The Effect of Corporate Governance on Intellectual Capital Performance of Commercial Banks in Ethiopia: An Analysis of Random Effects

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Abstract

The purpose of this study was to empirically examine the effect of corporate governance mechanisms on intellectual capital performance of Ethiopian commercial banks using short panel data. The study crafted explanatory research design with a combination of secondary source of data collection, ex post control over variables, unbalanced panel with cross sectional and time dimension inclined with quantitative research approach. Besides, both financial and non-financial data of 14 commercial banks were used. Econometric model estimation procedures and diagnostic tests for classical linear regression model assumptions were also carried out. In fact, random effects regression model was selected as best fitted model over pooled OLS and fixed effect. Both descriptive statistics and regression analysis were also conducted. As a result, empirical findings of the random effects GLS regression analysis indicated that gender diversity and profitability have statistically significant and positive effect on intellectual capital performance of commercial banks. On the other hand, board size has statistically significant and negative effect on intellectual capital performance. However, board remuneration and bank size failed to show statistically significant effect.

Keywords: Corporate Governance Mechanisms, Intellectual Capital, Random effects, Banks

1. INTRODUCTION

To date, the development of economy and wealth creation depends more on the production, diffusion and use of intellectual capital, shifting from industrial economy to knowledge based economy. For that reason, the worth of individuals, organizations, regions and countries is mostly the effect of their intellectual capital (Chao, Xiao, & Lingyu, 2015). The higher the performance of intellectual capital of a firm, the more the competitive and winner the sector will be, and the better in boosting economic growth (Meressa, 2016).Thus, intellectual capital is the main foundation for success of company which can be considered as a life blood of knowledge intensive economy (Fahim, Maleki, & Yousefnezhad, 2013). In fact, the need to develop and manage this asset has become a serious obligation in the national level and in any business arena (Iranmahd, Moeinaddin, Shahmoradi, & Heyrani, 2014).In the same fashion, corporate governance has become one of the most important topics for business environment and governments in a globalized economy. Its proper implementation brings out advantages for companies and countries. That's why it has become one of the most important researchable issues recently (Yuksel, 2008).However, the relationship between corporate governance practices and company financial performance has been a matter of considerable interest to academic researchers and the general public even though intellectual capital performance is the most important resource to take competitive advantage in the recent economic phenomenon (Swartz & Firer, 2009). But, few studies were carried out on the relationship between corporate governance and intellectual capital performance (Swartz & Firer, 2009; Abidin, Kamal, & Jusoff, 2009; Al-Musalli & Ismail, 2012 ; Isa & Ismail, 2015) with mixed empirical results on corporate governace attributes' impact on value added intellectual capital coefficient. As every nation has its unique economy, corporate governance is not homogenized rather varies from country to country (Mugunthan, 2013). Hence, its practices vary across nations and individual companies (Saheed, 2013). To the best of the researcher's knowledge, no study has not yet examined on the effect of corporate governance mechanisms on intellectual capital performance of commercial banks in Ethiopia. Accordingly, this study tried to fill this gap by investigating the effect of these attributes on intellectual capital performance.

The rest of the paper presents review of related literature in section 2 , data and research methodology in section 3, empirical results and discussions in section 4, and conclusion in the final section.

2. Review of Related Literature

Knowledge is superior to other productive elements. Accordingly, the current economy considers it as the most important productive element and names it the most important competitive factor (Momeni & Esmaeili, 2015). Intellectual capital is key success factor in the knowledge economy. It was first used by John Kenz Galbris in 1969. And he believed that intellectual capital is a means to achieve goals (Momeni & Esmaeili, 2015). In the current economy the predominant activity is no longer production of goods but production of this resource. Besides, it is the starting point of any further economic analysis. During the industrial era, the dominant way of value creation was production of goods. And lack of financial and physical capital has been considered as the main cause of

backwardness in developing countries (Rezai &Mousavi, 2015). However, the situation is different to date as long as intellectual capital is the main factor of success and development (Pulic, 2008). In the past two decades, the economic performance for most of countries in the world is driven by the development and invention of technology and these inventions are results of intellectual capital (Tsai, Yu, & Wen, 2013).Corporate governance is also a recent issue used to maintain safety and soundness of financial system. It is a system by which firms are controlled and directed to accomplish their objectives (Basyith, 2016).In addition, it involves a network of relationships between corporate managers, directors, and stakeholders (Saheed, 2013). It also fosters economic growth, increase investment financing, reduces costs of capital, manage stakeholders interest, and ultimately increase corporate performance (Pardis, Sofian, & Abdullah, 2016).The importance of corporate governance is distinguishing feature of new economy. Its attributes are becoming fundamental determinants of firm value and growth since economies are becoming knowledge and technology based. For that reason, the increasing interest in corporate governance is one of major developments within today's business practice (Manini & Abdillahi, 2015). Likewise, it is associated with intellectual capital. Firms that comply with corporate governance guidelines should report their intellectual capital properly. This plays important role in achieving objectives of firms and assures their survival. Intellectual capital is important resource to outshine in competitive business. In the same vein, firms having higher compliance of corporate governance attract more investors as long as corporate governance is viewed as one asset .of firms (Basyith, 2016). Empirical evidences on the effect of corporate governance mechanisms on intellectual capital performance were discussed here to be used as a base for further analysis in this study. As a result, board size, board remuneration and gender diversity were used as explanatory variables among corporate governance attributes.

Board of directors have greater contribution in the creation, development and management of intellectual capital of firms by configuring relevant policies and strategies that can ultimately improve value added intellectual capital coefficient. The larger the board size, the higher improvement in quality of strategic decisions and actions will be as stated in resource dependency theory. Besides, larger board size can bring better interlocking with stakeholders, in turn increases relational capital which is one element of intellectual capital (Al-Musalli & Ismail, 2012). Larger boards allow firms to bring critical and diverse resources and experiences that can make the board's decision effective and boost economic performance of companies (Oba, Ibikunle, & Damagum, 2013). There is a significant positive impact of company's corporate governance measures like board size determination on intellectual capital performance (Makki & Lodhi, 2014). With respect to board size, the capacity of the board for monitoring proliferates as its number increases as far as larger board brings more human capital (Ayele, 2013). A study was carried out by Abidin, Kamal, & Jusoff (2009) on board structure and intellectual capital performance in Malaysia. It was carried out by using sample of 75 companies listed on Bursa Malaysia selected randomly. Results of the regression analysis revealed statistically significant and positive relationship between total number of directors and value added intellectual capital coefficient, implying that the larger the board size, the greater contribution towards value creation due to the assumption that more ideas and skills can be shared among board members. To the reverse of this, Al-Musalli & Ismail (2012) found significant and negative relationship between board size and level of intellectual capital performance in GCC banks. This may be due to problems of communication and coordination among the members of board to use their intellectual capacity while making strategic decisions of firms. Alizadeh, Chashmi, & Bahnamiri (2014) also examined the association between corporate governance and intellectual capital in the pharmaceutical companies accepted in Tehran Stock Exchange over the period 2004-2009 using a regression based model. Further, empirical evidences of this study found negative impact of board size on value added intellectual capital coefficient. The other attribute is remuneration of board. With regard to this, executive management could act opportunistically or speculatively to accumulate their personal income after using their privileged position at the cost of other stakeholders as explained in the proponents of agency theory (Isa & Ismail, 2015). A research study was made by Isa & Ismail (2015) titled the effect of corporate governance mechanisms on intellectual capital performance of Nigerian Banks using audited financial statements of sample banks for the period of 11 year starting from 2003 to 2013. Regression result of this study discovered statistically significant and positive effect of board remuneration on value added intellectual capital coefficient used as a proxy of intellectual capital performance. Hence, board remuneration was best predictor of intellectual capital performance in this study.

Gender diversity is also part of the broader concept of board diversity which is one of corporate governance mechanisms. Greater female representation on boards provides some additional skills and perspectives that could not be possible with all-male board members. Female board members could bring diverse viewpoints. In fact, gender diversity in boards is supported by different theoretical perspectives. For instance, agency theory highlighted that representation of directors from diverse groups may perhaps provide a balanced board. So, no one can dominate decision making of the board. It possibly will also provide representation for different stakeholders of the firm for fairness and equity according to the stakeholders' theory point of view (Manini & Abdillahi, 2015).This issue is recently creating interest with majority of studies showing the positive effect of gender diversity on corporate boards intellectual capital creation (Oba, Ibikunle, & Damagum, 2013). For that reason, variety of

arguments has tried to explain how companies could benefit from the presence of women on their board of directors. Empirically, a study was made by Swartz & Firer (2009) to examine the relationship between board structure and the intellectual capital performance of South African publicly listed companies using cross sectional multiple regressions. In view of that, empirical results of the study discovered statistically significant and positive relationship between percentage of women on the boards of directors and intellectual capital performance. Evidence of the research suggested that boards of directors with higher percentage of women could make decisions on the future intellectual capital performance with more sensitivity towards public concerns. Besides, women have more detailed thoughts involved in decision-making analysis (Rasmini, Wirakusuma, & Yuniasih, 2014). Business organizations recently have employees with diversity in terms of age, ethnic background, gender, educational qualification and others. However, compared to the diversity of other attributes, gender diversity appears to be the most extensively addressed issue in literature (Darmadi, 2010). In addition to the above corporate governance attributes, profitability and bank size were also used in this as control variables. Profitability is the ability of business to earn income. If banks generate profit, bank managers and research and development department, if any, could have time to do different intellectual activities that can improve competitiveness of a particular bank as well as banking sector in general (Sefidgar, Maleki, & Minouei, 2015). Empirical results of research studies indicate positive and statistically significant impact of return on asset as a proxy measure of bank profitability on intellectual capital performance of banks, suggesting banks with higher financial performance have better value added intellectual capital coefficient (El-Bannany, 2008; Eftekhare, Asgaryan, & Seyyedy, 2014). Bank size is also considered as another factor that affects value added intellectual capital coefficient. Empirical evidence of a research study carried out by Al-Musalli & Ismail (2012) failed to show statistically significant association between bank size and intellectual capital performance. On the other hand, El-Bannany (2012) found significant impact of bank size on value added intellectual capital coefficient.

3.   RESEARCH METHODOLOGY

This section answers the question how the research was carried out. Particularly, it includes research design, data type, data source and method of collection, population, sample size and sampling technique, variables and their measurement, hypotheses formulation, econometric model specification and diagnostic tests, and data analysis.

3.1. Research Design, Sample and Data Collection

Researchers should choose among different types of possible research designs depending on such dimensions as purpose of the research, method of data collection, control of variables, time dimension, research approach, and other related issues as an architect chooses among different types of possible building designs depending on factors like purpose of the building, method of construction, time of construction and other relevant factors (Gebru, 2012).Accordingly, this study purposely employed explanatory research design with a combination of secondary source of data collection, ex post control over variables since the researcher used past data, short and unbalanced panel with cross sectional and time dimension, and quantitative approach.

Population of this study consist of all commercial banks in Ethiopia which are 19 in number. Banks which have not annual financial statement for five years from 2011 to 2015 were excluded from the study to determine sample size of the study. For that reason, 14 commercial banks were selected. These are: Dashen Bank, commercial bank of Ethiopia, Awash International Bank, United Bank, Wegagen Bank, NIB International Bank, Lion International Bank, Cooperative Bank of Oromia, Bank of Abyssinia, construction and business bank, Bunna International Bank, Zemen Bank, Oromia International Bank, and Abay Bank. Additionally, this study used financial and non-financial secondary data obtained from national bank of Ethiopia and audited annual report of each bank under investigation. The required data was collected by reviewing these documents.

3.2. Variable Measurement and Hypotheses Development
3.2.1.   Measurement of Dependent Variable: Intellectual Capital Performance

Value added intellectual capital coefficient developed by Pulic (1998) was used to measure intellectual capital performance. Accordingly, it can be determined using the following five procedures.

1. Calculation of value added for all stakeholders using the following equation :
   Value Added = Employee salaries and benefits +Total interest expenses + Taxes +Net income
2. Determination of value added relational capital coefficient

$$\text{Value added relational capital coefficient} = \frac{\text{Value Added}}{\text{Relational capital}}$$

Where, value added relational capital coefficient signifies the value created by one unit of relational capital and relational capital is equal to net asset of banks at the end of t period as of Lipunga (2015).

3. Determining value added human capital coefficient

$$\text{Value added human capital coefficient} = \underline{\text{Value Added}}$$

Human Capital

Where, value added human capital coefficient shows the contribution made by each dollar invested in human capital, reflecting the collective ability of the company to produce best solutions based on the knowledge of people in the company. And human capital refers to total salaries, wages and all incentives for the bank during the period of t.

4. Calculation of value added structural capital coefficient

$$\text{Value added structural capital coefficient} = \frac{\text{Structural Capital}}{\text{Value Added}}$$

Where, value added structural capital coefficient determines the amount needed to produce a dollar of value added and an indication of how the structural capital of success in creating value. Structural capital is simply the difference between value added and human capital.

5. Calculation of value added intellectual capital coefficient

Value added intellectual capital coefficient is therefore the sum of value added human capital coefficient, structural capital coefficient and relational capital coefficient. Hence, it can be expressed mathematically as:

$$\text{VAIC} = \text{VARC} + \text{VAHC} + \text{STVA}$$

Where, VAIC= Value added intellectual capital coefficient, indicates corporate value creation

VARC= Value added relational capital coefficient, indicates the value created by one unit of relational capital

VAHC= Value added human capital coefficient, indicates contribution of each dollar invested in human capital

STVA= Value added structural capital coefficient, indicates value created by one unit of structural capital

3.2.2. Measurement of Independent and control Variables

Independent variables of this study are corporate governance attributes including: Board size, gender diversity of board of directors, and remuneration of board of directors. Besides, profitability and bank size are used as control variables. Measurements of these variables are discussed here. Board size represents total number of directors on the board. While, board remuneration is represented by total amount of payments made to directors. Moreover, gender diversity is measured by proportion of female members of the board of directors. In the literature, return on asset and return on equity can be used to measure profitability of banks. However, return on asset is a better proxy for bank profitability opposed to return on equity because return on equity disregards financial leverage. Hence, return on asset is used as a proxy measurement of commercial banks profitability. In addition, bank size is measure by logarithm of total assets.

Table 3.1: Summary of Symbol and Measurement of Variables

No.	Variable	Symbol	Measurement
1.	Value added intellectual capital coefficient	VAIC	Sum of value added relational capital, human capital, and structural capital coefficients
2.	Board Size	BOARD	Total number of directors on the board
3.	Gender diversity	GENDER	$\frac{\text{Number of female directors}}{\text{Total number of board}}$
4.	Board Remuneration	REMUN	Total amount of money directors rewarded
5.	Bank Profitability	ROA	Ratio of net income to total asset
6.	Bank size	ASSET	Logarithm of total assets

3.2.3. Hypotheses Development

The study tested the following research hypotheses developed based on prior related empirical studies.

H1: Board size has positive effect on intellectual capital performance

H2: Board remuneration and intellectual capital performance are positively associated

H3: There is positive relationship between presence of female directors and intellectual capital performance

3.3. Econometric Model estimation and Specification

This study employed panel data in which 14 Ethiopian commercial banks were observed over 5 years starting from 2011-2015. Hence, comparison among pooled OLS, fixed effect and random effect regression models were carried out to choose the best fitted model. Accordingly, Chow-test, Breusch and Pagan Lagrange Multiplier test and Hausman-test were used to make a choice between pooled OLS and fixed effect, pooled OLS and random effects, fixed effects and random effects respectively. Breusch and Pagan Lagrange Multiplier test for random effects was carried out to test the presence of random effects. And the result was in favour of rejecting the null hypothesis as the test was statistically significant **(Insert Table 3.2. Here),** suggesting the presence of random effects. The result of chow test (F-test) also rejected pooled OLS **(Insert Table 3.3 Here).** As long as pooled OLS was rejected in both cases, favouring random and fixed effect, Hausman test was used to make a choice between random and fixed effect. Accordingly, Hausman test validates random effects regression over fixed effect **(Insert Table 3.4 Here).** Therefore, the appropriate model used to make statistical inferences was random effects regression model.

$$\text{VAIC}_{it} = \alpha + \beta_1 \text{BOARD}_{it} + \beta_2 \text{GENDER}_{it} + \beta_3 \text{REMUN}_{it} + \beta_4 \text{ROA}_{it} + \beta_5 \text{ASSET}_{it} + (\mu_i + \epsilon_{it})$$

Where: VAIC = value added intellectual capital coefficient   BOARD= Total number of directors

GENDER= proportion of female directors   REMUN=Board remuneration
ROA= profitability of bank   ASSET= size of bank
α = constant; β_{1-5} = parameters estimated ϵ_{it} = an idiosyncratic error term
μ_i =Unobserved random effect that varies across banks but not over time
it = bank i during year t

4. EMPIRICAL RESULTS AND DISCUSSIONS

4.1. Descriptive Analysis

Table 4.1 presents descriptive statistics for the variables in the study. The table presents mean, and standard deviation as well as minimum and maximum values of regression variables included in the estimated model.

Table 4.1: Descriptive statistics

Variable	Mean	Std.Dev	Min	Max
VAIC	6.146883	1.690537	2.653447	12.59244
BOARD	9.538462	1.846254	5	12
REMUN	427671.7	201271.8	170000	850000
GENDER	.1277496	.0883756	0	.25
ROA	.029984	.0112167	.0058218	.0637194
ASSET	9.417356	1.80888	2.659916	11.38527

Source: STATA out put

The mean intellectual capital performance for the sample banks throughout the study period is 6.146883 with the standard deviation of 1.690537, minimum and maximum value added intellectual capital coefficient of 2.653447 and 12.59244 respectively. The average return on asset as measurement of profitability of Ethiopian banks selected in the sample of this study is .029984, the lowest return on asset is .0058218 and the highest return on asset is .0637194 with standard deviation of 0.0112167. Ratio of number of female directors to total number of board shows that the average ratio of female directors of these commercial banks under investigation is 0.1277496 with standard deviation of 0.0883756, minimum and maximum proportions of 0 and 0.25 respectively. Corporate governance directive NO SBB/62/2015 article 5(2) also requires a board to be mixture of gender and other core competencies. However, nothing is said about number of female directors on board.

The average board size, measured by number of directors on the board, is approximately 10 with minimum of 5 and maximum of 12 members.In accordance with Banking Business Proclamation NO.592/2008, National Bank of Ethiopia issued bank corporate governance directives NO SBB/62/2015. As stated in Art 5(1) of this directive the minimum size of board should be nine. However, maximum number of board of directors is not determined in this directive though Commercial Code under Art.347 (2) requires for incorporated bodies to have a minimum of 3 and maximum of 12 board members. For that reason, empirical evidence of this study revealed that the minimum number of boards is below the legal requirement of the directive although the maximum number is within the requirement of commercial code.

The mean with regard to board remuneration is birr 427,671.7 with deviation of birr 201,271.8 ranging between birr 170,000 and birr 850,000. As article 4(1 and 2) of directive NO SBB/49/2011 issued in accordance with Banking Business Proclamation No 592/2008, annual board compensation to a director shall not exceed birr 50,000; and monthly allowance shall not exceed birr 2,000. Hence, the upper limit of remuneration per year is birr 74,000 since remuneration is sum of compensation and allowances. In fact, the remuneration is within the requirement on average based on findings of this study. For the variable bank size, a deviation from the mean of 9.417356 is about 1.80888 with a range between 2.659916 and 11.38527.

4.2. Diagnostic Tests for Classical Linear Regression Model Assumptions

Normality assumption is required in order to conduct single or joint hypothesis tests about the model parameters (Brooks, 2014). As stated in Gujarati (2003), Normality of the residual shows that the estimator is unbiased, minimum variance and consistent. Shapiro wilk test was used to test normality distribution of error term. Result of this test proved that the residuals are normally distributed **(Insert Table 4.2 Here).** VIF was also used to test multicollinearity. Hence, VIF for each explanatory variable is less than 2, suggesting there is no severe multicollinearity problem in the estimated model **(Insert Table 4.3 Here)**. Ramsey RESET test was performed for model specification with null hypothesis that the model has no omitted variables and its result was statistically insignificant supporting the null hypothesis **(Insert Table 4.4 Here).** In addition, Wooldridge test was used to test autocorrelation with null hypothesis that there is no first order auto correlation. And there was statistically insignificant result supporting absence of autocorrelation **(Insert Table 4.5 Here).** Other assumption required in the classical linear regression model is that the average value of the errors is zero. In fact, if a constant term is included in the regression equation, this assumption will never be violated (Brooks, 2014). Hence, a constant term is included in the model of this study to satisfy this assumption of classical linear regression model, making the value of the errors to be zero. Moreover, heteroscedasticity was controlled using White's robust standard error.

4.3. Regression Analysis

Table 4.6: Random-effects GLS regression results

VAIC	Coef.	Robust Std. Err.	Z	P>|Z|
CONS	4.753465	1.224004	3.88	0.000
BOARD	-.2929724	.1146068	-2.56	0.011
REMUN	8.29e-07	8.10e-07	1.02	0.306
GENDER	.5139212	.193336	2.66	0.008
ROA	63.27007	30.20035	2.10	0.036
ASSET	.1460075	.1086601	1.34	0.179
Number of observations = 63 Prob > chi2 = 0.0000 R-squared = 0.5446				

Source: STATA out put

The results of random effects GLS regression model on the effect of corporate governance attributes on intellectual capital performance of commercial banks in Ethiopia is shown in Table 4.2**.** The estimated regression model is statistically significant with 54.46 % explanatory power of independent variables and Prob > chi2 = 0.0000. Board size has statistically significant and negative effect on value added intellectual capital coefficient at 95% confidence level which is contrary to the expected hypothesis. This is concurrent with (Al-Musalli & Ismail, 2012; Alizadeh, Chashmi, & Bahnamiri, *2014*). The smaller the number of board of directors, the higher value creation whereas the higher the board size, the lower value added intellectual capital coefficient. This could be due to communication and coordination problems of boards while making decision and other strategic directions to meet objectives of banks though board of directors have superior contribution in creating, developing and managing intellectual capital as of resource dependency theory.

Gender diversity represented by presence of female directors on the board has positive and statistically significant effect on intellectual capital performance of commercial banks in Ethiopia at 5% significant level, supporting the expected hypothesis. This empirical result is consistent with findings of research studies carried out by (Swartz & Firer, 2009**;** Oba, Ibikunle, & Damagum, 2013). As the presence of female directors on the board increases, intellectual capital performance of banks under investigation will improve. This finding suggests that presence of higher percentage of women with board of directors will make value creation better off. Because, female directors have ability to attract and communicate with a wider scope of employees and other stake holders to increase the competitive abilities and make decisions on the future intellectual capital performance with more sensitivity toward community concerns. Women directors also have more detailed thoughts in the decision-making analysis (Rasmini, Wirakusuma, & Yuniasih, 2014).

Likewise, profitability of banks has statistically significant and positive effect on value added intellectual capital coefficient at 5% significance level. Here, the implication is that as return on asset of commercial banks as a proxy measure of profitability increases, value added intellectual capital coefficient will also be improved similarly and vice versa(El-Banny, 2008;Meressa,2016). This is due to the fact that the more time managers use to identify causes of losses if happened, the less time they can spend to undertake other useful intellectual activities and vice versa (Soheili & pakdel, 2012). That's why good financial performance motivates bank directors to do various value creative activities (El-Banny, 2008). Hence, positive financial out come in commercial banks contributes to greater time devotion by managers in intellectual activities like motivating and training employees , conducting research and development activities, convince shareholders about their superior managerial abilities to obtain higher degrees of confidence from investors and other stakeholders. These activities could also improve value added intellectual capital coefficient. However, the variables board remuneration and bank size have statistically insignificant effect on intellectual capital performance even at 90% confidence level.

5. CONCLUSION

Corporate governance has been considered as a cause for the failure of many corporate entities throughout the World. As a result, the issue has become a focus for research among academicians and researchers due to its greatest reputation (Yemane & Raju, 2015). On the other hand intellectual capital performance has become an important factor in outshining competitiveness of individuals, companies and nations in the recent knowledge base economy. Hence, the performance of intellectual capital investments is important because it affects long term competitive advantage (Saleh, Rahman, & Hassan, 2009). However, only few studies are carried out regarding the connection between these two issues. Accordingly, objective of this paper was to empirically investigate the effect of corporate governance attributes on intellectual capital performance of commercial banks in Ethiopia using five years financial and non-financial data. Results of the random effects GLS regression revealed that gender diversity and profitability have statistically significant positive effect on intellectual capital performance indicating that higher return on asset and presence of female directors increase value creation. On the contrary, board size has statistically significant negative effect on intellectual capital performance implying that the more board of directors,

the lower the value added intellectual capital coefficient and vice versa. However, board remuneration and bank size have statistically insignificant effect on value added intellectual capital coefficient.

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APENDICES

Table 3.2: Breusch and Pagan Lagrangian multiplier test for the presence of random effects

Breusch and Pagan Lagrangian multiplier test for random effects Vaic [bank,t] = Xb + u[bank] + e [bank,t]		
Estimated results:	Var	sd = sqrt (Var)
Vaic	2.925909	1.710529
e	1.197868	1.094471
u	.7530975	.8678119
Test: Var (u) = 0 chibar2 (01) = 6.26 Prob > chibar2 = 0.0062		

Table 3.3: F-test of simple Pooled OLS against fixed-effects specification

F test that all u_i=0: $F_{(13, 44)}$ = 2.99 Prob > F = 0.0033

Table 3.4: Hausman Specification Test of Random-Effects against Fixed-Effects

	---- Coefficients ----			
	(b) fixed	(B) random	(b-B) Difference	sqrt (diag(V_b-V_B)) S.E.
BOARD	-.2291719	-.2929724	.0638006	.136876
REMUN	1.16E-06	8.29E-07	3.27E-07	9.31E-07
GENDER	.404672	.5139212	-.1092492	.1357934
ROA	64.70049	63.27007	1.430429	13.58574
ASSET	-.6661986	.1460075	-.8122061	.5992437
b = consistent under Ho and Ha; obtained from xtreg B = inconsistent under Ha, efficient under Ho; obtained from xtreg Test: Ho: difference in coefficients not systematic chi2 (4) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 3.48 Prob>chi2 = 0.4805				

Table 4.2: Normality Test

Shapiro-Wilk W test for normal data					
Variable	Obs	W	V	z	Prob>z
Residuals	63	0.99075	0.523	-1.401	0.91941

Table 4.3: Multicollinearity Test

VARIABLE	VIF	1/VIF
ROA	1.72	0.581563
REMUN	1.71	0.584117
ASSET	1.13	0.884462
GENDER	1.13	0.884927
BOARD	1.13	0.888507
MEAN VIF	1.36	

Table 4.4: Model Specification Test for Omission of Variables

Ramsey RESET test using powers of the fitted values of VAIC Ho: model has no omitted variables $F_{(3, 54)}$ = 2.63 Prob > F = 0.0596

Table 4.5: Test of autocorrelation

Wooldridge test for autocorrelation in panel data H0: no first-order autocorrelation $F_{(1, 12)}$ = 0.368 Prob > F = 0.5556