bank presence may lead to higher market power if it increases more rapidly and fails to create procompetitive pricing pressure on local players (Delis et al., 2016). Foreign banks may engage in "cream-skimming," whereby they select customers based on hard information and collaterals (Sengupta, 2007). Foreign banks may also concentrate more on nontraditional banking activities (fee and commission income-generating activities), where competition can be relatively low (Bolt and Humphrey, 2010). By contrast, domestically owned banks might reorient their business models and focus on segments where they have informational advantages and hence achieve higher market power (Peria and Mody, 2004). Accordingly, the effect of foreign bank participation on all the banks' market power (i.e., the spillover effect) can be positive or negative.

Several studies have employed various performance indicators and focused on the effect of foreign banks' increased participation on banking competitiveness; they reported mixed results. For example, some studies have found that foreign banks' increased presence was associated with a reduction in domestic banks' profitability and margins (Claessens et al., 2001) and enhanced competition (Claessens and Laeven, 2004; Jeon et al., 2011). By contrast, other studies have reported that increased foreign penetration has no significant spillover effects on bank spreads (Peria and Mody, 2004) or results in a less competitive industry (Yeyati and Micco, 2007).

In this context, focusing on the impact of foreign bank ownership and penetration on bank-level market power, Fungáčová et al. (2010) found that ownership structure did not have any bearing on banks' market power in Russia. However, Efthyvoulou and Yildirim (2014) showed that foreign ownership is associated with higher market power in the case of Central and Eastern European (CEE) banking markets. Similarly, Lin et al. (2020) reported that higher foreign ownership is associated with higher market power in Chinese banks. Moreover, several studies have differentiated foreign participants across the employed entry modes, such as greenfield investment versus acquisition, because entry modes signal different post-entry strategies and involve diverse costs and benefits. Poghosyan and Poghosyan (2010) demonstrated that foreign-acquired banks' market power in the CEE countries was

³Empirical studies investigating performance differences employing efficiency and other performance measures, such as return on assets between foreign and domestic banks remain mixed. See for example, Berger et al. (2000); Berger et al. (2005); Havrylchyk (2006); Claessens and Van Horen (2012); and Shaban and James (2018).

significantly lower than that of domestic and foreign greenfield banks. They suggested the acquired banks' strategy of expanding their activities in the region and the resulting procompetitive pressure could explain the differences in the two types of entrants' relative market powers. By contrast, Lozano-Vivas and Weill (2012) demonstrated that in the European Union, foreign banks established through greenfield entry have lower market power; however, those established through acquisitions have higher market power. According to the authors, the source of lower market power for greenfield banks could be switching costs and entry barriers.

Only a few studies have focused explicitly on foreign ownership's own and spillover effects on bank-level market power. Employing a wide crosscountry sample, Delis et al. (2016) failed to find a significant direct (own) ownership effect on market power; however, they reported a positive and statistically significant spillover effect. Furthermore, they found that lower marginal costs drove the positive effect of foreign presence on market power. Alexakis and Samantas (2020) performed similar analyses in European banking sectors and reported that both own and spillover effects vary depending on the (host) countries where foreign banks operate and (home) countries from which they originate. More specifically, (a) foreign-owned banks originating from other European countries enjoy higher market power, (b) foreign-owned banks in emerging markets have higher market power, and (c) the spillover effect has a U-shaped relationship with market power in the case of advanced European markets.

In this context, numerous studies have concentrated on the role of the local institutional environment because it affects foreign banks' abilities to enter and operate successfully in foreign markets (Claessens and Van Horen, 2012; Bhaumik et al., 2018). Institutional development and regulations promoting more contestable systems, such as fewer activity or foreign-ownership restrictions, improved competitiveness in banking (Claessens and Laeven, 2004; Bikker et al. 2007; Delis, 2012). However, Mirzaei and Moore (2014) revealed distinct characteristics of competition drivers across countries with different income levels (advanced, emerging, and developing) and hence institutional setups. Similarly, Agoraki et al. (2020) found that regulations interact with the level of democracy: In partially free democracies, regulations may not necessarily target bank competitiveness but rather focus on powerful banks' interests. Moreover, foreign bank penetration negatively affects market power in the case of emerging countries (Mirzaei and Moore, 2014) and CEE countries (Agoraki et al., 2020).

The foregoing discussion reveals the ambiguous findings on the nexus between foreign ownership and market power and highlights the importance of considering the heterogeneity of foreign banks pertaining to their countries of origin and host-market institutional contexts. The increasing geographic scope of emerging-country banks and the accompanying rise in regional banking in recent years require new research into market power by using a more granular approach to evaluate if own and spillover effects vary across foreign banks' countries of origin. We draw on the extant literature's contributions and aim to provide new evidence of the link between foreign ownership and market power by leveraging the heterogeneity among foreign banks in the ASEAN banking markets. These markets have achieved significant regional financial integration and experienced an increasing presence of foreign banks from emerging and regional countries over the sample period.

4. Empirical methodology and data

4.1 Nexus between foreign bank ownership and market power

To evaluate the relationship between foreign bank ownership and bank market power, we employed the following empirical model (M1):

$$L_{int} = \beta L_{int-1} + \gamma For\ Bank_{int} + \delta For\ Part_{nt} + \theta X_{int} + \nu Y_{nt} + \varphi M_{nt} \quad (M1)$$

where L represents the Lerner index or the markup of price over marginal cost for each bank i in country n at year t , the estimation of which is explained below. In model M1, *For Bank* and *For Part* are our main independent variables. *For Bank* (*Foreign Bank*) is a dummy that takes the value 1 if a bank is foreign at each point in time. It allows us to evaluate the own effect of foreign ownership on bank market power. However, *For Part* (*Foreign Participation*) is the extent of foreign bank presence calculated as the share of total assets of foreign banks at the country level at each point in time. By including *For Part*, we intended to assess whether a spillover effect exists on market power because of the presence of foreign banks in the system.

X , Y , and M are vectors of bank-level, macroeconomic, and market structure control variables, respectively. We have included these vectors following the recent studies on determinants of bank market power (Efthyvoulou and Yildirim, 2014; Mirzaei and Moore, 2014; Delis et al., 2016). Vector X includes (a) share of customer deposits in total assets (*Deposits*), thereby capturing the funding preferences; (b) share of noninterest income in operating revenues (*Diversification*) measuring business mix; (c) cost to income ratio (*Inefficiency*); (d) log of total assets (*Bank Size*); and (e) total equity to total assets (*Capitalization*). Furthermore, vector Y includes two macroeconomic controls intended to capture macroeconomic fluctuations and business cycle effects: inflation rate (*Inflation*) and GDP growth rate (*Growth*). Finally, Vector M comprises two market structure proxies: degree of concentration in the market measured by the HHI based on total assets (*HHI*) and level of financial development measured by the ratio of broad money to GDP (*Broad Money*).

To determine whether the nexus between foreign bank ownership and market power depends on foreign banks' home countries, we defined the following extensions of our baseline model (M2 and M3):

$$L_{int} = \beta L_{int-1} + \gamma_1 ADV\ For_{int} + \gamma_2 EME\ For_{int} + \delta_1 ADV\ Part_{nt} + \delta_2 EME\ Part_{nt} + \theta X_{int} + \nu Y_{nt} + \varphi M_{nt} \quad (M2)$$

$$L_{int} = \beta L_{int-1} + \gamma_1 ADV\ For_{int} + \gamma_2 EME\ ASEAN_{int} + \gamma_3 EME\ nonASEAN_{int} + \delta_1 ADV\ Part_{nt} + \delta_2 EME\ ASEAN\ Part_{nt} + \delta_3 EME\ nonASEAN\ Part_{nt} + \theta X_{int} + \nu Y_{nt} + \varphi M_{nt} \quad (M3)$$

In model M2, *EME For* (*ADV For*) is a dummy variable that codes foreign banks originating from emerging markets (advanced markets); *EME Part* and *ADV Part* are asset-based market shares of foreign banks originating from emerging and advanced countries, respectively.⁴ In

⁴We classify countries as emerging if they are not classified as advanced according to the IMF World Economic Outlook (April 2020).

model M3, we distinguish between EME banks originating from the ASEAN countries and the others.⁵ In particular, *EME ASEAN* (*EME non-ASEAN*) is a dummy variable coding foreign banks coming from the ASEAN countries (non-ASEAN countries). *EME ASEAN Part* and *EME non-ASEAN Part* are then asset-based market shares of foreign banks originating from the ASEAN and non-ASEAN countries, respectively.⁶

We employed the generalized method of moments (GMM) to estimate our models and address potential endogeneity issues associated with bank-level variables. For example, a well-capitalized bank may acquire another bank and increase its market power. Moreover, the introduction of the lagged bank market power (L_{int-1}) might be plausible because bank market power might be persistent. The introduction of the lagged dependent variable among the right-hand-side variables in models M1–M3 creates complications in estimations because the lagged dependent variable is correlated with the disturbance term. To solve this problem, Arellano and Bond (1991) developed a difference GMM estimator for the coefficients as in the aforementioned models, wherein the lagged levels of the regressors are the instruments for the equation in first differences. However, Arellano and Bover (1995) and Blundell and Bond (1998) suggested to difference the instruments instead of the regressors to make them exogenous to the fixed effects. This approach leads from the difference GMM to the system GMM estimator, which is a joint estimation of the equation in levels and in first differences. Therefore, we used the two-step system GMM estimators with Windmeijer (2005) corrected standard errors. We used the lagged dependent variable, *Deposits*, *Diversification*, *Inefficiency*, *Capitalization*, and *Bank Size*, as the GMM variables, and the *HHI*, *Broad Money*, *Growth*, *Inflation*, foreign bank ownership indicators, and foreign bank market share measures as the independent variables.

We followed the nonstructural approach to assessing bank competition and measured market power by using the Lerner index. The Lerner index has the advantage of capturing market power dynamics at the bank level over time and hence is more informative and richer than other methodological approaches.⁷ It is calculated as follows:

$$L_{int} = \frac{(P_{int} - MC_{int})}{P_{int}} \quad (1)$$

⁵We have also considered grouping our EME banks into two subcategories: from the East Asia-Pacific and South Asia region and other EME countries using the East Asia-Pacific and South Asia country groupings of the World Bank. However, we had only two EME banks originating from outside the East Asia-Pacific and South Asia region.

⁶We should note that EME ASEAN countries exclude Singapore, which is classified as advanced by the IMF. See also Footnote no. 4.

⁷Other alternative measures are employed under the nonstructural approach. Bikker and Haaf's (2002) continuous-time curve version of the H-statistic allows measuring degree of banking competition in a particular market over time. The empirical methodologies based on Panzar and Rosse (1987) and Boone (2008) offered by Brissimis and Delis (2011) and Delis (2012), respectively, generate estimates of competition and market power at bank level. Recent applications of the Lerner index in measuring competition in banking include Efthymou and Yildirim (2014), Mirzaei and Moore (2014), Delis et al. (2016), and Clark et al. (2018). See Mulyaningsih et al. (2015) and Ventouri (2018) for applications of alternative indicators.

where P is the price of bank output proxied by the ratio of interest and noninterest income to total assets and MC is the marginal cost to be estimated.⁸ The Lerner index ranges between zero (in the case of a perfectly competitive bank) and one (purely monopolistic bank), with higher numbers implying greater market power.⁹ Marginal costs are extracted from the estimation of a translog cost function by econometric methods. We explain in detail the estimation of marginal costs in Appendix A.

4.2 Data

We obtained financial data (unconsolidated) for commercial banks from the 10 ASEAN countries for 2011–2018 from the Bureau van Dijk’s BankFocus.¹⁰ Subsequent bank-by-bank screening resulted in removing additional observations, which were noncommercial banks, such as microfinance institutions, private banks, and leasing companies. Banks for which we did not have all the model variables to estimate the Lerner index were also excluded, and the data were reviewed for reporting errors or other inconsistencies. All nominal variables were adjusted for inflation and winsorized at the first and 99th percentiles. The final sample included a total of 1,671 bank-year observations belonging to nine ASEAN countries; Brunei, with data for only one commercial bank, was excluded. Table 1 presents the sample breakdown by country and year.

	2011	2012	2013	2014	2015	2016	2017	2018	Total
Indonesia	40	41	69	75	95	97	96	95	608
Cambodia	12	16	25	25	33	33	30	29	203
Lao PDR	1	1	4	6	10	10	10	10	52
Myanmar	2	3	4	3	3	5	5	3	28
Malaysia	8	8	22	22	25	25	25	24	159
Philippines	10	11	15	15	21	21	21	20	134
Singapore	3	3	6	6	6	6	6	6	42
Thailand	16	17	22	22	24	24	24	24	173
Vietnam	4	4	23	37	47	54	52	51	272
Total	96	104	190	211	264	275	269	262	1,671

Table 1. Number of banks by country and year

Ownership information available on BankFocus reflects the most recent status; therefore, banks were manually classified into the specified ownership categories on a year-by-year basis by employing several sources of data: Claessens and Van Horen’s (2014, 2015) foreign ownership data, bank websites, central bank websites, and ORBIS, which is also provided by the Bureau van Dijk. Data on macroeconomic and institutional variables were extracted from the World Bank’s World Development Indicators and Worldwide Governance Indicators.

⁸Shaffer and Spierdijk (2020) demonstrated the aggregate Lerner index, based on total assets as the single aggregate output factor, can only qualify as a consistently aggregated Lerner index if certain conditions hold. However, because of data limitations, we followed the commonly employed approach in the literature and used a single output cost function to estimate the Lerner index. We are grateful to an anonymous referee for raising this issue.

⁹Theoretically, for the Lerner index, values below zero can be detected, indicating that the bank is having losses in a particular year, which is evidently not sustainable in the long run.

¹⁰More than 75% of the BankFocus observations for the ASEAN countries are in the commercial bank category.

Table 2 presents the variable definitions and data sources. Descriptive statistics of the variables are given in Tables B1 and B2, and the crosscorrelation matrix for variables employed in the second-stage analysis is presented in Table B3. Regarding the prevalence of foreign bank presence in the ASEAN countries, we can see in Table B2 that (a) a considerable variation in the foreign bank presence levels exists across countries and (b) in several cases, foreign banks originate primarily from advanced countries, whereas in other cases, emerging country foreign banks have substantial market shares.

Variable	Definition	Source
Total Cost (TC)	Total of interest and operating expenses (in thousands of US dollars at constant 2010 prices)	BankFocus
Quantity of Output (Q)	Total assets (in thousands of US dollars at constant 2010 prices)	BankFocus
Price of Funds (W1)	Ratio of interest expenses to customer deposits and wholesale funds ($\times 100$)	BankFocus
Price of Labor and Capital (W2)	Ratio of noninterest expenses to total assets ($\times 100$)	BankFocus
Price of Output (P)	Ratio of total revenue (interest and noninterest income) to total assets ($\times 100$)	BankFocus
Marginal Cost (MC)	MC ($\times 100$); MC estimated on the basis of a translog cost function	OC
Price–Cost Margin	(P-MC) ($\times 100$)	OC
Lerner Index (L)	Ratio of the difference between price and marginal cost to price ($\times 100$), where the marginal cost is estimated through a translog cost function	OC
For Bank	0–1 Dummy variable; takes value 1 if the bank is foreign owned	OC
EME For	0–1 Dummy variable; takes value 1 if the bank is foreign owned and originates from an emerging-market economy	OC
ADV For	0–1 Dummy variable; takes value 1 if the bank is foreign owned and originates from an advanced economy	OC
EME ASEAN	0–1 Dummy variable; takes value 1 if the bank is foreign owned and originates from an emerging country that is also an ASEAN country	OC
EME non-ASEAN	0–1 Dummy variable; takes value 1 if the bank is foreign owned and originates from an emerging country that is not an ASEAN country	OC
For Part	Foreign-owned banks' market share in banking sector total assets ($\times 100$)	OC
EME Part	EME Foreign-owned banks' market share in banking sector total assets ($\times 100$)	OC
ADV Part	ADV Foreign-owned banks' market share in banking sector total assets ($\times 100$)	OC
EME ASEAN Part	EME ASEAN banks' market share in banking sector total assets ($\times 100$)	OC
EME non-ASEAN Part	EME non-ASEAN banks' market share in banking sector total assets ($\times 100$)	OC
Inefficiency	Ratio of noninterest operating expenses to operating revenues ($\times 100$)	BankFocus
Diversification	Ratio of noninterest operating revenues to operating revenues ($\times 100$)	BankFocus
Deposits	Ratio of customer deposits to total assets ($\times 100$)	BankFocus
Capitalization	Ratio of total equity to total assets ($\times 100$)	BankFocus
Bank Size	Log of total assets (at constant 2010 prices)	BankFocus
Growth	GDP growth (annual %)	WDI
Inflation	Consumer prices (annual %)	WDI
HHI	Herfindahl–Hirschman index; based on total assets	OC
Broad Money	Broad money to GDP (%)	WDI
Market Capitalization	Market capitalization of listed domestic companies (% of GDP)	WDI
Average Governance	Simple average of six governance indicators: Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence or Terrorism, Regulatory Quality, Rule of Law, and Voice and Accountability	WGI
Liquidity	Ratio of liquid assets to total assets ($\times 100$)	BankFocus
Credit risk	Ratio of loan loss reserves to gross loans ($\times 100$)	BankFocus

Note: WDI: World Bank's World Development Indicators; WGI: World Bank's Worldwide Governance Indicators; OC: Own calculations.

Table 2. Description of variables and data sources

5. Empirical results

5.1 Evolution of market power

We start by exploring the level and evolution of market power in the ASEAN countries' banking sectors during 2011–2018. We generated country aggregates of the Lerner index by calculating a yearly asset-weighted mean of the individual Lerner indices. Table 3 presents the average Lerner indices for each country and year, with the grand averages for all countries and years. We highlight several findings.

First, the average Lerner indices for the nine ASEAN countries ranged 27.5%–32.9% over the analysis period. These averages are comparable with the indices estimated for other emerging country banking markets [see e.g., Clark et al. (2018) for the Commonwealth of the Independent States and Efthyvoulou and Yildirim (2014) for CEE banking markets].

Second, the indices reveal varying degrees of market power in the ASEAN countries: the ASEAN-5 countries have higher levels of market power than Lao PDR, Myanmar, and Vietnam. This finding could reflect the post-crisis consolidation measures taken in these countries. In particular, the highest level of average market power observed in Singapore over the period (50.4%) is consistent with the consolidation measures taken to fortify local banks in Singapore. However, Singapore has high concentration levels (see Figure 1); therefore, a few large banks might be driving the average Lerner indices for that country.¹¹ Meanwhile, the lowest average market power observed in Lao PDR over the period (10.9%) is in accordance with the measures taken to allow greater foreign bank participation in the country's banking industry (Nishimura et al., 2016). The higher market power level observed in Cambodia compared with Lao PDR, Myanmar, and Vietnam can be explained by a few large banks that dominate the credit market despite the existence of numerous small banks (Unteroberdoerster, 2014).

Third, the global picture regarding the trend in the evolution of the country averages is rather mixed. In some countries, an upward trend is observed in the market power in the later periods; in some others, the opposite is true. Market power in the ASEAN-5 and Vietnam is more stable; however, market power in Lao PDR and Myanmar is more volatile.¹² Cambodia had very low market power in the beginning; however, consolidation in the banking sector seems to have had some effect from 2012 onwards. Finally, the variation across countries in the level of market power seems to be lower in the later periods analyzed.

¹¹We are thankful to anonymous referees for raising this point.

¹²Please note the high volatility observed in the Lerner indices for Lao PDR and Myanmar can be because of the smaller number of banks from these countries, especially in earlier years in the sample period. We are grateful to anonymous referees for pointing this out.

	2011	2012	2013	2014	2015	2016	2017	2018	Mean
Indonesia	0.368	0.392	0.387	0.364	0.358	0.377	0.378	0.379	0.375
Cambodia	-0.003	0.250	0.338	0.366	0.400	0.379	0.389	0.399	0.315
Lao PDR	0.042	0.055	0.099	0.083	-0.052	0.177	0.215	0.251	0.109
Myanmar	0.464	0.240	0.123	0.056	0.027	0.085	0.023	0.149	0.146
Malaysia	0.407	0.380	0.375	0.364	0.332	0.346	0.359	0.342	0.363
Philippines	0.354	0.355	0.401	0.383	0.337	0.351	0.350	0.315	0.356
Singapore	0.535	0.545	0.536	0.519	0.505	0.473	0.455	0.467	0.504
Thailand	0.383	0.371	0.402	0.401	0.407	0.430	0.438	0.432	0.408
Vietnam	0.208	0.208	0.190	0.197	0.246	0.233	0.264	0.276	0.228
Mean	0.299	0.301	0.308	0.296	0.275	0.309	0.312	0.329	0.304

Table 3. Asset-weighted average of bank-level Lerner indices

5.2 Foreign ownership and market power

Turning to the assessment of the impact of foreign bank ownership and penetration on bank market power, we start our analysis by estimating models M1–M3, the results of which are presented in Table 4, columns 1–3, respectively.¹³ Employing our baseline model (M1), we can see that neither foreign ownership (own effect) nor foreign presence (spillover effect) exerts any significant effect on the bank market power (column 1). When we differentiate between foreign banks originating from advanced and emerging countries in our subsequent specification (M2), we fail to find any own effect of foreign ownership on banks' margins (column 2). Regarding the spillover effect of foreign bank presence, the increasing presence of advanced countries' banks creates a downward pressure on the bank market power. However, a higher presence of foreign banks from emerging countries is associated with higher market power (column 2). Estimating our final specification (M3) shows foreign banks originating from emerging countries (with or without the ASEAN origins) have similar levels of market power as domestic banks, and the positive effect on market power from a higher presence of foreign banks from emerging countries (reported in column 2) is because of the banks originating from the ASEAN countries only (column 3).

Dependent variable: Lerner index			
	1	2	3
Lagged Lerner index	0.135*** (4.061)	0.148*** (4.470)	0.140*** (4.381)
For Bank	0.826 (0.636)		
ADV For		1.715 (1.239)	1.889 (1.463)
EME For		-0.234 (-0.153)	
EME ASEAN			0.329 (0.222)
EME non-ASEAN			-0.181 (-0.096)
For Part	-0.030 (-0.977)		

¹³The second stage analyses exclude Lao PDR because of data limitations.

ADV Part		-0.255***	-0.326***
		(-4.904)	(-5.492)
EME Part		0.162**	
		(2.315)	
EME ASEAN Part			0.340***
			(3.399)
EME non-ASEAN Part			0.074
			(0.704)
Deposits	-0.048	-0.042	-0.042
	(-1.195)	(-1.028)	(-1.031)
Diversification	0.127***	0.139***	0.147***
	(2.599)	(2.751)	(2.868)
Inefficiency	-0.675***	-0.662***	-0.659***
	(-15.493)	(-15.705)	(-15.177)
Bank Size	0.693	0.775	1.117*
	(0.932)	(1.112)	(1.706)
Capitalization	0.112*	0.133**	0.142**
	(1.831)	(2.200)	(2.572)
HHI	-0.100	-0.166***	-0.174***
	(-1.614)	(-2.999)	(-3.177)
Broad Money	-0.043***	-0.037***	-0.035***
	(-3.429)	(-3.032)	(-2.932)
Growth	0.398	-0.282	-0.434*
	(1.330)	(-1.141)	(-1.828)
Inflation	-0.590***	-0.485***	-0.473***
	(-4.551)	(-3.528)	(-3.785)
Constant	54.090***	56.268***	52.113***
	(3.829)	(4.384)	(4.331)
Number of observations	1344	1344	1344
Number of banks	268	268	268
Number of instruments	204	206	208
Hansen p -value ^a	0.105	0.121	0.174
AR(2) p -value ^b	0.772	0.755	0.798

Note: The table presents regression results of estimating Models M1, M2, and M3. The sample includes foreign and domestic banks. Columns report estimated coefficients (z -statistics). The description of the regression variables is given in Table 2. All regressions employ the two-step system GMM estimator with Windmeijer (2005) corrected standard errors.

^aThe Hansen test p -value for over-identifying restrictions, where H_0 : over-identifying restrictions are valid.

^bThe Arellano–Bond test p -value for serial correlation of order two in the first-differenced residuals, where H_0 : no autocorrelation.

*, **, and *** denote statistically significant at the 10%, 5%, and 1% confidence level, respectively.

Table 4. The effect of foreign bank ownership on market power: Total sample

For the remaining explanatory variables, we first note that the coefficient on the lagged Lerner index is positive and statistically significant, thereby implying the persistence of market power over time. Among the bank-specific control variables, the coefficient on *Diversification* is positive and statistically significant in all the specifications, thereby indicating banks that focus more on noninterest-income-generating activities have higher market powers. This finding agrees with previous findings suggesting competition is lower in noninterest-income-generating activities (Bolt and Humphrey, 2010; Efthyvoulou and Yildirim, 2014; Lin et al., 2020). However, concerning *Inefficiency*, we found it statistically significantly and negatively affects bank market power, which is expected and concurs with previous findings (Efthyvoulou and Yildirim, 2014). Higher levels of capital were found to increase market power, which could be because of better-capitalized banks' ability to access funds more easily

and at lower costs (Delis et al., 2016).¹⁴ However, the remaining bank-level controls, *Bank Size* and *Deposits*, exerted very little or no effect on the dependent variable.

Regarding the country-level controls, we found that bank markup is higher in markets where concentration (*HHI*) is lower in specifications M2 and M3.¹⁵ However, *Broad Money* was found to be statistically significantly and negatively related to market power, thereby suggesting that financial development promotes competitive bank behavior. Finally, we found that although *Growth* failed to exert any consistent and statistically significant effect on market power, *Inflation* had a statistically significant and negative effect on market power.¹⁶

Further, we estimated the same models (M1 to M3) for the subsample of domestic banks (see Table 5, columns 1–3) to better understand the impact of foreign bank presence on domestic banks' competitive behavior. We found that although the presence of banks from advanced countries created a downward pressure on domestic banks' margins, the presence of banks from emerging countries had the opposite effect (column 2). However, in the final specification, we found the spillover effects from emerging-country banks' presence did not depend on their regional origins because both coefficients on *EME ASEAN Part* and *EME non-ASEAN Part* were statistically significant and positive (column 3).

Coefficients on the country- and bank-level controls, in general, maintained their significance levels and signs as reported in the total sample with two exceptions. First, *Bank Size* is a statistically significant and positive determinant of market power for domestic banks. Second, orientation toward noninterest-income-generating activities did not seem to contribute toward higher margins of domestic banks.

¹⁴Both Delis et al. (2016), for a world sample, and Lozano-Vivas and Weill (2012), for a European sample, reported positive relationships between capital levels and market power.

¹⁵We should note that concentration and competitiveness are different concepts, and concentrated markets can be very competitive if banks are subject to hit-and-run entry (Claessens and Laeven, 2004).

¹⁶The impact of GDP growth and inflation on bank market power can be both positive and negative. Higher levels of economic activity may allow banks to increase their markups, but inflation may depress bank markups because of costs associated with higher inflation (Efthyvoulou and Yildirim, 2014).

Dependent variable: Lerner index			
	1	2	3
Lagged Lerner index	0.193*** (3.783)	0.166*** (3.263)	0.166*** (3.300)
For Part	-0.057 (-1.494)		
ADV Part		-0.304*** (-5.181)	-0.291*** (-4.383)
EME Part		0.253*** (3.460)	
EME ASEAN Part			0.222** (1.988)
EME non-ASEAN Part			0.278** (2.172)
Deposits	-0.012 (-0.231)	-0.003 (-0.061)	-0.006 (-0.129)
Diversification	0.079* (1.709)	0.057 (1.212)	0.057 (1.201)
Inefficiency	-0.523*** (-13.886)	-0.528*** (-13.696)	-0.530*** (-13.342)
Bank Size	2.842*** (4.138)	2.902*** (4.836)	2.850*** (4.877)
Capitalization	0.281*** (4.378)	0.273*** (4.353)	0.266*** (4.171)
HHI	-0.142*** (-2.883)	-0.162*** (-3.880)	-0.161*** (-3.698)
Broad Money	-0.077*** (-4.835)	-0.065*** (-4.662)	-0.063*** (-4.897)
Growth	0.296 (1.211)	-0.692*** (-3.354)	-0.690*** (-3.332)
Inflation	-0.600*** (-4.818)	-0.528*** (-4.141)	-0.515*** (-4.350)
Constant	12.182 (1.163)	18.106* (1.800)	19.055* (1.850)
Number of observations	719	719	719
Number of banks	147	147	147
Number of instruments	120	121	122
Hansen p-value ^a	0.135	0.132	0.146
AR(2) p-value ^b	0.453	0.677	0.675

Note: The table presents regression results of estimating Models M1, M2, and M3. The sample includes domestic banks only. Columns report estimated coefficients (z -statistics). The description of the regression variables is given in Table 2. All regressions employ the two-step system GMM estimator with Windmeijer (2005) corrected standard errors.

^aHansen test p -value for over-identifying restrictions, where H_0 : over-identifying restrictions are valid.

^bArellano–Bond test p -value for serial correlation of order two in the first-differenced residuals, where H_0 : no autocorrelation. *, **, and *** denote statistically significant at the 10%, 5%, and 1% confidence level, respectively.

Table 5. The effect of foreign bank ownership on market power: Domestic banks sample

These results support our expectations that foreign banks' business models and performances vary according to their countries of origin; therefore, depending on the entrants' home markets, (emerging or advanced) spillover effects of foreign bank penetration on market competitiveness vary. The downward pressure on the bank margins from the increased presence of advanced countries' foreign banks can be attributed to several underlying forces. Domestically owned banks may have access to new technologies introduced by the foreign entrants and may be forced to upgrade their competitive skills if the entrants compete with the incumbents in all the market segments (Delis et al., 2016). If they pass the cost savings on to their customers through lowered prices to protect their market shares in the face of foreign

entrants from advanced countries, they may have lower margins. By contrast, foreign banks originating from emerging countries are more likely to have similar know-how as local lenders and may not elicit a procompetitive pressure. Alternatively, both domestic and foreign banks may focus on diverse market segments and/or services and products with different levels of intermediation costs and margins. Remolona and Shim (2015) reported that ASEAN-based banks generally expand regionally through subsidiary operations rather than branches. Banks aiming to enter local markets through large and primarily retail operations prefer to expand via subsidiaries (Cerutti et al., 2007). Our findings, combined with these results, suggest that emerging country banks fail to present any procompetitive pressure on domestic banks despite being more focused on retail operations than advanced country banks.

5.3 Components of market power

We studied the underlying mechanisms responsible for the lack of own and varying spillover effects of foreign ownership on market power. Thus, we estimated our models M1–M3 by using as the dependent variable the components of the Lerner index, namely, price, marginal cost, and price–cost margin. Table 6 presents the results for the total sample and Table 7 for the domestic banks sample. Turning first to the direct ownership effects on the components presented in Table 6, we see all types of foreign banks have significantly lower prices (columns 1–3) and price–cost margins (columns 7–9) than domestic banks. Regarding marginal costs, however, we found foreign banks from only emerging countries have lower marginal costs compared with domestic banks (columns 4–6). Overall, lower prices combined with lower price–cost margins explain the lack of market power advantages for foreign-owned banks as reported previously (Table 4).

For the spillover effects, we observed a positive and statistically significant effect of increased presence of advanced countries' foreign banks and a negative and statistically significant effect of increased presence of emerging countries' foreign banks on prices in the total sample (Table 6, columns 1–3). However, we found only a negative and marginally statistically significant (10%) effect of the increased presence of emerging countries' foreign banks on domestic banks' prices (Table 7, columns 1–3).

Regarding marginal costs for both total and domestic banks samples, we found that an increased presence of foreign banks from advanced countries is positively and statistically significantly related to marginal costs. However, the increased presence of foreign banks from emerging countries is negatively and statistically significantly related to costs (Tables 6 and 7, columns 4–6). Therefore, the negative spillover effect of the increased presence of foreign banks from advanced countries on market power seems to be because of the increasing marginal costs and depressing price–cost margins of the domestic incumbents. This finding is consistent with domestic banks employing inefficient technologies or serving market segments that are costly to serve (e.g., informationally more opaque customers) and not adjusting their prices accordingly. However, the positive spillover effect of the increased presence of emerging countries' foreign banks on market power appears to be through lowering marginal costs and the prices of domestic lenders. This result can be attributed to emerging countries' foreign banks competing with domestic banks in similar market segments. Therefore, domestic banks are forced to improve their efficiency to survive in the market. Indeed, regional foreign banks have more outlets and/or branches than nonregional ones, and they tend to compete with local banks, particularly in retail banking.

	Dependent variable: Price			Dependent variable: Marginal Cost			Dependent variable: Price–Cost Margin		
	1	2	3	4	5	6	7	8	9
Lagged dependent variable	0.643*** (14.037)	0.632*** (13.133)	0.633*** (12.808)	0.629*** (12.064)	0.611*** (11.481)	0.610*** (11.308)	0.316*** (4.864)	0.324*** (5.120)	0.331*** (5.128)
For Bank	−0.647*** (−2.844)			−0.293** (−2.029)			−0.466*** (−3.153)		
ADV For		−0.537** (−2.410)	−0.514** (−2.337)		−0.253* (−1.699)	−0.243 (−1.636)		−0.391** (−2.553)	−0.382** (−2.513)
EME For		−1.000*** (−3.479)			−0.642*** (−3.164)			−0.622*** (−3.722)	
EME ASEAN			−0.796*** (−2.598)			−0.577*** (−2.716)			−0.476** (−2.521)
EME non-ASEAN			−1.144*** (−3.507)			−0.666*** (−2.925)			−0.762*** (−4.053)
For Part	−0.009* (−1.734)			−0.000 (−0.051)			−0.010*** (−2.852)		
ADV Part		0.020* (1.751)	0.025** (2.237)		0.030*** (3.205)	0.031*** (3.209)		−0.011* (−1.867)	−0.010 (−1.614)
EME Part		−0.033** (−2.529)			−0.026*** (−2.580)			−0.010 (−1.412)	
EME ASEAN Part			−0.049** (−2.326)			−0.030* (−1.915)			−0.011 (−0.841)
EME non-ASEAN Part			−0.025 (−1.580)			−0.024* (−1.927)			−0.008 (−1.194)
Deposits	0.028*** (3.849)	0.028*** (3.878)	0.030*** (3.909)	0.026*** (4.550)	0.025*** (4.547)	0.025*** (4.563)	0.002 (0.371)	0.002 (0.468)	0.003 (0.802)
Diversification	−0.004 (−0.496)	−0.003 (−0.346)	−0.003 (−0.364)	−0.014* (−1.693)	−0.012 (−1.423)	−0.012 (−1.382)	0.008* (1.770)	0.009* (1.956)	0.009* (1.911)
Inefficiency	−0.019*** (−4.272)	−0.020*** (−4.476)	−0.021*** (−4.340)	0.018*** (4.156)	0.017*** (4.196)	0.017*** (3.980)	−0.043*** (−13.201)	−0.043*** (−13.193)	−0.043*** (−11.980)
Bank Size	−0.454*** (−2.883)	−0.457*** (−2.993)	−0.469*** (−2.810)	−0.257** (−2.030)	−0.277** (−2.189)	−0.271** (−2.053)	−0.167* (−1.891)	−0.179* (−1.946)	−0.181* (−1.783)
Capitalization	0.018 (1.541)	0.017 (1.532)	0.018 (1.575)	0.001 (0.068)	−0.001 (−0.081)	0.000 (0.040)	0.016** (2.185)	0.017** (2.186)	0.017** (2.383)
HHI	−0.013 (−1.344)	−0.008 (−0.858)	−0.009 (−0.918)	−0.002 (−0.219)	0.004 (0.415)	0.003 (0.357)	−0.019*** (−3.343)	−0.019*** (−3.315)	−0.019*** (−3.225)

Broad Money	−0.005*	−0.007**	−0.007**	−0.002	−0.003	−0.003	−0.006***	−0.006***	−0.006***
	(−1.866)	(−2.262)	(−2.367)	(−0.724)	(−1.236)	(−1.362)	(−5.424)	(−4.908)	(−4.883)
Growth	−0.184***	−0.072	−0.062	−0.147***	−0.029	−0.023	−0.062*	−0.059*	−0.059*
	(−3.054)	(−1.226)	(−1.254)	(−2.744)	(−0.601)	(−0.590)	(−1.833)	(−1.835)	(−1.937)
Inflation	0.112***	0.098***	0.096***	0.122***	0.110***	0.111***	−0.010	−0.012	−0.014
	(3.827)	(3.373)	(3.111)	(4.475)	(3.931)	(3.957)	(−0.660)	(−0.821)	(−0.909)
Constant	9.857***	9.273***	9.356***	3.968*	3.699*	3.563*	7.054***	7.140***	7.071***
	(3.602)	(3.560)	(3.389)	(1.952)	(1.912)	(1.787)	(4.071)	(4.078)	(3.813)
Number of observations	1344	1344	1344	1344	1344	1344	1344	1344	1344
Number of groups	268	268	268	268	268	268	268	268	268
Number of instruments	204	206	208	204	206	208	204	206	208
Hansen p-value ^a	0.168	0.154	0.133	0.118	0.082	0.056	0.351	0.303	0.315
AR(2) p-value ^b	0.344	0.347	0.348	0.236	0.236	0.236	0.671	0.675	0.677

Note: The table presents regression results of estimating Models M1, M2, and M3, where dependent variable is Price for columns 1–3, Marginal cost for columns 4–6, and Price–Cost margin for columns 7–9. The sample includes foreign and domestic banks. Columns report estimated coefficients (z -statistics). The regression variables' description is given in Table 2. All regressions employ the two-step system GMM estimator with Windmeijer (2005) corrected standard errors.

^aHansen test p -value for over-identifying restrictions, where H_0 : over-identifying restrictions are valid.

^bArellano–Bond test p -value for serial correlation of order two in the first-differenced residuals, where H_0 : no autocorrelation.

*, **, and *** denote statistically significant at the 10%, 5%, and 1% confidence level, respectively.

Table 6. The effect of foreign ownership on the Lerner index components: Total sample

	Dependent variable: Price			Dependent variable: Marginal Cost			Dependent variable: Price–Cost Margin		
	1	2	3	4	5	6	7	8	9
Lagged dependent variable	0.513*** (9.711)	0.497*** (9.022)	0.496*** (8.533)	0.487*** (10.081)	0.469*** (9.160)	0.467*** (8.809)	0.427*** (4.960)	0.432*** (4.885)	0.434*** (4.843)
For Part	–0.008 (–0.623)			0.005 (0.506)			–0.014*** (–3.416)		
ADV Part		0.017 (0.714)	0.012 (0.549)		0.041*** (2.590)	0.034** (2.053)		–0.015** (–2.081)	–0.014** (–2.058)
EME Part		–0.045* (–1.813)			–0.043** (–2.487)			–0.013 (–1.545)	
EME ASEAN Part			–0.024 (–0.542)			–0.024 (–0.704)			–0.014 (–0.802)
EME non-ASEAN Part			–0.066 (–1.130)			–0.060 (–01.401)			–0.012 (–0.892)
Deposits	0.013 (0.605)	0.015 (0.748)	0.015 (0.762)	0.018 (1.223)	0.017 (1.086)	0.018 (1.139)	–0.003 (–0.217)	–0.002 (–0.174)	–0.002 (–0.153)
Diversification	–0.016 (–1.163)	–0.014 (–0.951)	–0.013 (–0.842)	–0.013 (–0.928)	–0.010 (–0.676)	–0.009 (–0.573)	–0.003 (–0.501)	–0.002 (–0.353)	–0.002 (–0.317)
Inefficiency	–0.029*** (–2.730)	–0.029*** (–2.811)	–0.029*** (–2.814)	0.020*** (3.906)	0.021*** (4.044)	0.021*** (4.109)	–0.044*** (–8.265)	–0.044*** (–8.102)	–0.044*** (–7.952)
Bank Size	–0.378*** (–2.665)	–0.356*** (–2.593)	–0.347** (–2.397)	–0.419*** (–3.212)	–0.418*** (–3.437)	–0.407*** (–3.277)	–0.093 (–1.345)	–0.101 (–1.423)	–0.102 (–1.324)
Capitalization	0.035 (1.360)	0.040* (1.663)	0.043* (1.762)	0.005 (0.297)	0.009 (0.456)	0.011 (0.571)	0.030* (1.681)	0.031 (1.640)	0.031 (1.639)
HHI	–0.025 (–1.579)	–0.025 (–1.639)	–0.025 (–1.572)	–0.001 (–0.059)	0.000 (0.026)	–0.001 (–0.073)	–0.020*** (–2.874)	–0.020*** (–3.049)	–0.020*** (–2.918)
Broad Money	–0.007 (–1.528)	–0.010** (–2.155)	–0.009** (–2.046)	0.000 (0.106)	–0.002 (–0.549)	–0.002 (–0.540)	–0.006** (–2.165)	–0.006** (–2.123)	–0.006** (–2.155)
Growth	–0.120 (–1.482)	–0.003 (–0.038)	–0.013 (–0.174)	–0.196*** (–3.103)	–0.029 (–0.417)	–0.044 (–0.822)	–0.014 (–0.397)	–0.013 (–0.541)	–0.013 (–0.548)
Inflation	0.215*** (5.436)	0.208*** (5.444)	0.205*** (5.148)	0.189*** (4.869)	0.180*** (4.553)	0.178*** (4.673)	0.003 (0.168)	0.002 (0.119)	0.003 (0.130)
Constant	11.026***	10.092***	9.930***	7.411***	6.550**	6.408**	5.883***	5.924***	5.907***

	(3.029)	(2.891)	(2.798)	(2.589)	(2.362)	(2.279)	(3.711)	(3.596)	(3.458)
Number of observations	719	719	719	719	719	719	719	719	719
Number of groups	147	147	147	147	147	147	147	147	147
Number of instruments	120	121	122	120	121	122	120	121	122
Hansen p-value ^a	0.113	0.111	0.097	0.123	0.085	0.080	0.326	0.334	0.313
AR(2) p-value ^b	0.453	0.457	0.459	0.293	0.299	0.299	0.474	0.477	0.479

Note: The table presents regression results of estimating Models M1, M2, and M3, where dependent variable is Price for columns 1–3, Marginal cost for columns 4–6, and Price–Cost margin for columns 7–9. The sample includes domestic banks only. Columns report estimated coefficients (*z*-statistics). The regression variables description is given in Table 2. All regressions employ the two-step system GMM estimator with Windmeijer (2005) corrected standard errors.

^aHansen test *p*-value for over-identifying restrictions, where H_0 : over-identifying restrictions are valid.

^bArellano–Bond test *p*-value for serial correlation of order two in the first-differenced residuals, where H_0 : no autocorrelation.

*, **, and *** denote statistically significant at the 10%, 5%, and 1% confidence level, respectively

Table 7. The effect of foreign ownership on the Lerner index components: Domestic banks sample

5.5 Robustness tests

We employed the share of the number of foreign-owned banks (originating from both ADV and EME countries and also ASEAN and non-ASEAN countries) as an alternative measure of foreign bank presence. The number-based presence measures might be appropriate if the number of domestic and foreign banks determines the competitive conduct in the market rather than our asset-based presence measures. For example, upon foreign banks' entry, domestic banks might respond by adjusting their prices to prevent entrants from capturing market shares. However, a foreign bank's presence can also create a procompetitive pressure only if the foreign entrant captures significant market shares, thereby rendering asset-based presence measures appropriate (Claessens et al., 2001).

Table 8 presents our results when we replaced our asset-based presence measures with number-based measures for the total sample (columns 1–3) and the domestic banks sample (columns 4–6). Similar to our main results reported in Tables 4 and 5, we found that the increasing presence of banks from advanced countries created a downward pressure on the bank market power in both samples. However, we found only a marginally statistically significant (10%) and positive effect of the presence of foreign banks from emerging countries on bank market power in the domestic banks sample (column 5). This suggests that the effect of emerging countries' entrants on domestic players' competitiveness depends on their asset shares rather than numbers.

Dependent variable: Lerner index						
	Total sample			Domestic banks sample		
	1	2	3	4	5	6
Lagged Lerner index	0.136*** (4.067)	0.137*** (4.084)	0.139*** (4.066)	0.194*** (3.770)	0.153*** (3.013)	0.158*** (3.148)
For Bank	1.063 (0.858)					
ADV For		1.829 (1.280)	2.075 (1.548)			
EME For		-0.350 (-0.236)				
EME ASEAN			0.219 (0.142)			
EME non-ASEAN			-0.836 (-0.420)			
For Part	-0.040 (-1.572)			-0.071*** (-2.687)		
ADV Part		-0.122*** (-3.576)	-0.130*** (-3.970)		-0.130*** (-4.405)	-0.124*** (-4.304)
EME Part		0.062 (1.387)			0.092* (1.915)	
EME ASEAN Part			0.045 (0.767)			0.063 (1.070)
EME non-ASEAN Part			0.092 (0.985)			0.136 (1.405)
Deposits	-0.042 (-1.040)	-0.040 (-0.974)	-0.032 (-0.790)	-0.002 (-0.048)	-0.012 (-0.237)	-0.011 (-0.207)
Diversification	0.128*** (2.642)	0.139*** (2.855)	0.130*** (2.633)	0.081* (1.860)	0.062 (1.388)	0.059 (1.267)
Inefficiency	-0.673*** (-15.117)	-0.667*** (-15.227)	-0.669*** (-14.906)	-0.520*** (-13.064)	-0.529*** (-13.749)	-0.529*** (-13.565)
Bank Size	0.691 (0.969)	0.924 (1.268)	0.628 (0.779)	2.758*** (4.367)	3.184*** (4.603)	2.905*** (4.269)
Capitalization	0.114* (1.875)	0.131** (2.208)	0.118** (2.011)	0.280*** (4.077)	0.279*** (4.333)	0.271*** (4.194)
HHI	-0.117* (-1.793)	-0.120* (-1.724)	-0.110 (-1.544)	-0.172*** (-3.509)	-0.135** (-2.552)	-0.120** (-2.062)
Broad Money	-0.031** (-2.228)	-0.028** (-2.087)	-0.023* (-1.734)	-0.053*** (-2.884)	-0.064*** (-3.147)	-0.059*** (-3.179)
Growth	0.402 (1.328)	0.123 (0.486)	0.083 (0.330)	0.205 (0.880)	-0.094 (-0.546)	-0.062 (-0.367)
Inflation	-0.641*** (-4.933)	-0.539*** (-4.242)	-0.561*** (-4.232)	-0.659*** (-5.421)	-0.581*** (-4.522)	-0.585*** (-4.789)
Constant	53.790*** (4.019)	51.211*** (3.927)	55.410*** (4.079)	13.422 (1.312)	10.902 (1.058)	13.898 (1.317)
Number of observations	1344	1344	1344	719	719	719
Number of banks	268	268	268	147	147	147
Number of instruments	204	206	208	120	121	122
Hansen p-value ^a	0.092	0.096	0.119	0.152	0.155	0.143
AR(2) p-value ^b	0.731	0.689	0.662	0.526	0.619	0.613

Note: The table presents regression results of estimating Models M1, M2, and M3. Columns 1–3 present foreign and domestic banks sample results; columns 4–6 present domestic banks only sample results. Foreign participation is proxied by number of foreign banks to total number of banks. Columns report estimated coefficients (z -statistics). The description of the regression variables is given in Table 2. All regressions employ the two-step system GMM estimator with Windmeijer (2005) corrected standard errors.

^aHansen test p -value for over-identifying restrictions, where H_0 : over-identifying restrictions are valid.

^bArellano–Bond test p -value for serial correlation of order two in the first-differenced residuals, where H_0 : no autocorrelation.

*, **, and *** denote statistically significant at the 10%, 5%, and 1% confidence level, respectively.

Table 8. The effect of foreign bank ownership on market power: Robustness tests

Furthermore, we checked our results' robustness by including additional controls used in previous studies to explain market power. More specifically, we introduced two additional bank-level variables in separate specifications: *Credit Risk*, measured by loan loss reserves to gross loans, and *Liquidity*, measured by liquid assets to total assets ratio. *Credit Risk* was not statistically significant in the total sample; however, it was statistically significant and positively affected margins in the domestic banks sample. However, our baseline results regarding foreign presence were not affected by this exercise. *Liquidity* was found to be insignificant in either samples; thus, our main results regarding foreign presence remained the same. Moreover, we introduced the market capitalization of the listed companies to GDP (*Market Capitalization*) to control for competitive pressure on banks from capital markets in a separate specification. Although we found that *Market Capitalization* had a positive and statistically significant effect on market power, our primary variables of interest (foreign bank presence variables) maintained their significance and signs in both total and domestic banks samples. As an additional country-level control, we introduced a proxy for governance infrastructure (*Average Governance*). *Average Governance* was defined as the simple average of six governance indicators of the World Bank: Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence or Terrorism, Regulatory Quality, Rule of Law, and Voice and Accountability. We found that *Average Governance* does not statistically significantly affect the domestic banks sample; however, it positively, but not consistently and statistically significantly, affects the market power in the total sample.

Finally, we ran repeated regressions for the Lerner index and its components by excluding in separate runs: (a) banks from Singapore and (b) banks from Myanmar. Singapore is one of the largest financial centers in the world and can be an outlier in our setting. Meanwhile, Myanmar has the most underdeveloped financial sector in the ASEAN and the smallest number of banks in our sample. Our results regarding foreign presence were not affected by these exclusions. Results from these additional estimates were not reported here for the sake of brevity; however, they are available on request.

6. Conclusions

This paper investigates the effect of foreign ownership on market power in the ASEAN banking markets, which have witnessed an increasing presence of regional banking groups under the influence of ongoing initiatives to further intraregional trade and financial integration in recent years. Given this changing make-up of the foreign bank population in the region, we examined own and spillover effects of foreign ownership and penetration on bank market power by differentiating between foreign banks from emerging and advanced countries.

Regarding the nexus between foreign ownership and market power, three primary results emerged. First, although there is no own effect of foreign ownership on individual banks' market power, a significant spillover effect exists on banks' market power. Second, the direction of the spillover effect depends on the foreign bank's country of origin. In particular, the increasing presence of foreign banks from advanced (emerging) countries is associated

with reduced (higher) margins. Further analyses show that the increasing presence of foreign banks from advanced countries is associated with higher marginal costs and lower price–cost margins of the domestic incumbents. However, the increasing presence of emerging countries' banks lowers marginal costs and prices of domestic lenders. This suggests that foreign banks from emerging countries compete with domestic banks in similar market segments. Finally, we found that the spillover effect from the presence of emerging country banks does not depend on their regional origins. Therefore, despite their cultural and geographical proximity to host markets, which might offer them higher margins and/or different spillover effects on competition, foreign banks originating from the ASEAN countries do not appear to have an advantage over other emerging country banks.

Overall, our study shows that domestic banks conduct differently under increased participation levels of advanced and emerging country foreign banks. Accordingly, regulatory policies toward improving competitiveness in the financial sector should consider that a bank's competitive strategies reflect its ownership structure and its country of origin. In the ASEAN context, our study's findings should help inform future policymaking regarding foreign bank entry and participation in the region and the ideal mix of foreign banks, conventional global banks versus regional/emerging country banks. The AEC aims to achieve financial inclusion and financial stability. However, our findings suggest that regional banking participation is associated with higher margins, which undoubtedly does not facilitate greater financial inclusion in the region. Meanwhile, greater market power that results from regional banking participation can make the ASEAN banking sectors more vulnerable to financial instability as demonstrated by Soedarmono et al. (2011). Measures are needed to ensure adequate regulation and supervision are in place to manage potential problems arising because of greater regional banking integration.

Our paper responds to calls for future research into implications of the growing importance of emerging countries' banks and regionalization of banking systems for the competition and stability of local banking markets (see e.g., Claessens, 2017; World Bank, 2018). Future research should examine differences in business models and the focus of advanced and emerging country foreign banks as potential sources of the differential impact that they have on market power, as demonstrated in our study.

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Appendix A. Estimation of marginal costs

We estimate a cost function employing the stochastic frontier model of Battese and Coelli (1992) to derive marginal costs, which allows for a firm-specific and time-varying intercept shift in the distribution of the inefficiency term. Assuming that costs, for bank i at time t , are a function of output Q , input prices W , inefficiency u , and random error v , then the cost function can be specified as follows:

$$\ln TC_{i,t} = f(Q_{i,t}, W_{i,t}) + v_{i,t} + u_{i,t} \quad (\text{A1})$$

where TC denotes total costs; $v_{i,t}$ has the usual features, which is independently and identically distributed $N(0, \sigma_v^2)$, whereas the nonnegative inefficiency term $u_{i,t}$ is assumed to be independent and identically distributed as a truncated normal with mean μ and variance σ_u^2 . $u_{i,t}$ is modeled as a function of time and specified as follows:

$$u_{i,t} = u_i \{ \exp[-\gamma(t - T_i)] \} \quad (\text{A2})$$

This means that the final period T_i contains the base level of bank i 's inefficiency, which varies with time. For example, if $\gamma > 0$, inefficiency decays toward the base level. However, technology is very unlikely to be constant over time; therefore, we incorporate time variable *Trend* to capture neutral technical change. The *Trend* is an index of technology because, holding everything else constant in the cost function, any change in cost curves over time may be ascribed to technological advances. This also means that *Trend* does not contrast with the $u_{i,t}$ term, which captures inefficiency. Similar cost function specifications have been used to estimate marginal costs in previous studies (see e.g., Kauko, 2009; Turk Ariss, 2010; Mirzaei and Moore, 2014; Coccoresse and Ferri, 2020).¹⁷

In modeling the cost function, we adopt the following translog functional form because it does not require too many restrictive assumptions about the nature of the technology:

$$\begin{aligned} \ln \left(\frac{TC}{w_2} \right) = & \alpha_0 + \alpha_1 \ln Q + \frac{1}{2} \alpha_2 (\ln Q)^2 + \alpha_3 \ln \left(\frac{w_1}{w_2} \right) + \alpha_4 \text{Trend} + \frac{1}{2} \alpha_5 \left(\ln \left(\frac{w_1}{w_2} \right) \right)^2 + \\ & \frac{1}{2} \alpha_6 (\text{Trend})^2 + \alpha_7 \ln Q \ln \left(\frac{w_1}{w_2} \right) + \alpha_8 \ln Q \text{Trend} + \alpha_9 \ln \left(\frac{w_2}{w_3} \right) \text{Trend} + v + u \end{aligned} \quad (\text{A3})$$

where Q is the proxy for bank output (measured by total assets); and w_1 and w_2 are the two input prices of borrowed funds and price of capital and labor, respectively, and defined as follows:¹⁸

$$w_1 = \text{Total interest expenses} / \text{Customer deposits and wholesale funding}$$

¹⁷As a robustness check, a translog cost function by a random-effects GLS procedure with robust standard errors is also estimated. The correlation coefficient between the marginal costs derived from this alternative estimate and our model is found to be 1.00. Results from these estimates are not reported here but available on request.

¹⁸Ideally, separate input prices for capital and labor should be used, as commonly observed in the literature. However, in our data set, personnel expense data are missing for many banks. See Clark et al. (2018) and Hasan and Marton (2003) for a similar approach as here. However, as a robustness check, we have estimated a three-input cost function specification in a reduced sample for which we have personnel expense data. The correlation coefficients between marginal costs and Lerner indices derived from this alternative model and those of our original model are found to be over 99%. These results are not reported here but are available upon request.

$w_2 = \text{Noninterest operating expenses} / \text{Total assets}$

Trend is an annual index of time representing the level of technology and included to take account of technical change over time.

We imposed standard restrictions of linear homogeneity in input prices and symmetry of the second order parameters to ensure that the estimated cost frontier is well-behaved. Hence, the assumption of linear homogeneity in input prices is met by normalizing total costs and one input price with the second one. The indices for each bank have been dropped from the above presentation for the sake of simplicity.

The marginal cost is then computed by taking the partial derivative of the cost function with respect to total assets:

$$MC = \frac{\partial n\left(\frac{TC}{w_2}\right)}{\partial Q} = \frac{TC}{Q} \left(\alpha_1 + \alpha_2 \ln Q + \alpha_7 \ln \left(\frac{w_1}{w_2} \right) + \alpha_8 \text{Trend} \right) \quad (A4)$$

Appendix B. Additional tables

Variable	Number of obs.	Mean	Std. dev.	Min	Max
Total Cost (TC) ^a	1,671	349,712	644,285	818	3,392,859
Quantity of Output (Q) ^a	1,671	10,300,000	24,700,000	0	169,000,000
Price of Funds (W1)	1,671	0.025	0.018	0.001	0.197
Price of Labor and Capital (W2)	1,671	0.033	0.022	0.001	0.205
Price of Output (P)	1,671	0.070	0.036	0.003	0.319
Marginal Cost (MC)	1,671	5.338	3.210	.449	25.517
Price–Cost Margin	1,671	1.655	1.454	–7.440	12.502
Lerner Index (L)	1,671	0.248	0.203	–1.292	0.738
For Bank	1,671	0.463	0.499	0	1
EME For	1,671	0.172	0.378	0	1
ADV For	1,671	0.290	0.454	0	1
EME ASEAN	1,671	0.093	0.290	0	1
EME non-ASEAN	1,671	0.080	0.271	0	1
For Part	1,671	24.586	18.414	0	85.882
EME Part	1,671	8.893	11.153	0	59.303
ADV Part	1,671	15.693	8.985	0	40.779
EME ASEAN Part	1,671	5.866	6.814	0	26.378
EME non-ASEAN Part	1,671	3.027	5.493	0	42.971
Inefficiency	1,671	57.888	22.407	19.660	152.870
Diversification	1,671	22.977	15.716	–106.386	98.653
Deposits	1,671	62.906	21.164	0.108	96.920
Capitalization	1,671	17.412	14.069	0.660	98.598
Bank Size	1,671	14.364	1.963	10.554	18.943
Growth	1,671	5.595	1.341	0.840	8.426
Inflation	1,671	3.492	2.020	–0.900	18.676
HHI	1,671	11.570	9.111	6.567	100.000
Broad Money	1,619	84.315	43.833	26.444	158.063
Market Capitalization	1,388	69.725	42.396	19.154	259.272
Average Governance	1,671	–0.264	0.424	–1.614	1.639
Liquidity	1,671	28.462	17.632	2.431	97.935
Credit Risk	1,490	2.172	2.638	0.006	51.114

^aValues are in thousands of US dollars at constant 2010 prices.

Table B1. Descriptive statistics

	Indonesia	Cambodia	Lao PDR	Myanmar	Malaysia	Philippines	Singapore	Thailand	Vietnam
Total Cost (TC) ^a	284,519.90 (586,506.50)	20,233.44 (40,640.81)	24,862.81 (37,166.29)	239,753.70 (640,092.10)	662,671.00 (788,662.80)	294,901.20 (300,464.10)	1,608,449.00 (1,135,318.00)	710,461.50 (814,982.10)	235005.90 (456693.70)
Output (Q) ^a	4890133.00 (11200000.00)	520622.60 (808222.20)	464092.40 (912448.10)	7668202.00 (31600000.00)	21600000.00 (28300000.00)	9620518.00 (10800000.00)	101000000.00 (71900000.00)	21,400,000.00 (24,400,000.00)	4456225.00 (8662272.00)
Price of Funds (W1)	0.03 (0.02)	0.02 (0.01)	0.03 (0.02)	0.02 (0.01)	0.02 (0.01)	0.03 (0.03)	0.01 (0.01)	0.02 (0.01)	0.02 (0.01)
Price of Labor and Capital (W2)	0.05 (0.02)	0.02 (0.01)	0.04 (0.02)	0.06 (0.01)	0.02 (0.01)	0.01 (0.01)	0.01 (0.01)	0.02 (0.01)	0.03 (0.02)
Price of Output	0.10 (0.03)	0.05 (0.03)	0.08 (0.03)	0.08 (0.02)	0.05 (0.01)	0.06 (0.05)	0.03 (0.01)	0.05 (0.02)	0.06 (0.02)
Marginal Cost	0.08 (0.03)	0.04 (0.02)	0.07 (0.03)	0.07 (0.02)	0.03 (0.01)	0.04 (0.03)	0.02 (0.01)	0.03 (0.01)	0.04 (0.02)
Price-Cost M.	0.02 (0.02)	0.02 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.02 (0.01)	0.01 (0.01)	0.02 (0.01)	0.01 (0.01)
Lerner Index	0.21 (0.18)	0.29 (0.27)	0.10 (0.18)	0.14 (0.12)	0.29 (0.13)	0.30 (0.11)	0.44 (0.11)	0.33 (0.22)	0.20 (0.21)
For Bank	0.36 (0.48)	0.84 (0.37)	0.48 (0.50)	0.00 (0.00)	0.60 (0.49)	0.16 (0.37)	0.43 (0.50)	0.54 (0.50)	0.48 (0.50)
EME For	0.09 (0.28)	0.45 (0.50)	0.29 (0.46)	0.00 (0.00)	0.16 (0.37)	0.16 (0.37)	0.00 (0.00)	0.20 (0.40)	0.17 (0.38)
ADV For	0.27 (0.45)	0.39 (0.49)	0.19 (0.40)	0.00 (0.00)	0.44 (0.50)	0.00 (0.00)	0.43 (0.50)	0.34 (0.48)	0.31 (0.46)
EME ASEAN	0.03 (0.18)	0.33 (0.47)	0.19 (0.40)	0.00 (0.00)	0.03 (0.16)	0.04 (0.21)	0.00 (0.00)	0.08 (0.27)	0.12 (0.33)
EME non-ASEAN	0.06 (0.23)	0.11 (0.32)	0.10 (0.30)	0.00 (0.00)	0.13 (0.34)	0.12 (0.33)	0.00 (0.00)	0.12 (0.32)	0.05 (0.22)
For Part	27.98 (1.54)	66.21 (12.80)	13.32 (8.87)	0.00 (0.00)	18.17 (3.65)	6.33 (0.57)	7.35 (3.12)	20.55 (4.82)	8.58 (3.11)
EME For Part	8.82 (0.59)	35.95 (9.50)	7.19 (5.55)	0.00 (0.00)	0.69 (0.37)	6.33 (0.57)	0.00 (0.00)	2.88 (0.36)	1.36 (0.28)
ADV Part	19.16 (1.46)	30.26 (5.34)	6.14 (4.00)	0.00 (0.00)	17.48 (3.50)	0.00 (0.00)	7.35 (3.12)	17.67 (4.50)	7.22 (3.01)
EME ASEAN Part	7.33 (1.02)	21.96 (2.69)	4.48 (3.09)	0.00 (0.00)	0.13 (0.10)	0.74 (0.32)	0.00 (0.00)	1.68 (0.16)	0.89 (0.18)
EME non-ASEAN Part	1.49 (0.55)	13.99 (9.66)	2.70 (3.21)	0.00 (0.00)	0.56 (0.27)	5.59 (0.81)	0.00 (0.00)	1.20 (0.21)	0.47 (0.21)
Inefficiency	61.16 (22.23)	54.17 (26.70)	73.37 (29.88)	61.03 (16.12)	51.95 (17.88)	62.74 (12.86)	45.13 (15.12)	50.05 (19.45)	58.10 (23.27)
Diversification	17.24 (12.23)	21.68 (14.34)	32.50 (19.90)	40.37 (14.03)	32.63 (13.75)	24.92 (13.50)	31.86 (33.32)	30.41 (13.81)	20.47 (14.73)
Deposits	69.83 (15.74)	46.50 (26.57)	65.04 (22.46)	83.81 (10.32)	59.98 (19.46)	75.59 (9.45)	67.00 (20.51)	58.62 (18.42)	54.68 (22.53)
Capitalization	15.32 (7.58)	28.30 (22.33)	23.02 (20.56)	9.88 (7.93)	15.42 (13.44)	13.13 (4.64)	9.26 (1.74)	18.03 (15.01)	17.80 (15.55)

Bank Size	14.05 (1.59)	12.47 (1.16)	12.26 (1.05)	13.75 (1.65)	15.67 (1.90)	15.28 (1.46)	17.99 (1.09)	16.09 (1.44)	14.07 (1.64)
Growth	5.23 (0.39)	7.17 (0.18)	7.08 (0.54)	6.91 (0.94)	5.14 (0.54)	6.31 (0.83)	3.82 (0.96)	3.29 (1.73)	6.46 (0.51)
Inflation	4.82 (1.36)	2.86 (1.00)	2.30 (1.75)	5.66 (2.08)	2.37 (0.93)	2.82 (1.52)	1.18 (1.80)	1.31 (1.39)	3.74 (2.45)
HHI	0.08 (0.01)	0.09 (0.02)	0.42 (0.15)	0.48 (0.08)	0.12 (0.02)	0.11 (0.01)	0.28 (0.03)	0.10 (0.00)	0.11 (0.07)
Broad Money	39.28 (0.88)	73.55 (17.28)	na	43.67 (8.86)	131.24 (6.05)	72.95 (6.58)	126.06 (2.61)	124.47 (2.41)	143.38 (15.05)
Market Capitalization	45.27 (3.97)	na	na	na	132.33 (14.23)	83.53 (6.66)	221.19 (21.85)	97.59 (13.69)	39.87 (12.31)
Average Governance	-0.24 (0.09)	-0.74 (0.03)	-0.73 (0.05)	-1.11 (0.25)	0.37 (0.08)	-0.31 (0.07)	1.58 (0.05)	-0.29 (0.02)	-0.39 (0.07)
Liquidity	19.18 (8.58)	37.33 (19.59)	30.13 (16.57)	20.88 (7.12)	37.25 (19.25)	18.71 (9.77)	25.43 (12.17)	28.34 (15.18)	43.28 (20.09)
Credit Risk	1.96 (1.85)	2.34 (2.00)	1.53 (1.38)	0.12 (0.13)	1.73 (1.53)	2.98 (2.21)	1.49 (0.61)	3.38 (1.93)	1.86 (4.60)

^aValues are in thousands of US dollars at constant 2010 prices. Means and standard deviations (in parentheses).

Table B2. Key descriptive statistics by country

	Price of Output	Marginal Cost	Price-Cost Margin	Lerner Index	For Bank	EME For	ADV For	EME ASEAN	EME non-ASEAN	For Part	EME Part	ADV Part	EME ASEAN Part	EME non-ASEAN Part
Price of Output	1													
Marginal Cost	-0.15	1												
Price-Cost Margin	-0.36	0.06	1											
Lerner Index	-0.19	-0.08	0.47	1										
For Bank	-0.25	0.12	0.74	-0.24	1									
EME For	-0.10	-0.08	0.29	0.62	-0.15	1.00								
ADV For	-0.15	-0.03	0.35	0.74	-0.18	-0.07	1.00							
EME ASEAN	-0.13	0.19	0.49	0.15	0.43	0.15	0.06	1						
EME non-ASEAN	0.46	-0.11	0.03	-0.07	0.09	-0.09	-0.01	0.05	1					
For Part	0.60	-0.12	-0.14	-0.09	-0.09	-0.09	-0.04	-0.06	0.70	1				
EME Part	0.29	-0.08	0.11	-0.04	0.15	-0.07	0.01	0.09	0.93	0.40	1			
ADV Part	0.61	-0.15	-0.08	-0.10	0.00	-0.07	-0.07	-0.05	0.82	0.91	0.60	1		
EME ASEAN Part	0.08	0.06	-0.17	0.02	-0.20	-0.04	0.06	-0.03	-0.15	0.37	-0.38	-0.05	1	
EME non-ASEAN Part	0.38	0.07	-0.37	-0.17	-0.27	-0.11	-0.13	-0.18	0.25	0.30	0.17	0.31	0.03	1
Inefficiency	0.13	-0.87	-0.02	0.06	-0.07	0.07	0.02	-0.15	0.08	0.17	0.02	0.14	0.10	-0.06
Diversification	-0.37	0.36	0.22	-0.07	0.29	-0.10	0.00	0.21	-0.18	-0.31	-0.08	-0.32	-0.01	-0.22
Deposits	0.39	-0.01	-0.50	-0.28	-0.34	-0.23	-0.16	0.01	0.15	0.32	0.02	0.24	0.23	0.21
Capitalization	-0.14	-0.27	0.32	0.26	0.16	0.17	0.18	-0.07	0.02	-0.06	0.06	-0.04	-0.05	-0.14
Bank Size	-0.26	0.52	-0.19	-0.21	-0.05	-0.10	-0.18	0.25	-0.20	-0.28	-0.12	-0.31	0.02	0.02
Growth	0.03	-0.11	-0.04	0.00	-0.05	0.04	-0.04	-0.13	-0.38	-0.01	-0.49	-0.05	0.09	-0.02
Inflation	0.45	-0.16	-0.11	-0.08	-0.06	-0.04	-0.07	-0.09	0.27	0.47	0.11	0.53	-0.05	0.17
HHI	-0.22	0.14	-0.07	-0.03	-0.06	-0.03	-0.02	0.03	-0.42	-0.45	-0.32	-0.41	-0.16	-0.12
Broad Money	-0.61	0.10	0.16	0.11	0.10	0.11	0.04	0.05	-0.70	-0.96	-0.42	-0.88	-0.35	-0.30
Market Capitalization	-0.43	0.28	0.04	0.02	0.03	-0.05	0.07	0.13	-0.25	-0.51	-0.06	-0.55	-0.01	-0.19
Average Governance	-0.24	0.18	0.01	-0.04	0.04	-0.08	0.02	0.05	-0.06	-0.34	0.10	-0.28	-0.20	-0.10
Liquidity	-0.42	-0.07	0.38	0.13	0.31	0.07	0.11	0.01	-0.34	-0.52	-0.18	-0.42	-0.30	-0.20
Credit Risk	-0.01	-0.07	0.02	0.14	-0.08	0.23	-0.02	0.00	-0.04	-0.01	-0.04	-0.07	0.12	0.04

	Inefficiency	Diversification	Deposits	Capitalization	Bank Size	Growth	Inflation	HHI	Broad Money	Market Capitalization	Average Governance	Liquidity	Credit Risk
Inefficiency	1												
Diversification	-0.21	1											
Deposits	0.06	-0.10	1										
Capitalization	0.25	-0.14	-0.54	1									
Bank Size	-0.45	0.42	0.29	-0.47	1								
Growth	0.10	-0.15	0.03	-0.02	-0.21	1							
Inflation	0.10	-0.26	0.13	-0.10	-0.25	0.19	1						
HHI	-0.13	0.19	-0.05	-0.08	0.33	-0.09	0.05	1					
Broad Money	-0.16	0.28	-0.34	0.08	0.23	0.05	-0.48	0.30	1				
Market Capitalization	-0.20	0.39	-0.04	-0.05	0.49	-0.30	-0.50	0.48	0.42	1			
Average Governance	-0.15	0.26	-0.02	-0.06	0.33	-0.22	-0.29	0.46	0.19	0.80	1		
Liquidity	0.05	0.24	-0.48	0.32	-0.19	0.13	-0.18	0.13	0.53	0.09	0.05	1	
Credit Risk	0.13	0.08	-0.08	0.20	0.04	-0.09	-0.14	-0.02	0.02	0.04	-0.06	0.04	1

Table B3. Crosscorrelation matrix