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KEYWORDS	ABSTRACT
Corporate Governance, Financial Performance, Intellectual Capital, Pakistan Stock Exchange	The focus of this study is to analyze the effect of corporate governance and intellectual capital on the financial performance of non-financial companies listed on Pakistan Stock Exchange (PSX). The study uses a board characteristics model with three measures of financial performance: return on assets (ROA), return on equity (ROE) and the price-earnings ratio (P/E), with three measures of board efficiency to cope with endogeneity and heteroscedasticity and serial autocorrelation: the Generalized Method of Moments (GMM). The financial performance models account for a significant proportion of the financial performance variation: ROA (78.3%), ROE (68.6%) and P/E (57.8%). Board independence and board ownership are important in all three models but with different directions of impact, depending on whether accounting or market performance measures are used. The major components of intellectual capital, namely structural capital efficiency and capital employed efficiency, are generally the most important factors, with board size and CEO duality being relatively unimportant. The results validate the agency theory notion that governance arrangements reduce conflicts between owners and managers and validate that the role of intellectual capital is a material one, which has been under-researched in an emerging market environment. The study is methodologically important for the inclusion of the study of endogeneity (GMM), which was missing in the previous studies conducted in Pakistan, and substantive for studying the non-uniform effects of governance and intellectual-capital on the accounting and market-based performance metrics.
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Introduction

Both Corporate Governance and intellectual capital have generated substantial empirical streams of research that investigate their relationships with firm financial performance, but there is limited research that examines the inter- and synergistic effects of a combination of corporate

governance and intellectual capital, especially in developing countries. The scandals of Enron and WorldCom and the transition from an industrial to a knowledge-based economy have increased academic and regulatory focus on governance mechanisms, and the competitive advantages of intangible resources – human capital, structural capital, and capital employed efficiency – have grown in significance (Inkinen, 2015).

Many firms today rely as much on their intangible assets (proprietary processes, employee knowledge, customer relationships, and organizational routines) as on their physical and financial capital, but traditional financial statements don't measure these value drivers directly. This results in a measurement void which is the gap which intellectual capital research, and more specifically Pulic's (1998) Value Added Intellectual Coefficient (VAIC), attempts to fill. In Pakistan, Securities and Exchange Commission of Pakistan (SECP) has gradually tightened the Code of Corporate Governance since 2002 with increasing provisions on board composition, disclosure and director independence. Compliance and disclosure practices are, however, variable by industry and enforcement lagging more established markets. In parallel, there is limited research that simultaneously models corporate governance, intellectual capital and financial performance in Pakistan.

The comparison is made with the most relevant study, by Makki and Lodhi (2014), which has a cross-sector sample and does not account for endogeneity of the governance and intellectual-capital variables, which may have a negative impact on the results: variables of governance structure and intellectual-capital investment can be jointly determined by firm performance rather than being exogenously imposed on it. This paper tries to fill this gap by concentrating on non-financial listed companies on the PSX and by adopting an instrumental-variables (IV) (or GMM) approach which explicitly considers endogeneity, heteroscedasticity and serial correlation effects. The research questions are: (1) how board structure variables (size, independence and ownership) influence financial performance; (2) which components of intellectual capital efficiency are most strongly correlated with financial performance; and (3) what is the combined influence of corporate governance and intellectual capital on financial performance, and what are most important.

The goal is to identify the most important governance and intellectual-capital determinants of accounting-based (ROA, ROE) and market-based (P/E) financial performance measures, which in turn proves to be quite significant in determining the final price of governance and intellectual capital for PSX-listed non-financial firms (as can be seen from the results presented below). This study has three contributions. Firstly, it jointly models the corporate governance and intellectual capital as determinants of financial performance of a sector-balanced sample of non-financial firms of Pakistan Stock Exchange, going beyond the limited evidence base from the Pakistani context by Makki and Lodhi (2014). Second, it explicitly and directly deals with endogeneity, as opposed to assuming strict exogeneity in pooled OLS or fixed/random-effects models, by using GMM estimation, based on the diagnostic approach of Baltagi (2008). Third, it estimates separate models to account for both the accounting-based (ROA, ROE) and market-based (P/E) measures

of performance, thereby revealing that governance and intellectual-capital effects are not consistent across these two measures of performance, which has direct implications for the interpretation of governance reforms by the boards, regulators and investors.

Literature Review and Hypothesis Development

Theoretical Framework

This study is based on two theoretical frameworks that complement each other. The agency theory (Smith, 1776/1937) is the main lens for the governance variables: There are information asymmetries and conflicts of interest between managers (agents) and shareholders (principals), and board structure (board size, independence, board ownership, and duality in board leadership) is the governance mechanism by which shareholders monitor and discipline management (Kakabadse & Kakabadse, 2001). A resource-based view provides the motivation for the intellectual-capital variables as they are a bundle of tangible and intangible resources, and sustained competitive advantage comes more from the intangible resources that are valuable, rare, and hard to imitate (human capital, structural capital, and organizational routines) than from physical assets. However, when the intuition of asset-based value creation is translated into an operational definition that is computable from audited financial statements, as in the case of Pulic (1998), it becomes tractable for large-sample emerging-market research where consistent and reliable collection of survey-based or disclosure-based measures of intellectual capital is hard.

Corporate Governance and Financial Performance

The research in corporate governance is mostly based on agency theory, which suggests that as boards separate ownership and management, there arise conflicts of interest, which corporate governance bodies are supposed to resolve (Smith, 1776; Kakabadse & Kakabadse, 2001). The size, independence, ownership, and duality of board structure have been the most widely researched proxies of board governance. Research on the effect on board size on performance is mixed, with some finding it has a positive relationship with performance, as larger boards allow for more deliberation, access to external networks and expertise, and slower, more expensive, more likely-to-fail decision making processes (Brown & Caylor 2004). The conclusions reached by the studies on board independence are also split: On the one hand, Larcker, Richardson and Tuna (2007) identify a negative association with accounting performance, despite an increase in governance quality, and, on the other hand, there are studies (such as Tornyeva & Wereko, 2012) that find a positive association with accounting performance, which agrees with independent directors bringing external expertise and reducing managerial entrenchment.

Typically, board ownership is supposed to align the interests of the manager and the shareholders, reduce the incentive of managers to pursue private benefits at the shareholders' expense and has been correlated with firm value by, for example, La Porta, Florencio and Shleifer (2002) and Klapper and Love (2002) extend this logic to the emerging markets specifically where the protection of investors is low, as in Pakistan. The idea of CEO duality, in which the CEO and the

chairman of the board are the same person, is that it may reduce the monitoring function of the board of directors, as the CEO may do both the setting of the agenda and the oversight of it (Bhagat & Bolton, 2008; Gompers, Ishii, & Metrick, 2003); although the empirical evidence on the performance consequences of CEO duality is mixed and sample-specific.

Intellectual Capital and Financial Performance

Intellectual capital (IC) is the value of the firm's intellectual resources that lie outside the firm's balance sheet and are becoming more and more important in knowledge intensive sectors to achieve a competitive advantage; it is the value of the human, structural, and relational resources used in the firm. The IC, as measured by the Value Added Intellectual Coefficient (VAIC) offered by Pulic (1998), which consists of human capital efficiency (HCE), structural capital efficiency (SCE) and capital employed efficiency (CEE), is the most commonly used measure of IC because it can be calculated from standard and audited financial statements that are available to compute IC measures, and can be computed in a way that is feasible for large panel studies. HCE measures the value added generated for each dollar of employee compensation while SCE measures the value added generated for each dollar of value-added net of human capital (value added divided by employee compensation).

CEE measures the value added generated for each dollar of physical and financial capital invested in the organization. The empirical results of banking (Mondal & Ghosh, 2012) and pharmaceutical companies (Vishnu & Gupta, 2014) and of technology companies (Shiu, 2006) all show a positive correlation between IC efficiency and financial performance; however, the relative importance of each component of the VAIC depends on industry, country, and performance measures, and thus the three components should be analyzed individually and not as a single index. This module focuses on corporate governance, intellectual capital, and firm performance.

The module is based on the concept of Corporate Governance, Intellectual Capital and Firm Performance. A narrower body of work discusses governance in connection with the IP: In theory, governance of IP leads to competitive advantage, as Keenan and Aggestam (2001) suggest that if boards actively manage intangible asset allocation, they will be better equipped to safeguard and enhance firm value. Cerbioni and Parbonetti (2007) show that the structure and independence of the boards are significant factors in the level of intellectual capital disclosure among European biotechnology companies, while Appuhami and Bhuyan (2015) document a similar governance–disclosure relationship for Australian service companies. This is followed by the key precedent of Makki and Lodhi (2014) who have addressed the relationship between corporate governance and financial performance in the context of Pakistan, and they have found that the relationship between the two is mediated by intellectual capital. Basyith (2016) further extends this stream of research to Indonesia, using GMM and two-stage least squares, and finds that only a small number of governance indicators are robust to endogeneity correction once intellectual capital is controlled for — a finding that directly motivates the estimation approach that will be followed in this study.

Research Gap

This review identifies three gaps. Firstly, the evidence base for the impact of governance and intellectual capital on financial performance in Pakistan is sparse and in the case of Makki and Lodhi (2014) susceptible to endogeneity bias. Second, the majority of previous research focuses on a single performance indicator, such as an accounting-based ratio, meaning they are unable to comment on the extent to which governance and intellectual-capital effects are generalizable to market-based valuation. Third, few studies disentangle VAIC into its three components when examining with multiple performance measures at once, potentially obscuring offsetting or measure-specific effects. The aim of this study is to sample and close all three gaps in one sector.

Hypotheses

Based on the theoretical framework adapted from Makki and Lodhi (2014) and the literature reviewed above, the following seven hypotheses are tested.

H1: Financial performance is significantly influenced by board size. Larger boards may bring broader expertise and external networks, but coordination costs and slower decision-making can offset these benefits as board size increases.

H2: CEO duality has a significant impact on financial performance. Combining the CEO and chair roles concentrates authority and may weaken independent board monitoring of management.

H3: Board independence has a significant impact on financial performance. Monitoring is expected to be strengthened by independent directors, but stronger monitoring does not necessarily have the same effect on the market and accounting.

H4: Board ownership has a significant impact on financial performance. In accordance with agency theory, it is anticipated that director share ownership will align shareholder and managerial interests.

H5: Human capital efficiency has a positive and significant impact on financial performance, reflecting the productivity of employee-related value creation.

H6: Structural capital efficiency has a positive and significant impact on financial performance, reflecting the value embedded in organizational systems, processes, and routines.

H7: Capital employed efficiency has a positive and significant impact on financial performance, reflecting the productivity of physical and financial capital.

Data and Methodology

Sample and Data

The sample consists of secondary panel data for 30 non-financial firms listed on the PSX, which are spread across six sectors (five firms per sector) and observed for 8 years (2009–2016) resulting in 240 firm-year observations to guarantee a sample not dominated by any one sector/industry. Financial-sector firms (banks, insurers, and other financial institutions) are not included as they have a distinctly different structure of capital, regulatory capital requirements, and process for computing value-added than non-financial firms, or else the VAIC and leverage measures would be confounded. Information has been hand collected from the annual reports of the firms which are audited and required to be made under the Companies Ordinance and SECP Code of Corporate Governance and checked within the PSX filings for consistency.

Variable Measurement

Four indicators are used to measure corporate governance: board size (BSIZE, total number of directors), CEO duality (CEOD, dummy variable = 1 if the CEO also chairs the board), board independence (BOARD_INDP, the percentage of independent directors), and board ownership (BOARD_OW, the percentage of shares held by directors, their spouses, and their children). The value added measured by Intellectual capital components of Pulic (1998) (Human capital, Structural capital, Capital employed) scaled by value added. To reflect current and future profitability as well as market valuation, two accounting ratios (ROA and ROE) and one market ratio (P/E) are used to measure financial performance. We include firm size (natural log of total assets) and leverage (total debt to equity) as control variables following previous governance-performance research. The measurement of each variable and the hypothesized direction of the measurement are summarized in Table 1.

Table 1: Variable Definitions and Measurement

Variable	Symbol	Measurement	Expected Sign
Board Size	BSIZE	Total number of directors on the board	±
CEO Duality	CEOD	Dummy = 1 if CEO also chairs the board, 0 otherwise	–
Board Independence	BOARD_INDP	Percentage of independent (non-executive) directors on the board	+
Board Ownership	BOARD_OW	Percentage of shares held by directors, their spouses, and children	+
Human Capital Efficiency	HCE	Value added (VA) divided by human capital (HC), per Pulic (1998)	+
Structural Capital Efficiency	SCE	Structural capital (VA – HC) divided by VA	+
Capital Employed	CEE	VA divided by capital employed (book value	+

Efficiency		of net assets)	
Return on Assets	ROA	Net income divided by total assets (%)	dependent
Return on Equity	ROE	Net income divided by shareholders' equity (%)	dependent
Price-Earnings Ratio	P/E	Market price per share divided by earnings per share	dependent
Firm Size	LN(SIZE)	Natural logarithm of total assets	control
Leverage	LEVERAGE	Total debt divided by total equity	control

Model Specification

Three panel regression models are estimated, one for each performance measure, with firm and year subscripts i and t :

$$ROA_{it} = \beta_0 + \beta_1 BSIZE_{it} + \beta_2 CEOD_{it} + \beta_3 BOARD_INDP_{it} + \beta_4 BOARD_OWN_{it} + \beta_5 HCE_{it} + \beta_6 SCE_{it} + \beta_7 CEE_{it} + \beta_8 LN(SIZE)_{it} + \beta_9 LEVERAGE_{it} + \varepsilon_{it}$$

$$ROE_{it} = \beta_0 + \beta_1 BSIZE_{it} + \beta_2 CEOD_{it} + \beta_3 BOARD_INDP_{it} + \beta_4 BOARD_OWN_{it} + \beta_5 HCE_{it} + \beta_6 SCE_{it} + \beta_7 CEE_{it} + \beta_8 LN(SIZE)_{it} + \beta_9 LEVERAGE_{it} + \varepsilon_{it}$$

$$P/E_{it} = \beta_0 + \beta_1 BSIZE_{it} + \beta_2 CEOD_{it} + \beta_3 BOARD_INDP_{it} + \beta_4 BOARD_OWN_{it} + \beta_5 HCE_{it} + \beta_6 SCE_{it} + \beta_7 CEE_{it} + \beta_8 LN(SIZE)_{it} + \beta_9 LEVERAGE_{it} + \varepsilon_{it}$$

where ε_{it} is the firm-year error term. All right-hand-side variables are as defined in Table 1.

Estimation Technique

Pooled OLS, fixed-effects, and random-effects regression are all subject to assumption of strict exogeneity of regressors and can give biased and inconsistent coefficient estimates when one or more of the governance or intellectual-capital variables is plausibly endogenous to financial performance, such as the ease of attracting independent directors or the amounts that more profitable firms invest in structural capital. Diagnostic tests were therefore employed to choose the best estimator among the different alternatives. A Hausman-type specification test (Hausman, 1978) was used to test fixed- versus random-effects specifications; a modified Wald test was used to test for group-wise heteroscedasticity; and a Wooldridge test was used to test for serial autocorrelation in the panel. Three diagnostic tests suggested that the pooled OLS, fixed-effect and random-effects models were all rejected because of the presence of heteroscedasticity, serial autocorrelation and endogeneity.

The study thus estimates all three models using the Generalized Method of Moments (GMM) with lagged values of the endogenous regressors as instruments, consistent under both heteroscedasticity and autocorrelation of unknown form, and recommended by Baltagi (2008). The validity of the instruments for each model is tested using the Hansen/Sargan J-statistic,

which is tested under the null hypothesis that the instruments are not correlated with the error term (the over-identifying restrictions are valid).

Results

Descriptive Statistics

Descriptive statistics for the full panel are listed in table 2. The average number of directors on the board is about 8.6 (range 7-15) which is like the average number of board members reported by PSX-listed companies in past governance studies. Independent directors have an average of 25.5% (range 14%-70%) on the board, while the average level of director ownership is 15.5% (range 0%-74.7%) – reflecting significant cross-firm variation in the capacity to monitor and in the degree of insider alignment. Similarly, mean HCE (5.73) is significantly higher in magnitude and more dispersive than mean SCE (0.72) and mean CEE (0.42) and this is like the pattern seen in VAIC studies conducted in other emerging markets (Mondal & Ghosh, 2012). The leverage and firm size variables are important as they result in a wide range of each indicator with some firm-years experiencing losses, as evidenced by the negative minimum values for mean ROA (9.98%), ROE (14.57%), and P/E (8.70%).

Table 2: Descriptive Statistics (30 firms, 2009–2016, 240 firm-year observations)

Variable	Mean	Maximum	Minimum	Std. Dev.
BSIZE	8.575	15.000	7.000	1.717
CEOD	0.342	1.000	0.000	0.475
BOARD_INDP	25.517	70.000	14.000	21.627
BOARD_OWN	15.467	74.720	0.000	22.087
HCE	5.730	56.948	-0.363	5.025
SCE	0.716	0.982	-1.102	0.232
CEE	0.424	7.829	-0.007	0.805
ROA (%)	9.977	84.200	-37.900	14.496
ROE (%)	14.566	79.000	-58.480	17.743
P/E	8.704	61.310	-65.860	11.639
LN(SIZE)	23.328	25.790	19.900	1.201
LEVERAGE	1.470	11.100	0.050	1.631

Regression Results

The GMM results are presented in Table 3 for the three financial performance measures. In all three models, the J-statistics are insignificant ($p = .311, .244, .773$ respectively), meaning that the instruments are valid and that the over-identifying restrictions cannot be rejected. The adjusted R² values of 78.3% for ROA, 68.6% for ROE and 57.8% for P/E suggest that the models capture a significant fraction of the cross-sectional and time series variance in each of the performance measures.

Table 3: GMM Regression Result

Variable	ROA Coef. (p)	ROE Coef. (p)	P/E Coef. (p)
BSIZE	1.988 (.005)**	0.274 (.723)	0.372 (.584)
CEOD	-0.173 (.906)	0.935 (.650)	3.264 (.165)
BOARD_INDP	-0.054 (.004)**	-0.070 (.007)**	0.021 (.038)*
BOARD_OWN	0.040 (.319)	-0.069 (.000)**	0.072 (.018)*
HCE	0.057 (.000)**	0.178 (.352)	0.109 (.007)**
SCE	1.185 (.532)	20.158 (.007)**	2.059 (.016)*
CEE	4.748 (.002)**	2.239 (.004)**	-1.551 (.192)
LN(SIZE)	5.946 (.000)**	5.901 (.000)**	1.283 (.194)
LEVERAGE	-2.433 (.000)**	-2.005 (.000)**	-0.264 (.659)
Adj. R ²	0.783	0.686	0.578
Prob(J-stat)	0.311	0.244	0.773

* $p < .05$, ** $p < .01$

CEOs' dual roles as CEO and chair of the board are insignificant in all three models, giving no support to H2 — in this sample, duality of the CEO and chair of the board does not affect any of the three measures of accounting performance in a measurable way. The direction of the results for board independence is opposite for accounting-based measures (ROA and ROE) and similar for the market-based measure (P/E) — a pattern that mirrors the opposite effect of monitoring costs (depressing accounting profit) and increased quality of governance (raising valuation) to the market, as argued by Larcker et al. (2007); H3 is therefore qualitatively supported, but only after the performance measure is taken into account. Board ownership is included in a similar fashion, positive ROA and ROE, but negative P/E, and statistically significant in all three models, with a sign depending on the model of performance measurement, so H4 is supported as well.

Of the intellectual capital components, capital employed efficiency (CEE) is the most consistent in the accounting-based performance (ABP) (positive and significant for ROA and ROE), but not significant for P/E, thus only partially supporting H7. The partial support for H6 is supported by the significance of structural capital efficiency (SCE) in ROE and P/E and not ROA. Human capital efficiency (HCE) is important for ROA and P/E, but not for ROE, thus support partial to H5. As for the overall conclusion on whether or not the intellectual capital efficiency is important for financial performance, the results indicate that at least one IC component is significant provided that the specific performance measure is different in each model. Table 4 shows the support of the hypotheses in the three models.

Table 4: Summary of Hypothesis Testing

Hypothesis	ROA	ROE	P/E	Overall
H1: Board size → performance	Supported	Not supported	Not supported	Partially supported
H2: CEO duality → performance	<u>Not supported</u>	Not supported	<u>Not supported</u>	Not supported

H3: Board independence → performance	Supported (-)	Supported (-)	Supported (+)	Supported, sign varies
H4: Board ownership → performance	Not supported	Supported (-)	Supported (+)	Partially supported, sign varies
H5: HCE → performance	Supported	Not supported	Supported	Partially supported
H6: SCE → performance	Not supported	Supported	Supported	Partially supported
H7: CEE → performance	Supported	Supported	Not supported	Partially supported

Discussion

Two results are of special significance. First, the direction of the board-independence and board-ownership effects switches from accounting-based performance measures to market-based ones. This is in line with the monitoring-cost interpretation: independent, low-ownership boards could raise the immediate reporting and compliance costs, or even account more strictly, which would drive down the reported ROA and ROE for a short period, but signal to the market the increased oversight, and the investors might be willing to pay for it in the form of higher P/E even if the accounting profitability falls in the near term. This suggests that one governance proxy, measured against one governance indicator, can give a materially incomplete — or even misleading — picture of whether a governance mechanism is ‘working’ or not.

Second, none of the VAIC components dominates for each of the three performance measures, indicating that the different components capture different value-creation processes (capital productivity, process and structural efficiency, and physical capital and financial capital efficiency) that have differential prices, depending on the accounting- or market-based measures. Capital employed efficiency is the most consistent and likely because it has the closest relationship to asset turnover and operating efficiency which in turn have the closest relationship to accounting profitability as measured by ROA and ROE. Structural capital efficiency, on the other hand, is more consistently priced by the market (through P/E) and by ROE, as this is a signal of sustainable and hard-to-imitate competitive advantage that the investor infuses into value ahead of the accounting statement that is fully reflected.

The results are broadly corroborative of the basic premise of agency theory that governance mechanisms are systematically related to firm performance, and extend the Pakistani evidence base largely drawn from Makki and Lodhi (2014), by employing a methodologically rigorous instrumental-variable approach that holds firm control for endogeneity, an explicit challenge identified in the prior literature. In addition, they extend Basyith's (2016) findings for Indonesia which showed that the majority of governance indicators are not robust enough against endogeneity when intellectual capital is included in the analysis, whereas in this sample of Pakistan, only board independence and board ownership are able to survive endogeneity correction, and their interpretation relies critically on the type of performance measure applied to them.

Conclusion, Implications, and Limitations

The study, based on panel data for 30 non-financial firms listed on the Ghana Stock Exchange (GSE) between 2009 and 2016, reveals that an accounting-based measure of financial performance is more strongly associated with corporate governance than an accounting-based measure of intellectual capital, while a market-based measure of financial performance is more closely related to intellectual capital. Board independence and board ownership are the governance variables that are most consistently significant, while structural capital efficiency and capital employed efficiency are the most consistently significant characteristics of the intellectual capital.

Theoretical Implications

For regulators, the results validate ongoing SECP attention to both financial and non-financial (intellectual capital) disclosure, as the results demonstrate that the efficiency in the use of intellectual capital is material and thus under-disclosed from the firm value perspective. For boards and firm management, the findings recommend taking into account investments in board reforms as well as investments in structural and human capital, because both are individually correlated with financial performance, and because the accounting cost of a better governance should be measured against the market valuation of a better governance rather than against accounting measures. The market-based (P/E) results indicate that the three factors—board independence, board ownership, and structural capital efficiency—are signal variables that can be considered in valuation models of PSX-listed companies.

Practical and Policy Implications

For regulators, the results validate ongoing SECP attention to both financial and non-financial (intellectual capital) disclosure, as the results demonstrate that the efficiency in the use of intellectual capital is material and thus under-disclosed from the firm value perspective. For boards and firm management, the findings recommend taking into account investments in board reforms as well as investments in structural and human capital, because both are individually correlated with financial performance, and because the accounting cost of a better governance should be measured against the market valuation of a better governance rather than against accounting measures. The market-based (P/E) results indicate that the three factors—board independence, board ownership, and structural capital efficiency—are signal variables that can be taken into account in valuation models of PSX-listed companies.

Limitations

There are four limitations to the study that future studies should address. However, the small number of firms (five firms in each sector, 240 firm-year observations) means that statistical power and hence conclusions reached for individual sectors are somewhat limited and do not necessarily generalise to the wider sector. Second, the number of instruments used relative to the number of

firms in the cross-section is important; too many instruments can over-fit the model and cause the p-value for the J-statistic to be spuriously high, misleading those using it to believe that the instrument is valid. The reported J-statistics are of no significance in all three models, but the number of instruments and instrument-to-firm ratio should be explicitly reported and should be reduced (e.g. by collapsing instrument sets) where possible, to enable the reviewers to assess whether there is any real power in this sample for the Hansen/Sargan test.

Third, VAIC is an imperfect measure of intellectual capital, because it relies entirely on data from the financial statements, and thus fails to measure non-financial aspects such as “relational” capital or employee capability and innovation output; future research should triangulate this with IC measures based on disclosures or on surveys. Fourth, the governance proxies are only at the level of the board; they do not reflect features of the audit committee, ownership beyond directors, or the overall governance approach and board dynamics that go beyond what is observed in the governance structures proxied by the variables.

Directions for Future Research

This study could be extended in four ways in future. First, with longer samples and more firms, sector-based estimation could be accomplished, and a formal test run to determine the stability of the documented sector-wise relationships between governance and performance, and IC and performance could be made. Second, adding the audit-committee characteristics and ownership concentration of the directors alone (i.e. institutional and family ownership) would give a more comprehensive view of governance. Third, integrating the VAIC with disclosure-based data or primary survey data (provided by SECP officials, boards, and investors) would help triangulate the intellectual-capital construct and provide tests to determine whether the market's valuation of structural capital is truly a result of value creation or simply the result of lower information asymmetry around disclosure firms. Fourth, because of the accounting/market divergence found in this study, future research could be conducted explicitly modelling the time path through which governance-induced accounting costs are realized in subsequent market valuation, further testing the monitoring-cost interpretation than can be performed in the cross-sectional GMM setting employed in this study.

References

- Appuhami, R., & Bhuyan, M. (2015). Examining the influence of corporate governance on intellectual capital efficiency: Evidence from top service firms in Australia. *Managerial Auditing Journal*, 30(4/5), 347–372.
- Baltagi, B. H. (2008). *Econometric analysis of panel data* (3rd ed.). Wiley.
- Basyith, A. (2016). Corporate governance, intellectual capital and firm's performance. *Research in Applied Economics*, 8(1).
- Bhagat, S., & Bolton, B. (2008). Corporate governance and firm performance. *Journal of Corporate Finance*.

- Brown, L. D., & Caylor, M. L. (2004). Corporate governance and firm performance (Working paper). *Georgia State University*.
- Cerbioni, F., & Parbonetti, A. (2007). Exploring the effects of corporate governance on intellectual capital disclosure: An analysis of European biotechnology companies. *European Accounting Review*, 16(4), 791–826.
- Gompers, P., Ishii, J., & Metrick, A. (2003). Corporate governance and equity prices. *The Quarterly Journal of Economics*, 118(1), 107–155.
- Hausman, J. (1978). Specification tests in econometrics. *Econometrica*, 46(6), 1251–1271.
- Inkinen, H. (2015). Review of empirical research on intellectual capital and firm performance. *Journal of Intellectual Capital*, 16(3).
- Kakabadse, A., & Kakabadse, N. (2001). Dynamics of executive succession. Corporate Governance: *The International Journal of Business in Society*, 1(3).
- Keenan, J., & Aggestam, M. (2001). Corporate governance and intellectual capital: Some conceptualisations. Corporate Governance: *An International Review*, 9(4).
- Klapper, L. F., & Love, I. (2002). Corporate governance, investor protection, and performance in emerging markets (*Policy Research Working Paper No. 2818*). World Bank.
- La Porta, R., Florencio, L., & Shleifer, A. (2002). Government ownership of banks. *Journal of Finance*, 57.
- Larcker, D., Richardson, S., & Tuna, I. (2007). Corporate governance, accounting outcomes, and organizational performance. *The Accounting Review*, 82.
- Makki, M. A., & Lodhi, A. (2014). Impact of corporate governance on intellectual capital efficiency and financial performance. *Pakistan Journal of Commerce and Social Sciences*, 8(2).
- Mondal, A., & Ghosh, S. K. (2012). Intellectual capital and financial performance of Indian banks. *Journal of Intellectual Capital*, 13(4), 515–530.
- Pulic, A. (1998). Measuring the performance of intellectual potential in knowledge economy. Paper presented at the 2nd McMaster World Congress on Measuring and Managing Intellectual Capital.
- Shiu, H. (2006). The application of the value-added intellectual coefficient to measure corporate performance: Evidence from technological firms. *International Journal of Management*, 23(2), 356–365.
- Smith, A. (1776/1937). The wealth of nations (E. Cannan, Ed.). *Modern Library*.
- Tornyeva, K., & Wereko, T. (2012). Corporate governance and firm performance: Evidence from the insurance sector of Ghana. *European Journal of Business and Management*, 4(13), 86–94.
- Vishnu, S., & Gupta, V. K. (2014). Intellectual capital and performance of pharmaceutical firms in India. *Journal of Intellectual Capital*, 15(1), 83–99.