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ARE GOVERNMENT BANKS LESS COMPETITIVE THAN PRIVATE BANKS? EVIDENCE FROM INDONESIAN BANKING

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Abstract

Literature suggests that compared to private banks, state-owned banks have lower incentives to maximize profit. This study aims to investigate the possible different competitive behaviour of state-owned banks and private banks. The recent refinement of Panzar-Rosse method by Bikker, Shaffer, and Spierdijk (2011) was employed to estimate the competitive behaviour of state-owned and private banks. The empirical estimation of Fixed-Effect approach shows that the H-statistics of the state-owned banks was significantly smaller than of the private banks. It implies that private banks behaved more competitively than the state-owned banks. The private bank market was close to perfect competition or monopolistic competition where bank products are regarded as perfect substitutes for one another. In contrast, state-owned banks attempted to collude rather than to compete to generate a maximum profit. State-owned banks behaved less competitive because they served the interest of government or politician, have a long hierarchical organisational design, receive an interest rate subsidies and an implicit guarantee from government against failure and their business are being controlled by government.

Keywords: Bank ownership, competitive behaviour, Panzar-Rosse
JEL Classifications: L1, L2, G21

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I. INTRODUCTION

Indonesian banking prior to 1988 deregulation was dominated by five state commercial banks. In terms of third party deposits, in average state-owned banks controlled 80 per cent of the industry. In all types of deposits, state-owned banks had the highest market share compared to private banks. The state-owned banks collected 88 per cent of demand deposits, 72 per cent of time deposits and 95 per cent of saving deposits. The domination of state banks was becoming very obvious considering the fact that during that period the number of private banks exceeded the number of state banks. It also reveals that the capacity of state-banks was much larger that their private counterparts.

The banking reform through the introduction of PAKTO 88 (October Package 1988) opened the access for new entrants to the industry after the long-periods of restriction to new entrants in 1971. The entry of banks was not limited to local private banks but also for joint venture banks that established by the partnership between local and foreign banks. PAKTO 88 also facilitated the opening of new banks by lowering the minimum capital requirement. Furthermore, the reform removed restrictions on business scope and business expansion. PAKTO 88 reduced the proportion of the reserve requirement from 15 per cent to 2 per cent (McLeod, 1999); eliminated the limit on interbank borrowing; permitted banks to introduce savings deposits products of their own design; reduced requirements for existing banks to expand their market through opening new branches and upgrading their services coverage to include foreign exchange transactions.

During the banking reform, the state owned banks were required to compete directly with their private counterparts without major support from the authorities as in the 1970s and early 1980s. The lack of support from government, poor management and intervention from the authorities created less efficient state banks. While banking reform granted opportunity for the private banks to expand their business. Further, the more competitive market created a favourable climate for the most efficient banks to lead the industry. Banking reform changed the landscape of Indonesian banking. The domination of state banks declined and replaced by their more efficient counterparts of private banks. The share of state banks demand deposits fell from 88 per cent in 1981 to 30 per cent in 1996. The state banks were still quite strong in time deposits. However, their share declined after the reform by 36 per cent in 1996. In saving accounts, the share of state banks also declined from 95 per cent in 1981 to 42 per cent in 1996. This paper aims to examine the competitive behaviour of state banks and compare to private banks.

II. LITERATURE REVIEW

The literature suggests that bank ownership structure influences bank behaviour and performance. State-owned banks are inclined with lower performance than their private counterparts. The study by Micco, Panizza, and Yanez (2004) found that state-owned banks particularly those located in developing countries had lower profitability, higher overhead costs, and higher Non-Performing-Loans (NPL) than their local counterparts. Furthermore, a study by Mian (2003) of 1,600 banks in developing countries found that local private banks are considered to be highly competitive as they offered higher interest rates on deposits as well as loans. In regard to state-owned banks, Mian (2003) found that they had a riskier loan portfolio in terms of loan losses. Nevertheless, state-owned banks still enjoyed low cost of deposits, probably reflecting the implicit or explicit support of the government.

Banks that owned by government tend to have longer hierarchical organisational design than private banks. According to Williamson (1967); Cole, Goldberg, and White (1999, p. 4) and Mian (2003) as the size of an organisation increases, top management loses control of successive hierarchies Further, in larger organisations the distortions are higher because the orders and directions are transmitted into lower hierarchies. In order to reduce distortions, banks set up explicit rules, for example, about extending loans. Thus, banks tend to rely on hard information to assess

loans applications to ensure that top management maintains control of the whole organisations. On the contrary, managers of private bank with less hierarchical have more discretion in the lending process. Top management can more easily monitor the performance of the loans officer than in larger organisation. As loans officers have more flexibility in extending loans, private banks have a comparative advantage to focus on small borrowers who may not be able to provide hard information on firm performance. It implies that local private banks may have a different segment to state-owned banks.

In addition government banks and private banks may different in terms of the incentive to maximise profit. Private banks have a higher incentive to maximize profit than state-owned banks. State-owned banks are highly controlled and intervened by the main shareholder, government or government officials. The banks operate to fulfil the needs of government for example serving the social and development activities (Micco, Panizza, & Yañez, 2007). Thus, state-owned banks may less profitable than their private counterparts because they have to finance the socially profitable but financially unprofitable activities (Gerschenkron, 1962; Stiglitz, 1993). In the case of Indonesian banking, state-owned banks and regional banks (owned by regional government) mostly serve state and local governments. Prior banking reforms in 1988, state-owned banks used as a main instrument to manage money supply that limited banks credit expansion. Further, the lending of state-owned banks was the directive lending based on government priority. Business scope of state-owned banks prior reform was also restricted to serve particular sector of the economy. According to Panglaykim (1968), during the1960s, the state banks of Bank Negara Indonesia (BNI) focused on providing loans for industry, Bank Rakyat Indonesia (BRI) provided loans to farmers, fishermen, and co-operatives, Bank Bumi Daya (BBD) provided loans to plantations and forestry, Bank Ekspor-Impor (EXIM) to foreign trade and Bank Dagang Negara (BDN) to mining. This restriction still existed up to the 1990s. Regarding to regional banks, regulation number 13 in 1962 concerning regional banks highlighted the role of regional banks as regional development agents. They should focus on funding activities for regional development projects.

Other studies by Micco et al. (2007), La Porta, Lopez-de-Silanes, and Shleifer (2002) and Yeyati, Micco, and Panizza (2004) confirmed that state-owned banks are inefficient because they work to maximize the personal objective of politicians. State-owned banks in developing countries were found to be less profitable during the election period. Unlikely in developing countries, election did not influence the profitability level of state-owned banks in developed countries. Study by Micco et al. (2007) suggests that the differential between the profitability of private and state-owned banks was higher in the election year compared to non election year. Moreover, their study argued that the effect of election variable on bank profitability was substantial. In the election year, the profitability differential was 1.5 per cent, compared to 0.9 per cent in the non election year. In the case of Indonesian banking, the study by McLeod (1999) argued that the source of uncompetitive behaviour of state-owned banks is the privilege of having a captive market for both loans and deposits amongst the state enterprises.

III. RESEARCH METHOD

3.1. Panzar-Rosse Method

The literature on the non-structural approach provides evidence that market structure is an endogenous rather than exogenous variable. Referring to the contestable theory by Baumol (1982), the structure of markets is determined by the freedom of entry and exit into the market. Thus, a degree of market concentration is not solely determined by market structure. If the market is contestable, which means that there are no barriers to entry and exit, the concentrated market may produce normal profits with price equal to the marginal costs. Based on the non-structural approach, the recent studies directly analysed firms' behaviours rather than market concentration to determine the level of competition (Bresnahan, 1982; Iwata, 1974; Panzar & Rosse, 1987). The

development of the non-structural approach promoted the development of methods to assess the competitive conduct of banks directly "without using the explicit information about the structure of the market" (Bikker & Haaf, 2002, p. 2192).

There were at least three important methods under the non-structural approach developed which are the Iwata model (1974), the Breshanan model (1982), and the Panzar-Rosse (P-R) model (1987). The Iwata model estimates market power by measuring the conjectural variation values for individual banks supplying a homogeneous product in an oligopolistic market (Bikker & Bos, 2008). "Conjectural variation refers to the assumptions a firm makes about the reactions it expects from its rivals in response to its own action" (Lipezynski, Wilson, & Goddard, 2005, p. 118). The application of this model to estimate competition is rare because of technical issues. Bikker and Bos (2008) explained that the profitability determinants in the Iwata model are interrelated or hard to observe in practice. Further, Bikker and Bos (2008) also underline the complexity of estimating the Iwata model in empirical studies. The model is difficult to employ for empirical research if data about cost and production structure is unavailable.

The second model under the non-structuralist paradigm is the Bresnahan model. It was developed by Bresnahan (1982) and Lau (1982) by assuming that all banks are equal and identical. Based on this assumption, they measured an aggregate analysis of the industry (Bikker & Bos, 2008). Assuming that banks are intermediation institutions that produce one output using various input factors, Bresnahan (1982) and Lau (1982) developed a short-run empirical model for the market power of an average bank. The model determines the value of conjectural variation by simultaneous estimations of market demand and supply curves (Bikker & Bos, 2008). The values of conjectural variation range from zero to one. The result is one if the market is perfectly competitive. In a perfect competitive market, an increase of output by one firm must lead to an analogous decrease of output by remaining firms (Bikker & Bos, 2008).

The third model was developed by Panzar and Rosse (1987). This approach has been used extensively in empirical studies on banking competition because of the modest data requirement compared to the Bresnahan and Iwata approaches. It calculates the sum of elasticity of the reduced form revenues with respect to changes in factor prices. The joint elasticity is known as the H-statistic and it allows us to distinguish empirically between perfect competition and imperfect competition (whether monopoly, perfect collusion or monopolistic competition (Vesala, 1995)). Thus, Panzar-Rosse assesses the competitive behaviour of banks to define the market structure. It is based on properties of reduced form revenue equations at the bank level, the data on revenues, and factor prices. Generally, the Panzar-Rosse method calculates the sum of the elasticity of the reduced form revenues with respect to changes of factor prices. The sum of the elasticities is given by the H-statistics. The value of the elasticity will provide information about banks' competitive behaviours, 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; otherwise 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 behaviour of Indonesia banks - whether monopoly or perfect collusion in the oligopoly market, monopolistic competition or perfect competition (Vesala, 1995).

The Panzar-Rosse empirical model assumes that banks have a log-linear marginal cost (MC) and marginal revenue (MR) function (Bikker & Haaf, 2002). The marginal cost and marginal revenue functions are available in equation 1 and 2, where *OUT* is output, *i* is the number of banks, $j \odot m$ is the number of input prices, $k \odot q$ is the other variables affecting bank revenue and cost function, and *FIP* denotes factor input prices. *EXi,rev* and *EXi,cost* are other variables affecting bank revenue and cost functions, respectively. The empirical application of the Panzar and Rosse

approach assumes a log-linear marginal cost function, where dropping subscripts referring to bank *i* (Bikker & Haaf, 2002).

$$\ln(MC) = \alpha_{0+}\alpha_1 \ln(OUT) + \sum_{j=1}^{m} \beta_j \ln(FIP_{ij}) + \sum_{k=1}^{q} \gamma_j \ln(EX_{cost,ik}) \quad 1$$

$$\ln(MR) = \delta_{0+}\delta_1 \ln(OUT) + \sum_{k=1}^{q} \varphi_k \ln(EX_{revenue,ik}) \quad 2$$

Further, the Panzar-Rosse model assumes profit maximizing individual banks, from which it derives a first order condition for profit maximization. The profit maximizing banks produce at the level where marginal cost equals marginal revenue. The equilibrium value for output is available in equation 3.

$$\ln(OUT) = \left(\alpha_0 - \delta_0 + \sum_{i=1}^{m} \beta_j \ln(FIP_{ij}) + \sum_{k=1}^{q} \gamma_k \ln(EX_{cost,ik}) - \sum_{k=1}^{q} \varphi_k \ln(EX_{revenue,ik})\right) 1/(\delta_1 - \alpha_1) \quad 3$$

In the empirical analysis, the following operationalisation of the reduced-form revenue equation is used. According to Bikker and Haaf (2002, p. 2196) "the reduced-form equation of bank *i* is the product of the equilibrium values of output of bank *i* and the common price level, determined by the inverse demand equation, which reads, in logarithms, as $\ln p = \xi + \eta \ln(\sum_i OUT_i^*)$". Refer to equation 4 for the operationalisation of the reduced-form revenue equation.

$$\ln TR = \alpha + \sum_{i=1}^{m} \beta_j \ln w_{ji} + \sum_{k=1}^{q} \gamma_k \ln BSF_{ki} + \delta \ln OI_i + \varepsilon \quad 4$$

Where, *TR* is the bank revenue, *w* refers to three input prices which are the funding rate, the wage rate or personnel expenses and the capital price or capital expenditure, *BSF* is bank-specific exogenous factors, such as the risk component and differences in the deposit mix and *OI* is the contribution of non-interest income (Bikker et al., 2011; De Bandt & Davis, 2000; Yeyati & Micco, 2007). The reduced-form revenue in equation 4 is the standard specification. Some studies modify the specification. For example Shaffer (1982); Nathan and Neave (1989); Molyneux, Lloyd-Williams, and Thornton (1994); Bikker and Haaf (2002) and Gelos and Roldos (2002) added total assets as one of the explanatory variables to represent scale. Total asset is also used as the denominator of bank revenue in the left-hand side of the model representing bank revenue for each value of assets or price (Bikker & Haaf, 2002; De Bandt & Davis, 2000; Molyneux et al., 1994). Other studies, for example Vesala (1995) and De Bandt and Davis (2000), added equity as a scale variable.

Based on equation 3, this study estimates the joint elasticity of the reduced-form revenue function with respect to factor prices or the H-statistics. *i* is the bank, *j* 👁 *m* is the input prices.

$$H = \sum_{j=1}^{m} \frac{\partial R_i}{\partial FIP_{ij}} \frac{\partial FIP_{ij}}{\partial R_i} \quad 5$$

The value of H-statistics represents the market structure, whether monopoly or perfect collusion, monopolistic competition or perfect competition. Equation 6, below is a formula to calculate H. It is the sum of the elasticities in equation 4, which consists of the elasticity of revenue with regard to the changes of funding cost (β_1), elasticity of revenue with regard to changes in human resource expenditure (β_2), and elasticity of revenue with regard to capital price changes (β_3).

$$H = \sum_{i=1}^{3} \beta_i \quad 6$$

Table 1 provides a summary of the discriminatory power of H based on some studies on banking competition. The value of H-statistics determines the structure of the market under observation.

Table 1. Summary of Discriminatory Power of H-statistics

Values of H	Competitive environment
$H \leq 0$	- Monopoly equilibrium: each bank operates independently as under monopoly profit maximisation conditions. - Perfect cartel (collusive oligopoly) [i] - Monopolistic competition without the threat of entry [ii]
$0 < H < 1$	- Monopolistic competition with free entry equilibrium. - Strategic interactions among a fixed number of banks in oligopoly market [iii]
$H = 1$	- Perfect competition. - Free entry equilibrium with full efficient capacity utilisation. - Monopolistic competition where banks products are regarded as perfect substitutes of one another [iii]

Source: Panzar and Rosse (1987); Vesala (1995); Bikker and Haaf (2002, p. 2195); Bikker et al. (2011).
Note: i Panzar and Rosse (1987) and Vesala (1995)
ii Vesala (1995)
iii Bikker and Haaf (2002)

In the empirical study, there are five assumptions under the Panzar-Rosse method. First, banks are treated as single product firms that act as financial intermediaries. As financial intermediaries, bank output is interest revenue. Banks have three types of inputs which are intermediate funds, labour and capital (De Bandt & 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 banking is close to meeting the first assumption because banks rely on interest-based activities to generate their income. The data shows that between 1980 and 2010, on average the contribution of interest-based activities was almost 80 percent of total bank revenue.

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 equalised across banks in the competitive capital market. It means that the bank return rates will not be correlated with input prices (Bikker & Haaf, 2002, p. 2200). The equilibrium test can be performed by recalculating Panzar-Rosse's H-statistics by replacing the dependent variable total revenue with the return on assets (Delis, Staikouras, & Varlagas, 2008, pp. 8-9). The null hypothesis is that the H-statistics equal zero reflecting a market in long-run equilibrium (De Bandt & Davis, 2000). Otherwise, we can indicate that the market is in disequilibrium. The formal test of the long-run equilibrium is available in appendix. Third, we have to assume that higher input prices are not associated with higher quality services that generate higher revenues because if the correlation exists there might be bias in interpreting H (Gelos & Roldos, 2002). The fourth and fifth assumptions are considering banks as profit maximization institutions and that they have normally shaped revenue and cost functions (Gelos & Roldos, 2002, pp. 13-14).

3.2. Empirical Model

The Bank of Indonesia, as the regulator of the banking industry divides banks into six categories based on ownership and business capacity. The local banks consists of four categories which are the state-owned banks, the regional banks, the private banks with capacity to handle

foreign exchange activities and the private banks without capacity to handle foreign exchange activities. The Government of Indonesia is the major shareholder of the state-owned banks. The regional banks are owned by the local or provincial governments. The private local banks belong to Indonesian private entities. The foreign banks category consists of two categories which are the joint venture banks and branches of foreign banks. Joint venture banks are created through a partnership between local banks and foreign banks. The second type of foreign banks is the branches of overseas banks in Indonesia. The literature groups the joint ventures and branches of foreign banks

Table 2 provides information on the number of banks in each category across the major periods in the last three decades. In total, the number of banks reached the highest point under the deregulation and liberalization period and reduced to half within the consolidation and crisis periods. In terms of the number of banks, Indonesian banking is dominated by the local private banks. The number of private banks increased during the deregulation and liberalization period (1988-1997) from sixty-five banks to 181 banks. It is followed by joint venture banks with twenty-nine banks between 1998 and 2000 or 18 per cent of the market. There were eleven branches of foreign banks. The number of regional banks was twenty-five and there were four state-owned banks after the crisis.

Table 2. The Number of Banks for each Category between 1980 and 2010

Period (Year)	Number of banks	Group/ Category						
		Government Banks		Private Banks				
				Local Private Banks		*De novo* Banks		Foreign Acquired Banks
		State Owned Banks	Regional Banks	Local private – Foreign Exchange Banks	Local private – Non Foreign Exchange Banks	Joint Venture Banks	Branches of Foreign Banks	
Prior deregulation: 1980-1987	110	7 (6%)	27 (25%)	10 (9%)	55 (50%)	None	11 (10%)	none
Deregulation and liberalization: 1988-1997	259	7 (3%)	27 (10%)	80 (31%)	101 (39%)	34 (13%)	10 (4%)	none
Crisis: 1998-2000	159	5 (3%)	25 (16%)	46 (29%)	44 (28%)	29 (18%)	10 (6%)	none
Consolidation: 2000-2010	148	4 (3%)	25 (17%)	32 (21%)	38 (26%)	18 (12%)	11 (7%)	20 (14%)

Source: calculated using data from the Annual Financial Report of Banks, published by the Central Bank of Indonesia.
Data in the bracket is the percentage of banks in each category compared to total banks.

In this study, government banks are defined as banks owned by the central, state or regional governments. More specifically, central, state or regional governments are the main shareholders of the government banks. On the contrary, private banks are owned by private entities either local or foreign. This study employs the un-scaled revenue specification, of the Panzar-Rosse method based on Bikker et al. (2011) to estimate the degree of competition in the group of government banks and the group of private banks. The base group is government banks. The model

introduces one dummy variable, P_1, to estimate the degree of competition across groups independently. The dummy variable of P_1 is assigned to private banks and is equal to one if it is a private bank and zero if it is a government bank. The treatment of the dummy variable is similar to the previous sections with the multiplication of explanatory variables and the dummy variable to form interaction variables. The difference between the coefficient of input prices for the base group and the interaction variables determines the difference in the degree of competition between groups. The F-test is employed to examine whether the difference is statistically significant. Further, the coefficient of interaction variables inform whether the group of private banks is more competitive than the group of government banks. Below is the econometric model used to assess competition across groups.

Unscaled-Revenue Specification with Interaction Variables

$$\ln TR_{it} = \alpha_0 + \sum_{j=1}^{3} \beta_j \ln w_{jit} + \gamma_1 \ln EQ_{it} + \gamma_2 \ln DEP_{it} + \gamma_3 \ln OI_{it} + \gamma_4 \ln DDC_{it} + P_1 * \left[\alpha_0 + \sum_{j=1}^{3} \beta_j \ln w_{jit} + \gamma_1 \ln EQ_{it} + \gamma_2 \ln DEP_{it} + \gamma_3 \ln OI_{it} + \gamma_4 \ln DDC_{it}\right] + \sigma_i + \varepsilon_{i,t}$$

Table 3 provides the specification of variables to assess the competition across sub-groups of government banks and private banks.

Table 1. Specification of Variables of Assessing the Competition across Sub-groups

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 banks revenue measured by the values of total revenue or interest income of bank i and time t
w_{1it}	is funding rate measured by the ratio of annual interest expenses to total deposit of bank i and time t
w_{2it}	is wage rate/ personnel expenses 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 rate measure by the ratio of other expenses to fixed assets of bank i and time t
$P1_{it}$	is dummy of private banks multiplied by input prices j, bank i and time t $P1_{jit}$=1 if i= private bank
OI_{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 deposit 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 deposit of bank i and time *t*
σ	is is the bank fixed effect (unobserved heterogeneity)
ε	is a white-noise error term that includes errors in the competition measure.

The empirical model was estimated by using the Fixed-Effect approach of panel data. The application of the Fixed-Effect Model allows the inclusion of bank Fixed-Effects that can be used to control for the heterogeneity between banks that are not captured in the model. The Fixed-Effect Models will treat the heterogeneity of the non-time-varying determinants of revenues by entering cross-section dummies (for each bank). Therefore, the model will introduce different intercepts capturing the bank-specific characteristics that are not explicitly addressed in the regression specification (De Bandt & Davis, 2000). Controlling for the heterogeneity of the non-time-varying determinants of bank revenue will result a consistent measures of the estimators.

3.3. Source of Data

The present study relied 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 of 2000 are available in book format. Those books can be accessed from the library of the Bank of Indonesia in Jakarta. Banks annual financial reports after the year 2000 are available electronically at the website of the Bank of Indonesia. Data of all variables are collected from the annual banks' balance sheets and income statement.

This study aims to cover all commercial banks in the industry based on the database of banks' annual financial reports published by the Bank Indonesia. This study had successfully compiled the unbalanced panel data of all 286 commercial banks between 1980 and 2010. The total number of observations was almost 3,636. Hence, on average, the sample includes more than 13 observations for each commercial bank. The average number of observations for each commercial bank was less than the number of years captured by this study due to a lack of data (bank mergers, bank entries and bank exits) for those banks during the sample period.

IV. ANALYSIS AND DISCUSSION

The results on the competition level in the two sub groups are presented in Table 4. The values of the H-statistics for government banks and private banks are 0.27 and 0.73 respectively. This implies government and private banks had a different degree of competition. The F-test was employed to assess whether the difference in the values of the H-statistics was significant or not. The outcomes of the hypothesis test shows that the difference in the degree of competition between the government and private banks was significant using the 99 per cent confidence level. The results imply that the private banks were more competitive than were government banks. The test of the joint coefficient of input prices supports the above findings. By using the 99 per cent confidence level, the joint coefficient of input prices of government banks could not reject the null hypothesis that the government banks worked in a monopoly or collusive oligopoly type of market. In contrast, their private counterparts were more competitive. The test of joint coefficients of input prices of the private banks rejects monopoly and perfect competition. Thus, private banks were operating under a monopolistically competitive market.

The finding indicates that the markets of state-owned banks and private banks were segmented. The literature, discussing organisational design such as Williamson (1967) may explain why the two groups are segmented. State-owned banks have a longer hierarchical organisational design than private banks which are dominated by small local banks and joint ventures. State-owned banks have bigger constraints in extending loans to small borrowers with the limitation to provide "hard information". In contrast, private banks with less hierarchical organisational design may have a comparative advantage in using soft information to extend loans to smaller borrowers. Thus, the two markets may be segmented on the type of borrowers that they serve. Government banks prefer to extend loans to bigger borrowers while private banks may be more willing to allocate some loans to smaller borrowers. Another supporting argument of market segmentation

between state-owned and private banks relies on the existence of high switching costs in the banking industry. It involves some costs if customers plan to switch from one bank to another. Most of state-owned banks have existed for longer than their private counterparts. Therefore, state banks may already have a large number of devoted long-term customers who find it costly to switch to a newer private bank.

State-owned banks were working under a monopoly or collusive oligopoly market. This result may also be interpreted as the state-owned banks attempting to collude rather than compete to generate profit maximisation. Vesala (1995) provides evidence that the non-positive value of H-statistics may also imply that banks are working under monopolistic competition without threat of entry. This type of market may also explain the type of competition within government banks. Under monopolistic competition banks tend to differentiate themselves by various product quality variables and advertising. However, state-owned banks work under monopoly profit maximization because there was an entry restriction to becoming state-owned banks. In contrast, the private banks worked in a monopolistic competition market. The finding is consistent with the evidence presented in the previous section where it is shown that the small banks market was more competitive than the large banks. Private banks in the Indonesian banking were dominated by small banks that are likely to be more aggressive than the larger banks (Berger, Klapper, & Udell, 2001; Berger & Udell, 2002; Cole et al., 1999; Stein, 2002). Therefore, it is clear that private banks behave in a more competitive way than do the state-owned banks.

This finding is also in line with the argument presented by McLeod (1999) that the state-owned banks have some advantages compared to their private counterparts. There was a policy that required state-owned enterprises to deposit all their funds in the state-owned banks (Margono, Sharma, & Melvin Ii, 2010; McLeod, 1999). This policy benefitted the state-owned banks as they have captive funds from the deposits of the state enterprises. In addition, before banking deregulation in the 1980s, the government subsidised the interest rates of deposits of the state-owned banks (Margono et al., 2010). These advantages spoiled the state-owned banks and generated un-competitive behaviour. On the contrary, private banks work to maximize the profit and behave more aggressively to increase their market shares. The study by Laeven (2005) on the banking industry in East Asian countries also found that the performance of private banks in general was superior to state banks. Banks' performance was measured by the ratio of operating income to total assets. The study assumed that banks are profit maximisers, thus higher profit is associated with better performance (Laeven, 2005).

Table 4. Competitive Environment Test of Indonesian Banking, Competition Estimation on Sub-Group, Government Banks and Private Banks (Total Revenue as proxy of Banks' Revenue and Time Effect Dummies)

Explanatory Variables	**3rd Specification (Unscaled Revenue Specification) [a]**	
	Government Banks (FE Estimate)	
w_1	0.11 (0.08)	**
w_2	0.04 (0.09)	
w_3	0.13 (0.05)	**
OI	0.01 (0.03)	
EQ	-0.1 (0.09)	**
DEP	-0.36 (0.13)	**
DDC	-0.01 (0.04)	

Joint Coefficients of input prices or	Government Banks	Private Banks
H-Statistics	0.27[b]	0.73[c]
Hypothesis testing:	(0.06)	(0.01)
Ho=0		
F test		
ρ	4.25	51.45
Ho=1	0.04	0.000
F test		
ρ	30.43	6.97
Degree of freedom	0.000	0.009
OH	(1,285)	(1,285)
F test (1,288), OH=0		0.46
P		8.12[d]
		0.000
Number of observation	3,639	
R^2within	0.77	
Time Effect Dummies	37.43[e]	
(F statistics of joint test)		

*** 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.

a) Total revenue as dependent variable
b) Ho=0 cannot rejected and Ho=1 rejected (both in the level of confidence 99%).
c) Ho=0 and Ho=1are rejected (both in the level of confidence 99%).
d) Ho=0 rejected (*in the level of confidence 99%)*
e) Ho=0 rejected (in the level of confidence 99%).

V. CONCLUSION AND POLICY RECOMENDATION

This study reveals that ownership structure affects bank competitive behaviour. State-owned banks and private banks behave differently. Particularly, state-owned banks behaved less competitive than their private banks counterpart. The state-owned banks worked to serve the interest of government as the majority shareholder (McLeod, 1999). In addition, the state-owned banks have long hierarchical organisational designs which leads banks to focus more on large borrowers than the small ones (Williamson, 1967). State-owned banks also suffered from quality controls, government intervention and were used to disburse directed loans. This contributes to create uncompetitive behaviour of government banks. After all, state-owned banks receive an interest rate subsidies prior 1988 banking reform and an implicit guarantee from the government against failure as shown by a series of state-owned bank bailouts, for example Bappindo, in the early 1990s and all state commercial banks during the 1997 crisis.

On the contrary, private banks which are dominated by small banks have more capacity to extend loans to small borrowers. The private banks competed more rigorously than state-owned banks. The private bank market was close to perfect competition or monopolistic competition where bank products are regarded as perfect substitutes for one another. In contrast, state-owned banks attempted to collude rather than to compete to generate a maximum profit. Or the state-owned banks may operate under monopolistic competition with a fixed number of banks as there was a restriction to establish state-owned banks. Small banks, joint venture banks, and branches of foreign banks contributed to enhance competition within the private banks market. They behaved more aggressively in order to survive or reap some shares in the market. On the contrary, the state-banks worked to serve the government interest as the major shareholder and were used to fulfil the interests of some government, government officials and politicians. Therefore, the degree of competition in the market of state-owned banks was much lower than in the market of private banks.

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