



Foreign participation and banking competition: Evidence from the Indonesian banking industry



Tri Mulyaningsih^{a,*}, Anne Daly^b, Riyana Miranti^c

^a Faculty of Economics and Business, University of Sebelas Maret, Jl. Ir. Sutami 36A, Surakarta 57126, Indonesia

^b Faculty of Business, Government and Law, University of Canberra, ACT 2610, Australia

^c National Centre for Social and Economic Modelling, University of Canberra, ACT 2610, Australia

ARTICLE INFO

Article history:

Received 26 July 2013

Received in revised form 8 June 2014

Accepted 12 February 2015

Available online 20 February 2015

JEL classification:

D4

G2

L1

Keywords:

Banking competition

Foreign penetration

Modes of entry

ABSTRACT

Foreign participation in Indonesian banking has expanded from the establishment of foreign *de novo* banks into the acquisition of existing local banks. The increase in foreign participation has therefore not been associated with a growing number of banks. This study aims to examine the competitive behavior of foreign and local banks as a competitive banking industry is important in boosting economic efficiency and economic growth. This study also examines the role of modes of entry of foreign banks on competition, either through the establishment of foreign *de novo* banks or the acquisition of local banks. The recent methodological refinements of the Panzar–Rosse method developed by [Bikker et al. \(2011\)](#) are employed to estimate the level of competition among local and foreign banks. Generally, the foreign banks, particularly foreign *de novo* banks behaved more competitively than local banks, and their penetration is therefore important in creating a contestable market. This study found that in terms of assets, on average foreign *de novo* banks were smaller, more efficient, and had lower overhead costs, so they could offer lower loan rates and disburse more loans. The recent consolidation in the Indonesian banking industry may have an adverse impact on competition as it restricts the establishment of foreign *de novo* banks.

© 2015 Elsevier B.V. All rights reserved.

1. Introduction

The Indonesian banking sector is open for foreign investment. The current trend shows that regulatory and policy changes in Indonesian banking have widened the access for foreign penetration into the local market. Currently foreign banks are allowed to acquire established local banks (later these are named foreign acquired banks) and establish joint ventures and branches of foreign banks (these last two modes are later called foreign *de novo* banks). The wider access explains a higher degree of foreign penetration in the Indonesian banking industry. The share of assets of foreign banks in Indonesian banking increased from 10% in 1990s to 35% in 2000s. However, the increased penetration of foreign banks was not associated with a growing number of banks in the industry because in the 2000s foreign banks entered the market by acquiring existing local banks rather than establishing new joint ventures

or branches of foreign banks. According to the ownership data, in 2010 more than half of foreign banks were foreign acquired banks and the number of foreign *de novo* banks decreased from 37 in 1998 to 19 in 2010.¹

There is a significant interest in understanding the competitive behavior of the two types of foreign banks, foreign *de novo* banks and foreign acquired banks, in order to predict the impact of policy changes in favor of banking liberalization on competition. Regarding competition, the literature suggests that different modes of entry of the foreign banks may have different impacts on competition ([Berger et al., 2004](#); [Claeys and Hainz, 2006](#); [Clarke et al., 2001](#); [Jeon et al., 2011](#); [Lehner, 2009](#); [Martinez Peria and Mody, 2004](#); [Montgomery, 2003](#)). The study of competitive behavior of banks is important because some empirical studies, for example [Jayaratne and Strahan \(1996\)](#), [Levine et al. \(2000\)](#), and [Collender and Shaffer \(2003\)](#) have found a strong relationship between competitive banking and economic growth. Competitive banking lowers the interest rate on loans compared to less competitive

* Corresponding author. Tel.: +62 82313234842; fax: +62 271 638143.

E-mail addresses: trimulyaningsih.uns@gmail.com,

agi197@yahoo.com (T. Mulyaningsih), anne.daly@canberra.edu.au (A. Daly), riyana.miranti@canberra.edu.au (R. Miranti).

¹ Some *de novo* banks exited from the market due to bank closures or merging with other banks.

banking. Therefore, a competitive banking industry will boost the loans disbursement for investment activities. Further, competition facilitates the emergence of innovations and drives financial institutions to deliver a high quality product. An efficient banking industry will benefit the whole economy through loans provision, payment system delivery, monetary policy transmission and its role in maintaining financial stability (Bikker et al., 2011).

This study has two objectives. The first is to examine the contribution of foreign participation to competition in the Indonesian banking industry. This study estimates and compares the competitive behavior of local banks and foreign banks between 1980 and 2010. Second, this study aims to examine the role of modes of entry of foreign banks, either through the establishment of foreign *de novo* banks or acquisition of local banks (foreign acquired banks), on competition. We examine the competitive behavior of foreign *de novo* banks and foreign acquired banks using the observation period 2000–2010. The recent refinements of the Panzar–Rosse (P–R) method by Bikker et al. (2011) are employed to estimate the level of competition. It is important to employ the correct specification of the Panzar–Rosse method as Bikker et al. (2011) found that the price and scaled-revenue specifications are mis-specified because they cannot distinguish between perfect and imperfect competition. Finally, this article contributes to the study of foreign penetration in local banking, particularly in emerging economies where the capital market is under-developed and the banking sector is the main source of lending.

2. Regulatory changes

The form of foreign participation in the Indonesian banking industry has evolved in the past 30 years. In the 1970s, foreign participation was permitted through establishing branches of foreign banks. In those times, foreign banks had more business restrictions than their local counterparts. For example, in terms of operation the branches of foreign banks were only permitted to operate in the capital city with two offices (Hadad et al., 2004; McLeod, 1999). The banking reform in 1988 granted larger access for foreign banks to penetrate the local banking market by establishing joint venture banks through a partnership with local banks. Unlike branches of foreign banks, joint venture banks are a local legal entity that is separated from the headquarter bank (Hadad et al., 2004). The regulation treats joint venture banks as local banks, and in consequence they do not have any geographical restriction to expanding their business. As the regulation was more lenient, foreign penetration increased gradually. Following the reform, the Indonesian banking industry was further opened for foreign penetration through the introduction of the Banking Law of 1992. The Law permitted the purchase of listed local banks in the stock market by foreigners (Table 1).

The 1997 economic crisis contributed to changes in the nature of foreign penetration in the Indonesian banking industry. After the 1997 crisis, foreign penetration was conducted through the purchase of existing local banks under the divestment program.² This program provided larger opportunities to enter Indonesian banking. Furthermore, foreign participation was unlimited because

foreign banks could purchase up to 99% of the shares of local banks.³ Referring to the ownership data for Indonesian banks in 2009, at least seven large banks under the recapitalization program were owned by foreign investors. The shares of foreign investors in those seven large banks were even higher than 50% (Fig. 1).

After the 1997 economic crisis, the Indonesian banking industry has consolidated. During the consolidation in the 2000s, foreign penetration was observed in local banks particularly in small banks and existing joint venture banks. Under consolidation, banks had to meet new capital requirements by 2010. Some small banks invited investors to inject additional capital to meet the new requirements. In addition, the intensity of foreign penetration rose, as the existing foreign partners in joint ventures increased their participation so that they became the main shareholders. The ownership data shows that among the 16 joint ventures, the foreign banks' participation increased substantially up to 99%. Information relating to the ownership structure of banks is available in the appendix.

3. Literature review

3.1. Foreign penetration and competition in local banking

There are substantial numbers of papers discussing the influence of foreign presence in the banking industry. As the focus of this study is Indonesian banking, the discussion of the literature is focused on foreign penetration in developing economies. The behavior of foreign banks in developing countries differs compared to those operated in developed countries. For extensive studies about foreign banks in developing and developed countries, please refer to the study by Claessens et al. (1998). Regarding developing countries, initially most of the studies are concerned with the penetration of foreign banks in Latin American countries, where foreign investment was first observed. Among the studies about foreign banks' penetration in Latin American countries are Barajas et al. (2000), Gelos and Roldos (2002), Yeyati and Micco (2003), Martinez Peria and Mody (2004), Yeyati and Micco (2007), and Jeon et al. (2011).

Most of the studies confirmed that foreign banks' penetration enhances competition in the local banking industry. The new entrants contribute to creating a contestable market by alerting the incumbents to enhance their competitiveness. Contestable market theory was introduced by Baumol (1982) to describe a market where firms have zero profit and sell at a price equal to marginal cost even though firms are working under imperfect competition including monopolistic competition, monopoly and oligopoly. A contestable market exists as long as there are no barriers to entry and exit. The freedom of entry puts pressure on the incumbents to operate at normal profits because any extra profit will attract new entrants.

In addition, as foreign banks operate in local banking, their competitive behavior further exerts pressure on the local banking market. Foreign banks behave more aggressively than local banks due to their smaller size. A study by Claessens et al. (1998) in 80 countries showed that in most of the countries, foreign banks were smaller than local banks. Comparing the shares of foreign banks in terms of number and assets, foreign banks had a higher percentage in terms of number than in terms of size. A study by Bassett and Brady (2002) suggests that small banks behave more aggressively than the larger banks because they are more likely to be highly dependent on interest-based activities compared to the large banks. In the case of Indonesian banks, the contribution of

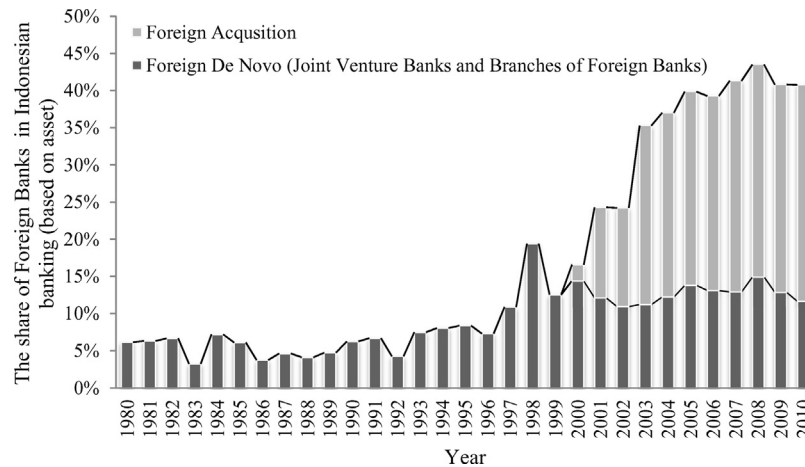
² During the 1997 economic crisis, the government bailed out some banks through the Indonesian Banking Restructuring Agency (IBRA) in order to improve the banks' financial performance. The government contributed 80% of funds required to increase the banks' equity to meet the capital adequacy ratio (CAR) requirement of 4%. The government contribution was then converted into shares of the recapitalized banks. In 2003, under the privatization program, the Indonesian government offered the shares of bailout-banks to the public.

³ The Banking Law Number 10 of year 1998 permits foreigners, including banks, entities and individuals to have up to 99% of shares in joint venture banks.

Table 1

Policies related to foreign penetration in the Indonesian banking industry.

| Period | Policies |
|--------|---|
| 1970s | Foreign penetration was allowed in the form of opening branches of foreign banks. |
| 1988 | Second banking reform through banking deregulation in October 1988. In addition to opening branches of foreign banks, penetration was permitted through the establishment of joint venture banks, which requires a partnership with a local bank. |
| 1992 | The Banking Law Number 10/1992 permitted foreign banks and entities to purchase shares of local banks that were listed on the stock market, as long as the local owner was still the main shareholder. In addition, foreign investors could also penetrate state banks as the Law permits the state banks to be listed on the stock market. |
| 2003 | Foreign banks were allowed to purchase the bail-out banks. In 2003, the Indonesian Banking Restructuring Agency (IBRA) introduced a divestment scheme of bail-out banks from the 1997 crisis. |
| 2004 | Foreign penetration increased due to the introduction of Indonesian Banking Architecture that required banks to comply with the new minimum capital. |

**Fig. 1.** Foreign penetration in Indonesian banking between 1980 and 2010.

Source: Banks' annual financial report collected by the Bank of Indonesia.

interest-based activities to the revenue of small banks reached 93% on average between 1980 and 2010. The contribution of interest-based activities to total revenue of large banks was 82% on average between 1980 and 2010. The above argument was supported by Bassett and Brady (2002) who found that small banks are more aggressive in raising the deposit rate in order to attract more deposit funding.

Furthermore, the penetration of foreign banks has contributed to lower the intermediation costs (Claessens et al., 1998) in local banking that further lower the banks' costs structure (Clarke et al., 2001). Foreign banks are capable to put pressure on local incumbent banks because they are more efficient as evidenced by lower operating expenses (Martinez Peria and Mody, 2004; Unite and Sullivan, 2003) and overhead costs (Manlagñit, 2011). In addition, a study by Martinez Peria and Mody (2004) found that foreign banks have a lower spread of interest rates than local banks.⁴ By having a lower spread, banks have reduced profits as found by Manlagñit (2011) in order to maintain their competitiveness.

Moreover, the foreign banks enhance the performance of local banks via knowledge spillovers. The spill-over is particularly higher in countries with a lower level of development because the gap in terms of the adoption of modern techniques and practices between foreign and local banks is larger (Lensink and Hermes, 2004). A study by Rajan and Gopalan (2010) shown that foreign banks bring new technologies and banking products, advanced marketing skills, management and better corporate governance structures

Some studies on foreign banks' penetration published in the 2000s reveal that in studying local banking competition, it is important to take into account different modes of entry. A study by Clarke et al. (2001) explains that the regulation in host countries influences the modes of entry adopted by foreign banks. As illustrated in the previous section, in the past the penetration into Indonesian banking was allowed by establishing *de novo* operations. Recently, as the regulator limits the number of banks, foreign penetration is permitted through purchase or merger with local existing banks. Hence, as suggested by Montgomery (2003), the analysis of foreign penetration should consider banks that enter by various modes such as establishing joint ventures, branches of foreign banks and acquiring the local existing banks. The modes of entry are also determined by multinational firm strategy.

Martinez Peria and Mody (2004) analyzed the different impacts of foreign penetration on competition if the entry is conducted either through the establishment of foreign *de novo* banks or the acquisition of existing local banks (foreign acquired banks). Their study found that foreign *de novo* banks have a larger impact on competition compared to foreign acquired banks. The empirical evidence shows that foreign *de novo* banks particularly operated with lower spread compared to foreign banks that entered the market by acquiring local banks. This implies that foreign *de novo* banks behave more aggressively than foreign acquired banks (Martinez Peria and Mody, 2004). Foreign *de novo* banks are more aggressive because they are a new business entity, unlike the foreign acquired banks. On the one hand, foreign *de novo* banks as the newcomers are more willing to charge lower rates because they have to work hard to establish market shares (Martinez Peria and Mody, 2004). On the other hand, the foreign acquired banks already have a captive

⁴ Spread is calculated by subtracting the division of total interest income on loans, and the division of interest cost on deposits.

market from the acquired local banks. In addition, as a new business entity, a foreign *de novo* bank is not likely to possess the knowledge about borrowers in the local banking industry. Martinez Peria and Mody (2004) argued that foreign *de novo* banks focus on transparent segments of the market, where the information asymmetry is lower and information about borrowers can be accessed. The segment of the transparent borrowers is perceived to be more competitive thus foreign *de novo* banks have to charge a lower spread in order to attract these borrowers (Dell'Ariccia and Marquez, 2004).

Claeys and Hainz (2006) also suggest that competition is stronger if market entry occurs through the establishment of foreign *de novo* banks. Their study indicates that a 1% increased in foreign *de novo* market share will lead to a reduction in domestic bank average lending rates of 0.17% compared to a reduction of 0.13% with foreign acquired banks. This study made the interesting finding that foreign *de novo* banks are working under a non-linear age dynamic. Foreign *de novo* banks charge higher interest rates on average but subsequently reduce interest rates over time. Foreign *de novo* banks charged higher rates in the beginning because they focus on small firms with the characteristics of soft information. A similar conclusion is presented by Jeon et al. (2011). The study suggests that foreign *de novo* banks have a stronger positive impact on competition than foreign acquired banks.

A study by Lehner (2009) highlights the different cost structures of *de novo* operation and foreign acquired banks due to the capability to access soft information. *De novo* operations have higher marginal cost than domestic banks. The cost advantage of domestic banks is due to access of soft information from the lending relationship. Conversely, foreign acquired banks do not experience cost disadvantage because they can access the soft information from the acquired local banks. Moreover, foreign acquired banks may implement their superior technology so they operate at lower marginal costs than domestic banks. In line with a previous study by Dell'Ariccia and Marquez (2004), it is argued that due to the inability of *de novo* operations to access soft information, they focus on more transparent borrowers with the capability to provide hard information. As a consequence, *de novo* banks have to offer a more attractive interest rate than foreign acquired banks.

3.2. Foreign banks penetration in the Asian countries

Nevertheless, a study by Jeon et al. (2011) reveals increased foreign penetration in emerging economies in Asia in recent years. In spite of increased foreign bank penetration in Asian economies, there are only a handful of studies discussing the impact of foreign penetration on the local banking markets. Among those studies are Cho (1990) on Indonesian banking; the international study by Claessens et al. (1998) on foreign banks covered 80 countries, including Indonesia; Unite and Sullivan (2003) and Manlagñit (2011) on Philippine banking; Montgomery (2003) on South East Asian countries including Indonesian banking; Liu et al. (2011) on the Indonesian, Malaysian, Philippine and Vietnamese banking industries; and Rajan and Gopalan (2010) and Molyneux et al. (2013) on South East Asian countries.

In terms of assets, foreign banks in Asian countries accounted for 30.5% of the total assets of the banking industry in 1997. After 10 years, the proportion of assets owned by foreign banks increased 10 points to 40.5% (Jeon et al., 2011). However, in terms of numbers, in the 2000s the number of foreign banks in the Indonesian banking industry just slightly increased compared to the 1990s. A study by Rajan and Gopalan (2010) described Indonesia liberalizing enthusiastically but no new licenses are being granted to *de novo* banks. Instead, foreign penetration is in the form of acquiring existing local banks. A study by Molyneux et al. (2013) in

five South East Asian countries found supporting evidence of the shifting trend in modes of entry of foreign banks. They revealed that foreign penetration in the local banking market is driven by profit opportunities rather than following their home customers. In the past, foreign banks entered overseas market to finance foreign direct investment (FDI) of their home customers. We argue that the acquisition of existing local banks is perceived as more suitable to pursue local profit opportunities. In addition, establishing *de novo* operations is not preferable because during the consolidation period, the regulator restricted the entry of new banks.

In regards to Indonesian banking, there is a lack of studies discussing the impact of foreign penetration on competition. There is one study by Mulyaningsih and Daly (2011) on competition in the Indonesian banking industry, however this does not specifically cover foreign penetration. A discussion of foreign penetration in Indonesian banking is covered by Cho (1990), whose study focuses on the period when the regulator introduced restrictions to establish joint venture banks and foreign acquired banks. Therefore, Cho (1990) mainly discusses the branches of foreign banks. Furthermore, the examination of the impact of foreign penetration on the local banking market relied on market concentration information rather than using the direct observation of banks' competitive behavior. Another study on foreign banks' behavior in Indonesian banking was conducted by Montgomery (2003), whose study compares the interest spread and lending behavior of local banks and foreign banks, which consisted of branches of foreign banks and joint venture banks. The study suggests that foreign banks are more stable because they have a larger spread between foreign liabilities and foreign assets. In addition, the lending of foreign banks fluctuated less compared to domestic bank lending, particularly during the 1997 economic crisis.

There are five cross-country studies on foreign penetration capturing Indonesian banking, which are Claessens et al. (1998), Jeon et al. (2011), Liu et al. (2011), Molyneux et al. (2013) and Soedarmono et al. (2013). The discussion of Claessens et al. (1998) is based on foreign banks in general regardless of their modes of entry. Liu et al. (2011) discuss the trade-off between competitive banking and risk taking behavior in South East Asian countries including Indonesia. Their study found that foreign banks were safer compared to their local counterparts and their penetration contributed to enhancing competition in the local banking industry. A more detailed study on foreign penetration of emerging economies is conducted by Jeon et al. (2011), considering the possible different impact of the penetration of foreign *de novo* banks and foreign acquired banks on competition in the local banking market. In order to examine the impact of foreign penetration on competition, Jeon et al. (2011) rely on the measure of proportion of foreign banks in the local banking industry in terms of assets and the number of banks. In contrast, this study directly observes the competitive behavior of foreign banks and local banks using the recent refinement of the P–R method. A study by Molyneux et al. (2013) focused on the motive of foreign banks' penetration in East Asian countries. The study concluded that foreign banks' penetration in East Asian countries was driven by the profit motive rather than following customers from home countries. Soedarmono et al. (2013) also found an increasing role of foreign ownership in the Indonesian banking industry during the 1997 Asian crisis due to the loss of comparative advantage of the domestic banks under unstable credit market conditions. A higher share of foreign banks contributed to stabilize local banking because they have better screening technology to assess hard information from the borrowers. During the crisis, hard information is more reliable than soft information.

4. Methodology and data sources

4.1. The Panzar–Rosse (P–R) method

This study employed the P–R method to assess the competitive behavior of foreign, local, foreign *de novo* and foreign acquired banks. This method is more suitable because it is a direct measure of competition, unlike the structural approaches such as the Lerner index which calculates the market power of banks and assumes that price–cost margins decrease with more intense competition creating higher welfare (Leon, 2014). Studies by Shaffer (1994, 2004) provide evidence that the Lerner index is not a reliable proxy for social welfare as the linkage between the Lerner index and measures of welfare is not monotonic. Moreover, the P–R method facilitates the use of bank-level data so it enables us to examine the competitive behavior of banks across different ownership types, which are foreign banks and local banks (Claessens and Laeven, 2004; Liu et al., 2011). In addition, this approach is robust in terms of market definition (Shaffer, 2004) and has been used extensively in empirical studies on banking competition because of the modest data requirements compared to Bresnahan's (Bresnahan, 1982) and Iwata's (1974) approaches. Finally, in order to sharpen the precision of the P–R method to measure competition in the banking industry, this study employed the recent refinement by Bikker et al. (2011). This refinement strengthens confidence in the estimates because it uses correct specification of the P–R method, unscaled revenue, that is capable to distinguish between perfect and imperfect competition.

In order to observe the competition in the market, the P–R method is based on properties of reduced form revenue equations at the bank level, and the data on revenues and factor prices. Generally, the P–R method calculates the sum of elasticity of the reduced form revenues with respect to changes in factor prices. This sum of elasticity is given by *H*-statistics. The value of elasticity provides information about banks' competitive behavior, and furthermore it determines the structure of the market. The assumption underlying this method is that the market power of banks is measured by the extent to which changes in factor prices (unit costs) are reflected in revenue earned (Vesala, 1995). If the industry is competitive the elasticity will be high, while the elasticity will be low or even negative in the case of monopoly and collusive oligopoly. The properties of *H*-statistics allow us to distinguish empirically between common imperfect competition theories of price formation as characterizations of the competitive behavior of Indonesia's banks, whether banks work in a monopoly or perfect collusion in the oligopoly market, monopolistic competition or perfect competition market (Vesala, 1995). Further, if the *H*-statistics are positive between 0 and 1, the higher number implies more competitive behavior (Vesala, 1995).⁵ The assumptions under the P–R method are described in Appendix A.

Below is the operationalization of the reduced-form revenue equation to measure the elasticity of revenue in regards to the change in input prices.

$$\ln TR = \alpha + \sum_{i=1}^n \beta_i \ln w_i + \sum_{j=1}^J \gamma_j \ln BSF_j + \delta \ln OI + \varepsilon \quad (1)$$

where *TR* is the bank revenue; *w* refers to three input prices which are the funding price, the wage or personnel costs and the

capital price; *BSF* are bank-specific exogenous factors, such as the risk components and differences in the deposit mix and *OI* is the contribution of non-interest income (Bikker et al., 2011; Yeyati and Micco, 2007). In regards to the risk component, the empirical model uses the capital risk (*EQ*) that is measured by the ratio of equity to total assets. The deposit mix variables are important to capture the variety of funding sources for local and foreign banks. There are two variables that are employed to examine the influence of funding mix on banks' revenue. First is the proportion of deposits to total assets to capture the role of deposits in the banks' funding mix (*DEP*). Considering deposits are a relatively stable source of funding compared to debts (particularly short-term debts), a higher proportion of deposits in the banks' funding mix should have a positive impact on the banks' revenue. Second is the proportion of demand deposits to total deposits (*DDC*). Demand deposits are also perceived as a cheap source of funds because banks do not have to pay interest. Thus, a higher contribution of demand deposits may have a positive impact on the banks' revenue.

The reduced-form revenue in Eq. (1) is the standard un-scaled revenue specification. Some studies modified the specification. Shaffer (1982), Nathan and Neave (1989), Molyneux et al. (1994), Bikker and Haaf (2002) and Gelos and Roldos (2002) employed a scaled-revenue specification by adding total assets as one of the explanatory variables to represent the scale. Other studies, for example Vesala (1995) and De Bandt and Davis (2000), used equity as a scale variable. A number of studies used the price specification by treating the total assets as the denominator of the banks' revenue on the left-hand side of the model, representing the banks' revenue for each value of assets or price (Bikker and Haaf, 2002; De Bandt and Davis, 2000; Molyneux et al., 1994). However, as suggested by Bikker et al. (2011), the price and scaled-revenue specifications are mis-specified because they cannot distinguish between perfect and imperfect competition. This is particularly the case if the market is a monopoly where the monopoly price ($(\partial P / \partial MC) > 0$) is an increasing function of marginal cost. In this situation, the *H*-statistic of the price specification (H^P) is larger than 0 (it has a positive value) instead of negative.

Further, the study of Bikker et al. (2011) also examined the problem of the revenue specification, whether it controls scale by imposing total assets (*TA*) as one of the explanatory variables (scaled-revenue specification). The main problem arises in the case of an imperfectly competitive market where the joint elasticity of input prices is negative. In the monopoly market it assumes that the monopolist has the capacity to adjust the quantity in response to changes in input prices (Bikker et al., 2011). However, in the case of an inelastic demand function, there would be no quantity adjustment. Therefore, total revenue would move in the same direction as price (*P*) and marginal cost (*MC*). Hence, we would get a value of *H*-statistics larger than zero or positive. The revenue specification with the control on scale will also be mis-specified if the demand function is elastic; where $MR = MC > 0$. By imposing the log of total assets (*TA*) as a control variable, the output quantity will be constant (Bikker et al., 2011). Further, the value of the input prices' elasticity (*H*) will represent the change in price times fixed input. Hence, the estimates will yield $H > 0$ for any monopoly.

This study used the standard (un-scaled revenue) specification of the reduced-form revenue equation to estimate the competitive behavior of foreign and local banks. The empirical model was based on Gelos and Roldos (2002), Wong et al. (2006) and Sun (2011). The panel data approach, particularly fixed effects, is employed to estimate competition in the Indonesian banking industry.⁶ This

⁵ Bikker and Haaf (2002) and Vesala (1995) explain that the result of the interpretation of *H*-statistics between 0 and 1 is a continuous measure of the degree of competitive behavior. Further, the higher value of *H* can be used as an indication of the stronger degree of competitive behavior.

⁶ The Hausman test was performed to select from two methods in the panel data, which are fixed effect or random effect. The Hausman test shows that a fixed effect

study introduced a dummy variable L_1 to estimate the competitive behavior of local and foreign banks independently. The local banks were treated as the base group and the dummy variable of L_1 was assigned to foreign banks. L_1 equals one if it is a foreign bank and zero if otherwise. In order to examine the competitive behavior of foreign banks across different modes of entry, there are six estimation models. In the first model, L_1 is assigned to joint venture banks. In the second model, L_1 is used for branches of foreign banks. In the third model, L_1 is assigned to foreign *de novo* banks that covered both joint ventures and branches of foreign banks. In the fourth model, L_1 refers to banks that are at least 50% owned by foreign banks or entities. In the fifth model, L_1 refers to foreign *de novo* banks that covered both joint ventures and branches of foreign banks. In the sixth model, L_1 refers to foreign acquired banks. In addition, the fourth, fifth and sixth models are estimated by using shorter periods than the other equations. The observation period for model four, five and six is between 2000 and 2010 because the foreign penetration through acquisition of local banks occurred in the 2000s. Prior to 2000, the foreign penetration was only through the establishment of foreign *de novo* banks, which is already captured by model one, two and three. Finally, time dummies are used in the model to capture changes of the regulation environment, the macroeconomic environment and other general effects that vary over time, such as technological change.

In order to form the interaction variable, we multiplied dummy variables with all explanatory variables. The difference between the coefficient of the input prices of the base group and the coefficient of input prices of the interaction variables determines the difference in competitive behavior between local and foreign banks. An *F*-test was employed to examine whether the difference is statistically significant. Further, the coefficients of interaction variables inform whether foreign banks are more competitive than local banks. Below is the econometric model to assess the competitive behavior across groups.

Econometric model with interaction variables

$$\begin{aligned} \ln TR_{it} = & \alpha_0 + \sum_{j=1}^3 \beta_j \ln w_{jit} + \gamma_1 \ln EQ_{it} + \gamma_2 \ln DEP_{it} + \gamma_3 \ln OI_{it} + \gamma_4 \ln DDC_{it} + L_1 \\ & * \left[\alpha_0 + \sum_{j=1}^3 \beta_j \ln w_{jit} + \gamma_1 \ln EQ_{it} + \gamma_2 \ln DEP_{it} + \gamma_3 \ln OI_{it} + \gamma_4 \ln DDC_{it} \right] + \sigma_i + \varepsilon_{i,t} \end{aligned} \quad (2)$$

Please refer to Table 2 on the specification of variables to assess the competition across sub-groups of foreign banks and local banks.

4.2. Measuring foreign penetration

According to the banking statistics published by the central bank, the form of foreign banks consisted of both joint ventures and branches of foreign banks.⁷ This implies that the central bank definition only covers foreign *de novo* banks. The current pattern shows that foreign penetration also appeared in the form of acquisitions of local banks. This paper extends the definition of foreign banks to represent the current pattern and trend of foreign penetration. Relying on the definition of the central bank may underestimate the proportion of the foreign banks in the local market. Furthermore, once the foreign proportion reaches 25%, the foreign shareholders have control of the bank (*Single Presence Policy Regulation of Bank Indonesia Number 8/16/PBI/2006 (Indonesia)*). Therefore, excluding

the local private banks, which have substantial foreign participation will under-estimate the role of foreign banks in the banking industry.

In order to properly define foreign banks, this study refers to previous studies in the banking industry. According to Claessens et al. (1998), foreign banks are those with at least 50% of assets being foreign-owned. They measured foreign penetration as the proportion of the number of foreign banks to total banks in the industry and the proportion of assets of foreign banks to the total assets of the industry. In addition, Yeyati and Micco (2007) defined foreign penetration as the ratio of foreign bank assets to the total assets of banking. Yeyati and Micco (2007) further defined foreign banks as those with a foreign participation of at least 51%. A similar definition is also employed by Jeon et al. (2011) where foreign banks are those with more than 51% of the capital owned by foreign individuals, firms (including banks) or international organizations. Similar to previous studies, Jeon et al. (2011) employed both the share of the number of foreign banks and the share of the size of foreign banks to measure foreign penetration. Based on some of the literature above, this article defines foreign banks as those with at least 50% foreign ownership. Foreign *de novo* banks refer to either the branches of foreign banks or the joint venture banks. Foreign acquired banks are defined as local banks that have been acquired by foreign banks.

4.3. Sources of data

This study relies on the data of annual financial reports between 1980 and 2010. The data was collected from banking statistics published by the Bank of Indonesia. The commercial banks' annual financial reports prior to the year 2000 are available in book format. Those books can be accessed at the library of the Bank of Indonesia in Jakarta. The banks' annual financial reports after the year 2000 are available electronically on the website of the Bank of Indonesia. Data of all variables are collected from the annual banks' balance

sheet and income statement. We successfully compiled the unbalanced panel data of all 286 commercial banks between 1980 and 2010, and produced a dataset of banks' revenue, cost, and balance sheet from manual extraction of the banks' annual financial report. The total number of observations is almost 3636. Hence, on average, the sample includes more than 13 observations for each commercial bank. The average number of observations for each commercial bank is less than the number of years captured by this study due to data unavailability for those banks, bank mergers, bank entry and bank exit during the sample period.

5. Discussion of the empirical results

The focus of estimations one to three is comparing the competitive behavior of local and foreign *de novo* banks. In order to capture the possible difference in behavior of foreign *de novo* banks that enter through establishing joint venture banks or branches of foreign banks, this study ran estimations one and two. The results of all estimations are presented in Table 3. As explained in the methodology section, all estimations incorporated time dummies to capture the changes in the banking environment. This study also estimated the empirical model using the dummies to reflect the banking

is more appropriate to use for estimating competition in the Indonesian banking industry.

⁷ The Banking Law does not allow foreign banks to set up a subsidiary that is wholly owned or partially owned without having a partnership with local banks.

Table 2
Variable specification.

| Variable | Variable specification |
|---------------|--|
| i | is the index for bank |
| t | is the index for year between 1980 and 2010 |
| j | is the index for three input price variables, which are w_1 , w_2 , w_3 |
| TR_{it} | is bank's revenue measured by the values of total revenue or interest income of bank i and time t |
| w_{1it} | is funding price measured by the ratio of annual interest expenses to total deposit of bank i and time t |
| w_{2it} | is wage rate/personnel cost measured by the ratio of annual wage and salary expenses to total deposits plus total loans of bank i and time t |
| w_{3it} | is capital price measured by the ratio of other expenses to fixed assets of bank i and time t |
| L_{jit} | is dummy of foreign banks multiplied by input prices j , bank i and time t |
| OL_{it} | is the proportion of non-interest income measure by the ratio of non-interest income to interest income of bank i and time t |
| EQ_{it} | is capital risk measured by the ratio of equity to total assets of bank i and time t |
| DEP_{it} | is deposits mix measured by the ratio of total deposits on total assets of bank i and time t |
| DDC_{it} | is deposits mix measured by the ratio of demand deposits from customers to total deposits of bank i and time t |
| σ | is the bank fixed effect (unobserved heterogeneity) |
| ε | is a white-noise error term that includes errors in the competition measure. |

reform in 1988 and 1992, the Asian financial crisis 1997–1998, and the global financial crisis of 2007–2008. The result is similar with estimation using time effect dummies.

Estimation results of models one to three confirmed that foreign *de novo* banks behaved more competitively than their local counterparts. The H -statistics of foreign *de novo* are higher than those of local banks. From model 1, the H -statistics of local banks and joint venture banks are 0.65 and 0.83 respectively. Regarding model 2, the H -statistics of local banks and branches of foreign banks are 0.66 and 0.81 respectively. The estimation of the third model shows that the H -statistics of local banks and foreign *de novo* banks are 0.62 and 0.83 respectively. The above argument is also supported by the results of the test on the joint coefficient of input prices. The H -statistics of foreign banks and local banks are significantly different from zero, which implies that local and foreign banks were not working under a monopoly type of market. The different outcomes appeared when we conducted the test of the joint coefficient of input prices for the perfect competition hypothesis. In the case of local banks, the test shows that the joint coefficients rejected the perfect competition hypothesis. However, in the case of foreign *de novo* banks either as joint ventures or branches of foreign banks (in models one, two and three), the joint coefficients were not significantly different from one using the confidence level of 99%. This result implies that foreign *de novo* banks were working in a very competitive environment which was close to perfect competition.

In order to further investigate the competitive behavior of foreign and local banks, this study estimated model four. The observation uses all foreign banks regardless of their modes of entry as long as foreign owners have at least 50% of the total share so that they have controlling power in the banks. The estimation of model four shows that the H -statistics of local banks and foreign banks are 0.33 and 0.37 respectively. Compared to the H -statistics from models one to three, the H -statistics for both local and foreign banks are lower. It signals the less competitive behavior of both banks during the 2000s. This may due to the banking consolidation after the 1997 economic crisis. During the consolidation, there were some bank closures and more restrictions to open the new banks (Rosengard and Prasetyantoko, 2011). The lower H -statistics values also reveal that foreign acquired banks behaved less competitively than foreign *de novo* banks. Unlike models one to three, model four captures both foreign *de novo* banks and foreign acquired banks. The estimation of model five was run to examine this issue further. Model five compares the level of competition between local banks and foreign *de novo* banks by using the same observation period (2000–2010) as for equation four. By running model five, we have comparable information to model four on the competitive behavior of local and foreign banks. Confirming the findings of models one, two and three, between 2000 and 2010, foreign *de novo* banks were

more competitive than the local banks. According to the F -test, the H -statistics of foreign *de novo* banks were statistically higher than the H -statistics of local banks with a confidence level of 90%.

Furthermore, we also attempted to assess the competitive behavior of the foreign acquired banks by estimating model six. The estimation of model six shows that the H -statistics of foreign acquired banks was slightly higher than the local banks, however the difference was not statistically significant. The joint coefficient test of H -statistics of model six has also confirmed that the foreign acquired banks and the local banks worked in a monopolistic competition market. The comparison of the H -statistics of local banks, foreign *de novo* banks and foreign acquired banks from models five and six show that foreign *de novo* banks had the highest H -statistics (0.51). In addition, the difference in H -statistics of foreign *de novo* banks and local banks ($\Delta H = 0.32$) was higher than the difference in H -statistics of foreign acquired banks and local banks ($\Delta H = 0.10$). This finding supports the literature, which state that foreign *de novo* banks behaved more competitively than local banks and foreign acquired banks.

The findings of this study imply that the foreign banks behaved more competitively than the local banks, particularly if foreign penetration was conducted through foreign *de novo* banks, either by creating joint venture banks or establishing branches of foreign banks. This finding is consistent with studies in other regions, for example the Latin American banking industry (Martinez Peria and Mody, 2004), the Philippines banking industry (Manlagñit, 2011; Unite and Sullivan, 2003); 80 countries including Indonesia (Claessens et al., 1998), and the banking industry in developing countries (Clarke et al., 2001), all of which found that foreign banks are more competitive. It is important to examine the source of competitive behavior of foreign *de novo* banks.

In terms of assets, compared to the local banks, on average foreign *de novo* banks were smaller with assets of 21,367 million Rupiah. According to Table 4, the average assets of local banks in the industry and foreign acquired banks were 56,998 million Rupiah and 192,101 million Rupiah respectively. If we compare the assets of two types of foreign *de novo* banks, joint venture banks recorded the smallest assets by 14,184 million Rupiah, compared to branches of foreign banks with 48,133 million Rupiah. The foreign acquired banks are considered large banks, with average assets that surpassed the overall assets of local banks in the Indonesian banking industry. In terms of market share, on average the foreign acquired banks had the largest share and the joint venture banks had the lowest share. The data shows that some of the foreign acquired banks were large banks, for example Bank Central Asia, Bank CIMB Niaga, Bank Danamon Indonesia, Bank International Indonesia, Bank OCBC NISP, Bank UOB Buana and Bank Ekonomi Rahardja (please refer to Appendix Table A1). The literature

Table 3

Competitive environment test for the Indonesian banking sector—competition estimation of group of local banks and group of foreign banks (total revenue as proxy of banks' revenue and time effect dummies). FE means fixed effect estimates. Figures in parentheses are the probability of rejecting the null hypothesis. (a) Total revenue as dependent variable. (b) Foreign de novo operations consist of joint venture banks and branches of foreign banks. (c) Foreign banks are defined as those with at least 50% of foreign ownership. (d) Foreign acquired banks are defined as banks that were acquired by foreign banks/institutions where the shares of foreign investors are at least 50%. (e) The values of H -statistics are smaller than the other equations. This probably occurred because they cover different lengths of periods of observation within the last 11 years of the overall period. (f) $H0 = 0$ rejected and $H0 = 1$ rejected (level confidence 99%). (g) $H0 = 0$ rejected and $H0 = 1$ could not be rejected (level confidence 99%). (h) However the difference is not statistically significant by using the level of confidence 95% and 99%.

| 3rd Specification (fixed effect model of un-scaled revenue specification) ^a | Model 1 | | Model 2 | | Model 3 | | Model 4 | | Model 5 | | Model 6 | |
|---|---|------------------------------|---|------------------------------|---|------------------------------------|---|-------------------------------|---|------------------------------------|---|-------------------------------------|
| | Local banks | Joint venture banks | Local banks | Branches of foreign banks | Local banks | Foreign de novo banks ^b | Local banks | Foreign banks ^c | Local banks | Foreign de novo banks ^b | Local banks | Foreign acquired banks ^d |
| <i>H</i> -stats | 0.65 | 0.83 | 0.66 | 0.81 | 0.62 | 0.83 | 0.33 ^e | 0.37 ^e | 0.19 ^e | 0.51 ^e | 0.35 ^e | 0.46 ^e |
| <i>Hypothesis test</i> | | | | | | | | | | | | |
| $H0 = 0$ | 36.99 ^f (0.000) | 86.1 ^g (0.000) | 37.10 ^f (0.000) | 15.7 ^g (0.000) | 28.89 ^f (0.000) | 50.9 ^g (0.000) | 12.43 ^f (0.000) | 12.49 ^f (0.000) | 3.59 ^f (0.06) | 12.38 ^f (0.000) | 12.80 ^f (0.000) | 7.85 ^f (0.001) |
| $H0 = 1$ | 10.77 ^f (0.001) | 3.6 ^g (0.056) | 10.08 ^f (0.001) | 0.8 ^g (0.3483) | 10.81 ^f (0.001) | 2.0 ^g (0.1497) | 51.12 ^f (0.002) | 33.91 ^f (0.000) | 66.48 ^f (0.000) | 11.26 ^f (0.001) | 42.87 ^f (0.000) | 11.17 ^f (0.001) |
| Market structure | Monopolistic competition | Close to perfect competition | Monopolistic competition | Close to perfect competition | Monopolistic competition | Close to perfect competition | Monopolistic competition | Monopolistic competition | Monopolistic competition | Monopolistic competition | Monopolistic competition | Monopolistic competition |
| Number of banks | 247 Banks | 39 Banks | 273 Banks | 13 Banks | 234 Banks | 52 Banks | 73 Banks | 75 Banks | 96 Banks | 52 Banks | 96 Banks | 23 Banks |
| Observation period | 1980–2010 | | 1980–2010 | | 1980–2010 | | 2000–2010 | | 2000–2010 | | 2000–2010 | |
| Observation ΔH | 3639 0.18 (0.13) | | 3639 0.15 (0.23) | | 3.639 0.21 (0.16) | | 1242 0.04 (0.096) | | 1242 0.32 (0.17) | | 1242 0.10 (0.15) | |
| <i>F</i> -test of ΔH | <i>F</i> -test = 1.90 Probability = 0.1689 | | <i>F</i> -test = 0.43 Probability = 0.5103 | | <i>F</i> -test = 1.73 Probability = 0.1888 | | <i>F</i> -test = 0.245 Probability = 0.6243 | | <i>F</i> -test = 3.43 Probability = 0.07 | | <i>F</i> -test = 0.46 Probability = 0.49 | |
| <i>F</i> -test results | The difference degree of competition is not statistically significant | | The difference degree of competition is not statistically significant | | The difference degree of competition is not statistically significant | | The difference degree of competition is not statistically significant | | The difference degree of competition is statistically significant by using the level of confidence 90% ^h | | The difference degree of competition is not statistically significant | |

Table 4

Means of interest variable across banks with different ownership 1980–2010.

Source: Calculated using data from the annual financial report of banks, published by the Central Bank of Indonesia for bank database, and the Statistics of Indonesia Economy and Finance Published by the Central Bank of Indonesia and available at: <http://www.bi.go.id/statistik/seki/terkini/moneter/Contents/Default.aspx>.

| Variable | Symbol | Local banks | Foreign banks | Foreign <i>de novo</i> banks | Branch of foreign banks | Joint venture banks | Foreign acquired banks |
|--|----------|-------------|---------------|------------------------------|-------------------------|---------------------|------------------------|
| Total revenue in real value (in million Rupiah and in real value after deflated with GDP deflator) | TR | 7,976.56 | 6,987.71 | 4,333.47 | 7,091.19 | 2,464.15 | 22,058.78 |
| Fund price | w_1 | 0.18 | 0.31 | 0.27 | 0.12 | 0.38 | 1.02 |
| Personnel cost | w_2 | 0.02 | 0.02 | 0.01 | 0.02 | 0.01 | 0.08 |
| Capital price | w_3 | 1.37 | 7.84 | 9.14 | 6.69 | 10.80 | 0.96 |
| Ratio of non-interest income to interest income | OI | 0.12 | 0.42 | 0.44 | 0.56 | 0.36 | 0.17 |
| Ratio of equity to total assets | EQ | 0.12 | 0.12 | 0.11 | 0.06 | 0.15 | 0.15 |
| Ratio of deposits to total assets | DEP | 0.72 | 0.49 | 0.44 | 0.55 | 0.37 | 0.77 |
| Ratio of demand deposits to total deposits | DDC | 0.28 | 0.36 | 0.38 | 0.42 | 0.35 | 0.17 |
| Total assets (in million Rupiah and in real value after deflated with GDP deflator) | | 56,977.62 | 33,069.05 | 21,386.64 | 48,133.22 | 14,183.85 | 192,100.80 |
| Overall bank risk (z-score of insolvency risk measured by $Z_{it} = \frac{ROA_{it} + (EQ_{it}/TA_{it})}{\sigma(ROA)_{it}}$) | z score | 74.17 | 28.77 | 26.62 | 13.41 | 35.83 | 42.79 |
| Return on assets | ROA | 0.63% | 2.26% | 1.46% | 2.84% | 0.52% | -0.16% |
| Overhead (ratio of operational expenses to total revenue) | Overhead | 0.91 | 0.79 | 0.81 | 0.77 | 0.79 | 0.94 |
| Average market share | MS | 0.009 | 0.007 | 0.004 | 0.007 | 0.002 | 0.020 |
| Efficiency (ratio of total expenditure to total revenue) | EFF | 0.92 | 0.80 | 0.81 | 0.78 | 0.79 | 0.94 |
| Loans to deposits ratio | LDR | 1.22 | 6.71 | 7.43 | 1.07 | 11.91 | 1.78 |
| Lending rate for capital (on average, based on data in year 1990–2013) | LR | 18.10% | na | 16.50% | na | na | na |
| Deposit rate for 1 month (on average, based on data in year 1990–2013) | DR | 13.23% | na | 11.62% | na | na | na |
| Interest spread (on average, based on data in year 1990–2013) | Spread | 4.87% | na | 4.88% | na | na | na |
| Number of banks | N | 247 | 75 | 52 | 13 | 39 | 23 |
| Proportion of foreign banks | | 62% | 19% | 13% | 3% | 10% | 6% |

suggests that smaller banks are more competitive than larger banks (Bassett and Brady, 2002). Smaller banks have less diversified products because they depend more on interest-based activities than the larger banks. As their products were relatively homogeneous such as time deposits, demand deposits and savings, the competition among smaller banks was more intense.

The Statistics of Indonesia Economy and Finance published by the Central Bank of Indonesia, as presented in Table 4, shows that the average lending rate of foreign *de novo* banks between 1990 and 2013 was lower than that of local banks. Foreign *de novo* banks charged 16.50% while the local banks' lending rate was 18.10% on average. As their lending rate was lower, foreign *de novo* banks disbursed more loans compared to local banks. The data of ratio of loans to deposits (LDR) in Table 4 reveal that foreign *de novo* banks had the highest LDR with 7.43. Nevertheless, a high LDR within foreign *de novo* banks was mainly due to joint venture banks. The competitive behavior of foreign *de novo* banks can also be explained by their cost structure. Foreign *de novo* banks had lower overhead costs as shown in Table 4. If we use the ratio of operational expenses to total revenue, on average, foreign *de novo* banks spent 81% of the revenue to support the banks' operation. Local banks and foreign acquired banks were less efficient because they needed more revenue to support banks' operation. The overhead costs for local and foreign acquired banks were 0.91 and 0.94 on average. If we use the ratio of total expenditure to total revenue as the measure of efficiency, foreign *de novo* banks were also more efficient than the local and foreign acquired banks.

The recent consolidation imposes more barriers to entry for the newly established banks while at the same time giving incentives for foreign banks to acquire local existing banks. By consolidating the banking industry, the regulator attempts to have a smaller number of banks (Bank Indonesia, 2008; Rosengard and Prasetyantoko, 2011). This study suggests that foreign banks, particularly foreign *de novo* banks behaved more competitively than their local counterparts. While the degree of competition of foreign acquired banks was relatively similar to the local banks. The current consolidation may create a less competitive market as the policies restrict the entry of the most competitive banks. Nonetheless, the regulator should give more attention to the level of banks' insolvency risk. Foreign *de novo* banks, particularly the branches of foreign banks, may pose higher insolvency risk than their local counterparts. This finding differs from Liu et al. (2011), who find that foreign banks are safer than local banks. This study calculated a z-score for banks across different ownerships to measure the probability of banks becoming insolvent. The z-score reflects the overall risk level of banks by covering the level of profitability, the level of capitalization and the variability of returns on assets (Beck, 2008). A higher z-score implies a lower probability for banks to become insolvent. The z-score information in Table 4 shows that branches of foreign banks had lowest z-score compared to other banks. The z-score of branches of foreign banks, joint venture banks, and foreign acquired banks are 13.41, 35.83 and 42.79 respectively. Foreign banks, particularly the branches, had higher risk profile because they hold much lower level of capitalization than local banks. The t-test on

the level of capitalization shows that the difference between local banks and branches of foreign banks is statistically significant. This finding is consistent across time.

6. Conclusion

This study contributes to the debate on the competitive behavior of foreign banks in the Indonesian banking industry, an emerging economy, between 1980 and 2010. During the observation period, foreign penetration increased gradually and reached its peak twice in 1994 and 2008. Overall, foreign banks behaved more competitively than their local counterparts. The estimations based on the P–R method show that foreign banks, particularly foreign *de novo* banks, had higher *H*-statistics than their local counterparts. The findings imply that foreign *de novo* banks were more competitive than local banks because they were smaller and more efficient, had lower overhead costs, so they could offer lower loan rates and disbursed more loans. The findings also indicate that the existence of foreign *de novo* banks is important in creating a contestable market in the local banking industry by putting pressure on local banks to behave more competitively. However, this study did not conduct an empirical analysis of the spillover impact of foreign penetration on local banks' behavior. Future studies should be aimed at covering this issue.

Acknowledgements

We thank to two anonymous reviewers, the journal editor and the participants of the 8th Conference on Risk, Banking and Financial Stability in Bali, Indonesia for their valuable comments. The financial assistance for conducting this study was received from the Directorate of Higher Degree of Education, Ministry of Education of the Republic of Indonesia and the University of Canberra, Australia.

Appendix A.

See [Tables A1–A3](#).

Table A1

The ownership composition of bail-out banks under the Indonesian Banking Restructuring Agency in 2009.

Source: Banks' annual financial reports collected by the Bank of Indonesia. Note: (a) Data based on the position of 14 March 2014.

| No. | Bank | Assets in 2009 (in millions Rupiah) | Ownership composition in 2009 | Assets in 2013 (in millions Rupiah) | Ownership composition in 2009 |
|-----|-----------------------------------|-------------------------------------|--|-------------------------------------|--|
| 1 | Bank Central Asia | 280,817,308 | Farlindo Investment (Mauritius) Ltd. (47.15%); Public (49.91%); Buyback by Bank (1.18%) | 488,498,242 | Farlindo Investment (Mauritius) Ltd. (47.15%); Public (51.09%); Anthony Salim (1.76%) |
| 2 | Bank Niaga/Bank CIMB Niaga | 106,803,360 | CIMB Group Sdn Bhd (77.24%); Santubong Ventures Sdn Bhd, Malaysia (16.64%) | 211,427,283 | CIMB Group Sdn Bhd (96.9%); Public (3.1%) |
| 3 | Bank Danamon Indonesia | 96,630,214 | Asia Financial (Indonesia) Ltd Pte (67.76%); Public (32.24%) | 152,021,037 | Asia Financial (Indonesia) Ltd Pte (67.37); Public (26.23%); JPMCB-Franklin Templeton Investment Funds (6.40%) |
| 4 | Pan Indonesia Bank Ltd/Bank Panin | 76,075,202 | PT PANIN Life (45.92%); Votraint No 1103 PTY Limited (38.48%); Public (15.6%) | 154,128,770 | PT Panin Financial Tbk (46%); Votraint No 1103 PTY Limited (39%); Public (15.6%) |
| 5 | Bank International Indonesia | 58,701,483 | Sorak Financial Holding Pte. Ltd (54.33%); Mayban Offshore Corporate Services (Labuan) Sdn Bh (43.19%); Public (2.48%) | 134,445,720 | Sorak Financial Holding Pte. Ltd (45.02%); Mayban Offshore Corporate Services (Labuan) Sdn Bh (33.96%); UBS AG London (18.31%); Public (2.71%) |
| 6 | Bank Bali/Bank Permata | 55,900,751 | PT Astra Indonesia Tbk (44.5%); Standard Chartered Bank (44.5%); Public (10.99%) | 165,558,317 | PT Astra Indonesia Tbk (44.5%); Standard Chartered Bank (44.5%); Public (10.99%) |
| 7 | Bank Tabungan Pensiunan Nasional | 22,272,246 | TPG Nusantara S.a.r.i * (71.61%) | 69,666,109 | Sumitomo Mitsui Banking Corporation (40%); TPG Nusantara S.a.r.i * (25.88%); Public (34.12%) ^a |

A.1. Assumptions under the P–R method

The P–R model assumes that banks have a log-linear marginal cost (MC) and marginal revenue (MR) function ([Bikker and Haaf, 2002](#)). The marginal cost and marginal revenue functions are available in Eqs. (A.1) and (A.2), where *OUT* is output, $i \rightarrow m$ is the number of banks, $j \rightarrow k$ is the number of input prices, k is the number of other variables affecting banks' revenue and cost function, *FIP* denotes factor input prices, $EX_{i,rev}$ and $EX_{i,cost}$ are other variables affecting banks' revenue and cost functions, respectively. The empirical application of the P–R approach assumes a log-linear marginal cost function, where, dropping subscripts referring to bank *i* ([Bikker and Haaf, 2002](#)):

$$\ln(MC) = \alpha_0 + \alpha_1 \ln(OUT) + \sum_{i=1}^m \beta_i \ln(FIP_i) + \sum_{j=1}^p \gamma_j \ln(EX_{cost,j}) \quad (A.1)$$

$$\ln(MR) = \delta_0 + \delta_1 \ln(OUT) + \sum_{k=1}^q \varphi_k \ln(EX_{revenue,k}) \quad (A.2)$$

Further, the P–R model assumes profit maximizing individual banks, from which it derives a first order condition for profit maximization. The profit maximizing banks will produce at the level where marginal cost equals marginal revenue. The equilibrium value for output is available in Eq. (A.3).

$$\ln(OUT) = \left(\alpha_0 - \delta_0 + \sum_{i=1}^m \ln(FIP_i) + \sum_{j=1}^p \gamma_j \ln(EX_{j,cost}) - \sum_{k=1}^p \varphi_k \ln(EX_{k,revenue}) \right) \quad (A.3)$$

There are also some assumptions that should be held when we interpret the results from the P–R method. First, banks are treated

Table A2

Foreign penetration of the small banks.

Source: Banks' annual financial reports collected by the Bank of Indonesia. Note: (a) The license of Bank Barclays Indonesia was revoked by the Central Bank based on the decree of Governor of Bank of Indonesia Number 13/48/KEP.GBI/2011 on 7 July 2011. (b) Based on data in 2010.

| No. | Bank | Assets in 2009 (in millions) | Assets in 2013 (in millions) | The position of banks' capital/equity | Foreign penetration | Ownership composition in 2013 |
|-----|---|------------------------------|------------------------------|---|--|---|
| 1 | Bank Bintang Manunggal/Bank Hana | 1,843,562 | 8,692,545 | in 2006 the equity was 33 billion and increased to 153 trillion in 2007 | Hana Bank Korea with 70.1% (2006) | Hana Bank Korea (75.1%); International Finance Corporation (19.9%); Bambang Setijo (5%) |
| 2 | Bank Executive International/Bank Pundi Indonesia | 1,425,576 | 9,000,918 | in 2009 the equity was –47 billion and increased to 310 billion in 2010 | IF Services Netherlands BV with 24% (2010) | PT Recapital Securities (67.85%); IF Services Netherlands BV (13.34%); Pershing LLC (10.71%); Public (8.10%) |
| 3 | Bank Indomoneks/Bank SBI Indonesia | 1,142,551 | 2,848,541 | in 2006 the equity was 25 billion and increased to 156 trillion in 2007 | The State Bank of India with 76% (2006) | The State Bank of India (99%); PT Ravindo Jaya (1%) |
| 4 | Bank Akita/Bank Barclays Indonesia | 841,062 | na ^b | in 2008 the equity was minus 105 billion and increased to 286 billion in 2009 | Barclays Bank PLC with 99% (2009) | na ^a |
| 5 | Bank Aglomas/Bank Aglomas International | 260,074 | 177,266 | in 2009 the equity was 84 billion and increased to 104 billion in 2009 | Wishart Investments Inc. 90% (2007) | Wishart Investments Inc. (99%); PT TG Indonesia (1%) |
| 6 | Bank Sri Partha/Bank Andara | 217,228 | 1,309,017 | in 2006 the equity was 25 billion and increased to 105 billion in 2008 | The Mercy Corp. with 40.16% (2007) and The International Finance Corp. with 19.9%. | Mercy Corp. (33.39%); The International Finance Corp. (19.90%); Stichting Hivos – Triodos Fund (16.53%); KfW (13.73%); Catholic Organization for Relief and Development Aid (7.75%); I Wayan Gatha (8.70%) ^b |

Table A3

The increase of foreign shares in joint ventures.

Source: Banks' annual financial reports collected by the Bank of Indonesia. Note: (a) Based on data in 2009. (b) Based on data in 2012. (c) Merged with Bank Haga and Bank Hagaku and became Rabobank International on 24 June 2008. The ownership composition of Rabobank International in 2008 was Cooperative Centrale Raiffeisen Boerenleenbank B. (56.94%); PT Aditirta Suryasentosa (16.99%); PT Antarindo Optima (16.99%); PT Antariksabuana Citanagara (8.5%); PT Mitra Usaha Kencana Sejati (0.58%). (d) In 2001, bank Sakura Swadharma merged with Bank Sumitomo Niaga and became Bank Mitsui Sumitomo Indonesia. The ownership structure in 2010 was Sumitomo Mitsui Banking Corporation, Tokyo (99%). (e) Upon the merger of The Bank of Tokyo-Mitsubishi, Ltd. and UFJ Bank Limited, it was decided to consolidate the operations of PT Bank UFJ Indonesia into the Bank of Tokyo Mitsubishi Jakarta branch. Consequently, it has been decided to liquidate PT Bank UFJ Indonesia. (f) The Societe Generale Summa was closed on 25 April 2003. (g) As in point d. (h) In 2001, Bank Tokai Lippo merged with Bank UFJ Indonesia. (i) Bank UOB Indonesia was closed as it merged with Bank UOB Buana on 10 June 2010. Both banks had the same ultimate shareholders.

| No. | Bank | Increase in foreign shares | Ownership structure in 2013 |
|-----|---|------------------------------|---|
| 1 | ANZ Panin | 85% (2009) → 99% (2010) | ANZ Banking Group Ltd. (99%); PT Bank Panin Tbk. (1%) |
| 2 | Commonwealth Bank Indonesia | 50% (1998) → 97.44% (2010) | Commonwealth Bank of Australia (98.38%) |
| 3 | BNP Lippo Indonesia/BNP Paribas | 75% (1995) → 99% (2009) | BNP Paribas, S.A. (99%) |
| 4 | Bank of Chinatruster | 85% (1998) → 99% (2008) | Chinatruster Commercial Bank Co., Ltd, Taiwan, ROC (99%); Bank Danamon Indonesia (1%) |
| 5 | Bank Fuji International/Bank Mizuho Indonesia | 80% (1995) → 99% (2010) | Mizuho Corporate Bank, Ltd., Japan (99%); PT Bank Negara Indonesia (1%) |
| 6 | Bank Hanvit/Bank Woori | 80% (1999) → 95.18% (2009) | Woori Bank, Korea (95.18%); PT Bank Danamon Indonesia (4.82%) |
| 7 | Bank Korea Exchange Danamon/Bank KEB Indonesia | 85% (1995) → 99% (2009) | Korea Exchange Bank, Seoul (99%); PT Clermont Finance Indonesia (1%) ^b |
| 8 | Bank Multicor/Bank Windu Kentjana International | 76% (1995) → 90% (2009) | Johny Wiraatmadja (66.74%), the ultimate shareholders are UBS AG Sing; PT Blue Cross Indonesia (9.18%); PT Mitra Wadah Kencana (9.42%); Public (14.66%) |
| 9 | Bank Mitsubishi Buana/Bank DBS Buana/Bank DBS Indonesia | 85% (1995) → 99% (2009) | DBS Bank Ltd. (99%); PT Bank Central Asia (1%) |
| 10 | Rabobank Duta Indonesia | 85% (1995) → 99% (2008) | na ^c |
| 11 | Bank Sakura Swadharma | 85% (1995) → 97% (2000) | na ^d |
| 12 | UFJ Indonesia/Bank Sanwa Indonesia | 79.9% (1995) → 96.23% (2005) | na ^e |
| 13 | Societe Generale Summa | 85% (1995) → 99% (2002) | na ^f |
| 14 | Sumitomo Niaga | 79.9% (1995) → 99% (2009) | na ^g |
| 15 | Tokai Lippo | 70% (1995) → 84.39% (2000) | na ^h |
| 16 | UOB Indonesia | 79.9% (1995) → 99% (2009) | na ⁱ |

Table A4

Equilibrium test of competition model of Indonesian banking between 1980 and 2010 (return assets as dependent variable).

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level. FE means fixed effect estimates. Figures in parentheses are *t* ratios. Clustered standard errors have been used to deal with general heteroskedasticity and cross-sectional correlation in the model error (Baum, 2006). (a) $H=0$ cannot be rejected (level confidence 99%).

| Explanatory variables | All banks (FE estimate) with time dummies |
|---|---|
| W_1 | 0.0014 (0.003) |
| W_2 | −0.0017 (0.003) |
| W_3 | −0.0019 (0.0014) |
| OI | 0.001 (0.001) |
| EQ | 0.012*** (0.002) |
| DEP | 0.0007 (0.003) |
| DDC | 0.000 (0.001) |
| Number of observations | 3636 |
| R^2 within | 0.077 |
| Joint coefficients of input prices or F -statistics | −0.00147 ^a (0.004) |
| Equilibrium test | 0.33 |
| F test | 0.33 |
| ρ (1286) | 0.5649 |

as single product firms that act as financial intermediaries. As financial intermediaries, the banks' output is interest revenues. Banks have three types of inputs which are intermediate funds, labor and capital (De Bandt and Davis, 2000). By using the three inputs, banks offer loans and other interest-based activities to customers to generate interest income. Banks are also assumed to produce a single product which is an interest-based product such as loans. Indonesian banks meet the first assumption. The data shows that between 1980 and 2010, on average the contribution of interest-based activities was almost 80% of total banks' revenue. It implies that the Indonesian banks relied on interest-based activities to generate their income.

The second assumption is that the market is in equilibrium in the long run. It implies that under long-run equilibrium, the risk-adjusted rates of return will be equalized across banks in the competitive capital market. It means that the banks' return rates will not be correlated with input prices (Bikker and Haaf, 2002). The equilibrium test can be performed by recalculating P–R's H -statistics by replacing the dependent variable total revenue with the return on assets (Casu and Girardone, 2006). The null hypothesis is that the H -statistics equal zero reflecting a market in the long-run equilibrium (De Bandt and Davis, 2000). Otherwise, we can indicate that the market is in disequilibrium. The formal test of the long-run equilibrium is available in Table A4. Third, we have to assume that higher input prices are not associated with higher quality services that generate higher revenues. Gelos and Roldos (2002) explained that if the correlation exists, there might be bias in interpreting H . The fourth assumption is considering banks as profit maximization institutions. Finally, the method also assumes that banks have normally shaped revenue and cost functions (Gelos and Roldos, 2002).

References

- Bank Indonesia, 2008. *The Program of Indonesian Banking Architecture*. Bank Indonesia, Jakarta.
- Barajas, A., Steiner, R., Salazar, N., 2000. The impact of liberalization and foreign investment in Colombia's financial sector. *J. Dev. Econ.* 63, 157–196.

- Bassett, B., Brady, T., 2002. *What Drives the Persistent Competitiveness of Small Banks?* The Federal Reserve Board, Finance and Economics Discussion Series, Washington, DC.
- Baum, C.F., 2006. *An Introduction to Modern Econometrics Using Stata*. Stata Press Books, College Station, Tex.
- Baumol, W.J., 1982. Contestable markets: an upraising in the theory of industry structure. *Am. Econ. Rev.* 72 (1), 1–15.
- Beck, T., 2008. Bank Competition and Financial Stability: Friends or Foes? In: *G20 Seminar in the Financial Sector*, Bali, Indonesia.
- Berger, A.N., Buch, C.M., DeLong, G., DeYoung, R., 2004. Exporting financial institutions management via foreign direct investment mergers and acquisitions. *J. Int. Money Financ.* 23 (3), 333–366.
- Bikker, J.A., Haaf, K., 2002. Competition, concentration and their relationship: an empirical analysis of the banking industry. *J. Bank. Financ.* 26 (11), 2191–2214.
- Bikker, J.A., Shaffer, S., Spierdijk, L., 2011. Assessing competition with the Panzar–Rosse model: the role of scale, costs, and equilibrium. *Rev. Econ. Stat.* 94 (4), 1025–1044.
- Bresnahan, T.F., 1982. The oligopoly solution concept is identified. *Econ. Lett.* 10 (1–2), 87–92.
- Casu, B., Girardone, C., 2006. Bank competition, concentration and efficiency in the single European market. *Manch. Sch.* 74 (4), 441–468.
- Cho, K.R., 1990. Foreign banks presence and banking market concentration: the case of Indonesia. *J. Dev. Stud.* 27 (1), 98–110.
- Claessens, S., Demirgüç-Kunt, A., Huizinga, H., 1998. *How Does Foreign Entry Affect the Domestic Banking Market?* The World Bank Policy Research Paper, Washington, DC.
- Claessens, S., Laeven, L., 2004. What drives bank competition? Some international evidence. *J. Money Credit Bank.* 36 (3), 563–583.
- Claeys, S., Hainz, C., 2006. Acquisition Versus Greenfield: The Impact of the Mode of Foreign Bank Entry on Information and Bank Lending Rates. Working Paper Series European Central Bank, Frankfurt, Germany.
- Clarke, G.R.G., Cull, R., Martinez Peria, M.S., Sanchez, S.M., 2001. *Foreign Bank Entry: Experience, Implications for Developing Countries, and Agenda for Further Research*. Policy Research Working Paper World Bank, Washington, DC.
- Collender, R.N., Shaffer, S., 2003. Local bank office ownership, deposit control, market structure, and economic growth. *J. Bank. Financ.* 27 (1), 27–57.
- De Bandt, O., Davis, E.P., 2000. Competition, contestability and market structure in European banking sectors on the eve of EMU. *J. Bank. Financ.* 24 (6), 1045–1066.
- Dell'Ariccia, G., Marquez, R., 2004. Information and bank credit allocation. *J. Financ. Econ.* 72 (1), 185–214.
- Gelos, G.R., Roldos, J., 2002. Consolidation and Market Structure in Emerging Market Banking Systems. IMF Working Paper 02(186), pp. 1–29.
- Hadad, M.D., Santoso, W., Besar, D.S., Rulina, I., Purwanti, W., Satria, R., 2004. *Fungsi Intermediasi Bank Asing dalam Mendorong Pemulihan Sektor Riil di Indonesia*. Research Paper Biro Stabilitas Sistem Keuangan 6 (1), 1–34.
- Iwata, G., 1974. Measurement of Conjectural Variations in Oligopoly. *Econometrica* 42 (5), 947–966.
- Jayarathne, J., Strahan, P.E., 1996. The finance-growth nexus: evidence from bank branch deregulation. *Q. J. Econ.* 111 (3), 639–670.
- Jeon, B.N., Olivero, M.P., Wu, J., 2011. Do foreign banks increase competition? Evidence from emerging Asian and Latin American banking markets. *J. Bank. Financ.* 35 (4), 856–875.
- Lehner, M., 2009. Entry mode choice of multinational banks. *J. Bank. Financ.* 33 (10), 1781–1792.
- Lensink, R., Hermes, N., 2004. The short-term effects of foreign bank entry on domestic bank behaviour: does economic development matter? *J. Bank. Financ.* 28 (3), 553–568.
- Leon, F., 2014. *Measuring competition in banking: a critical review of methods*. Series etudes et documents du CERDI 12 (June), 1–44.
- Levine, R., Loayza, N., Beck, T., 2000. Financial intermediation and growth: causality and causes. *J. Monet. Econ.* 46 (1), 31–77.
- Liu, H., Molyneux, P., Nguyen, L.H., 2011. Competition and risk in South East Asian commercial banking. *Appl. Econ.* 44 (28), 3627–3644.
- Manlagñit, M.C.V., 2011. The economic effects of foreign bank presence: evidence from the Philippines. *J. Int. Money Financ.* 30 (6), 1180–1194.
- Martinez Peria, M.S., Mody, A., 2004. How foreign participation and market concentration impact bank spreads: evidence from Latin America. *J. Money Credit Bank.* 36 (3), 511–537.
- McLeod, R.H., 1999. Control and competition: banking deregulation and re-regulation in Indonesia. *J. Asia Pacific Econ.* 4 (2), 258–297.
- Molyneux, P., Lloyd-Williams, D.M., Thornton, J., 1994. Competitive conditions in European banking. *J. Bank. Financ.* 18 (3), 445–459.
- Molyneux, P., Nguyen, L.H., Xie, R., 2013. Foreign bank entry in South East Asia. *Int. Rev. Financ. Anal.* 30, 26–35.
- Montgomery, H., 2003. *The Role of Foreign Banks in Post-Crisis Asia: The Importance of Method of Entry*, vol. 51. Research Paper Series ADB Institute, pp. 1–29.
- Mulyaningsih, T., Daly, A., 2011. Competitive conditions in banking industry: an empirical analysis of the consolidation, competition and concentration in the Indonesian banking industry between 2001 and 2009. *Bull. Monet. Econ. Bank.* October, 141–176.
- Nathan, A., Neave, E.H., 1989. Competition and contestability in Canada's financial system: empirical results. *Can. J. Econ.* 22 (3), 576–594.

- Rajan, R.S., Gopalan, S., 2010. Financial sector de-regulation in emerging Asia: focus on foreign bank entry. *J. World Invest. Trade* 11 (1), 91–108.
- Rosengard, J.K., Prasetyantoko, A., 2011. If the banks are doing so well, why can't I get a loan? Regulatory constraints to financial inclusion in Indonesia. *Asian Econ. Policy Rev.* 6 (2), 273–296.
- Shaffer, S., 1982. A non-structural test for competition in financial markets. In: *Conference on Bank Structure and Competition*, Federal Reserve Bank of Chicago, pp. 225–243.
- Shaffer, S., 1994. Structure, conduct, performance, and welfare. *Rev. Ind. Org.* 9, 435–450.
- Shaffer, S., 2004. Patterns of competition in banking. *J. Econ. Bus.* 56, 287–313.
- Soedarmono, W., Machrouh, F., Tarazi, A., 2013. Bank competition, crisis and risk taking: evidence from emerging markets in Asia. *J. Int. Financ. Mark. Inst. Money* 23, 196–221.
- Sun, Y., 2011. Recent Development in European Bank Competition. IMF Working Paper 11(146), pp. 1–25.
- Unite, A.A., Sullivan, M.J., 2003. The effect of foreign entry and ownership structure on the Philippine domestic banking market. *J. Bank. Financ.* 27 (12), 2323–2345.
- Vesala, J., 1995. Testing for competition in banking: behavioral evidence from Finland. *Bank Finl. Stud.* E1, 1–167.
- Wong, J., Wong, E., Fong, T., Choi, K.-F., 2006. Competition in Hong Kong's Banking Sector: A Panzar-Rosse Assessment. Research Memorandum, Hong Kong.
- Yeyati, E.L., Micco, A., 2003. Concentration and Foreign Penetration in Latin American Banking Sectors: Impact on Competition and Risk. Inter-American Development Bank, Research Department Working Paper 499., pp. 1–38.
- Yeyati, E.L., Micco, A., 2007. Concentration and foreign penetration in Latin American banking sectors: impact on competition and risk. *J. Bank. Financ.* 31 (6), 1633–1647.