

GENDER DIVERSITY, BOARD MONITORING AND BANK EFFICIENCY IN ASEAN-5

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ABSTRACT

We examine the effect of gender diversity and board monitoring (board size and independence) on bank efficiency. Using a broad panel of ASEAN-5 listed commercial banks over the period 1999-2012, we observe that gender diversity in bank board decreases cost and profit efficiency. This finding confirms our concern that the appointment of female directors in bank board is merely to comply with regulatory requirement and the market for high performing women directors could be limited, particularly in the banking sector. Our result also shows that board independence increases bank efficiency, suggesting that higher ratio of independent directors is related to the board ability to monitor and advise management; thus improving efficiency. However, we find that board independence confounded the negative effect of gender diversity on bank efficiency. This finding suggests that the inclusion of women independent directors in bank board fails to mitigate the negative effect of gender diversity on bank efficiency. Alternatively, the positive effect of an independent director towards monitoring and advisory roles of the board weakens if the director is a woman. Further, we find a U-shaped relation between board size and bank efficiency. Banks exhibit decreasing return to scale with small board size, and when the board size multiply the banks started to have better efficiency level. Our result casts doubt on most extant literature that asserts that one board size (either small or large) is always the way to go for all organizations.

Key words: Gender Diversity, Independent Directors, Board Size, Efficiency, ASEAN-5

Introduction

Policy makers, investors and academic researchers have been giving considerable focus on firms' board composition that is believed to affect strategic decision-making process and the quality of the decisions itself. Board composition is a central element of governance mechanism, which directly affects firm market value (Claessens and Yurtoglu, 2013). In the banking industry, board of directors plays a crucial role not only to maximize shareholders' wealth but also to ensure stability and safety of the bank because they are accountable to a wider range of stakeholders such as the depositors, borrowers, clients and regulators (Ciancanelli and Reyes-Gonzalez, 2000; Pathan et al., 2007). In developing countries, the role of board of directors is even far more complex due to the severe form of information asymmetries that could an efficient allocation of resources. Hence, although banking industry is highly regulated, the role of board of directors in corporate governance is given greater emphasis. This is because failure of financial institutions disturbs the allocation of resources and payment system, and could affect the global economic conditions adversely; thus motivates us to undertake the current study on the contribution of gender diversity in corporate boardrooms and oversight role of the board of directors in ASEAN-5 banking industry.

Gender diversity in corporate boardrooms has become a central component of corporate governance reforms around the world. In the UK, the corporate governance code (2012) highlights the need to promote gender diversity in listed firms. In Norway and Spain, all listed companies must have 40% women directors in their board. The same goes for Malaysian listed firms in which

the government imposed a mandatory quota of at least 30% women directors in the boards. Whilst gender diversity policy is receiving greater attention the real challenge is the actual implementation. For example, Malaysian listed firms have yet to meet the mandatory quota even after ten years of its implementation. Some possible reasons for such difficulty include gender discrimination (Doldor et al., 2012), high turnover and absenteeism (Cox and Blake, 1991) and less ambitious women to pursue high-profile careers due to family commitment compared to their male counterparts (Goldin and Katz, 2010). Firms are concerned about the difficulty to increase gender diversity because not only they will not be able to meet the imposed quota but more importantly, their performance might be adversely affected. In banking industry, this issue is of great concern because corporate boardrooms failure may impede the banking system and resulted in financial turmoil and recessions (Claessens and Yurtoglu, 2013).

Theoretical argument supports a higher participation of women in boardrooms (Carter et al., 2003; Campbell and Mínguez-Vera, 2008). But of greater concern is the actual benefit of such participation, which may not be realized if the motive to promote gender diversity is largely driven by societal pressure for greater equality of the sexes or by way of regulation. Such motives seem to force firms to meet the demands of the society and setting quotas may push them to appoint unsuitable and incapable women directors, thus defeating the objective of enhancing firm performance. This possible scenario motivates us to undertake this study to gather some insights about the extent of women directors' participation in bank boards and their contribution towards efficiency pursuant to the banking and corporate governance reforms that have taken place in ASEAN-5 countries. The main objective of this paper is to examine the influence of gender diversity and board monitoring on commercial banks' efficiency in ASEAN-5, an important emerging market.

We also explore the moderating effect of board independence in the relationship between gender diversity and bank efficiency. We believe that the monitoring role of the independent directors that had been widely acknowledged (Hermalin and Weisbach, 2003; Anderson et al., 2004) will further enhance the bank efficiency. We focus on five ASEAN countries namely Indonesia, Malaysia, the Philippines, Thailand and Singapore. These countries have been undergoing a continuous banking and corporate governance reforms since the Asian Financial Crisis in 1997/98. Banking reforms mainly aim at consolidation of market players to prepare them for the liberalization of the financial system in ASEAN. An important agenda of the reform initiatives is to promote gender diversity in boardrooms.

Apart from gender diversity, we also investigate the role of educational and foreign directors' diversity towards banks' efficiency. We observe that board with high number of directors with finance or accounting background lead to better firm performance due to their ability to understand, interpret and analyse financial data to make strategic business decisions. These vital skills become more important given the complexity of the banking industry. We also examine foreign directors' role as they represent ethnic diversity in the board. Ethnic diversity in board has positive effect on firm performance as decisions were made after taking into account different perspectives offers by directors (Carter et al., 2010).

We contribute to the existing literature by providing new empirical evidence on gender diversity and board monitoring, which are central elements of corporate governance reform in the ASEAN-5 banking sector. To the best of our knowledge no investigation has been conducted on how the banking industry in ASEAN-5 has performed after undergoing the structural change especially in the context of gender diversity. Further, our study is the first to investigate the role of independence directors in the link between gender diversity and bank efficiency. We expect that higher participation of independent directors is vital in overcoming the potential short-coming of female directors. As such, our study provides some understanding on the contribution of women directors in general or independent women directors specifically. Further, the findings of our study provide insight to the authority responsible for monitoring the extent of gender diversity and board oversight mechanisms in corporate boardrooms.

The rest of this paper is organized as follows. Section 2 covers a survey of related literature and the development of hypotheses. Section 3 describes the data, research variables, statistical techniques and regression model employed in this study. Section 4 reports and discusses the results. Section 5 concludes this paper by summarizing the key findings, implications, limitations and suggestions for future research.

Related literature and hypothesis development

Gender diversity and bank efficiency

A diverse board contributes different knowledge, creativity and problem solving skills in managing the banks. According to Carter et al. (2003), board diversity is important because diverse boards offer fresh and multiple perspectives to problem solving. Thus, board diversity creates positive impact on firm performance and firm value (Erhardt et al., 2003) because the unique attributes that members bring to the board contribute to high quality decisions, an increase in creativity and innovation (Cox and Blake, 1991), and enhanced problem-solving ability (Miller et al., 1998).

The common benefits of appointing female directors range from the aspects of personality, communication style, educational background and career experience and expertise (Liao et al., 2014), which contribute to wider perspective in decision making. More importantly, female directors are more benevolent and universally concerned but less power oriented than male directors (Adams and Funk, 2012). In addition, women are found to be more committed and involved, more diligent and less self-interest oriented, thus they improve the decision-making process and enhance board effectiveness and firm performance (Liao et al., 2014; Lucas-Perez, et al., 2014; Balasubramaniam et al., 2015). Furthermore, female directors are found to have better

attendance records than male directors and hence, gender-diverse boards are believed to improve monitoring (Adams and Ferreira 2009).

Female directors on board offer different perspectives to the board in their decision making process because females are good at considering problems from different perspectives and to be persistent in addressing solutions (Jean et al. 2014). In addition, female directors create greater vitality and facilitate more complete and thorough thinking processes (Nielsen and Huse, 2010). In short, prior studies suggest that gender-diverse boards improve not only the decision-making but also the supervision role of the boards, which the ultimate benefit is enhanced bank efficiency level.

Moreover, females also excel in interactions with human and this helps the companies in retaining and expanding human resources and improving relationships with institutional investors, clients and other stakeholders (Liu and Li, 2010). This inevitably contributes to long-term relationship building between the employees, clients and stakeholders that lead to better growth prospect of the companies. On the other hand, Bear et al. (2010) find that females directors on board positively affect firms' CSR ratings, sponsoring charity events, improving working environments and promoting environmental protection. Thus, we offer the following hypothesis:

H₁: Gender diversity is positively related to bank efficiency.

Nevertheless, a competing hypothesis asserts that increasing gender diversity in corporate boards affect firm outcomes negatively. Bohren and Strom (2010) find that relatively little research links gender diversity and firm outcomes and the results are conflicting. As Gul et al. (2011) pointed out adding female directors in the board will increase internal divisiveness, which will limit the board's ability to act. As a result, boards become less effective and do not yield significant abnormal returns to the firm (Farrell and Hersch, 2005). We argue that in the case of ASEAN-5 banks where the regulators are keen to impose mandatory requirement to increase the participation of women directors, the effect of such 'forced diversity' can be detrimental to bank efficiency. Forcing companies to meet the societal pressure and quotas may push them to appoint unsuitable and incapable women directors, thus defeating the objective of enhancing firm performance. In this instance, women directors are meant for 'window-dressing' instead of contributing meaningfully to the board operations and decision-making. In addition, the fact that some governments, for example, in Malaysia has revised the mandatory quota several times reflects the difficulty of recruiting and selecting capable and high caliber women directors due to limited market for high performing women directorship in this region. Adam and Ferreira (2009), Farrell and Hersch (2005) and Darmadi (2014) observe that mandating women directors in well-governed firms would have an adverse or no effect on the firm value. Thus, we offer the following competing hypothesis:

H₂: Gender diversity is negatively related to bank efficiency.

Additional board diversity variables

We also examine two additional board diversity variables namely education background and the number foreign directors in the bank board. Diversity in educational backgrounds, particularly with respect to board members having finance or accounting backgrounds, will enable boards to make better economic decisions and thus lead the company to perform positively (Mahadeo et al., 2012). Directors with finance or accounting background enhance financial reporting quality (Abbott et al. 2003) because they are better able to understand and analyze the company's performance based on the financial data and information. This contributes to higher efficiency level of the firms. Thus, we offer the following hypothesis:

H₃: Directors with finance and accounting background are positively related to bank efficiency.

Foreign directors' role is important as they represent ethnic diversity in the board. Similar to the inclusion of female directors, foreign directors offers different perspectives on issues discussed in the board. Foreign directors bring in the international view that will improve the performance of the board. Thus, increase participation of foreign directors in board will have positive effect on firm performance as decisions were made after taking into account different perspectives offers by directors (Carter et al., 2010). Thus, we offer the following hypothesis:

H₄: Higher percentage of foreign directors in bank board is positively related to bank efficiency.

Independent directors and bank efficiency

The boards should be the most important internal governance mechanism (Ahmed and Duellman, 2008) to discipline managers in their decision making process (Kosnik, 1990). However, the ability of the board to function as a critical monitoring device for the top management largely depends on the extent of independent directors' participation in the board (Hermalin and Weisbach, 2003). Greater representation of independent directors in the board of directors indicates the board may be better able to resist the influence of the top executives in its decision and to restraint them from misusing their power. Against this background corporate governance reforms around the globe have focused on strengthening the board's monitoring role by ensuring the boards consist predominantly of independent directors. This helps in reducing the principal-agent problem that distracts the firm's long term growth prospects.

The agency theory suggests that independent directors contribute to better monitoring function compared to the executive directors in the boards due to several reasons. First, an independent board of directors has fewer conflicts of interest than

monitoring managers because they have no relationship with the top management. Hence, independent directors are not obliged to blindly follow the views and opinions of the top management (Hermalin and Weisbach, 2003) and this prevent risky and opportunistic behavior of the managers (Jensen and Meckling, 1976). Second, independent directors strive to be good monitors because they want to protect their reputation in the directorship market (Fama and Jensen, 1983). Third, independent directors can bring unbiased and diverse opinions and views into board's decision making. Fourth, independent directors have vast experience and skills, which enable them to contribute different perspectives to tackle management problems and strategic issues because they come from different background. Therefore, we expect a positive relationship between the percentage of independent directors with bank efficiency when the board of directors is highly able to monitor the top management and mitigate the agency problem.

Prior studies observe that independent directors' superior monitoring increases firm market value (Busta 2007; de Andres and Vallelado, 2008; Ameer et al., 2010) and bank efficiency (Pathan et al., 2007; Tanna et al., 2011), reduces the cost of debt (Anderson et al., 2004) and improves credit ratings (Ashbaugh-Skaife et al., 2006). These findings suggest that independent directors are superior monitors, thus contributed to positive firm outcomes. Thus, we offer the following hypothesis:

H₅: Higher percentage of independent directors (due to better monitoring of management) is positively related to bank efficiency.

The ability of independent directors to monitor and advise the top management also depends on the effectiveness of their advisory function in the boards. To be effective independent directors must have sound industry knowledge and strong grasp about the business environment in which the bank they serve operate. Bank directors with no experience in the banking industry will have limited bank-specific knowledge and less industry knowledge to make significant contribution. They might not be able to constructively challenge the top management in the board. Further, banks operate in a highly regulated environment especially in the developing markets. It is possible that the appointment of independent directors is merely to conform to regulatory requirements as opposed to recruiting and selecting directors that are well qualified in terms of relevant industry experience and good understanding of a banking business. In this context, putting the independent directors on the board may not have significant impact on firm performance.

On the other hand, the appropriate number of independent directors to be appointed to the boards is still debatable. An excessive number may harm the advisory role of the board because it prevents the involvement of the executives in the boards and hence, minimizes information flow between the board and management (Coles et al., 2008). In such circumstances, we expect a higher participation of independent directors in the bank board may result in lower bank efficiency. A few prior studies have found that independent directors decrease bank performance (Pathan and Faff, 2013; Jermias and Ghani, 2014). Earlier studies reported similar findings in non-financial firms (see Bhagat and Black, 2002; Shukeri et al., 2012; Sheikh Ahmed et al., 2013). Thus, we offer the following opposing hypothesis:

H₆: Higher percentage of independent directors (due to their less industry knowledge, which adversely affects their ability to provide advice and counsel to management) is negatively related to bank efficiency.

Board size and bank efficiency

Critical examination of past literature indicates that there are competing theories to explain the association between board size and performance. On the one hand, Jensen (1993) and Lipton and Lorsch (1992) assert that smaller boards are more effective than larger boards for two reasons. First, smaller boards have a greater incentive to monitor the management team due to their nimbleness and cohesiveness, as well as their lower coordination and communication costs and 'free riding' issues. Second, it is easier for smaller boards to arrange meetings and reach consensus and respond quickly due to lower communication and coordination, free-riding problems and fewer tendency for conflicts and disagreement among directors. CEOs might find larger boards easier to control than smaller boards because in large boards, an individual director has low incentive to seek information and supervise the top executives (Jensen, 1993). Accordingly, several studies observe an inverse relationship between board size and firm performance, indicating smaller boards contribute to better performance (for examples, Pathan et al., 2007; Pathan and Faff, 2013).

On the other hand, larger boards improve firm performance due to greater access to networking opportunities and highly skilled employees, thus contributing to better firm performance (Kiel and Nicholson, 2003). In addition, larger boards facilitate monitoring of top management and bring in more human capital to advice managers. This is consistent with the finding of several studies that found larger board size positively affects performance (Adams and Mehran 2008; Sheikh Ahmed et al., 2013; Darmadi, 2014) and efficiency (Tanna et al., 2011). However, a few studies reported inconclusive results; either a non-linear relationship (de Andres and Vallelado, 2008; Kiel and Nicholson, 2003) or no relationship between board size and performance (Busta, 2007).

The conflicting theories and empirical findings suggest that the effect of board size on bank efficiency is a result of a trade-off between the benefits of monitoring and advising and the drawbacks of coordination, control, free riding and decision-making problems. This means additional directors appointed to the board may improve efficiency up to a certain point beyond which it falters. Thus, we offer the following hypothesis:

H₇: Board size has a non-linear relationship with bank efficiency.

Interaction effect between independent directors and women directors

This study focuses on the effect of gender diversity on the bank efficiency. We suspect that the relationship between women directors with bank efficiency level can be improved with the role of independent directors. This is because the governance role played by the independent directors is important to discipline managerial decision making process (Kosnik, 1990). The appointment of women independent directors suggests better monitoring process because the boards may be better able to resist the influence of top executives in its decision and to restrain them from misusing their power. Women directors may serve better as independent directors due to their nature such as more thorough and complete in their thinking process, persistent in addressing problems, more sensitive to changes in the business environment as well as more committed (e.g. higher attendance rate), more diligent and less self-interest-oriented than their male counterparts (Hillman et al., 2002; Darmadi, 2014; Lucas-Perez et al., 2014). In this case, we postulate that percentage of independent directors moderates the link between gender diversity and bank efficiency. Therefore, we argue that independent women directors will be able to contribute positively to bank efficiency. The positive effect of gender diversity could also be enhanced by the positive attributes of an independent director, in particular, the ability to play an oversight and advisory roles. If this strategy works, this will provide an important indication to the policy makers, which attempt to increase women participation rates in the corporate boardroom in order to increase bank performance.

H₈: Higher percentage of independent directors moderates the effect of gender diversity on bank efficiency.

Methodology

Data and sample

Our sample consists of selected commercial banks in ASEAN-5 comprising Malaysia, Singapore, Indonesia, Thailand and the Philippines, for the period of 1999 to 2012. We collected financial data between 1999 and 2012 from Bankscope. We chose the observation period from 1999 to 2012 in order to capture the effect of corporate governance after the major banking consolidations in the region due to 1997/98 Asian financial crisis and the Global Financial Crisis of 2008-2009. We only include banks with three years' financial data or more in order to provide a better representation of bank performance in both cost and profit efficiency. Our final sample consists of 102 banks. We use an unbalanced-panel data estimation of Tobit regression modelling based on 1,108 bank-year observations. We extract gender diversity and board monitoring variables manually based on a study of content from various years' annual reports of the banks in the sample.

Bank efficiency estimation

Our dependent variables are cost and profit efficiency scores of commercial banks in ASEAN-5. We use the non-parametric method based on Data Envelopment Analysis (DEA) to estimate the dependent variables. We will use the cost and profit efficiency scores in the second stage of the estimation to determine the effect of gender diversity on bank efficiency. The DEA is a linear programming approach proposed by Farrell (1957) and further developed Charnes et al. (1978) based on a constant return to scale. This method assumes that the production frontier is constructed based on the concept of Pareto efficiency where banks will not be able to alter the input mix to increase their efficiency level when they are situated on the frontier (Chen and Yeh, 2000). Each of the commercial banks is considered as a Decision-Making Unit (DMU) aiming to minimize its operating costs and maximize its profits.

The DEA method is a well-known technique due to its ability and consistency in measuring the efficiency level of multiple inputs and multiple outputs for the DMU. This is crucial because banks use multiple inputs, such as labor, capital and deposits, to create various types of financial products. In addition, the use of DEA assists in solving independent and identically distributed (IID) problems in the second-stage of estimation because the efficiency scores obtained are not based on the residuals obtained from a set of econometric estimations. Hence, it requires no prior specification of functional form, as compared to the parametric method.

Cost efficiency is defined as the ability of the banks to minimize costs by manipulating the input mix given the price of their inputs and the outputs. Therefore, the cost efficiency for N number of firms ($i=1, N$) is defined as the objective of the firms seeking to minimize costs by using a vector of p inputs $x_i = (x_{i1}, \dots, x_{ip}) \in \mathfrak{R}_{p++}$ given the price of the inputs $w_i = (w_{i1}, \dots, w_{ip}) \in \mathfrak{R}_{p++}$ to produce a vector of q outputs $y_i = (y_{i1}, \dots, y_{iq}) \in \mathfrak{R}_{q++}$. The estimation of the cost efficiency for j th bank can be estimated based on Equation 1:

$$\begin{aligned}
 & \text{Min} \sum_p w_{pj} x_{pj} \\
 & \text{s.t.} \sum_i \lambda_i y_{iq} \geq y_{jq} \quad \forall q \\
 & \quad \sum_i \lambda_i x_{ip} \leq x_{jp} \quad \forall p \\
 & \quad \sum_i \lambda_i = 1, \lambda_i \geq 0; i = 1, \dots, N
 \end{aligned} \tag{1}$$

The cost efficiency for the j th bank is given by the ratio of minimum costs to actual costs, as defined by Equation 2:

$$CE_j = \frac{\sum_p w_{pj} x_{pj}^*}{\sum_p w_{pj} x_{pj}} \quad (2)$$

Cost efficiency (CE) ranges between “0” and “1”, and a DMU with a score of “1” is said to be the most efficient bank as compared to the other DMUs in the sample.

Next, we include profit efficiency in our model because banks are not only focusing on minimizing cost but also on maximizing profit. The profit efficiency concept is widely accepted in the finance literature because it combines both cost and revenue sides in the estimation of efficiency (Berger and Mester, 1997). The alternative profit efficiency estimation is used in this study because banks are able to use their local market power to price their deposits and loans in the market (Humphrey and Pulley, 1997). Furthermore, banks can also differentiate their financial products based on their targeted customers, geographical areas and also over time.

The alternative profit efficiency for bank *j*th can be expressed as follows:

$$\begin{aligned} & \text{Max } R_j - \sum_p w_{jp} x_{jp} \\ & \text{s.t. } \sum_i \lambda_i R_i \geq R_j \\ & \quad \sum_i \lambda_i y_{iq} \geq y_{jq} \quad \forall q \\ & \quad \sum_i \lambda_i x_{ip} \leq x_{jp} \quad \forall p \\ & \quad \sum_i \lambda_i = 1; \lambda_i \geq 0; i = 1, \dots, N \end{aligned} \quad (3)$$

Where *R* is the revenue of the bank *j*. The alternative profit for bank *j*th is given by:

$$0 \leq APE_j = \frac{R_j - \sum_p w_{jp} x_{jp}}{\sum_q R_j - \sum_p w_{jp} x_{jp}^*} \leq 1 \quad (4)$$

The variable return to scale (VRS), by setting $\sum_i \lambda_i = 1$, is used in the estimation of both cost and profit efficiency. VRS is said to provide a better estimation as compared to constant return to scale because banks may not be able to proportionally increase both inputs and outputs simultaneously to minimize cost and maximize profit.

We select the inputs and outputs in this study based on the value-added approach proposed by Berger and Humphrey (1992). The value-added approach assumes that banks perform typical businesses in the services industry by taking into consideration the assets and liabilities as outputs that add value to the banks. Hence, in this approach, we treat deposits as outputs whereas the input price is the interest paid on deposits. The output vectors are the financial products such as loans, investments, off-balance sheet activities and deposits. We include off-balance sheet activities because in contemporary banking, banks are only specializing in deposit taking and granting loans, but also reaping profits from offering off-balance sheet services.

The input vectors used in the production of financial products and services are personnel costs, capital costs and the cost of loanable funds. We calculate the price of labor by dividing total personnel costs by total assets. We obtain the price of capital by dividing total depreciation of the banks by total fixed assets. We compute the price of loanable funds by dividing total interest expenses by total loanable funds. All input and output vectors employed in this study are denominated in USD (million).

Explanatory variables

Our independent variables are gender diversity (GEN), the percentage of directors with finance background (FIN), percentage of foreign directors (FOR), percentage of independent directors and board size (BS). We measure GEN as the percentage of female directors on the board. We include IND and BS to represent board monitoring aspect of corporate governance. We measure BS as the total number of directors on the board. We control for bank asset size (SIZE) because the level of efficiency may be different for banks of different scales of operation. Besides asset size, we also control for bank profitability in terms of return on assets (ROA) and return on equity (ROE). This is crucial because profitability affects the way that banks conduct their daily business activities, especially in deciding on the price of outputs and the usage of inputs. Next, we include the equity to total assets (ETA) of the bank to control for capital requirements. A bank with a higher ETA is better capitalized and able to withstand future economic shocks, which contributes to a higher efficiency level in the case of both cost and profit.

Table 1 shows the summary statistics of all the research variables. On average, banks in the ASEAN-5 are relatively inefficient in terms of cost and profit efficiency, with average efficiency scores of 31.6% and 34.8% respectively. This finding indicates that the banks could have further reduced their input mix by 68.4%, given the price of inputs, in order to achieve a given level of

output in their cost minimization objective. The banks could reduce 65.2% of the input mix in their objective to achieve a given level of profit. Commercial banks in the ASEAN-5 have an average board size of seven directors. This is relatively close to board size in the study of Adnan et al. (2011). The mean size of the board is considered optimum as suggested by Jensen and Ruback (1983), and the optimal size of corporate boards should not be more than seven or eight members to ensure their effectiveness. The average board size in Indonesia is five directors whereas commercial banks in Thailand have the largest average board size (12 directors). The size of boards of commercial banks in Thailand has not changed much from the report of 8 to 19 directors provided by Pathan et al. (2007) in their study of corporate governance and bank performance in Thailand from 1999 to 2003.

Banks, apart from those in the Philippines, have complied with national requirements to have at least 30% of the board comprised of independent directors. The percentage of independent directors is also consistent with the study of Adnan et al. (2011). In the present study, the boards of commercial banks in Singapore have the largest composition of independent directors as compared to other countries, with an average of 61.8%. This may be due to Singapore's more independent and developed financial market than other countries. Further, on average, 42.5% of directors in the ASEAN-5 commercial banks have finance-related education. The percentage is relatively small compared to the developed countries. For example, Göhlmann and Vaubel (2007) reported that 100% of council members of the central bank of Denmark had an economics/business background, compared to 73% of central bank council members in Germany, 66% of such members in the United States and 67% in Switzerland. In terms of the percentage of female directors, banks reported an average of 11.1% of female board members, far lower than the percentage of female directors suggested by the regulators (30%). However, other studies also reported a low percentage of female directors. Liao et al. (2014), for example, reported that only 9.2% directors are female. In addition, we also find that commercial banks in Singapore have the lowest percentage of female directors in ASEAN-5, with an average of 3.3%. The percentage of foreign directors on the boards of banks is 5.7%. This finding suggests that the ownership of commercial banks in the region is still highly regulated, which restricts foreign investment in the banking industry. Singapore reported the highest percentage of foreign directors on the boards of commercial banks, with an average of 9.7%.

Regression model

We employ Tobit regression model based on panel data estimation to investigate the effect of gender diversity on cost and profit efficiency of the commercial banks in ASEAN-5. We estimate the relationship using the basic model as presented in Equation (5). We employ the Tobit regression in the estimation because of the nature of the independent variables that take a value between "0 and 1".

$$\begin{aligned} Efficiency_{jt} = & \beta_0 + \beta_1 \ln BS_{jt} + \beta_2 IND_{jt} + \beta_3 FIN_{jt} + \beta_4 GEN_{jt} + \beta_5 FOR_{jt} \\ & + \beta_6 \ln SIZE_{jt} + \beta_7 ROA_{jt} + \beta_9 ROE_{jt} + \beta_9 ETA_{jt} + \varepsilon_{jt} \end{aligned} \quad (5)$$

We further examine the interaction effect of independent directors to determine whether the effects of gender diversity on bank efficiency can be improved by appointing when an independent woman director. We estimate this effect using an interaction term between the percentages of independent directors with the percentage of female directors. The model is also based on Tobit regression as indicated in Equation (6).

$$\begin{aligned} Efficiency_{jt} = & \beta_0 + \beta_1 \ln BS_{jt} + \beta_2 IND_{jt} + \beta_3 FIN_{jt} + \beta_4 GEN_{jt} + \beta_5 FOR_{jt} \\ & + \beta_6 \ln SIZE_{jt} + \beta_7 ROA_{jt} + \beta_9 ROE_{jt} + \beta_9 ETA_{jt} + \beta_{10} IND_{jt} * GEN_{jt} + \varepsilon_{jt} \end{aligned} \quad (6)$$

β_{10} is the parameter where it is used to identify whether the appointment of the independent women directors helps to improve the cost and profit efficiency.

Table 2 presents the correlation matrix for the independent and dependent variables used in this study. We find no significant correlation between the variables and hence, the model does not suffer from serious multicollinearity.

Results and discussions

We first estimate Equation (5) to determine the relationship between gender diversity and the cost and profit efficiency using Tobit regression analysis. We then estimate the Pooled Ordinary Least Squares (POLS) to check for the robustness of the Tobit regression model. Table 3 shows both regression results. The coefficients give very close value between POLS and Tobit regression in all models; hence, our estimation is robust. The result indicates that gender diversity has a significant negative effect on cost and profit efficiency in all models, which implies that banks with higher percentage of female director, becomes less efficient in handling their cost and profit. Prior literature suggests that female directors are supposed to offer different views and perspectives on issues discussed in the board (Jean et al., 2014). In addition, female directors are said to be more meticulous and thorough in their decision making process (Nielsen and Huse, 2010). As the result shows otherwise, it suggests that female directors appointed in ASEAN-5 banks are unable to perform their duties as expected.

The finding is consistent with Gul et al. (2011) and Farrell and Hersch (2005), who observe that the inclusion of female directors in the board adversely affects firm performance, in particular when female directors were included in well-governed firms (Adams and Ferreira, 2009; Farrell and Hersch, 2005). Hence, the result casts doubts whether the ASEAN-5 countries have

enough qualified female directors that are able to perform tasks given to them, particularly in the banking sector. With regulation imposed to the banks to increase female participation in the board, banks are forced to appoint unsuitable and incapable women directors, which lead the board to be further divisive and less efficient. In addition, such negative performance may also due to the reason where the limitation of the women directors to exercise their decision optimally as the inclusion of the women directors in the developing countries are still unpopular due to the culture in the countries involved.

In terms of board monitoring, we observe mixed results. First, we find a significant positive relationship between the percentage of independent directors and cost and profit efficiency. Thus we find support for the third hypotheses. Second, we observe that board size has a non-linear U-shaped relationship with bank efficiency; thus supporting our seventh hypothesis. This result indicates banks exhibit decreasing return to scale with small board size, and when the board size multiply the banks started to have better efficiency level.

When we test the interaction between gender diversity and percentage of independent directors we observe that it has a negative effect on both cost and profit efficiency (Refer Table 4). Hence, we find support for our final hypothesis in which independent directors in the board moderates the link between gender diversity and bank efficiency but in an adverse way in which appointing a female independent director decreases bank efficiency. The result implies that the theoretical benefit of board monitoring from the perspective of the oversight of independent directors could not be realized when banks appoint women independent directors.

Table 1: Descriptive statistics of the variables

Full Sample											
	COS T	PROFI T	BS	IND	FIN	GE N	FO R	TA	ROE	ROA	ETA
Mean	0.316	0.348	7.90	0.38	0.42	0.1	0.05	12097.4			
Standard Deviation	0.342	0.402	1.60	0.16	0.21	0.1	0.14	27514.7	0.114	0.015	0.117
Minimum	0.000	-0.216	2.00	0.00	0.00	0.0	0.00	30	0.608	0.087	0.109
Maximum	1.000	1.000	0	0	0	00	0	28.817	9.729	-0.843	1.292
Count	1108	1108	19.0	1.50	2.00	0.6	2.25	288590.	15.10		
			00	0	0	67	0	104	4	2.034	0.997
			1108	1108	1108	1108	8	1108	1108	1108	1108
Indonesia											
Mean	0.274	0.271	5.30	0.38	0.51	0.1	0.07	4097.77			
Standard Deviation	0.318	0.342	1.54	0.18	0.26	0.1	0.18	9023.96	0.168	0.013	0.133
Minimum	0.004	-0.014	2.00	0.00	0.00	0.0	0.00	4	0.788	0.056	0.150
Maximum	1.000	1.000	0	0	0	00	0	28.817	3.018	-0.843	1.292
Count	427	427	15.0	1.50	2.00	0.6	2.25	65730.9	15.10		
			00	0	0	67	0	94	4	0.129	0.997
			427	427	427	427	427	427	427	427	427
Malaysia											
Mean	0.497	0.513	8.84	0.43	0.41	0.0	0.01	12962.7			
Standard Deviation	0.353	0.455	1.26	0.12	0.13	0.0	0.06	18258.3	0.152	0.028	0.106
Minimum	0.000	-0.216	5.00	0.18	0.21	0.0	0.00	40	0.110	0.165	0.065
Maximum	1.000	1.000	0	2	4	00	0	150.582	0.719	-0.037	0.014
Count	253	253	16.0	0.75	0.85	0.3	0.28	161810.			
			00	0	7	33	6	908	0.554	2.034	0.353
			253	253	253	253	253	253	253	253	253
The Philippines											
Mean	0.143	0.129	10.7	0.28	0.34	0.1	0.09	5785.89			
Standard Deviation	0.255	0.269	1.34	0.10	0.11	0.1	0.15	7214.03	0.115	0.013	0.101
Minimum	0.001	0.001	4.00	0.08	0.07	0.0	0.00	8	0.217	0.010	0.056
Maximum	1.000	1.000	0	3	7	00	0	149.100	0.851	-0.029	0.140
Count	192	192	19.0	0.80	0.66	0.4	0.62	33719.6			
			00	0	7	00	5	77	2.454	0.041	0.298
			192	192	192	192	192	192	192	192	192

Singapore											
Mean	0.443	0.617	9.245	0.618	0.3	0.09	83245.48	0.10	0.01	0.1	
Standard Deviation	0.366	0.407	1.396	0.105	0.0	0.05	87340.82	0.04	0.01	0.1	
Minimum	0.013	0.007	3.000	0.375	0.2	0.00	111.118	0.00	0.00	0.0	
Maximum	1.000	1.000	14.00	0.818	0.6	0.18	288590.1	0.18	0.07	0.6	
Count	50	50	50	50	50	50	50	50	50	50	50

Thailand											
Mean	0.309	0.458	11.80	0.335	0.3	0.03	17014.31	0.05	0.00	0.1	
Standard Deviation	0.332	0.407	1.291	0.134	0.1	0.06	17115.51	0.82	0.03	0.0	
Minimum	0.008	0.003	8.000	0.053	0.0	0.00	57.776	9.72	0.26	0.0	
Maximum	1.000	1.000	19.00	0.700	0.8	0.22	78965.44	1.16	0.07	0.4	
Count	186	186	186	186	186	186	186	186	186	186	186

Notes: COST=cost efficiency score, PROFIT=profit efficiency score, BS=board size, IND=percentage of independent directors, FIN=percentage of directors with education in finance, GEN=percentage of female directors, FOR=percentage of foreign directors, TA=total assets, ROE=return on equity, ROA=return on assets, ETA=equity to total assets

Table 2: Correlation matrix

	COST	PROFIT	LNBS	IND	FIN	GEN	FOR	LNTA	ROE	ROA	ETA
COST	1.000	0.848	-0.157								
PROFIT	0.848	1.000	-0.073								
LNBS	-0.157	-0.073	1.000								
IND	0.077	0.057	-0.279	1.000							
FIN	0.027	-0.028	-0.538	0.439	1.000						
GEN	-0.137	-0.135	-0.154	0.002	0.101	1.000					
FOR	-0.045	-0.067	-0.091	0.022	-0.041	0.015	1.000				
LNTA	-0.007	0.014	0.670	-0.009	-0.319	-0.203	-0.107	1.000			
ROE	-0.002	-0.005	-0.046	0.058	0.032	-0.022	-0.022	0.033	1.000		
ROA	0.025	-0.024	-0.023	0.015	0.008	0.011	0.037	-0.069	0.040	1.000	
ETA	0.120	0.105	-0.202	0.053	0.110	-0.006	0.059	-0.307	-0.028	0.218	1.000

Notes: COST=cost efficiency score, PROFIT=profit efficiency score, LNBS=board size, IND=percentage of independent directors, FIN=percentage of directors with education in finance, GEN=percentage of female directors, FOR=percentage of foreign directors, LNTA=total assets, ROE=return on equity, ROA=return on assets, ETA=equity to total asset

Table 3: Estimated results for gender diversity, cost and profit efficiency

Variable	Model (1)		Model (2)		Model (3)		Model (4)	
	POLS	Tobit	POLS	Tobit	POLS	Tobit	POLS	Tobit
LNBS	-0.234*** (0.032)	-0.234*** (0.032)	-0.563*** (0.153)	-0.561*** (0.153)	-0.168*** (0.038)	-0.168*** (0.038)	-0.686*** (0.183)	-0.689*** (0.182)
IND	0.081 (0.070)	0.078 (0.070)	0.091 (0.070)	0.088 (0.070)	0.156* (0.083)	0.156* (0.083)	0.172** (0.083)	0.171** (0.083)
FIN	-0.179***	-0.178***	-0.180***	-0.180***	-0.243***	-0.242***	-0.246***	-0.245***

	(0.060)	(0.060)	(0.060)	(0.059)	(0.071)	(0.071)	(0.071)	(0.071)
GEN	-0.395***	-0.395***	-0.416***	-0.416***	-0.425***	-0.425***	-0.458***	-0.458***
	(0.081)	(0.080)	(0.081)	(0.081)	(0.096)	(0.096)	(0.097)	(0.096)
FOR	-0.166**	-0.165**	-0.165**	-0.165**	-0.240***	-0.242***	-0.239***	-0.241***
	(0.071)	(0.071)	(0.071)	(0.071)	(0.085)	(0.085)	(0.085)	(0.084)
BS2	-	-	0.085**	0.085**	-	-	0.134***	0.134***
			(0.039)	(0.039)			(0.046)	(0.046)
LNTA	0.031***	0.031***	0.032***	0.032***	0.022**	0.023**	0.023**	0.023***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.009)	(0.009)	(0.009)
ROE	-0.013	-0.013	-0.011	-0.011	-0.011	-0.011	-0.008	-0.008
	(0.016)	(0.016)	(0.016)	(0.016)	(0.019)	(0.019)	(0.019)	(0.019)
ROA	0.025		0.033	0.033	-0.198	-0.198	-0.186	-0.186
	(0.116)	0.025 (0.115)	(0.115)	(0.115)	(0.138)	(0.138)	(0.138)	(0.137)
ETA	0.412***	0.411***	0.404***	0.403***	0.466***	0.466***	0.453***	0.454***
	(0.099)	(0.098)	(0.098)	(0.098)	(0.118)	(0.117)	(0.117)	(0.117)
Constant	0.604***	0.605***	0.897***	0.897***	0.572***	0.571***	1.035***	1.036***
	(0.078)	(0.077)	(0.155)	(0.154)	(0.093)	(0.092)	(0.184)	(0.183)
Model fit								
F-Test	12.12***		11.43***		8.04***		8.12***	
R-squared	0.090		0.094		0.062		0.069	
Adj R-squared	0.083		0.086		0.054		0.061	
LR chi2(9)		104.56***		109.37***		70.68***		79.22***
Pseudo R2		0.1364		0.143		0.063		0.070
Log likelihood		-330.969***		-328.564		-527.053		-522.784

Notes: Estimation is done using unbalanced panel data estimation based on the Tobit regression. Model (1) is estimated based on Equation (5) and Model (2) estimates the U-shape relationship between board size and cost efficiency level. Model (3) is estimated based on Equation (5, which estimates the U-shape relationship between board size and efficiency level. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. Standard errors are in parentheses. LNBS=board size, IND=percentage of independent directors, FIN=percentage of directors with education in finance, GEN=percentage of female directors, FOR=percentage of foreign directors, BS2=square of board size, LNTA=total assets, ROE=return on equity, ROA=return on assets, ETA=equity to total assets

Table 4: Estimated results for the interaction effect between independent directors and gender diversity

Variable	Model (5)		Model (6)	
	POLS	Tobit	POLS	Tobit
LNBS	-0.234*** (0.032)	-0.233*** (0.032)	-0.168*** (0.038)	-0.168*** (0.038)
IND	0.239*** (0.086)	0.237*** (0.086)	0.274*** (0.103)	0.274*** (0.103)
FIN	-0.171*** (0.060)	-0.170*** (0.059)	-0.237*** (0.071)	-0.237*** (0.071)
GEN	0.139 (0.190)	0.138 (0.189)	-0.026 (0.227)	-0.026 (0.227)
FOR	-0.177** (0.071)	-0.177** (0.071)	-0.248*** (0.085)	-0.250*** (0.085)
LNTA	0.029*** (0.008)	0.029*** (0.008)	0.021** (0.009)	0.021** (0.009)
ROE	-0.014 (0.016)	-0.014 (0.016)	-0.012 (0.019)	-0.012 (0.019)
ROA	0.032 (0.115)	0.033 (0.115)	-0.193 (0.138)	-0.193 (0.137)
ETA	0.388*** (0.098)	0.387*** (0.098)	0.448*** (0.118)	0.448*** (0.117)
IND*GEN	-1.299*** (0.419)	-1.297*** (0.417)	-0.970* (0.502)	-0.970* (0.499)
Constant	0.552*** (0.079)	0.553*** (0.079)	0.534*** (0.095)	0.533*** (0.094)
Model fit				
F-Test	11.96***		7.63***	
R-squared	0.098		0.065	
Adj R-squared	0.090		0.057	
LR chi2(10)		114.17***		74.45***
Pseudo R2		0.149		0.066
Log likelihood		-326.160		-525.169

Notes: Estimation is done using unbalanced panel data estimation based on the Tobit regression. Model (5) and Model (6) are estimated based on Equation (6). Model (5) and (6) show the results of the moderating role of independent directors on gender diversity towards the cost efficiency and profit efficiency respectively. Superscripts *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively. Standard errors are in parentheses. LNBS=board size, IND=percentage of independent directors, FIN=percentage of directors with education in finance, GEN=percentage of female directors, FOR=percentage of

foreign directors, LNTA=total assets, ROE=return on equity, ROA=return on assets, ETA=equity to total assets, IND*GEN= interaction term between independent directors and gender diversity.

Conclusion

Banking guidelines on corporate governance call for the right composition of the boards of directors so that they are able to perform an effective oversight role on behalf of banks' shareholders and various stakeholders. Sound governance structure supports the long term growth of the banking industry. Strengthening board governance and corporate governance in general has been an agenda of great importance to both policy makers and investors in ASEAN-5 ever since the Asian Financial Crisis in 1997/98. In recent years, gender diversity has become a vital agenda to further improve board's oversight and decision-making process around the globe. However, stakeholders are concern if the appointment of women directors is not first and foremost based on merit. If the appointment is mainly due to societal pressure or regulatory requirement it may create adverse effects on bank performance. In light of this issue, we examine the contribution of women directors towards cost and profit efficiency.

The main objective of our research is to examine the influence of gender diversity and board monitoring on commercial banks' efficiency in ASEAN-5, an important emerging market. We observe several interesting findings. First, our results show that women directors contribute negatively towards the bank's cost and profit efficiency, suggesting that ASEAN-5 countries might not have enough qualified female directors that are able to perform tasks given to them, particularly in the banking sector. With regulation imposed to the banks to increase female participation in the board, banks are forced to appoint unsuitable and incapable women directors, which lead the board to be further divisive and less efficient. In addition, such negative performance may also due to the reason where the limitation of the women directors to exercise their decision optimally as the inclusion of the women directors in the developing countries are still unpopular due to the culture in the countries involved.

Second, we further investigate the effect of an independent women director by interacting the percentage of independent directors and the percentage of women directors. We find a negative relationship, which implies that the inclusion of women directors as an independent director fails to mitigate the negative effect of women directors on bank performance. Our results on gender diversity are consistent with the study of Gul et al. (2011) and Farrell and Hersch (2005) in developing countries. One possible reason is the appointment of women directors are merely to satisfy the mandatory quota, which forced the banks to appoint unsuitable and incapable women directors that fail to improve efficiency. Hence, we suggest that the banks' nomination committee need to be very cautious in selecting female candidates to fill the board's position. The selection should be made based on merit in order to create a positive spillover effect towards the bank efficiency, which is crucial for the sustainability of the banking industry in ASEAN-5.

Third, with regard to board monitoring we find higher percentage of independent directors, which implies greater board independence increases bank efficiency in ASEAN-5 commercial banks. This finding implies that greater board independence is positively related to the board ability to monitor and advise management; thus improving bank efficiency. However, the interaction term of the ratio of independent directors and gender diversity variable results in negative effect on bank efficiency, suggesting that women independent directors do not have what it takes to contribute meaningfully to bank efficiency in the sample banks. Next, board monitoring in terms of size of the board shows a non-linear U-shaped relationship, indicating that one board size 'does not fit all.' Hence, it is for the boards as whole to deliberate on its appropriate size taking into account the needs and nature of the bank business so as to gain the benefits of effective monitoring.

Finally, our study has several limitations that could serve as potential opportunities for future research. First, we mainly focus on gender diversity and board monitoring, which does not take into account the actual resources that women and independent directors bring to the board's decision-making process. Hence, future research on gender diversity and independent directors should examine the types of human and social capital that individual directors contribute to the board. Each director brings in different sets of skills, knowledge, experience and social connections to the board, which could differentiate women directors' contribution to bank efficiency. Second, our sample focuses on ASEAN-5 countries only, which are starting to encourage the inclusion of women directors to decision making positions. Results could be different if the sample includes other more developed Asian countries such as Korea and Japan. Finally, we utilize traditional measures of gender diversity and independent directors using ratios. Future research can use different measures such as Blau index and number of female directors, which could potentially yield a more robust result.

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