

Corporate Governance and Financial Performance: a literature Review of Measurements and Econometric Methods of Data Analysis in Research

Esther Wanjugu Gitundu^{1*}, Symon Kibet Kiprop², Lawrence Kangogo Kibet², Sifunjo E. Kisaka³.

1. Department of Accounting, Finance and Management Science, Egerton University, P.O Box, 536-20115, Egerton, Kenya
2. Department of Economics, Egerton University P.O Box, 536-20115, Egerton, Kenya
3. Department of Finance and Accounting, University of Nairobi, P.O Box, 30197-00100 Nairobi, Kenya.

Abstract

One of the major challenges to policy makers is the identification of standard framework to examine the effects of corporate governance on firm financial performance. This study examines the key corporate governance and financial performance variables and the methods of data analysis used in academic research. The study observes that most studies use ownership structure and corporate boards as the key explanatory factors to firm performance. Ownership structure is defined by the percentage of shareholders who include: the government, foreign and institutional shareholders, large individuals and dispersed owners. Financial performance has been measured using three different types of indicators. Some studies use accounting-based ratios such as Return on Assets (ROA) and Return on Equity (ROE) while others use the Tobin's Q ratio. Some studies also use efficiency indicators computed using the Data Envelopment Analysis (DEA) and Stochastic Frontier Approach (SFA). It is also apparent that most studies in corporate governance research use panel data and the shareholding, corporate boards and financial information is extracted from financial reports obtained from the stock exchanges. Most of the studies use a combination of descriptive statistics, correlation and regression analysis to examine the relationships between ownership structure, corporate boards and firm performance. Due to problems associated with panel data, a unit root test is used to examine stationarity of data while a Hausman test determines whether to use a Fixed Effects (FE) or Random effects regression model. A regression model with a robust standard error option is often used to control for heteroskedasticity and contemporaneous correlation which may lead to spurious results.

1.0 Introduction

Research in corporate governance stems from the problems associated with the wide separation of ownership and control in modern corporations leading to inefficiency and loss of firm value. According to Jensen and Meckling (1976) the existence of the agency relationship in the firm leads to conflicts of interest between the shareholders and the managers. Agency theory identifies several approaches through which shareholders assure themselves of getting returns on their investment. The theory identifies large block shareholders as a mechanism to reduce agency conflicts as the owners are more active in monitoring managers due to the size of ownership. According to Shleifer and Vishny (1997), large shareholders obtain power over their investment by matching control with cash flow rights. Agency theory also identifies corporate boards as a mechanism to protection of shareholders interests and ensures maximization of shareholder value. Jensen and Meckling (1976) indicates that corporate boards can effectively play their role its size is small, has diverse of skills, and with majority of outside directors and the position of Chairman and CEO are separate. These systems continue to evolve by encouraging greater diversity accountability, discipline, fairness, independence, responsibility, transparency and disclosure in governance.

One of the major challenges in research however has been the development of standard model to analyze the influence of corporate governance mechanisms on firm financial performance. The traditional standard framework to analyze corporate governance practices is provided by the OECD principles of corporate governance. These principles have been adopted in many countries and coded as good corporate governance practices for listed firms and focus on shareholders rights, board responsibilities and disclosure of information among others (CMA, 2002; OECD, 2005). The concern of policy makers however, is to attach measurable value to the concept of governance and consequently the empirical approaches towards establishing its influence on financial performance. This study reviews the key corporate governance variables used as the key determinant of financial performance and the theoretical justification for the predicted relationships. The study also looks at the modern econometric methods of data analysis in corporate in corporate governance studies. The paper is divided into five sections. Section one presents the introduction, section two discusses the methodology used in this study while section three discusses the concept of corporate governance and the measurement of variables derived from the concept. Section four discusses the key methods of data analysis in corporate governance research while section five is the conclusion of the study.

2.0 Methodology

The methodology adopted in this study involves a review and discussion of the concept of corporate governance and the operational meaning attached to variables derived from the concept. The review also includes theoretical prediction of expected relationships between corporate governance variables and firm financial performance. The study further discusses the methods of data analysis largely used in corporate governance research

3.0 The Concept of Corporate Governance and its Measurements

Corporate governance has been defined as the ways in which suppliers of finance to corporations assure themselves of getting returns on their investment (Shleifer and Vishny, 1997). It has also been defined as a system by which companies are directed and controlled to ensure maximum return to shareholders (Mallin, 2007). The OECD (2005) indicates that corporate governance specifies the distribution of rights to income, rules and procedures for making decisions in corporate affairs and responsibilities among different participants in the corporation, such as the shareholders, corporate boards and managers. Given these definitions, most studies use ownership structure and corporate board as the explanatory variables to financial performance. The variables and their measurements are discussed in the following subsections.

3.1 Ownership Structure

Ownership structure defines the distribution of ownership rights which enable shareholders to have claims of income from and also empower them to exercise decision making through voting rights (Grossman and Hart, 1988). This description includes the dimensions of size of ownership and the identity of owners. The size defines the rights to profits, extent of liability and influence in decision making in a firm, through voting over key issues. The identity of the shareholder is important as they comprise of individuals and institutions whose interests, goals, resources and capabilities to influence financial performance vary (OECD, 2005). A listed company has five types of shareholders who include: the government, foreign institutional, large individuals, and dispersed owners.

Government ownership has been measured by the percentage of shares held by the state and also by institutions wholly owned by government. The relationship between government shareholding ownership and performance is considered detrimental to firm performance and this is supported by several theories. The property rights theory predicts that the state as an owner will not perform as efficiently as private firms. According to Hanke (1987), firms with general public as a collective owner and hence have no direct claim on their residual income which reduces incentives to monitor firm managers. Laffornte and Tirole (1991) also indicate that State Owned Enterprises (SOEs) have multiple objectives that make them less focused on profit making. Shleifer and Vishny (1997) also assert that firms with large state ownership are inefficient as they serve political interests. According to the Agency theory, the wide separation between ownership and control makes it difficult for the state to monitor managers.

Institutional ownership has been measured by the percentage of shares held by private institutions. These institutions are defined as organizations, rather than an individual that invests funds on behalf of their members and include: financial institutions, collective investment scheme, insurance companies, pension funds or other body corporate whose ordinary business includes the management or investment of funds (La Porta, et al., 2000; OECD, 2010). The relationship between local institutions shareholders and performance remains ambiguous. On one hand, their role is also deemed to be crucial due to their ability to raise capital, monitor managers, interest in profits and expertise in managerial and marketing skills (OECD, 2010). They are expected to improve firm performance by exercising their oversight functions and influence decision making in firms where they invest (Kose and Senbert, 1998; OECD, 2010). They are also considered crucial in provision of resources in the form of access to private capital, networks, managerial and financial expertise to enable firms to exploit unique entrepreneurial opportunities (Hu and Izumida, 2008).

These arguments suggest that institutional investors positively influence firm performance. Contrary to these views their presence may impact negatively to financial performance. According to Wei et al. (2005), some of institutional shareholders are largely owned by the state. Consequently, such institutions are characterized by large separation of ownership and control which makes the government have little control and supervision over managers leaving them to pursue their interests. They are also perceived to be less focused on profit making due to multiplicity of the objectives they pursue (Laffornte and Tirole, 1991). Given the contrasting perspectives, the relationship between institutional shareholders and firm performance is of empirical concern.

Foreign institutional investors constitute a distinct category of ownership with governance implications which could ultimately affect the performance of firms. They consist of entities incorporated by the laws outside the country under study. In the Kenya context, they are defined as entities incorporated by the laws outside the East

African states. The relationship between foreign investors and firm performance is largely expected to be positive. According to Thomsen and Pedersen (2000), firms with large foreign shareholders gain from their financial resources, expertise in technical and managerial skills, and access to new markets. Foreign institutional shareholders are deemed to be more effective in monitoring of managers and endowed with expertise and technologies to stimulate performance (Chibber and Majumdar, 1999). However, foreign institutional investors could also impact on performance negatively if ownership is motivated by private benefits of control.

Dispersed shareholders are defined as the individuals and institutions that [purchases](#) small [amounts](#) of [shareholding](#) (La Porta, et al., 2000). Dispersed shareholding has been measured by the percentage of ownership held by this category. Theoretical work on the relationship between dispersed shareholders and performance is inconclusive. From the perspective of portfolio theory, investing in a very large number of shareholders maximizes the benefits of diversified investment through elimination of individual firm [financial](#) risk. Shareholders are also expected to put pressure on managers to perform as they demand dividend and influence decision making through the annual general meetings. This view contradicts the agency theory which conjectures that individual shareholders are diffused and may not have incentives and mechanisms to effectively monitor management (Jensen and Meckling, 1976). The ownership variables identified in this sub section have been widely used as independent variables in studies examining the relationship between the ownership structure and financial performance (Mei, 2013; Mishari et al. 2012; Wei, et al., 2005; Tian and Estrin, 2008; Trien and Chizema, 2011; Uwuigbe and Olusanmi 2012).

3.2 Corporate Boards

Corporate boards are an important governance mechanism due to their roles which involves monitoring managers, protecting shareholders interests and setting strategies in a firm (Fama and Jensen, 1983). The agency theory specifies the attributes necessary to make the board effective and include: a small and diverse board with at least a third of the members being non executive and separation of roles for the Chief Executive Officer (CEO) and the chairman of board (Jensen and Meckling, 1976). The optimal size of the board is not specified but some authors argue that a small board to include of a maximum of seven to nine members to function effectively (Lipton and Lorsch, 1992; Yermack, 1996). A smaller board is considered more effective in coordination and in decision making. However, some studies indicate that a larger board monitor is more effective in monitoring and advising managers as organizations exist in complex business environments (Pfeffer, 1972). Board size in previous studies has been measured by the total number of directors (Adusei, 2011; Chaghadari, 2011; Yermack, 1996).

Diversity in corporate boards often refers to the percentage of outside directors serving on the board (Adusei, 2011; Chaghadari, 2011). From an Agency Theory perspective the Non Executive Directors (NEDs) are crucial due to their role in monitoring and preventing conflict of interest between managers and shareholders. According to Fama and Jensen (1983) they are more effective as they are concerned with maintaining their integrity and reputation in the labor market. From a resource based theoretical perspective, the NEDs have access to unique expertise thereby enriching corporate strategies and decision making (Rashid, et al., 2010). Diversity also involves reflecting the structure of the society, gender balance, ethnicity and diverse professions to enable a firm respond effectively to the dynamic of business environment. From an Agency Theory perspective, women directors bring new perspectives and are useful in strategy formulation and understanding of certain markets. Srinthi *et al.* (2011) also argues that boards with more women have greater public disclosure and better oversight of managers. From a Resource Based theoretical perspective, women directors bring in additional expertise, market networks and ethical views crucial in decision making (Letting *et al.*, 2012). The corporate governance guidelines also emphasize separation of the position of the CEO and that of the chairman of the board (OECD, 2005; CMA, 2002). According to Jensen and Meckling (1976) separation of the two positions ensures that no individual dominate in corporate decision-making. The governance variables identified in this subsection are used as independent variables while investigating the relationship between corporate governance and financial performance of privatized companies (Adams and Mehran, 2011; Chaghadari (2011) Latief et al., 2014; María and Sánchez, 2010; Rashid et al., 2010).

3.3 Financial Performance

Financial performance has been measured using different indicators. Some authors use accounting-based ratios such as Return on Assets (ROA) and Return on Equity (ROE) (Afeikhena, 2008; Omran, 2004). The ROA measures the percentage of profit that a firm earns from its total assets and therefore measures how efficiently managers use company assets to generate profit. ROE is an indicator of profit raised using shareholder funds (Megginson et al., 1994). The accounting based ratios are however considered inadequate as they are an indicator of short-term performance. They also evaluate past performance and hence lag the actions that bring

about the results (Letting et al., 2012). This is largely used in studies comparing the pre and post privatization performance.

Performance is also measured by the Tobin's Q defined as the ratio of the [market value](#) to the [replacement cost](#) of the firm's [physical assets](#) (Carter et al., 2010; Trien and Chizema (2011; Wei et al., 2005). Unlike the accounting ratios, the Tobin's Q reflects the investor's opinion and growth prospects of a firm based on past and current performance. Mule *et al.* (2013) also indicates that the Tobin's Q ratio gauges the investors' confidence in a firm's business prospects and how closely the managers and shareholders' interests are aligned. According to Morck, (1988), it is a measure of growth prospects of assets, defined by the future profitability of the assets in relation to their replacement value. Consequently, a ratio of less than 1.0 implies that the market value is lower than the assets of the firm and hence it would cost more to replace a firm's assets than it's worth. It is considered that the higher the value of Q, the more effective are the governance mechanisms and the better is the market's perception of the company's performance. This indicator of performance has been widely used in studies examining the causal relationships between ownership structure and firm performance (Mei, 2013; Mrad and Hallara, 2012; Ongore et al., 2011; Wei, et al., 2005; Yiwei et al., 2011; Mishari et al., 2012).

Some authors measure performance using efficiency indicators such as total sales, the ratio of sales to employees and total asset turnover (Sun and Tong, 2002; Ochieng and Ahmed, 2014 Omran, 2004). The accounting based ratios are however inadequate as they are an indicator of short-term performance. They also evaluate past performance and hence lag the actions that bring about the results (Letting et al., 2012). However, there is an increased trend in measuring efficiency of corporate entities using cost and technical efficiency indicators (Kamaruddin and Abokareh, 2012; Sifunjo et al., 2014; Yiwei et al., 2011). The concept of cost efficiency was introduced by Leibenstein's (1966) and estimates how close a firm's actual costs are to the costs of a best-practice firm producing the same outputs. Cost inefficiency may therefore arise where manager's use more inputs than would a best practice firm or employ an input mix that does not minimize costs for a given input price (Sifunjo et al., 2014). According to Leibenstein's (1966) inefficiency may be attributed to managerial deficiencies, lack of external and internal pressure on managers, lack of competition and inefficient production techniques. The concept of technical efficiency was introduced by Farrell (1957) and measures the effectiveness by which a given set of inputs is used to produce an output. A firm is technically efficient if it is producing the maximum output from the minimum quantity of inputs, such as labor, capital and technology (Sifunjo et al., 2014). The technical efficiency can therefore be applied to gauge productivity loss which may not be captured in the accounting based ratios.

There are two approaches mainly used to compute the efficiency values. The Data Envelopment Analysis (DEA) developed by measures the amounts of inputs used to produce outputs in a decision making unit (Charnes et al., 1978). This is a linear programming approach for measuring the efficiency of a multiple input and multiple output of an individual decision making unit (DMU). The measures of efficiency are based on either the output or the input set. The output-oriented approach of efficiency determines the extent to which output could be increased given inputs. On the other hand, the input-oriented approach measures the extent to which firms could proportionally reduce inputs to produce a given quantity of output. The use of DEA as a measure of efficiency has been used in several corporate governance studies (Abdullahi, et al. 2012; Kamaruddin and Abokareh, 2012; Kang, 2009). However, it is considered inadequate in measuring efficiency as it does not take account of the measurement errors.

The Stochastic Frontier Analysis (SFA) is considered superior as it allows the estimation of cost efficiency by decomposing the stochastic term into an inefficiency component and random error. According Coelli (2007), the SFA captures deviations values from the maximum attainable output for a given level of input in a firm and also allow controlling firm level and industry characteristics that could influence firm efficiency. Coelli (2007) indicates that under the SFA, the estimated inefficiency for any firm is taken as the conditional mean or of the distribution of the inefficiency term, given the observation of the composed error term and can be estimated for both and cost and technical efficiency functions. Several authors the SFA approach to measure efficiency in corporate governance research (Destefanis and Sena, 2007; Ochi and Yosra, 2012; Ayadi, 2014; Tanna et al., 2009; Ravi and Hovey, 2013).

4.0 Methods of Data Acquisition and Analysis in Corporate Governance Research

4.1 Data Sources

According to Saunders et al. (2009) most organizations collect and store data to support their operations which can be utilized in research. The information about main shareholders, board members, financial and accounting

information is provided in the annual reports of listed companies. The capital markets and stock exchange regulations require all listed companies to disclose in their annual reports, the names of the major shareholders in a company and board composition. The annual reports of listed companies are usually stored by the capital markets authority and the stock exchanges. The annual reports can also be downloaded from company websites. Some historical market information for listed companies is also kept by stock exchanges and document as handbooks. In some cases it may be necessary to either contact firms directly or use other public records in order to complete missing information.

4.2 Use of panel data

Most studies in corporate governance research use panel data and the companies are the unit of analysis (Ongore et al., 2011; Mei, 2013; Mishari et al. 2012; Wei et al, 2005). Panel data also known as longitudinal or cross-sectional time-series is a dataset in which the behavior of entities is observed across time. Longitudinal data is important as it enables the researcher to study change and development in variables under study while cross sectional data provides current information about a phenomenon (Saunders, et al., 2009). The main strength of using panel data in corporate governance studies is that it allows researchers to control for variables that cannot be observed such differences in firm characteristics which could influence firm performance. There are several soft wares of data analysis which handle panel data. For instance, the Stata soft ware handles panel data by using the *xtset* commands. Ideally use of panel data requires strongly balanced panels which imply that in corporate governance research, all companies should have data for all years. While using stata software, all data must be declared as panel data to allow the use time series commands.

4.3 Methods of Data Analysis

Data extracted from financial reports requires to be reduced to manageable size, developing summaries and extracting usable information (Cooper and Schindler, 2006). Most corporate governance studies examine the relationships between ownership structure, corporate boards and firm performance and to achieve this, a combination of descriptive statistics; correlation regression analysis is used. These methods are discussed in the following sub sections.

4.3.1 Descriptive Statistics and Correlation Analysis

The descriptive statistics are essential in corporate governance research as they summarize [observations](#) in order to communicate the largest amount of information as simply as possible.

Descriptive statistics provide statistical measures of central tendency and dispersion. The main measures of [central tendency](#) commonly used in research are the [mean](#), [median](#), and [mode](#) while common measures of [statistical dispersion](#) are the [standard deviation](#), [variance](#) and [range](#) (Cooper and Schindler, 2004; Mugenda and Mugenda, 2003). Most of the studies in corporate governance research use quantitative data and hence have the capacity to quantify the correlation between the independent and dependent variables or between two independent variables. The correlation analysis measures the strength and direction of the linear relationship between the two variables.

The correlation analysis yields two important measures of the strength. The degree to which two or more X variables are related to the Y variable is expressed as the coefficient of correlation r . The measure of strength can also be expressed as the coefficient of determination r^2 an indicator of the proportion of variation in Y that is explained by the regression equation (Cooper and Schindler, 2004; Weirs, 2002). The Cooper and Schindler (2004) indicate that the value of Pearson's coefficient of correlation falls between 0.00 (no correlation) and +1.00 (perfect correlation). Consequently, a positive value of r indicates a positive correlation while a negative value indicates a negative correlation: A relationship is considered strong when $r=0.5$ and above, moderate if r is between 0.3 and 0.49 and weak if r is below 0.29 (Field, 2000). According to Mugenda and Mugenda (2003) determining the strength of the association between the variables does not imply any causal relationship but forms the basis for selecting variables for further regression.

4.3.2 Panel Data Validity Tests

There are basic assumptions which justify the use of panel regression models for prediction of relationships and if they are not met, then the results may be biased, inefficient or invalid (Field, 2000). Most statistical methods using the time series are based on the assumption that the variables and the panels are stationary. A variable is said to be stationary if its mean remains constant over time (Hlouska and Wagner, 2005). Regression models also assume non existence of autocorrelation and heteroskedasticity among the data values. Autocorrelation occurs when the error terms of two different time periods are correlated while heteroskedasticity implies that variances of errors are not the same (Field, 2000). It is rare dataset meets all of the assumptions and failure to meet assumptions lead to biased estimates. This has led to the development of several econometric tests and use

of robust regression methods to ensure validity of panel regression models. Some of these modern econometric methods largely used in corporate governance research are discussed in the following subsections.

Panel Unit Root Test

One of the assumptions while using panel data regression models is that the variables and the panels are stationary. Any regression with non stationary variables is invalid and hence, any time-series application must start with testing stationarity of the data. The Stata software has a series of unit root tests to examine stationarity of data. These include the Levin-Lin-Chu (LLC), Harris-Tzavalis (HT), Im-Pesaran-Shin (IPS), Fisher-type and Breitung test. The null hypothesis under these tests is that all the panel data contain a unit root (Karaca and Ekşi, 2012). Consequently, if the null hypothesis is rejected then the variable can be used in regression in their level form (Charito, 2010). A panel may also have unit root which mean that there is more than one trend in the series. A stationary series implies its statistical properties such as mean and variances are all constant over time will be the same in the future as they have been in the past. The Hadri (2000) and Lagrange multiplier (LM) is used in testing for unit roots collectively for cross-sectional units included in a certain panel. The null hypothesis under the test is that all the panels (trend) are stationary. Consequently, if the null hypothesis is rejected then the panels can be used in regression the way they are.

However, where the panel data is not stationary, it can convert into a stationary form through the use of mathematical transformational differencing (Charito, 2010; Mule et al., 2013). Differencing involves making the series stationary by transform it into a series of period-to-period differences. The first difference of a time series is the series of changes from one period to the next. For instance if Y_t denotes the value of the time series Y at period t , then the first difference of Y at period t is equal to $Y_t - Y_{t-1}$. (Magee, 2013) . Where a unit root is established, the researcher should investigate whether there is a relationship between the variables using a cointegration test. Stock and Watson, (1988) indicate that cointegration refers to the fact that two or more series share a common trend. According to Charito (2010), when non-stationary variables are not cointegrated, they can be differenced to achieve stationarity and their differenced values be used in the regression model.

Hausman Test

A common occurrence in panel data is that each entity has its own individual characteristics that may or may not influence the independent variables. There are two regression models designed analyze the effects of individual effects. These are the Fixed Effects (FE) and the Random Effects (RE) regression models (Park, 2011). A regression model with an FE option examines the relationship between predictor and outcome variables with the assumption that something within the company which is the unit of analysis may impact or bias the predictor or outcome variables and we need to control for this. This is the rationale behind the assumption of the correlation between entity's error term and predictor variables. The FE model controls for all time-invariant differences between the individuals, so the estimated coefficients of the FE models cannot be biased because of omitted time-invariant characteristics. FE removes the effect of those time-invariant characteristics so we can assess the net effect of the predictors on the outcome variable. Another important assumption of the FE model is that those time-invariant characteristics are unique to the individual and should not be correlated with other individual characteristics.

On the other hand the RE model assumes that the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model. The main distinction between fixed and random effects is whether the unobserved individual effect embodies elements that are correlated with the regressors in the model (Green, 2008). Given the two options of regression models applicable in analyzing panel data a researcher has to choose which model (FE or RE) is more relevant and significant. The appropriate approach of choosing between FE and RE is running a Hausman specification test to determine the more efficient model (Borensteina et al., 2010; Koskinen, 2012). The procedure involves running both the FE and the RE regression models, saving the estimates and testing whether the unique errors are correlated with the independent variables. Under the test, the null hypothesis is that there is no significant correlation between the individual effects and the independent variables. A rejection of the null hypothesis confirms the argument in favor of the FE against the RE model.

3.7.4 Regression Models with Robust Standard Error Option

Panel dataset rarely meets all of the assumptions underlying use of regression models which could lead to biased estimates. It is recognized that panel data widely used in corporate governance research is extracted from companies which can be categorized by industry or grouped into years implying that there are repetitive measuring of values. It is likely that the errors of different observations can be highly correlated (autocorrelation of errors) with the adjacent time. This between-group variation could be the sources of differences in variances

or heteroscedasticity (Schmidheiny, 2013). According to Saunders et al. (2009) heteroskedasticity among the data values, leads to biased, inconsistent and less accurate or invalid results. Contemporaneous correlation also described as cross-sectional dependence of errors, is also in panel data with long time series and can lead to bias in regression results (Srivastava and Dwivedi, 1979). According to Baltagi (2001) cross-sectional dependence is a problem in macro panels with long time series (over 20-30 years).

To ensure validity of the statistical results, most recent studies in corporate governance which include a regression on panel data therefore adjust the standard errors of the coefficient estimates for possible dependence in the residuals (Candida, et al., 2015; Dimitris et al, 2016; Kim and Rasheed, 2013). The Stata provides the option to estimate standard errors that are robust to certain violations of the underlying econometric model. This involves the selection of Stata commands and options that produce robust standard error estimates for linear panel model

The regression analysis generates several outputs. The *F*-ratio tests whether the overall regression model is a good fit for the data. The output shows whether the independent variables significantly predict the dependent variable. In corporate governance research, it is measured whether the joint ownership or corporate board variables included in the regression model influence the firm financial performance significantly. The R^2 value also called the coefficient of determination which is the proportion of variance in the dependent variable that can be explained by the independent variables. Field, (2000) indicates the proportion of variation accounted for by the regression model. The regression model also generates *t* value which test for the statistical significance of each of the independent variables. In stata procedure, the *t*-value and corresponding *p*-value are located in the "*t*" and "*P*>|*t*|" columns. If a *p*-value is less than 0.05 it can be concluded that the coefficients are statistically significantly different from 0 (zero) at that level. A researcher can also choose a significance level of 0.10 or 0.01. In these cases, the lower the *p*-value the higher the relevance of the variable.

5.0 Conclusions

This paper examines the measurements and the methods of data analysis in corporate governance research. This study observes that ownership and corporate boards are the key independent variables used to explain firm financial performance. Ownership structure is defined by the percentage of shareholders who include: the government, foreign and institutional shareholders, large individuals and dispersed owners. Corporate board variables include board size measured by the total number of board members, percentage of non executive directors and women directors. Financial performance has been measured using three different types of indicators. Some studies use accounting-based ratios such as Return on Assets (ROA) and Return on Equity (ROE) while others use the Tobin's Q ratio. Some studies also use efficiency indicators computed using the Data Envelopment Analysis (DEA) and Stochastic Frontier Approach (SFA). It is also apparent that most studies in corporate governance research use panel data extracted from financial reports. Most of the studies use a combination of descriptive statistics, correlation and regression analysis to examine the relationships between ownership structure, corporate boards and firm performance. Due to assumptions associated with of panel data, a unit root test is used to examine stationarity of data while a Hausman test determines whether to use a Fixed Effects (FE) or Random effects regression model. A regression model with a robust standard error option is often used to control for heteroskedasticity and contemporaneous correlation which may lead to spurious results.

REFERENCES

- Adams, B. & Mehran, H. (2011). "Corporate Performance, Board Structure and their Determinants in the Banking Industry", Available at: <http://www.nyfedeconomists.org>. Accessed on 2nd June, 2015.
- Adusei, M. (2011). "Board Structure and Bank Performance in Ghana". *Journal of Money, Investment and Banking*, 19, 72-84.
- Adhikary, B. K & Hoang, H.G. 2014. "Board Structure and Firm Performance in Emerging Economies: Evidence from Vietnam". *Ruhuna Journal of Management and Finance*, 1 (1), 53-72
- Afeikhena, J. (2008). "Privatization and Enterprise Performance in Nigeria: Case Study of Some Privatized Enterprises". African Economic Research Consortiums Paper, Nairobi. Available at: <http://dspace.africaportal.org>. Accessed on 2nd June, 2015.
- Ayadi, I. (2014). "Technical Efficiency of Tunisian Banks". *International Business Research*, 7(4),170-181.
- Baltagi, H. (2001). *Econometric Analysis of Panel Data*. New York: John Wiley & Sons.
- Borensteina, M., Hedges, L.B, Julian P.T. Higgin, S. C & Rothstein H. (2010). "A Basic Introduction to Fixed-Effect and random-Effects Models for Meta-Analysis". *Research Synthesis Methods*, 1: 97-111.
- Candida, B., Gigante, M., Tritto M, B. (2015). "The Impact of Corporate Governance on Banks Performance and Loan Quality: Evidence From Italian Cooperative Banks". *Chinese Business Review*, 14 (8), 390-401.

- Carter, D A., D'Souza, F.K., Simkins B. J & Simpson, G. 2010. "The Gender and Ethnic Diversity of US Boards and Board Committees and Firm Financial Performance". *Corporate Governance: An International Review*, 18(5), 396–414.
- Chaghadari, M.F.(2011). "Corporate Governance and Firm Performance". *International Conference on Sociality and Economics Development*, 10, 484-489.
- Charito, B. J. (2010). "The Evolution of Corporate Governance in an Emerging Market: Evidence from Philippine Initial Public Offerings (IPO)". Available at: cba.upd.edu.ph/docs/. Accessed on 30th June, 2014.
- Charnes, A., Cooper, W. & Rhodes, E. (1978). "Measuring the Efficiency of Decision-Making Units". *European Journal of Operation Research*, 2, 429-44.
- Chibber, P.K & Majumdar, S.K. (1999). "Foreign Ownership and Profitability: Property Rights, Control and the Performance of Firms in Indian Industry". *Journal of Law and Economics*, 42,209-238.
- CMA, (2002). "Guidelines on Corporate Governance Practices by Public Listed Companies in Kenya". Gazette Notice No. 3362. Government Printer. Nairobi
- Coelli, T. (2007). A guide to Frontier Version 4.1. "A computer Programme for Stochastic Frontier Production and Cost Function Estimation". Available at: www.uq.edu.au/economics. Accessed 24th July, 2015
- Cooper, R.D & Schindler, P.S. (2004). *Business Research Methods*. Eighth Edition. Tata McGraw-Hill. New Delhi, India.
- Destefanis, S. & Sena, V. (2007). "Patterns of Corporate Governance and Technical Efficiency in Italian Manufacturing Firms". *Managerial and Decision Economics*, 28, 27-40.
- Dimitris K. C , McMillan D. G., Fotios I.P, &Tavakol, M.(2016) . Insider trading and future stock returns in firms with concentrated ownership levels. University of St. Andrews WP N° 16-005. Available at: <http://www.st-andrews.ac.uk>. Accessed on 4th April, 2016.
- Fama, F. & Jensen, M. C. (1983). "Separation of Ownership and Control". *Journal of Law and Economics*, 26, 301- 25.
- Farrell, M.J. (1957). "The Measurement of Productive Efficiency". *Journal of the Royal Statistical Society*. 12, 253-29
- Fauzi, F. and Locke, S. (2012). "Firm Performance: A Study of New Zealand Listed Firms". *Journal of Accounting and Finance*, 8(2), 43–67.
- Field, A. (2000). "Discovering Statistics Using SPSS for Windows". Sage Publications, London.
- William H. Greene 2008. "Econometric Analysis". 6th ed., Upper Saddle River, N.J.: Prentice Hall
- Grossman, S. & Hart, O.D. (1988). "One Share-One Vote and the Market for Corporate Control". *Journal of Financial economics*, 20,175-202.
- Hanke, H.S. (1987). "Privatization and Development". International Centre for Economic Growth Press. California, USA.
- Hlouska, J. and Wagner, M. (2005). "The Performance of Panel Unit Root and Stationarity Tests: Results from Large Scale Simulation Study". Available at: cadmus.eui.eu/bitstream/. Accessed on 20th May, 2013
- Hu, Y., & Izumida, S. (2008). "The Relationship between Ownership And Performance: A Review of Theory and Evidence". *International Business Research*, 1(4), 72-81.
- Jensen, M. & Meckling, W. (1976). "Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure". *Journal of Financial Economics*, (3), 305-360.
- Kamaruddin, B. & Abokareh, M.S. (2012). "The Performance of Privatized Firms: Empirical Analysis for Libya". *International Review of Business Research*, 8, 134 – 148.
- Kang, C. C. (2009). "Privatization and Production Efficiency In Taiwan's Telecommunications Industry". *Telecommunications Policy*, 33(9), 495-505.
- Karaca, S.S & Ekşi, I. H. (2012). The Relationship between Ownership Structure and Firm Performance: An Empirical Analysis over Istanbul Stock Exchange (ISE) Listed Companies International. *Business Research*, 5:172 - 181.
- Kim, K & Rasheed, A. (2013). "Board Heterogeneity and Stability in Firm Performance: An Empirical Study Utilizing Multi-Theoretic Approach". *Corporate Board: Role, Duties and Composition*,. 9, (1), 26-39
- Kose, J. & Sebert, L. (1998). "Corporate Governance and Board Effectiveness". Working Paper Series, No. Fin.98-045. Available at unimedia.ac.id. Accessed on 8th July, 2012.
- Koskinen, J. (2012). "Longitudinal Data Analysis: How to apply fixed-effects Models to Panel Data Using Stata". Available at <http://www.ccsr.ac.uk/staff/jk.htm>
- Laffronte, J. & Tirole, J. (1991). "Privatization and incentives". *Journal of Law Economics and organization*, 7, 84-105
- La Porta, R., Lopez-de-Silanes, F. & Shleifer, A. (2000). Corporate Ownership around the World. *Journal of Finance*, 54:471-517.

- Latief, R., Syed, H., & Syed, A. (2014). "Impact of Corporate Governance on Performance of Privatized Firms; Evidence from Non-Financial Sector of Pakistan" .*Middle-East Journal of Scientific Research* 19 (3), 360-366.
- Leibenstein, H. 1966. "Allocative Efficiency versus X-Efficiency". *American Economic Review*. 56(3), 392–415.
- Letting, N., Aosa, E. & Machuki, V. (2012). "Board Diversity and Performance of Companies Listed in Nairobi Stock Exchange". *International Journal of Humanities and Social Science*, 2, 172-182
- Lipton, M.& Lorsch, J. W. (1992). "A Modest Proposal for Improved Corporate Governance". *Business Lawyer*, 48, 59- 77.
- Magee, L. (2013). "Regression Models With Lagged Dependent Variables and Arma Models". Available At [Http://Socserv.Mcmaster.Ca](http://Socserv.Mcmaster.Ca). Accessed on 5th March, 2016
- Mallin C. A. (2007). *Corporate Governance*. Second Edition, Oxford University Press
- María, I. and Sánchez, G. (2010). "The Effectiveness of Corporate Governance: Board Structure and Business Technical Efficiency in Spain". Available at: link.springer.com. Accessed on 20th December, 2014
- Meggison, W. Nash, R. & Randenborgh, M. (1994). The Financial and Operating Performance of Newly Privatized Firms: An International Empirical Analysis. *The Journal of Finance*, 49, 403-452.
- Mei, Y. (2013). "State ownership and firm performance: Empirical evidence from Chinese listed Companies". *China Journal of Accounting Research*, 6, 75-87
- Mishari, A., Faisal, A. & Hesham, A. (2012). The Influence of Institutional and Government Ownership on Firm Performance: Evidence from Kuwait. *International Business Research*, 5 (10): 192- 200.
- Mrad, M. & Hallara, S. (2012). "The Impact of Residual Government Ownership on Performance and Value Creation: The Case of Privatized French Companies". *Procedia - Social and Behavioral Sciences*, 62, 473 – 488
- Mugenda, O.M. & Mugenda A.G. (2003). "*Research Methods; Quantitative and Qualitative Approaches*". Acts Press, Nairobi, Kenya.
- Mule, R. K, Mukras, M.S. & Oginda, M. N. (2013). "Ownership Concentration and Financial Performance of Listed Firms in Kenya". *European Scientific Journal*, 9 (2),184-211.
- Ochi, A. & Yosra, S. (2012) . "Ownership Structure and Efficiency of Tunisian Banking Sector". *Journal of Finance and Investment Analysis*, 3, 239-254.
- OECD, (2005). Principles of Corporate Governance. OECD. Available at: [at www.oecd.org](http://www.oecd.org). Accessed on 20th, April, 2014.
- OECD, (2010). "White Paper on Strengthening the Role of Institutional Investors in Latin American Corporate Governance" . Available at www.oecd.org. Accessed on 20th, April, 2014.
- Omran, M. (2004). "The Performance of State-Owned Enterprises and Newly Privatized Firms: Does Privatization Really Matter? *World Development*, 32, 1019-1041.
- Ongore, V.O.,K'Obonyo, P. O.& Ogutu, M. (2011). Implications of Firm Ownership Identity and Managerial Discretion on Financial Performance: Empirical Evidence from Nairobi Stock Exchange. *International Journal of Humanities and Social Science*, 1, 187-195.
- Park, H.M. (2011). "Practical Guides to Panel Data Modeling: A Step by Step Analysis Using Stata". Available at: <http://www.ijf.ac.jp/faculty> Accessed on 20th April, 2013
- Pfeffer, J. (1972). "Size and Composition of Corporate Board of Directors: The Organization and its Environment". *Administrative Science Quarterly*, 17, 218-29.
- Rashid, A., De Zoysa, L. Odh, S. & Rudkin, K. 2010. " Board Composition and Firm Performance: Evidence from Bangladesh". *Australasian Accounting Business and Finance Journal*, 4, 76-95.
- Ravi, P. S & Hovey, M. (2013) . "Corporate Governance and Efficiency in Nepalese Commercial Banks": *International Review of Business Research Papers*. 9(4),53 – 64
- Saunders, M., Lewis, P, & Thornhill, A. 2009. *Research Methods for Business Students*.5th Edition.
- Schmidheiny, K. (2013). "Panel Data: Fixed and Random Effects": available at www.schmidheiny.name/teaching/panel2up.pdf
- Shleifer, A. & Vishny, R.W. (1997). "A Survey of Corporate Governance". *Journal of Finance*, 52(2), 737-783.
- Sifunjo E. K., Lyaga, S.S & Wafubwa, B. M. (2014). X-Efficiency of Commercial Banks in Kenya. *Research Journal of Finance and Accounting*, 5(14), 103-116.
- Srindhi, B., Gul, F. A., & Tsai, J. (2011). "Female Directors and Earnings Quality". *Contemporary Accounting Research*, 28, 1610–1644.
- Sun, Q. and Tong, W. (2002). Malaysia Privatization: A Comprehensive Study. *Journal of Financial Management*. 31, 79-105.
- Srivastava, V. K., & Dwivedi T. D. (1979). "Estimation of Seemingly Unrelated Regression Equations: A Brief Survey". *Journal of Econometrics*, 10, 15–32.

- Tanna, S. Pasiouras, F. & Nnadi. M. (2009). The Effect of Board Size and Composition on the Efficiency of UK Banks. Available at: <https://curve.coventry.ac.uk/open>. Accessed on 12th March, 2015
- Thomsen, S. & Pedersen, T. (2000) . Ownership Structure and Value of the Largest European Firms. *Journal of Management and Governance*, 7: 27-55.
- Tian, L & Estrin, S. (2008). Retained State Shareholding in Chinese PLCs: Does Government Ownership Reduce Corporate Value? *Journal of Comparative Economics*, 36: 74–89.
- Trien, L. & Chizema, A. (2011). “State Ownership and Firm Performance: Evidence from the Chinese Listed Firms”. *Organizations and Markets in Emerging Economies*, 2, 72-90.
- Uwuigbe, U. & Olusanmi, O. (2012). “An Empirical Examination of the Relationship between Ownership Structure and the Performance of Firms in Nigeria”. *International Business Research*, 5 (1), 208- 215.
- Wei, Z., Xie, F. & Zhang, S. (2005). “Ownership Structure and Firm Value in China’s Privatized Firms: 1991-2001”. *Journal of Financial & Quantitative Analysis*, 40, 87-108.
- Yermack, D. (1996). Higher Market Valuation of Companies with a Small Board of Directors. *Journal of Financial Economics*, 40, 185–211.
- Zelenyuk, V. and Zheka, V. (2006). “Corporate Governance and Firm’s Efficiency: The Case of a Transitional Country, Ukraine”. *Journal of Production Analysis*, 25, 143–157.