A DYNAMIC LONGITUDINAL MODELLING APPROACH FOR THE RELATIONSHIP BETWEEN THE HUMAN CAPITAL OF BOARD DIRECTORS AND FIRM FINANCIAL PERFORMANCE

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ABSTRACT

This paper investigates the effect the human capital of directors on the financial performance of Vietnamese listed companies. The dynamic system generalized method of moments (system GMM) estimator is used to examine a panel dataset consisting of 315 observations over a four-year period from 2008 to 2011. In line with the resource dependence theory, we report that the human capital of directors appears to have a positive influence upon the firm financial performance. To the best of our knowledge, this study is the pioneering work on the topic of human capital of directors and firm performance for the publicly listed companies in Vietnam. This study, by applying a dynamic longitudinal modelling approach, extends the nascent literature on board human capital as well as more generally to the corporate governance literature by providing robust empirical evidence showing that the general human capital of board directors may add value to firms. Our finding, therefore, supports the efforts made by the Vietnamese policy makers in setting up qualification standards as well as skill diversity for the boards.

Keywords: Corporate Governance, Human Capital, Financial Performance, System GMM, Vietnam.

1. INTRODUCTION

Dominant theoretical perspectives on corporate governance research including agency theory (Jensen & Meckling, 1976) and resource dependence theory (Pfeffer, 1973) acknowledge that board structures and effectiveness have significant influences on firm performance. It is the fact that board of directors is one of the vital determinant of the internal corporate governance mechanisms (Fama & Jensen, 1983) and its relationship to financial performance has attracted many scholars for a long time (Lynall, Golden, & Hillman, 2003).

Serving as members of boards, directors bring human capital to their companies. Certo (2003) describes that directors provide the companies with their human capital in the form of education, or their prior work experience. The human capital improves directors' ability to determine and take advantage of business opportunities (Unger, Rauch, Frese, & Rosenbusch, 2011), or monitor managerial behaviours (Victoria, 2006). This, in turn, may have a significant effect on firm outcome that is supported by empirical studies on governance–performance association.

In general, empirical evidence on the relationship between human capital of board directors and firm financial performance confirms that there is a positive relationship between human capital and firms' performance in various research contexts such as industry, country, and age of the business. However, the magnitude and the strength of the relationship depend on the conceptualization of human capital, the choice of performance indicators, the data, and the analysis methods used (Crook, Todd, Combs, Woehr, & Ketchen Jr, 2011; Unger et al., 2011).

This critiques show that there are gaps in the literature and render the need for refinement in subsequent research. This study extends the existing literature by examining the relationship between board's human capital and firms' performance in the context of a transitional economy, Vietnam.

Moreover, upon reviewing previous studies, we find that there exists one commonality among these previous studies: the variable used as the proxy for the human capital of directors is assumed to be exogenously determined. We argue that this assumption is impractical and, to the extent that this is the case, the results obtained from the OLS and/or GLS estimators are biased and inconsistent.

Our study differs from prior research in that we argue that the human capital variables may be endogenously determined. Given that the members of boards, especially outside directors, often serve in several boards of different companies, it is argued that the human capital value of a director is largely influenced by his/her performance in the role of an internal member in other organizations (Fama & Jensen, 1983). Therefore, it is natural that highly qualified directors have incentives to retain their directorships with success companies and tend to avoid taking part in the boards of poorly performing companies which could destroy their reputations (Valenti, Luce, & Mayfield, 2011). In this situation, the likelihood of a highly qualified individual to be a director of a firm should be a function of firm past performance, which is considered as dynamic endogeneity. Moreover, because a firms' current financial performance is highly affected by its past performance (Khanna, Jones, & Boivie, 2014), empirical models aim to seek for determinants of firm performance should include prior performance as one of explanatory variables (Vu, Tran, Nguyen, & Lim, 2016; Wintoki, Linck, & Netter, 2012). In other words, the empirical model specification should be examined in a dynamic framework to control for the problem of auto-regression (Nguyen, Locke, & Reddy, 2014; Wintoki et al., 2012).

Taking into account the potential endogeneity of the human capital variables, this study aims to assess the influence of the human capital of directors on firm performance. In Vietnam, this research theme has not received much attention from scholars and remains to be an unexplored area. By using the dynamic system GMM approach, our study can better control for the endogenous nature of human capital variable as well as other control variables. We find that the financial performance of firms tends to be positively influenced by the human capital of their board of directors. This finding is robust even when alternative proxies for firm financial performance are employed.

The rest of this paper is structured as follows. Section 2 provides a brief literature review from which the main research hypothesis developed. This is followed by Section 3 introducing the estimation method, together with a description of data, data sources, and variable definitions. Empirical results and discussion are presented in Section 4. The final section concludes the paper and indicates its limitations.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Human capital theory was originally developed to estimate employees' income distribution from their investments in human capital (Becker, 1962). In general, human capital can be thought of as knowledge, experience, and skills (Harris & Helfat, 1997). Because these concepts are largely unobservable, in practice, researchers have developed a wide range of variables to proxy for human capital, such as, formal education, training, employment experience, start-up experience, owner experience, parent's background, skills, knowledge, and others (Unger et al., 2011). Consistent with previous literature, we use education as a proxy for human capital in this study.

According to Becker (1962), human capital was defined as the resources embedded within people. It is accumulated through time as the result of human-specific investments of individuals and can be used in subsequent situations (Bantel & Jackson, 1989; Finkelstein & Hambrick, 1996; Huselid, 1995). Because human capital is peculiar to the individual who owns it, it cannot be imitated by the others and, thus, is a source that creates competitiveness and brings back economic rent to its owners.

In finance, resource dependence theory, first developed by Pfeffer (1973), implies that a firm is an open social entity closely connecting with its surrounding environment, and that the board of directors plays a crucial role in linking between the firm and social resources such as human, information, or capital resources (Boyd, 1990; Pfeffer, 1973). Specifically, the functionality of the board is not only monitoring managerial behaviours as suggested by agency theory, but also providing essential resources that need to enhance firm performance and/or ensuring those resources via connections with the external environment (Hillman, Cannella, & Paetzold, 2000). In other words, apart from monitoring function, the board also serves as a resource provider. Hillman and Dalziel (2003) refer to the ability of the boards to bring essential resources to firms as ‘board capital’ in which the human capital of directors is one of the most important components.

There is a growing amount of empirical evidence supporting the positive impact of board human capital on firms’ performance. It is well established in the literature on young and small firms that there is a significantly positive relationship between human capital variables and success indicators (such as growth or profitability). These type of firms is characterised by severe information asymmetry. Thus, the characteristics of the board convey very useful

information on the competency of the board and, hence, the prospect of the firms. A meta-analytical review on entrepreneurship conducted by Unger et al. (2011) shows that there is a significantly but small positive correlation between human capital and success. In support, another review of van der Sluis, van Praag, and Vijverberg (2008) also concludes that the effect of human capital (education) on performance is significantly positive. Certo (2003) suggests that the organizational legitimacy and, thus, the market value of a firm are affected by the characteristics of board members. Similarly, it is argued that firm's credibility and performance can be improved by the prestige of its board members (Hillman & Dalziel, 2003). In addition, directors with higher qualifications may send positive signals to investors of the value of the companies (Valenti et al., 2011). Shrader and Siegel (2007) examine the case of technology-based new ventures and find that the fit between strategy and team's experience is the key to long term performance of high-tech entrepreneurial ventures.

Research into medium size and small size companies also show the relationship between human capital and corporate performance Abor and Biekpe (2007) research into SMEs in Ghana and find that board human capital positively affect firms' performance. Storey (2002) also finds the same evidence with medium companies in the UK.

On the other hand, research with quoted establish firms, which do not suffer from such high level of information asymmetry, shows that the markets respond more critically to the news about changes in the board (Yermack, 2006). In particular, the market only responds positively to the change in directorship when the director is deemed to own knowledge or skills that suit the needs of the firm, not to the human capital in general as in the case of young and small firms.

Empirical evidence confirms that the markets react critically to the characteristics of individual directors. Research by Rosenstein and Wyatt (1990) and DeFond, Hann, and Hu (2005) also indicate that market reaction also depend on the specific expertise of the newly appointed directors. The market tends to react positively and significantly only to newly appointed directors with expertise in finance. Fich and Shivdasani (2005) show near zero and insignificant market reaction to news about outside director appointment. But for the subsample of new outside directors currently as CEO of other companies, market reaction is positive and significant, indicating that investors welcome outside directors with practical skills and knowledge from other companies.

The evidence shows that the markets also evaluate the ability to contribute of the new director to the board. Basing on insights from research on the individual's cognitive limitations, Khanna et al. (2014) argue that the benefits of board's human capital also depend on the information processing loads by the members. Empirical evidence from Rosenstein and Wyatt (1990) use firm size as a proxy for the amount and the level of complexity of the workload of the firm. The authors find that the markets' reaction to directors' appointment news of smaller firms is about three time larger than of larger firms, indicating that the markets assume that the director can contribute more effectively to the firm. Using a different measure of workloads, Fich and Shivdasani (2006) show that stock market reacts negatively and significant to the new of appointing a new director who is classified as "busy", perhaps for the reason that this person cannot contribute much to the board. Likewise, the resignation of a "busy" director is considered as a good news by the market. These results are not significant for the case of "non-busy" directors. Using another indicator, Shivadasani and Yermack (1999) show that the market only react positively to the news of appointing a new outside director if the new director is truly independent (i.e. nominated by the board), and thus, help improve the independence of the board in general.

Recent research also looks at different proxies for board human capital. For example, beside using education, experience, or tenure to capture human capital of outside directors, Francis, Hasan, and Wu (2015) also use professorship at universities as an additional proxy for board human capital. Their research points out that the presence of academic professors in the board is associated with greater acquisition performance, a higher number of patents and citations, higher stock price informativeness, lower discretionary accruals, lower chief executive officer (CEO) compensation, and higher CEO forced turnover-performance sensitivity and explains these as the result of their advising capability.

From the above literature review, there are some caveats to be made. In general, empirical evidence on the relationship between human capital of board directors and firm financial performance confirms that there is a positive relationship between human capital and firms' performance in various research contexts such as industry, country, and age of the business (Crook et al., 2011). However, the magnitude and the strength of the relationship depend on the conceptualization of human capital, the choice of performance indicators, the data, and the analysis methods used (Crook et al., 2011; Unger et al., 2011). For example, Crook et al. (2011) indicate that that the human capital–performance relationship would be stronger

among specific measures of human capital than general measures and that the positive relationship between human capital and performance would be stronger for studies relying on operational performance measures than for studies relying on global performance measures. Crook et al. (2011) also show that the use of longitudinal and cross-sectional data produces different results, though not significant. For example, applying ordinary least square (OLS) estimator (and generalised least square [GLS] estimator for robust checks) for European companies, Victoria (2006) suggested that the presence of highly qualified directors in the boardrooms does not have any effect on firm profitability. Meanwhile, Ujunwa (2012), who also applied the similar econometric approaches for Nigerian market, reported that directors with higher levels of education have a positive effect on firm outcome.

We argue that the results obtained from the OLS and/or GLS estimators are biased and inconsistent as the variable used as the proxy for the human capital of directors should be assumed to be exogenously determined. As above-mentioned, given that the members of boards, especially outside directors, often serve in several boards of different companies, it is argued that the human capital value of a director is largely influenced by his/her performance in the role of an internal member in other organizations (Fama & Jensen, 1983). Therefore, it is natural that highly qualified directors have incentives to retain their directorships with success companies and tend to avoid taking part in the boards of poorly performing companies which could destroy their reputations (Valenti et al., 2011). In this situation, the likelihood of a highly qualified individual to be a director of a firm should be a function of firm past performance, which is considered as dynamic endogeneity.

These critiques show that there are gaps in the literature and render the need for refinement in subsequent research. This study extends the existing literature in at least two ways: (i) we examine the relationship between board's human capital and firms' performance in the context of a transitional economy, Vietnam; and (ii) we control for the endogeneity of this relationship. Based on the perspective of resource dependence theory and previous empirical evidence, we propose the main hypothesis in this study as follows:

> **Hypothesis**: There is a statistically significantly positive relationship between the human capital of board directors and financial performance of the Vietnamese publicly listed companies.

3. DATA AND METHOD

3.1. Sample and Data Sources

Sample and Sample Selection

Under the control of the State Security Commission of Vietnam, there are two regulatory bodies for Vietnamese publicly listed companies, namely Ho-Chi-Minh Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX). We collect data of the companies listed in the two markets for a four-year period from 2008 to 2011 based on the availability of firms' annual reports and corresponding financial data. In line with prior studies, we exclude financial firms and banks from the sample since they are subject to strict regulations that may have different effects on their corporate governance structures. To mitigate the impact of potential outliers existing in Tobin's Q, ROA and ROE, all the financial performance variables are trimmed at the 1st and 99th percentile. As a result, our final sample consists of 315 firm-year observations which have relatively full information on the variables of interest. It is noteworthy that descriptive statistics and correlation matrix analyses are reported based on individual samples, in which the full available data of each variable will be utilised to maximise the attainable sample size. The common sample sizes employed to estimate equation (1) using alternative proxies for financial performance are reported in detail in Table 5 and Table 6.

Data Sources

Financial data of firms in the sample is obtained from *Thomson One Banker* (*Thomson Worldscope*). We hand-collect the corporate governance information (including the age of directors, the size of boards, and the human capital of directors) from firms' annual reports downloaded from *FPT-Ez-search Online Information Gateway* and *Vietstock*. The list of publicly listed companies classified according to the Industry Classification Benchmark–ICB is provided by *StoxPlus Financial Media Corporation*.

3.2. Variables

Dependent Variable

In this study, the dependent variable to be explained is firm financial performance. In line with previous studies (e.g., Ammann, Oesch, & Schmid, 2011; Coles, Lemmon, & Felix Meschke, 2012), Tobin's Q ratio is used as a market-based proxy for financial performance. Accordingly, Tobin's Q ratio is calculated as the sum of the market value of firm's stock and the book value of debt divided by the book value of total assets. Tobin's Q is transformed into the natural logarithmic form in order to alleviate the potential influences of outliers. In addition, two accounting-based measures of financial performance, namely Return on total assets (ROA) and Return on equity (ROE) are also used as alternative proxies to check the robustness of our findings.

Explanatory and Control Variables

The human capital of directors is our explanatory variable of interest. Audretsch and Lehmann (2006) suggest that obtaining an advanced academic degree, such as a Ph.D., should be considered to be a measure of the human capital of directors. Carpenter and Westphal (2001) also suggest that higher-level education may constitute an indicator of knowledge which is relevant to strategic decision making. Therefore, in line with prior corporate governance literature (see e.g., Ehikioya, 2009; Ujunwa, 2012; Victoria, 2006), we use the ratio of highly-qualified directors to total number of directors on the board as a proxy for directors' human capital (denoted as *educ*). A director is coded as a highly-qualified director if she or he obtains Master and/or Ph.D. qualifications. For uni-variate analysis, we establish a dummy variable that takes a value of one if there is at least one highly-qualified director on the board and zero otherwise.

Because the governance structure of a company is a set of interconnecting mechanisms which potentially complement and/or substitute for each other (Schultz, Tan, & Walsh, 2010), we include several control variables when modelling the relationship between the human capital of directors and firm performance. Specifically, following prior studies, average age of directors, board size, firm size, firm age, leverage, the growth rate of total assets, and the ratio of capital expenditures to total assets are employed as independent variables in order to control for other board and firm characteristics that may have influences upon financial performance. Industry dummies and year dummies are also treated as control variables to account for time-effects and industry-specific characteristics. Furthermore, in dynamic system GMM models, the one year lagged dependent variable is used as an explanatory

variable to control for the dynamic nature of the governance–performance relation suggested by Wintoki et al. (2012), and others. Table 1 presents detailed definitions and abbreviations of the variables used in this study.

[Insert Table 1 about here]

3.3. Method

As above-mentioned, because a firms' current financial performance is highly affected by its past performance (Khanna et al., 2014), empirical models aim to seek for determinants of firm performance should include prior performance as one of explanatory variables (Vu et al., 2016; Wintoki et al., 2012). In other words, the empirical model specification using firm performance as a dependent variable should be examined in a dynamic framework to control for the problem of auto-regression (Nguyen et al., 2014; Wintoki et al., 2012).

As documented by Wooldridge (2009), using lagged dependent variable(s) as one of explanatory variables helps to control for unobserved historical factors which have potential influences on current firm performance, thus reducing omitted variable bias. Besides, even if the estimated coefficient(s) on lagged dependent variable(s) are not of direct interest of the empiricists, "allowing for dynamics in the underlying process may be crucial for recovering consistent estimates of other parameters" (Bond, 2002, p. 142).

Therefore, in this paper, we use the dynamic modelling approach to investigate the relationship between firm financial performance (measured by Tobin's Q, ROA, and ROE) and human capital of directors (measured by *educ*), controlling for other firm-specific and industry-specific characteristics. Following previous studies on firm performance (e.g., Adams & Ferreira, 2009; Dezsö & Ross, 2012; Nguyen et al., 2014; Nguyen, Locke, & Reddy, 2015), we employ a first-order autoregressive [AR(1)] panel model specification, in which one-year lagged dependent variable is used as an explanatory variable. The general model specification is resented as the following equation (1).

$$Y_{it} = \alpha_0 + \alpha_1 Y_{i,t-1} + \sum_{k=1}^{8} \beta_k X_{k,it} + \vartheta_{it} \qquad (1)$$

With: $\vartheta_{it} = \mu_i + \omega_t + \varepsilon_{it}$

Where: Y_{it} is the financial performance of firm i in year t; α_1 is the estimated coefficient on one-year lagged dependent variable; β_k (k = 1, 8) are unknown estimated coefficients on firm-level variables; X is a vector of firm-level explanatory variables used in the model, including *educ; dirage; lnbsize; tagrow; lncapex; lnfage; fsize;* and *lev*. We also control for potential influences arising from differences across industries through the use of dummy variables for industry classification. The definitions of these variables are presented in Table 1; μ_i represents time-invariant unobserved firm characteristics; ω_t denotes time-specific effects which are time-variant and common to all firms. These time-specific effects are captured by year dummy variables; ε_{it} is the classical error term.

As documented by Flannery and Hankins (2013); Nickell (1981); and Wintoki et al. (2012), among others, the pooled OLS (OLS) and the OLS with fixed-effects (FE) methods will provide inconsistent estimations when the AR(1) structure presents in the equation (1). We follow Blundell and Bond (1998) and use the system generalised method of moments estimator (System GMM) to correct for this inconsistency. This estimation technique allows treating all the explanatory variables in equation (1) as endogenous variables (Roodman, 2009a). Following Wintoki et al. (2012), the two variables, namely firm age (*lnfage*) and *year dummies*, are considered to be exogenous variables.

4. EMPIRICAL RESULTS AND DISCUSSION

4.1. Descriptive Statistics

Table 2 summarises the descriptive statistics of the main variables used in this study. Both the mean (0.87) and median (.79) of Tobin's Q are smaller than one, thus suggesting that the market value of the listed companies over the sampling period, on average, is lower than their book value. On the average basis, this also indicates that the firms did not create value for their shareholders for the four-year period from 2008 to 2011. For the companies in the sample, the mean percentage of highly-qualified directors to total number of directors is about 22.58%. It is noteworthy that there is a wide variation in the percentage of directors with higher level of human capital across the sample firms. While the maximum percentage of highly qualified directors is 100%, the minimum one is 0%. On average, the age of directors is approximate 48, with the youngest of 38 and the oldest of 58 years old. The average number of directors on the boardrooms is about 5.86, which is alike to the report of

IFC (2011), and much lower than the average board size of other countries in the Asian region reported by The Korn/Ferry Institute (2012), such as China (11.6), Hong Kong (11.5), India (10.8), Malaysia (9), and Singapore (8.6). The board size of Vietnamese listed companies is in accordance with the requirement of the Code that the boards should have from three to eleven members. This is also consistent with Jensen (1993) who suggests that the size of boards should not be over eight members to ensure their effectiveness. It is evident that the listed companies in the sample are very young with the average period of time since the initial public offering is 3.35 years. Over the four-year period from 2008 to 2011, the total assets of firms in the sample increased, on average, 20.32% per year.

[Insert Table 2 about here]

Table 3 reports the pairwise correlation matrix for the key variables used in equation (3). We find that *educ* is statistically significantly positive correlated with *lnq* which supports our main research hypothesis. This implies that companies having more directors with a higher level of human capital tend to have higher firm value. The correlation coefficients between dependent variable and almost explanatory variables (including *educ*, *lnbsize*, *tagrow*, *lncapex*. *lnfage*, and *fsize*) are statistically significant at 5% level or above, thus suggesting that it may be necessary to include these independent variables in our model. A significantly negative correlation between *educ* and *dirage* may indicate that there is a reverse relationship between the age of directors and their ability to achieve high qualifications. In the similar vein, the significantly positive correlation coefficient between *educ* and *fsize* suggests that having highly qualified directors in the boardrooms increases along with the firm size which is consistent with the argument of Audretsch and Lehmann (2006). Remarkably, the correlation coefficient between *lnbsize* and *fsize* is .31 and statistically significant at 1% level. This may imply that larger firms tend to have larger board size. The highest correlation coefficient of the explanatory variables is .31which is well below the threshold of .80 suggested by Damodar (2004). This indicates that multi-collinearity is unlikely the serious issue in our dataset. In addition, as shown in the last column of Table 3, the values of variance inflation factors (VIFs) for all explanatory variables are also well below the threshold of 10. This confirms that there is no evidence of a serious multi-collinearity problem being present in the dataset.

[Insert Table 3 about here]

4.2. Preliminary evidence

Figure 1 presents the differences in the average values of Tobin's Q between companies with and without highly qualified directors on their boardrooms. It is likely that firms having directors with a higher level of human capital performed better than those without over four years from 2008 to 2011 as well as for the full sample. On the average basis, the biggest gap was shown in 2008 when the average Tobin's Q of firms with highly qualified directors was 52% higher than that of the counterparts. Across the full sample, the average Tobin's Q ratio of firms with highly qualified directors was 31% higher than that of those without. Overall, the graph suggests that there may be a positive relationship between the percentage of highly qualified directors (a proxy for the human capital of directors) and Tobin's Q (a proxy for financial performance). This finding is also consistent with the significantly positive correlation coefficient between the two variables as presented in Table 3.

[Insert Figure 1 about here]

In order to confirm whether the differences in the average Tobin's Q between companies with and without highly qualified directors are statistically significant, we conduct *t*-test for equal population means with unequal variances. The test results reported in Table 4 indicate that the null hypothesis of equal population means should be rejected in all of years as well as across the full sample. This leads us to conclude that the financial performance of companies having highly qualified board members is statistically significantly different from that of the counterparts. Based on the pooled sample's information, it appears that in year in which firms have highly qualified directors in their boards, they tend to have better financial performance as measured by Tobin's Q. This finding, therefore, supports our main research hypothesis that there is a statistically significantly positive relationship between the human capital of board directors and financial performance of Vietnamese publicly listed companies.

[Insert Table 4 about here]

4.3. Multiple Regression Analysis

The regression result in which Tobin's Q is employed as a proxy for financial performance is reported in the column 2 of Table 5. It is found that the variable *educ* is statistically positively correlated with Tobin's Q at 5% level of significance (β = .003, p =.011), thus supporting the

main hypothesis. The coefficient on the variable *educ* means that if the percentage of highly qualified directors in the boardrooms increases by one percentage-point, the predicted Tobin's Q will, on average, increase by approximately .30%, holding all other factors fixed. It is noteworthy that such a percentage change is economically meaningful given that the size of boards in Vietnamese listed companies ranges from three to eleven members. For instance, a change from a board having one highly qualified director out of eight members to a board having three highly qualified directors out of eight members leads to a 25 percentage-point change. Consequently, the predicted Tobin's Q will increase by approximately 25×.30% = 7.50%, or more exactly, by 100×[exp(.003×25) − 1] ≈7.79%. This result implies that companies having more highly qualified directors on their boardrooms tend to have higher market value. In other words, this finding may suggest that the market positively react to the presence of highly qualified directors on the boards. Our result supports the argument of Yermack (2006) that investors realise the promise of individual directors and respond tangibly to changes in board membership that ultimately leads to the fluctuation of share prices. Indeed, Yermack (2006) observes that firm value usually increase or decrease by 1% or more based on the qualifications of a new board member.

[Insert Table 5 about here]

Interestingly, neither the size of boards nor the age of directors is statistically significantly correlated with firm value. This finding is consistent with Pham, Suchard, and Zein (2011); Schultz et al. (2010) and Wintoki et al. (2012)among others, who argue that there is no causal relation between governance and firm performance. Regarding the other control variables, it is found that there is a significantly positive correlation between Tobin's Q and capital expenditures (*lncapex*) as well as firm size (*fsize*). Our findings, therefore, support the argument of Nakano and Nguyen (2012) that large companies and companies with strong capital expenditures tend to achieve higher market value.

In order to examine whether our findings obtained from the OLS model are robust to alternative proxies for financial performance, we replace Tobin's Q with two alternative accounting-based proxies for financial performance namely ROA and ROE. As reported in columns 3 and 4 of Table 5, the statistical significance and direction of estimated coefficents on variable *educ* are almost unchanged. Hence, given that the human capital variable is exogenously determined, the idea that the human capital of board members have contributed

to enhance fiancial performance of Vietnamese listed companies is likely valid. Remarkably, while board size has no significant effect on firm value as measured by Tobin's Q, it appears to have significantly negative influences on operating performance as measured by ROA and ROE. We argue that such mixed results may be driven by unobserved heterogeneity across the firms which are not controled in the OLS model.

4.4. Robustness Check with Dynamic System GMM Approach

It is evident from subsections 4.1; 4.2; and 4.3 that the relationship between the human capital of board of directors and firm performance is real, and the main question here is about causation. In this section, the dynamic system GMM model is adopted to control for the endogeneity issues inherent in this relationship.

The validity of the dynamic system GMM model is checked through several official tests including Hansen-J test of over-identification and difference-in-Hansen test of exogeneity of instrument subsets. The last row of Table 6 shows that the Hansen-J test yields the *p-values* of .26; .74; and .70 for models using Tobin's Q; ROA; and ROE, respectively. This suggests that the null hypothesis that instrumental variables used in the system GMM models are valid cannot be rejected. In an additional analysis, we follow good practices in implementing system GMM estimation recommended by Roodman (2009)and apply the difference-in-Hansen tests of exogeneity to the subsets of system GMM-type instrumental variables, and standard instruments[1]. The tests are under the null hypothesis of joint validity of a specific instrument subset. The test results suggest that all the subsets of instruments employed in our system GMM model are valid. Moreover, the F-test statistics for the overall significance of the regression models[2]reported in Table 6alsoindicate that our models appear to be well specified.

The results obtained from the two-step system GMM estimator with the Windmeijer (2005) finite sample correction are presented in column (2) of Table 6 (for Tobin's Q). It is found that the coefficient on the human capital variable is significantly positively related to Tobin's Q. This is consistent with the result attained from the OLS estimator. To further challenge

[1]The test results are not reported because of space limitations, but available from the authors on request.
[2] Based on small-sample corrections, we report *t*-test instead of *z*-test statistics for the estimated coefficients, and an *F* test instead of a *Wald Chi-squared* test for overall fit of the system GMM model.

this result, ROA and ROE are also employed in the system GMM models. The results reported in columns 3 and 4 of Table 6 indicate that the positive effect of the directors' human capital is robust to alternative proxies for financial performance even after controlling for the endogeneity inherent in this relationship.Our result is contrary to that of Victoria (2006) who suggests that the presence of highly qualified directors in the boardrooms does not have any effect on firm profitability. However, in line with Ujunwa (2012), this study reports that directors with higher human capital may have a positive impact on firm performance. It is argued that the human capital of board members may add value to their companies through a combination of competencies and capabilities (Ujunwa, 2012).

[Insert Table 6 about here]

Besides, the estimated coefficients on one-year lagged dependent variables in all three models for alternative financial performance proxies are statistically positive at 1% level of significance. This result supports the argument of Nakano and Nguyen (2012) that the past realizations of performance can help to forecast the future performance, and thus, should be considered to be an important explanatory variable in the regression model of governance–performance association. In other words, this suggests that unobserved historical factors having effect on contemporary firm performance can be controlled by using past performance as an independent variable. This finding also supports the arguments of Pham et al. (2011); Schultz et al. (2010) and Wintoki et al. (2012) among others that the nexus between governance and performance should be examined in a dynamic framework.

5. CONCLUSION AND LIMITATIONS

The major interest of this study is whether the human capital of boards is important. Exploring a panel dataset of 315 firm-year observations from Vietnamese market, this study provides empirical evidence to confirm that the human capital of directors is a significant determinant of firm outcome. This finding is consistent with the perspective of resource dependence theory, and robust to alternative proxies for financial outcome, including market-based and accounting-based financial performance measures. Unlike previous studies which often ignore the endogeneity issues, this study explicitly controls for the potential sources of endogeneity arising in the relationship between the human capital of directors and performance. In particularly, this study adopts the dynamic system GMM model to account for unobserved heterogeneity, simultaneity, and dynamic endogeneity. It is found that the

results remain unchanged even if the above-mentioned endogeneity concerns are taken into consideration.

To the best of our knowledge, this study is the first to explore the topic of board human capital and financial performance for publicly listed companies in Vietnam. Our study significantly contributes to the extant non-US literature on the human capital-performance nexus by providing robust empirical evidence from a transition market in the Asian region. Our finding suggests that companies may benefit greatly by implementing an appointment policy in which the human capital of potential board members is carefully examined. Also, given a positive outcome of having a board with high levels of human capital, it is necessary for companies to facilitate the continuing education process of board members. This leads to the improvement of the human capital of the boards that may ultimately increase the board effectiveness and firm performance. The empirical evidence obtained from this study supports the efforts of Vietnamese policy makers in setting up qualification standards as well as skill diversity for the boards.

Despite the aforementioned significant contributions to the literature on board human capital, this study should be considered as an initial exploration due to some limitations. First, this study only focuses on the human capital investments (in our case, education) that may or may not result in human capital outcomes (knowledge and skills) which are almost unobservable. It is worth to recall that while education and work experience are considered to be the human capital investments, knowledge and skills constitute the outcome of those investments (Becker, 1993). Becker (1993) argues that although the human capital investments are important, it does not necessarily guarantee that they will result in human capital outcomes. If so, the observable variable (education) in our study cannot be a reasonable proxy for what we want to measure (knowledge and skill). In this circumstance, it will be seriously misleading to suggest that the presence of highly qualified directors on boards has a significant effect on firm performance. Second, because of the unavailability of data, the sample size in our study is relatively small and, therefore, may be hardly reasonable to constitute a representative sample. Third, our research only controls for some popular variables on which we can collect the data. Some other potential important variables, such as “busy directors”, are not controlled for due to lack of data for the Vietnamese market. Thus, it would be desirable for future research to extend the current study by including further data and/or additional proxies for the human capital of directors such as their work experience or other observable skills.

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Table 1: Definition of variables

Variables	Acronym	Definition
Dependent variable		
Tobin's Q ratio	lnq	Tobin's Q is the sum of the market value of firm's stock and the book value of debt divided by the book value of total assets. The natural logarithm of Tobin's Q (lnq) is used in the models.
Return on total assets	roa	Return on total assets is sourced from WorldScope database. This ratio is calculated by the formula: [Net income before preferred dividends + ((Interest expense on debt - Interest capitalized) * (1-Tax rate))] / Last year's total assets * 100.
Return on equity	roe	Return on equity is sourced from WorldScope database. This ratio is calculated by the formula: (Net income before preferred dividends - Preferred dividends) / Total common equity * 100.
Human capital variables		
Percentage of highly-qualified directors (%)	educ	The ratio of highly-qualified directors to total number of directors on the board. A director is coded as a highly-qualified director if she or he obtains Master or PhD qualifications.
Dummy variable for directors' human capital	deduc	Dummy variable that takes a value of 1 if there is at least one highly-qualified director on the board and 0 otherwise. This dummy variable is used for univariate analysis.
Control variables		
The average age of directors	dirage	The average age of directors
Board size	lnbsize	Board size is the total number of directors on the board. The natural logarithm of board size (lnbsize) is used in the models.
Total assests growth (%)	tagrow	The growth rate of total assets is calculated by the formula: (the current year's total assets - the previous year's total assets) / the previous year's total assets * 100
The ratio of capital expenditures to total sales	lncapex	The natural logarithm of the company's capital expenditures divided by its total sales
Firm age	lnfage	The natural logarithm of the number of years from the time the company first appears on the HOSE or the HNX.
Firm size	fsize	The natural logarithm of the book value of total assets.
Leverage (%)	lev	The ratio of the company's total debt to total assets.
Lagged dependent variables	laglnq; lagroa; lagroe	The one year lags of lnq, roa, roe, respectively.
Industry dummy variables	Industry	A dummy variable for each of the eight industries, namely Basic Materials; Consumer Goods; Consumer Services; Health Care; Industrials; Oil & Gas; Technology; and Utilities.
Year dummy variables	Year	Four year dummies for each of the four years from 2008 to 2011

Table 2: Descriptive statistics

	Obs	Mean	Median	Sd	Min	Max	Skewness	Kurtosis
Tobin's Q ratio	315	0.87	0.79	0.40	0.22	2.56	1.75	6.96
Education (%)	315	22.58	20.00	22.13	0.00	100.00	1.00	3.91
The average age of directors in the board	256	48.25	48.17	3.78	38.00	58.22	0.11	2.71
Board size	315	5.86	5.00	1.40	4.00	11.00	1.64	5.22
Total assets growth (%)	315	20.32	15.06	27.27	-38.46	137.78	1.06	4.41
lncapex	307	1.33	1.45	1.59	-5.27	4.79	-0.46	3.92
Firm age (year)	315	3.35	3.00	2.06	0.00	11.00	1.10	4.73
Firm size [Ln(Total assets)]	315	27.39	27.31	1.20	24.11	30.55	0.25	3.36
Leverage (%)	315	29.92	30.84	20.97	0.00	75.69	0.15	1.92

Table 3: Correlation coefficients and variance inflation factors (VIFs) coefficients

	lnq	educ	dirage	lnbsize	tagrow	lncapex	lnfage	fsize	lev	VIFs
lnq	1.00									
educ	0.26***	1.00								*1.13*
dirage	-0.05	-0.16**	1.00							*1.05*
lnbsize	0.16***	0.07	0.00	1.00						*1.12*
tagrow	0.13**	0.02	-0.12*	0.13**	1.00					*1.14*
lncapex	0.18***	-0.03	-0.03	0.15***	0.26***	1.00				*1.19*
lnfage	-0.20***	0.01	0.05	0.05	-0.09	-0.12**	1.00			*1.11*
fsize	0.28***	0.21***	-0.03	0.31***	0.14**	0.18***	-0.00	1.00		*1.35*
lev	0.02	0.09	-0.10*	0.04	0.19***	0.07	-0.11*	0.31***	1.00	*1.21*

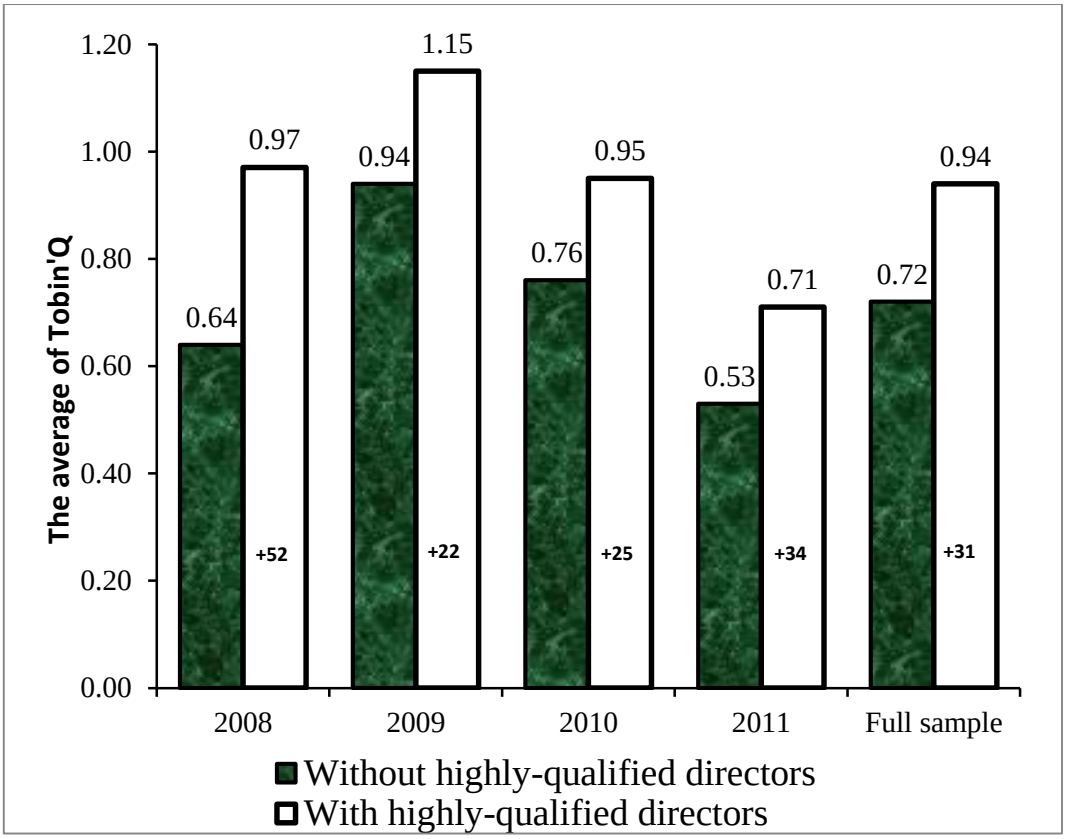

Figure 1: Does the human capital of board directors add value?

Table 4: *t*-test for equal population means with unequal variances

Year	Observations	The average of Tobin's Q		
		Without highly-qualified directors	With highly-qualified directors	Difference
2008	80	0.64	0.97	-0.33***
2009	79	0.94	1.15	-0.22**
2010	79	0.76	0.95	-0.19***
2011	77	0.53	0.71	-0.18***
Full sample	315	0.72	0.94	-0.22***

Asterisks indicate significance at 10% (*), 5% (**), and 1% (***).

Table 5: The relation between directors' human capital and alternative proxies for financial performance: Pooled OLS approach

	Dependent variables					
	Tobin's Q		**ROA**		**ROE**	
(1)	**(2)**		**(3)**		**(4)**	
	b/(*p*)	[*t*]	b/(*p*)	[*t*]	b/(*p*)	[*t*]
constant	-2.053**	[-2.589]	13.346	[0.647]	20.736	[0.753]
	(0.010)		(0.518)		(0.452)	
educ	**0.003****	**[2.577]**	**0.040****	**[2.389]**	**0.080*****	**[2.757]**
	(0.011)		(0.018)		(0.006)	
dirage	0.004	[0.598]	0.068	[0.571]	0.169	[0.937]
	(0.550)		(0.569)		(0.350)	
lnbsize	-0.052	[-0.404]	-4.070*	[-1.811]	-12.651***	[-3.118]
	(0.687)		(0.071)		(0.002)	
tagrow	-0.000	[-0.221]	0.068***	[3.560]	0.118***	[3.892]
	(0.825)		(0.000)		(0.000)	
lncapex	0.051***	[3.886]	0.503**	[2.062]	0.449	[1.292]
	(0.000)		(0.040)		(0.198)	
lnfage	-0.051	[-1.007]	-0.740	[-0.871]	-1.051	[-0.730]
	(0.315)		(0.385)		(0.466)	
fsize	0.055*	[1.892]	0.299	[0.443]	0.443	[0.510]
	(0.060)		(0.658)		(0.611)	
lev	0.001	[0.465]	-0.155***	[-5.892]	-0.141***	[-4.228]
	(0.643)		(0.000)		(0.000)	
year dummies	yes		yes		yes	
industry dummies	yes		yes		yes	
Observations	241		238		233	
R-squared	0.419		0.377		0.333	
F statistic	9.649		7.502		10.428	

Note: This table presents the results from estimating the equation (2) by using pooled OLS model. Columns (2); (3); and (4) report the estimated results of equation (2) when the dependent variable is Tobin's Q; ROA; and ROE, respectively. Asterisks indicate significance at 10% (*) 5% (**) and 1% (***). The notations are as defined in Table 1. *T*-statistics and *p*-values are based on the heteroskedasticity-robust standard errors and presented in brackets [*t*] and parentheses (*p*), respectively. Year dummies and industry dummies are included in all models.

Table 6: The relation between directors' human capital and alternative proxies for financial performance: Robustness check with system GMM approach

	Dependent variables					
	Tobin's Q		**ROA**		**ROE**	
(1)	**(2)**		**(3)**		**(4)**	
	b/(*p*)	[*t*]	b/(*p*)	[*t*]	b/(*p*)	[*t*]
constant	-0.678	[-0.635]	-47.275	[-1.095]	72.206	[0.777]
	(0.528)		(0.278)		(0.440)	
laglnq	0.429***	[3.228]				
	(0.002)					
lagroa			0.382***	[4.137]		
			(0.000)			
lagroe					0.341***	[2.767]
					(0.007)	
educ	**0.005***	**[1.779]**	**0.105****	**[2.606]**	**0.243*****	**[2.753]**
	(0.080)		(0.011)		(0.008)	
dirage	0.011	[0.826]	0.243	[0.964]	-0.396	[-0.746]
	(0.412)		(0.338)		(0.458)	
lnbsize	0.471	[1.656]	0.349	[0.093]	-5.310	[-0.465]
	(0.102)		(0.926)		(0.643)	
tagrow	0.001	[0.872]	0.063***	[2.990]	0.095**	[2.309]
	(0.387)		(0.004)		(0.024)	
lncapex	-0.005	[-0.246]	-0.755**	[-2.293]	-0.723	[-1.108]
	(0.807)		(0.025)		(0.272)	
lnfage	0.046	[0.749]	-0.977	[-0.685]	0.745	[0.237]
	(0.457)		(0.496)		(0.813)	
fsize	-0.050	[-1.139]	1.557	[1.060]	-1.465	[-0.560]
	(0.259)		(0.293)		(0.577)	
lev	0.003	[1.205]	-0.120**	[-2.109]	-0.130	[-1.211]
	(0.233)		(0.039)		(0.230)	
year dummies	yes		yes		yes	
Number of observations	188		188		188	
F statistic	14.31		10.84		5.64	
Number of instruments	58		58		58	
Number of clusters	67		67		67	
Hansen-J test (p-value)	0.26		0.74		0.70	

Note: This table presents the robust results obtained from estimating the equation (2) by using System GMM estimator. Columns (2); (3); and (4) report the estimated results of equation (2) when the dependent variable is *Tobin's* Q; or *ROA*; or *ROE*, respectively. The definitions of variables are provided in Table 1. Asterisks indicate significance at 10% (*) 5% (**) and 1% (***). *P*-values are presented in parentheses (*p*). *T*-statistics are based on Windmeijer-corrected standard errors and presented in brackets [*t*]. Lags 2 and lags 3 of the levels of firm performance variables (*Tobin's* Q, or *ROA*, or *ROE*); lags 1 and lags 2 of corporate governance variables (*educ*, *dirage*, *lnbsize*) and the other control variables (*tagrow*, *lncapex*, *fsize*, and *lev*) are employed as GMM-type instruments for the first differences equations. Whereas, lags 1 of the first differences of the above-mentioned variables are used as GMM-type instruments for the levels equations. For all three models of alternative proxies for firm performance, *year dummies* and *lnfage*, which are treated as exogenous variables, instrument themselves. Year dummies are unreported.