ROLE OF BOARD CAPITAL ON CAMBODIA BANK EFFICIENCY

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ABSTRACT

This research investigates the relationship between board capital and bank efficiency within Cambodian banking industry over 2011-2015. The bank efficiency is measured using Data Envelopment Analysis, meanwhile, the board capital is measured through content analysis of annual report and internet reporting. Using robust panel regression, we find that there is positive effect of board capital on bank efficiency supporting the knowledge transfer theory and human capital theory. The higher level board capital have increase the level of bank efficiency. Our results also indicate the importance of board capital for banking industry in achieving better efficiency. Our study exploits knowledge transfer theory and human capital theory showing that knowledge as well as experience has played an important role in the management of the bank's operation as the core business of a commercial bank is focusing to the activities of lending and borrowing of capital (Guthrie, 2001). As a result, the core competitiveness of the bank is highly dependent on the capability of the management teams in managing the experience and knowledge.

Keywords: *Board Capital; Bank Efficiency; Cambodia; content analysis*

Penelitian ini menguji hubungan antara board capital dan efisiensi bank dengan menggunakan sampel yang berasal dari industry bank di negara Kamboja pada kurun waktu 2011 = 2015. Efisiensi bank diukur dengan menggunakan Data Envelope Analysis, sedangkan board capital diukur dengan menggunakan content analysis pada laporan tahunan perbankan. Dengan menggunakan regresi panel, kami menemukan dampak positif board capital terhadap tingkat efisiensi bank di Kamboja. Hasil penelitian ini mendukung knowledge transfer theory and human capital theory. Hasil penelitian kami menunjukkan pentingnyan board capital di industry perbankan untuk mencapai tingkat efisiensi yang lebih baik. Dengan menggunakan knowledge transfer theory and human capital theory, kami berargumen pengetahuan dan pengalaman mempunyai peran penting dalam hal mengelola operasi bank. Tingkat kompetitif perbankan sangat tergantung pada kemampuan tim manajemen dalam mengelola pengalaman dan pengetahuan dewan dreksi.

Kata kunci: *board capital*, tingkat efisiensi bank, Kamboja, *analisis content.*

INTRODUCTION

The factor of bank efficiency continues to be heavily studied amid the conflicting theoretical disagreement documented in the extant empirical banking and finance literature (Stewart, Matousek and Nguyen, 2016; Tsolas and Charles, 2015). Thus far most of the existing literature focuses heavily on the bank characteristics as the determinants, and little is known about the factor of bank efficiency function outside the characteristics such as non-performing loan, loan to deposit ratio, net interest margin, and bank's size. It is rarely found a research examined the determinant of bank efficiency from the perspective of agency perspective such board capital. Furthermore, most bank efficiency research is more on developed market or emerging countries (Andries and Ursu, 2016; Casu and Ferarri, 2015; Fujii, Managi, Matousek and Rughoo, 2018; Qayyum and Riaz, 2018), less is known about bank efficiency with frontier markets perspective. Comparatively, the banking industry development in frontier market could offer a different snapshot of this bank efficiency research area as it is new, less-open, and higher

transaction cost. In other words, the determinants of bank efficiency for frontier market may not necessarily at the same magnitude with the developed and emerging markets. The gap of human capital and human development in frontier market may serve intriguing findings as the determinant of bank efficiency. Building on these theoretical assumptions, we aim to investigate the effect of board capital on bank efficiency in a small and less-open frontier market like Cambodia.

Human capital is one of the success factors in organization (Becker, 1964; Onkelinx, Manolova and Edelman, 2015, 2016; Vomberg et al, 2016). It may leads to the ability of organization in allocating resources effectively and efficiently (Ozkan et al, 2017; Park 2018). It is clearly stated in two seminal theories, which are Knowledge Transfer Theory and Human Capital theory where it argues that the human capital of managerial will improve the organization dynamics. In other words, higher human capital leads to better organization.

So far, banking literature argues that the performances as well as the efficiency of banks are solely determined by the bank characteristics. It missed out the role of directors in the decision making process as each of the decision made will give different impact to the performance of banks and this in turn will affect the banks' efficiency. Hence, the human and social capitals of directors play an important role in determining the banking efficiency. From the research study of Kauko (2009), the empirical results showed that education will help in the improvement of efficiency. The bank's operating system will be more efficient if the bank's management team consists of directors who have the qualification from tertiary institutions. This is because directors with higher educational level especially graduated from tertiary institutions are believed to be able to handle and face any difficulties lightly due to the availability of knowledge as well as skills that acquired by them. Hence, the educational background of the directors in the management team is relatively important to the bank's operation efficiency. In fact,

the efficiency in the bank's operating system will improve the performance of the bank (Fethi and Pasiouras, 2010; Olson and Zoubi, 2011) and market value of the bank (Shamsuddin and Xiang,2012), eventually will boost up the economics of a country (Ayadi, Arbak, Naceur and De Groen, 2015; Bettin and Zazzaro, 2012) as banking industry is considered as one of the most important industries regardless on countries.

Cambodia offers a unique background for investigating the relationship between board capital and bank efficiency for a number of reasons. Firstly, the human capital background of the board members in the Cambodian banks would provide a good platform for further discussion in this research topic. Besides, Cambodia also offers an interesting institutional setting for examine on how the board capital affects the Cambodian commercial banks' efficiencies with its small and open economy. Lastly, the contradiction between the findings of researchers might provide different insights into the literature review of this research study.

In Cambodia, the economy condition especially in the banking as well as the financial industry has grown rapidly until now after Cambodia had gained the independence in the year of 1953. Makara (2012) reported that the members in the National Bank of Cambodia agreed to the fact that the country's banking and financial industry had boosted up rapidly and significantly. Besides, the reporter reported that the development in the banking and financial industry in terms of laws and regulations in fact will attract more potential investors especially foreign investors to invest in the local banks. The President and CEO of the ACLEDA bank said that such circumstance can enhance the economy of Cambodia due to the high cash flow from the investment activities. This in turn will increase in the employment rate as well as the income level for the upcoming generations.

On the 9th December 2016, Cambodian Government had introduced new investment policies to Vietnamese enterprises at the 7th Mekong Forum in Phnom Penh in

order to attract more potential foreign investors (Business in brief, 2016). The Cambodian Government had also made an announcement that they will not implement the restriction on the currency trading. In fact, it is an ideal opportunity or timing for foreign investors to make investments or establish businesses or partnerships in Cambodia. Such circumstance can urge the efficiency in the banking industry due to the greater amount of loans provided for those who wishes to establish business by the local banks. A bank will be considered as an efficient bank if the outputs in which includes loans is greater than the inputs.

In a sum, we replicate and modify prior knowledge in this area by Kauko (2009), and De Jonghe et al (2012), in which we employ Data Envelopment analysis (DEA) to retrieve bank efficiency data, and Reeb and Zhao (2013) method in retrieving board capital. We also follow previous established studies by controlling for the bank characteristics. The detail will be explained in Section 3. The objective of this research is to investigate the board capital effect on bank efficiency by controlling bank characteristics in our model. Further, we want to draw a contention about the knowledge transfer theory and human capital theory in the context of banking and finance.

This study's contribution is threefold. First, we add to the literature by extending the understanding about board capital and bank efficiency in a small-less opened market like Cambodia. Second, we document the empirical findings of board capital effect on bank efficiency of Cambodian banks. Third, we provide the baseline study for small country and less opened countries in the context of banking and finance area.

The rest of this study is outlined as follow: Next section reviews the theoretical concepts and literature about board capital and bank efficiency. Section 3 describes the data and methods employed in this research. Section 4 reports the empirical findings and discusses the results. Section 5 addresses the conclusion.

LITERATURE REVIEW AND HYPOTHESIS

DEVELOPMENT

Despite the abundance of literature on bank efficiency, there is little evidence on whether board capital is the efficiency factor, especially in the context of less opened country like Cambodia. Thus far, earlier studies of bank efficiency were mostly conducted for the developed countries, and later extended to emerging countries but not in the frontier markers such Cambodia. Moreover, the effect of board capital on bank efficiency is an emerging issue in this research area where it does not yielded any consistent consensus yet.

Knowledge Transfer Theory

Knowledge transfer theory is defined as a process of affecting the experience of one unit such as group, department or division by the others (Argote and Ingram, 2000; Argote and Fahrenkopf, 2016). It is a strategic process for an organization to survive in competition (Guthrie, 2001) and contribute to firm performance (Bontis and Mention, 2013). Since the business model of commercial banks is focusing more on the lending and borrowing of capital to or from all other industries, the core competiveness of banks is highly dependent on the capability of the management teams in managing the experience and knowledge. Hence, Argote and Ingram (2000) suggested that banks should not only emphasize in the aspect of labour force, financial assets or in other word tangible assets, but also enhance the ability and capability in the management of intellectual capital as well as knowledge transfer in order to prepare for the competitive advantage. Gooderham, Minbaeva and Pedersen (2011) emphasized that social governance mechanism promote knowledge transfer at the Multi-National Corporations. Further, Swift and Hwang (2013) shows that affective trust is important to share interpersonal knowledge. Coyte, Ricceri and Guthrie (2012) investigate the knowledge resources in Australia SMEs. Using in-depth case study in Australia SMEs, they found that formal and informals control have significant effect on management of knowledge. Thus, it is important use both mechanisms formal and informals control to enhance the

knowledge transfer. Other study by Shiue, Chang, Yang and Chen found that organizational commitment have important impact on knowledge transfer.

Prior to the research studies of Lin *et al.*, (2008), they found out that the accumulation of intellectual capital and knowledge creation is closely related. Since the elements in the banking industry are highly regulated, risky, volatile as well as market sensitive, the knowledge required in the banking operations is much more complex than other industries. As a result, the process of selecting or recruiting the management team will be a vital process and more attention should be paid. Based on the suggestion given by Argote and Ingram (2000), during the recruitment, the development of professional skills, nurturing of the creativity, accumulation of innovation and creative capabilities should be the main criterion. This is because with the availability of such criteria in the employees or the board of directors, the operations in the banking industry can be going on smoothly. Besides, the management team can actually transfer the related knowledge to those newly joined stuff during the training period in order to produce high quality management team in the banking industry. Thus, knowledge sharing have positive effect to increase firm effectiveness (Yang, 2010).

Human Capital Theory

From the past decades, the concept of human capital captured a picture of the labour power, earning potential or even the difference between the output and consumption per person, but today, the concept of human capital has changed (Wright et al, 2014). It is defined as the availability of the knowledge, skills, assets as well as the experiences that an individual has. There are several possible sources of human capital proposed by Becker (1962) such as innate ability, schooling, school quality and non-schooling investments, training and pre-labour market influence. Innate ability indicates that an individual has the skills or human capital in nature. Meanwhile, schooling, school quality and non-schooling investments describe the

difference in the environment of institutions that the individuals attended. Although they might have completed in the same years of schooling, they might not have the similar human capital.

Human capital theory in which developed by Becker (1962) stated that education will create valuable human capital. Human capital is very useful in the production process. The employees' productivities will be enhanced with the availability of human capital regardless of type of industry. According to research study of Kauko (2009), the researcher commented that this theory actually brings the correlation between the board's education and bank efficiency. Human capital have significant effect to help bank to achieve better performance (Meles, Porzio, Sampagnaro and Verdoliva, 2016) and to build value for the bank (Joshi, Cahill, Sidhu and Kansal, 2013).

Board Capital and Bank Efficiency

The operation of a firm or an organization will be much efficient if any or the majority members of board with high human capital as well as the social capital. Haynes and Hillman (2010) proposed that directors with both high human and social capital indeed will provide useful information or opinion to the management team during the decision making process. At the same time, there is a belief that the performance of a board member which with higher level of expertise and experience as well as richer in social networking will perform better than those who do not (Muttakin *et al.*, 2016).

According to the research study of De Jonghe, Disli and Schoors (2012), the education of the board members has positive relationship to the firm performance, and hence boosts up the efficiency of the firm's efficiency. Based on the research result, they concluded that a chairman or the CEO with university degree in business, finance or economics will perform better in creating value for the firm or the organization if compared with other subordinates with another degree or lower. Kauko (2009) proved that board members with university degree in the related field such as business administration or economics seems to have

better performance than their counterparts with a university degree of unrelated fields such as law, agriculture and so on. The researcher also proposed that the banks' operation will be more efficient if university graduates run the banks.

Güner, Malmendier and Tate (2008) and Aldamen, Duncan, Kelly, McNamara and Sagel (2012) found out that those directors who are financial experts will indeed affect the firms' or organisations' decision. At the same time, Christoffersen and Sarkissian (2009) proposed that those financial expert as well as experienced mutual funds managers will be considered as good stock pickers. Moreover, Lewis, Walls and Dowel (2014) provided evidence that CEO with MBA background have response to carbon disclosure project. From the research study of Jeremias and Gani (2014), the researcher suggested that the board capital in terms of directors' educational background, experiences and social network has a positive relationship with the firm performance and hence the firm efficiency. The results showed that mangers with high level of expertise as well as experience will perform better. At the same time, richer in the social networking can also enhance the firm's performance and eventually the firm's efficiency. Therefore, this research hypothesizes:

H1 : There is significant and positive relationship between director capital and bank efficiency

RESEARCH METHODS
Data
This research uses secondary data as the source of information. It is unobstrusive method in retrieving the board capital where we combine data from Bloomberg, Linkedin, and annual report. There are 36 Cambodian banks from 2011 to 2015 which were downloaded from National Bank of Cambodia (Cambodia central bank). Meanwhile, the financial information is retrieved solely from the annual report.

Tabel 1.
Cambodian banks from 2011 to 2015

No	Bank	No	Bank	No	Bank
1	Association of Cambodian Local Economic Development Agencies (ACLEDA)	13	Cambodian Commercial Bank (CCB)	25	MB Bank Plc, Phnom Penh Branch Cambodia (MB Bank)
2	Advanced Bank of Asia (ABA)	14	Cambodian Public Bank (Campu Bank)	26	Mega International Commercial Bank Co.Ltd, Phnom Penh Branch
3	AGRIBANK CAMPUCHIA BRANCH (AGRIBANK)	15	Cambodian Post Bank Plc (CP Bank)	27	Phillip Bank Plc (Formerly HwangDBS Commercial Bank)
4	Australia and New Zealand Royal Bank (Cambodia) Ltd (ANZ Royal Bank)	16	Canadia Bank Plc (CNB)	28	Phnom Penh Commercial Bank (PPCB)
5	Bangkok Bank Public Company Limited, Cambodia Branch (Bangkok Bank)	17	Cathay United Bank (Cambodia) Corporation Ltd (Formerly SBC Bank)	29	RHB Indochina Bank Limited (RHB)
6	Bank of China Limited Phnom Penh Branch (BOC)	18	First Commercial Bank Phnom Penh Branch (FCB)	30	Saigon Thuong Tin Commercial Joint Stock Bank (Sacom Bank)
7	Bank of India Phnom Penh Branch (BOI)	19	Foreign Trade Bank of Cambodia (FTB)	31	Sathapana Bank Plc (Maruhan Japan Group)
8	Bank for Investment and Development of Cambodia Plc (BIDC)	20	Hong Leong Bank (Cambodia) Plc (HLBCAM)	32	SHB Plc, Phnom Penh Branch Cambodia
9	Booyoung Khmer Bank (BKB)	21	ICBC Bank Limited Phnom Penh Branch (ICBC)	33	Shinhan Khmer Bank (SKB)
10	Cambodia Asia Bank Ltd (CAB)	22	Kookmin Bank Cambodia Plc (KBC)	34	Taiwan Cooperative Bank, Phnom Penh Branch
11	CIMB Bank Plc (CIMB)	23	Krung Thai Bank Plc, Phnom Penh Branch (KTB)	35	Union Commercial Bank Plc (UCB)
12	Cambodia Mekong Bank Public Ltd (CMB)	24	Maybank Phnom Penh Branch (Maybank)	36	Vattanac Bank Ltd (VBL)

We use DEA-P as the program to retrieve the efficiency data.

Estimation Model

This research divides its model into two stage estimation models. First, we provide the baseline model whereby it estimates the bank efficiency according to prior knowledge. The baseline model is constructed by the control variables such as such as non-performing loan (NPL), net interest margin (NIM), loan to deposit ratio (LDR), bank size and bank age. Second, it will be our full model whereby the board capital is added into the baseline model.

Baseline Model

We construct our baseline model from previous studies in banking and finance research. Prior research such as Girardone et al (2004), Kauko (2009), De Jonghe et al (2012), Goddard et al (2014), and Matousek and Tzeremes (2016), addresses several factor of bank efficiency such as non-performing loan (NPL), net interest margin (NIM), loan to deposit ratio (LDR), size of bank and age of bank. Therefore, those factors are the control variables in this research, and it is our regressors for our baseline model. Hence, we formulate that the function of bank efficiency is NPL, NIM, LDR, Bank's Size, and Bank's Age.

Bank efficiency = f (Non-Performing Loan, Net Interest Margin, Loan to Deposit Ratio, Board Size and Board Age)

To assess the above model empirically, all the samples will be pooled and estimated into the following regression model:

$$BE_{i,t} = \beta_0 + \beta_1 NPL_{i,t} + \beta_2 NIM_{i,t} + \beta_3 LDR_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 AGE_{i,t} + \varepsilon_{i,t}$$

where:

BE = bank efficiency
NPL = non-performing loan
NIM = net interest margin
LDR = loan to deposit ratio
SIZE = bank size
AGE = bank age
β_0 = constant
β_1, β_2, β_3, β_4, β_5 = parameters to be estimated
t = time dimension of the data (t = 1 in year 2011)

ε = error term

Full Model

We introduce the board capital in our baseline model to construct the full model. We follow Reeb and Zhao (2013) method in building the board capital dimension. According to Reeb and Zhao (2013), the director capital is considered as the human capital such as education, networking as well as experience that owned by the board members. There are four stages in constructing this board capital. Note that board capital is the average of the sum of education capital, networking capital, and experience capital.

The first stage is that retrieving the information for each dimension in each year (2011 to 2015). Education capital is retrieved from aggregate educational status of board member. As can be seen from the work of Reeb and Zhao (2013), they used a number from 1 to 6 to represent each and every level of education of the board. Hence, the higher the education level, the higher the number represent will be shown in the table 2.

Meanwhile, networking capital is measured from aggregate of several items such as: (a) Board size; (b) number of board member was non-executive board; (c) was in non-profit organization board; (d) was in government; and (e) are as board in other companies. Lastly, the experience capital is measure from aggregate of several items such as: (a) number of board member was a partner in law firm or working in banking and finance industry, consulting firm, or university; (b) has professional certification (CPA, CFA, FRM, CMA); (c) was top manage-

Table 2.
Measurement of director's educational level

Level of education	Num. repre- sents
Below bachelor's degree	1
Bachelor's degree	2
MBA degree	3
Master's degree	4
Law degree or medical degree	5
PhD degree	6

ment (vice president, directors, chairman, etc); (d) number of firms before current bank; and (e) international or national honors and awards.

Our second stage is to rank each items in each dimension by quantile in ascending order for each year. We reorder the rank of the firms following their item score. The first 20th percentile will be given 1, and the last 20th percentile will be given 5. For example, Bank A with the largest board size was given 5 (as it is categorized in the last 20th percentile), meanwhile, Bank B with the smallest board size was given 1 (as it is categorized the first 20th percentile).

The third stage is to sum up the total items score for the three dimensions, and take the average. Actually this method is similar like the 5-likert scale method in survey design study. Yet, in the last stage, we standardize the average by against it the standard deviation. Like Reeb and Zhao (2013), the second order from those three dimensions is the data used as the board capital. Then, we add that board capital in the baseline model. The estimation model is as follow:

$$BE_{i,t} = \beta_0 + \beta_1 BC_{i,t} + \beta_2 NPL_{i,t} + \beta_3 NIM_{i,t} + \beta_4 LDR_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 AGE_{i,t} + \varepsilon_{i,t}$$

where:
BC is the board capital

Measuring Bank Efficiency

Data Envelopment Analysis (DEA) approach is used to measure the bank efficiency. It decomposes the error term into the expected value of inefficiency as well as the random variation. The technical efficiency can be calculated by using a general formula which will be shown as below:

$$\text{Technical efficiency} = \frac{\Sigma \text{ weighted outputs}}{\Sigma \text{ weighted iuputs}}$$

In the methodology of DEA approach, constant returns to scale (CRS) approach will be used to measure the bank efficiency. The CRS assumption will only justifiable when all the Decision Making Units (DMU) are operating at an optimal scale (Sufian,

2007). The ratio form of the efficiency formula will be shown as :
Such that :
Where:

$$\text{Max } \Theta = \frac{\Sigma^s_{r-1} Ury_{rj}}{\Sigma^m_{i-1} Vix_{ij}}$$

θ = efficiency score under analysis

$$\frac{\Sigma^s_{r-1} Ury_{rj}}{\Sigma^m_{i-1} Vix_{ij}} \leq 1 j = 1, \ldots \ldots n$$

$Ut \geq 0 \quad r = 1,2, \ldots \ldots s$
$Vt \geq 0 \quad i = 1,2 \ldots \ldots m$

n = number of unit under analysis
r = number of outputs
j = number of inputs

In this research study, two inputs and two outputs will be used as proxy for the measurement of bank efficiency. Total expenses and total assets will be used as the inputs whereas total loans and return on assets (ROA) will be used as the outputs of banks. The formulae of both inputs and output will be shown in Table 3.

ANALYSIS AND DISCUSSION
Descriptive Statistics

As can be seen from Table 4, the bank efficiency has ranges from minimum of zero to maximum of 1.0000, with an average of 0.0882. This implies that on average, out of the sample size of 34 Cambodian commercial banks, there is 8.82% of commercial banks are efficient. For the main independ-

Table 3.
Formulae of inputs and outputs

Variable	In./ Out.	Formula
Total exp.	Input	Total expenses = interest expenses + non-interest expenses
Total assets	Input	Total assets = current assets + long-term assets
Total loans	Output	Total loans = short-term loans + long-term loans
ROA	Output	ROA = net income : total assets

ent variable, director capital in which measured by both the human capital and also social capital such as educational background, working experience as well as social networking has an average value of 2.3141 and ranges from 1 to a maximum value of 5.3000.

For the non-performing loan which is also known as problematic loan has a median of 0.0458 and an average value of 0.1965. This indicates that from the sample size of 34 commercial banks, the banks have an average of 0.1965 non-performing loan. The non-performing loan is also made up of the minimum value of zero and maximum value of 2.5950. According to data provided in The World Bank (2016), the minimum value of Cambodian banks non-performing loan is 1.5927 whereas the maximum value is 2.3027. With the maximum value of 2.5950, the sample size of 34 commercial banks is said to have higher problematic loan if compared to the maximum value obtained from The World Bank.

Net interest margin and loan to deposit ratio have a similar minimum value of zero but different in the maximum value. The maximum value of net interest margin is 1.205 whereas 16.129 for loan to deposit ratio. Net interest margin has an average value of 0.318 and the average value for loan to deposit ratio is 1.870.

In this research study, the size of a bank is determined by using the logarithm of total assets of the particular bank. It has the range from the minimum value of zero to the maximum value of 1.311. The average bank's size in this sample shows the value of 1.135. Out of the 34 banks, the maximum value of the total assets is 492,391.7901 Cambodian Riel while the average total assets states a value of 162,195.3576 Cambodian Riel.

Bank's age ranges from the minimum of zero to the maximum of 1.380211. The bank's age can be determined by taking the logarithm of difference between current year of the bank operated and the year of the bank established. The result shows that

Table 4.
Descriptive statistic

	Mean	Median	Sta. Dev.	Min.	Max.
Bank efficiency	0.0882	0.0000	0.2845	0.0000	1.0000
Director Capital	2.3141	1.9500	1.3290	1.0000	5.3000
Non-performing Loan	0.1965	0.0458	0.3259	0.0000	2.5950
Net Interest Margin	0.3181	0.3030	0.1918	0.0000	1.2047
Loan to Deposit Ratio	1.8705	1.1664	2.1098	0.0000	16.129
Bank's Size	1.1354	1.1823	0.2579	0.0000	1.3107
Total Assets	162,195.3576	136,390.1791	96,201.887	0.0000	492,391.7901
Bank's Age	0.7715	0.7781	0.4275	0.0000	1.3802
Real Age	8.8706	5.5000	7.5428	0.0000	24.000
N	170				
N	34				
T	5				

Table 5.
Correlation Matrix

	BE	DC	NPL	NIM	LDR	SIZE	AGE
BE	1.0000						
DC	0.1000	1.0000					
	(0.1945)						
NPL	-0.0268	0.0953	1.0000				
	(0.7291)	(0.2166)					
NIM	0.4227	0.4361	0.1844	1.0000			
	(0.0000)	(0.0000)	(0.0161)				
LDR	0.3746	-0.2023	-0.0148	0.1134	1.0000		
	(0.0000)	(0.0082)	(0.8482)	(0.1408)			
SIZE	0.0355	0.2893	0.1235	0.3824	0.1372	1.0000	
	(0.6454)	(0.0001)	(0.1085)	(0.0000)	(0.0745)		
AGE	-0.0287	0.2474	0.2236	0.2702	-0.2403	0.4102	1.0000
	(0.7100)	(0.0011)	(0.0034)	(0.0004)	(0.0016)	(0.0000)	

the average age of the sample size of 34 commercial banks is 0.772. The real age shows a maximum value of 24 and with an average value of 8.8706. With the maximum value of 24, it means out of the sample size of 34 commercial banks, the oldest bank has operated for 24 years. In this research study, there are 9 banks can be considered as old banks due to the operations for more than 15 years whereas 20 banks can be considered as young bank as the establishment of the banks is less than 10 years.

Table 5 shows the correlation matrix between the independent variables and dependent variable and also the correlation matrix between the independent variables and other independent variables. The correlation between director capital (DC) and bank efficiency (BE) is positive and statistically significant with the correlation coefficient of 0.1000. Hence, the positive correlation between director capital and bank efficiency indicates that these two variables increase or decrease in parallel.

Based on the research study of Jeremias and Gani (2014), the researchers proposed that directors with high level of expertise as well as experiences can perform better and hence enhance the bank's efficiency. This is because directors with high educational background, working experience and social networking are believed to have more competency and reliability in the management of the bank's operation, cost allocation as well as the decision making process in which will boost up the efficiency of the bank eventually.

The correction between non-performing loan (NPL) and bank efficiency is negative and with the correlation coefficient of -0.0268. The negative correlation between the NPL and bank efficiency indicates these two variables increase or decrease in the opposite direction and can be considered to have a weak negative correlation due to the correlation coefficient almost near to the value of zero.

For the case of net interest margin (NIM), loan to deposit loan (LDR) and bank's size (SIZE), these three variables show the positive correlations with the bank efficiency with the correlation coeffi-

cients of 0.4227, 0.3746 and 0.0355. The positive correlation shows that LDR, NIM and SIZE increase or decrease parallel with bank efficiency.

In the case of bank's age (AGE), it shows a negative correlation with the bank efficiency and with the correlation coefficient of -0.0287. The negative correlation indicates both AGE and bank efficiency increase or decrease in the opposite direction. These two variables can be considered to have a weak negative correlation due to the correlation coefficient almost close to zero.

Empirical Findings
Baseline Model

Table 6 reports the baseline model results. It documents net interest margin shows a positive sign in which indicates that the net interest margin might induce the bank efficiency. The result is in line with the research study of Girardone et al (2004). The Loan to Deposit Ratio (LDR) also has positive contribution to bank efficiency implying the increase of LDR might induce the bank efficiency. On other hand, Bank size has negative contribution on bank efficiency with coefficient value of 0.2114. It can be concluded that there is an inverse relationship between the bank's size and bank efficiency.

Interestingly, there are two variables in our baseline model that has no effect on

Table 6.
Results for baseline model

Variables	Coeff.
Non-performing Loan (NPL)	-0.0787
	(0.0580)
Net Interest Margin (NIM)	0.6888***
	(0.1056)
Loan to Deposit Ratio (LDR)	0.0477***
	(0.0093)
Bank's Size (SIZE)	-0.2114**
	(0.0838)
Bank's Age (AGE)	0.0197
	(0.0510)
Constant	0.0201
	(0.0827)
R-squared	0.3237
F-Statistic	15.70***

Note: ** Indicates statistical significant at 5% level and *** at 1% level.

bank efficiency. First, it is the non-performing loan which does not have any effect on bank efficiency. Second, the bank's age has no significant effect on bank efficiency. It is in-line with Fan and Shaffer (2004). This concludes that only LDR, NIM, and bank size are the factor for bank efficiency in Cambodia.

Full Model

Table 7 reports the findings of our full model. Firstly, the control variables have similar conclusion with our baseline model. It shows that all control variables have significant effect on bank efficiency except NPL and bank's age. NIM has positive effect on bank efficiency with coefficient value of 0.8419 at 5% significance level. Similar with it, LDR also statistically contributes to bank efficiency with coefficient value of 0.0359. The relationship is significant at 5% level. Another control variable, bank's size, has statistically effect on bank efficiency at 1% level. The relationship is negative with coefficient value of 0.2346 indicating the bigger the bank, the less efficient it is.

Meanwhile for our main objective, Table 7 documents intriguing findings. It shows that board capital has statistically effect on bank efficiency at 5% level. The coefficient is 0.0944 implying board capital

Table 7.
Results for full model

Variables	Coefficient
Director Capital	0.0944** (0.0302)
Non-performing Loan (NPL)	-0.1110 (0.0738)
Net Interest Margin (NIM)	0.8419** (0.3960)
Loan to Deposit Ratio (LDR)	0.0359*** (0.0132)
Bank's Size (SIZE)	-0.2346*** (0.0781)
Bank's Age (AGE)	0.1597 (0.1272)
Constant	0.3001 (0.1222)
R-squared	0.3246
F-Statistic	13.06***

Note: ** Indicates statistical significant at 5% level and *** at 1% level.

contributes positively on bank efficiency. The increase of board capital leads to Cambodian bank to be more efficient. The result obtained from this research study is similar to the research study which had been done by Kauko (2009).

Discussion

Banking industry is one of vital vein for Cambodia economy. It plays an important role in the financial resources allocation of the economy through intermediation as well as the maturity transformation. In order to ensure the soundness of the banking system, board capital has played an important role in enhancing the banks performance and hence the efficiency of the banks.

From the panel regression results in which stated in Table 7, board capital shows a significant and positive relationship with the bank efficiency. The result obtained in this research study is consistent with the Knowledge Transfer Theory. According to the suggestion given by Guthrie (2001), knowledge creation has played an important role in a successful institution other than gaining profit with tangible assets. Since the business model of banks is focusing more on the lending and borrowing capitals, the core competitiveness of the banks is highly dependent on the capability of the management teams in managing the experience and knowledge. Hence, the director capital including knowledge transfer will be emphasized by the banks in order to prepare for the competitive advantages as well as to enhance the efficiency of the banks (Argote& Ingram, 2000).

Besides, the significant and positive relationship between board capital and bank efficiency is also consistent with the Human Capital Theory. The availability of the knowledge, skills as well as the experiences of an individual will be taken into consideration. Becker (1962) proposed that education will create valuable human capital as it is useful in the production process. A study of Dalziel, Gentry and Bowerman (2011) find that the importance of directors background such as education on the decision to R&D spending and improve the efficiency of the firm. Further, Berger, Kick

and Schaek (2014) provide evidence that the executive with PhD holding have decrease portfolio risk for the company. In fact, human capital formation is relatively important in the financial sector development as well as the stability especially in the efficiency of the banks (Amenta, 2007).

According to the research study which had been done by Abbott *et al.* (2003), they found out that directors with higher educational level or with educational background of finance or accounting will contribute to the greater efficiency level of the institutions. This is because the availability of the knowledge related to finance or accounting enable directors of the institutions to analyze the performance of the institutions by looking at the financial data of the institutions including banks. Immediate actions or measures can be taken in order to maintain or enhance the efficiency of the banks if the directors found out the inputs of the banks such as total expenses and total assets are greater than the outputs such as total loans and return on assets of the banks. In fact, a particular bank will be considered as inefficient if the inputs are greater than the output. Hence, directors with higher educational level or related knowledge bring a positive impact to the efficiency of the banks.

Furthermore, the research study in the past two decades had shown an evidence of the significant and positive relationship between board capital and bank efficiency. Spong *et al.* (1995) found an evidence to prove that director's decision is closely related to the bank's efficiency as well as the performance. This is because directors with higher education level as well as richer in working experience are believed to be more competence and reliable in the management of the bank's operation, cost allocation and also the process of decision making which in return will enhance the efficiency of the bank.

Recently, there is a research study from Jeremias and Gani (2014). They found a positive relationship between the board capital in terms of directors' educational level, working experiences and social networking with the efficiency. Directors with high level of expertise and experiences are

believed to perform better. This is because they might be more competence in solving the inefficiency problem of the banks with the related knowledge as well as the experiences that they have been exposed to. At the same time, richer in social networking can also boost up the bank's efficiency as problems can be easily solved by a branch of people. Besides, richer in social networking bring conveniences as well as advantages in the process of decision making or cost allocation. As a result, the efficiency of a bank can be improved.

CONCLUSION

This study addresses the phenomenon of board capital effect engaged by Cambodian banks. Our research is mainly motivated by the lack of attention given to this research area and frontier markets Like Cambodia. This research lays the foundation for any further research in this topic on frontier markets with more focus on country-specific characteristics dimensions.

We adopted and adapted two seminal research developed by Girardone et al (2004) and Reeb and Zhao (2013) with slight modification in measures. Our findings show that board capital effect does matter for bank efficiency, especially in Cambodian banking industry. This result brings implication about certain empirical evidence found in more advanced countries may align with frontier or emerging countries within the context board capital – bank efficiency nexus. In addition, our study is that we use panel data approach in testing less-opened countries, and retrieve rich data for that country.

Our study exploits knowledge transfer theory and human capital theory showing that knowledge as well as experience has played an important role in the management of the bank's operation as the core business of a commercial bank is focusing to the activities of lending and borrowing of capital (Guthrie, 2001). As a result, the core competitiveness of the bank is highly dependent on the capability of the management teams in managing the experience and knowledge. Hence, with the significant and positive relationship between director capital and bank efficiency in Cam-

bodia, the Knowledge Transfer Theory is said to be closely related to the Cambodian bank efficiency. Furthermore, with the significant and positive relationship between board capital and bank efficiency in Cambodia, the Human Capital Theory is said to be closely related to the Cambodian bank efficiency.

This research can provide a guideline for policy maker for the purpose of policy implementation based on the findings. For example, the National bank of Cambodia can set a policy or a regulation in requiring the board of directors of the bank must achieve the minimum requirement based on the human capital and also the social capital before appointing as the board of director.

Even though so, all our findings need to be validated by further research on other frontier countries such Argentina, Bangladesh, Jordan, Philippines, Sri Lanka, Ukraine or Vietnam. The focus of this study has been to examine board capital effect on bank efficiency with controlling the bank characteristics. Based on some of common institutional settings for frontier markets, a few extensions can be further built upon this analysis. First, an examination of the possible value difference of board nationality in board capital dimension may give interesting insight. Secondly, some internal corporate governance attributes such as compensation, transaction cost, and controlling shareholder can be another interesting extension of study for this analysis.

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