



DOES BANK CORPORATE GOVERNANCE MATTER FOR BANK PERFORMANCE AND RISK-TAKING? NEW INSIGHTS OF AN EMERGING ECONOMY



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ABSTRACT

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This study empirically focuses on the effects of corporate governance on bank performance and risk-taking during the financial crisis of 2007-2008. Using a balanced panel data in an emerging economy, we examine whether banks with corporate governance mechanism have heterogeneous effect on profitability and risk-taking amidst the crisis. Our empirical findings show that corporate governance derives benefits concerning profitability and risk-taking for the banks. Particularly, the key results are as follows: (i) corporate governance is a good mechanism of abating risk during global financial crisis; (ii) a U-shaped negative relation exists between corporate governance, profitability, and risk-taking; (iii) notably, corporate governance in Islamic bank is superior to conventional bank that can increase the stability of efficiency; and (iv) corporate governance has long-run effects on profitability and risk-taking behavior.

Contribution/ Originality: This study contributes to the existing literature in the following ways: first, considering Bangladesh as an emerging economy, it shows both linear and non-linear impact of corporate governance by addressing recent financial crisis on bank performance and risk-taking behavior; second, it empirically uses efficiency stability as an inverse measure of risk; and finally, it includes generalized method of moments (GMM) and dynamic ordinary least square (DOLS) together in governance literature.

1. INTRODUCTION

There has been considerable academic and regulatory interest in how to mitigate bank risk-taking behavior and improve performance in recent years. Undue risk-taking by banks jeopardizes the safety and soundness of individual institutions as well as the stability of the entire financial sector when contagion causes risks to spill over to other financial institutions. It is a well-known view that the vulnerability of the banking sector during 2007-2008 was at least in part caused by a build-up of excessive risk by some banks before the crisis (Brunnermeier and Pedersen, 2009; Deyoung *et al.*, 2013). Further, there is significant discussion over the extent to which governance failures have contributed to the risk exposures of banks. In particular, there are questions over whether bank boards were unable to monitor and control bank risk, whether executive pay was excessively structured to promote risk-taking,

and whether banks' risk management systems were adequate (Kashyap *et al.*, 2008; Kirkpatrick, 2009).¹ On the other hand, there is numerous evidence that focuses the impact of corporate governance (CG) on bank performance, for example, (Gompers *et al.*, 2003; Cremers and Nair, 2005; Brown and Caylor, 2006; Bhagat and Bolton, 2008; Brown and Caylor, 2009; Chhaochharia and Laeven, 2009; Renders *et al.*, 2010; Ammann *et al.*, 2011). On the one hand, very few study has been examined the relationship between corporate governance and bank risk-taking such as Akhigbe and Martin (2008), Pathan (2009) and Fortin *et al.* (2010). But little evidence found that extend the relationship between bank risk and performance together in corporate governance literature, for example, Peni and Vähämaa (2012).

In different studies Mishra and Nielsen (2000), Macey and O'hara (2003), Hanazaki and Horiuchi (2003), Sierra *et al.* (2006), Caprio *et al.* (2007), De Andres and Vallelado (2008), Cornett *et al.* (2009), Laeven and Levine (2009), and Cooper (2009) who focused the role of corporate governance in the banking industry.

Diamond and Rajan (2009) on the one hand argue that financial institutions with the high quality of corporate governance are likely to support in the form of appropriate incentives and controls and therefore, the risk-taking practices of these firms preserve or enhance shareholder value. Levine (2004) shows that the governance of banks is a priority concern because banks are critical for utilization and distribution of capital and growth in industrial productivity. If banks implement conventional governance structures, bank managers bring about efficient capital allocation, enhance markets and exert a positive impact on the overall governance practices of other firms. As documented by Akhigbe and Martin (2006) and Akhigbe and Martin (2008) we also expect that banks with the quality of governance would lessen risks. On the one hand, John *et al.* (2008); Pathan (2009) and Fortin *et al.* (2010) find that corporate governance improves firm's value even these driven by excessive risk. In contrary evidence, Beltratti and Stulz (2012) find that in a good corporate governance framework, performance can be detrimental if the firm driven by excessive risk. In recent studies, Stulz (2015) argues that governance plays a significant role in helping banks pursue an 'optimal' level of risk that allows managers to maximize shareholder value while also taking into account the social costs of bank failures. Similarly, Haan and Vlahu (2016) also review the corporate governance literature on banks, but their focus is primarily on the link between governance and bank performance (rather than governance and risk).

Surprisingly, a large number of corporate governance literature has taken place in the most developed economies particularly in Europe and U.S. After hitting hard by Asian financial crisis (1997- 1998), the landscape of corporate governance significantly changed and improved in many Asian countries (Mashayekhi and Bazaz, 2008) as effective governance is critical to all economic transactions, especially in emerging and transitioning economies (Dharwadkar *et al.*, 2000; Judge *et al.*, 2003). Thus, from emerging economies, Bangladesh has also implemented CG in 2006 to respond to the global regulatory changes.

However, before 2006, CG was practiced voluntarily. Therefore, the practices of corporate governance in Bangladesh are quite absent in most companies and organizations (Gillibrand, 2004). Later, Imam and Malik (2007) show the impact of corporate governance practice through ownership structure on different firm's performance. While Farooque *et al.* (2007) investigated the effect of board ownership on firm performance in Bangladesh. Recently, Moudud-Ul-Huq and Noman (2011) analyze corporate governance practices of commercial banks while Hoque *et al.* (2013) show the impact of corporate governance mechanisms on bank performance. Later, Moudud-Ul-Huq (2015a) shows the practices of corporate governance through a comparative analysis between conventional and Islamic banks. Besides, Khan (2010) and Moudud-Ul-Huq (2015b) analyze both governance corporate social

¹ Arguably, there exist various other dimensions that resulted in bank fragility during the global financial crisis of 2007–09, such as inadequate bank capital (Hanson, Kashyap, & Stein, 2011) unregulated shadow banking system (Gennaioli, Shleifer, & Vishny, 2013) and the too-big-to-fail problem (Freixas & Rochet, 2013). However, the focus of our paper is on one such channel like whether corporate governance improve bank performance and lessening risk-taking even financial crisis or not.

responsibility while the first one shows the effect of corporate governance elements to the corporate social responsibility and later, reflects both impact of corporate governance and corporate social responsibility on bank performance.

In spite of these links, there has been relatively little empirical research on the corporate governance of commercial banks in Bangladesh. Though “Corporate Governance” is a buzz word after the publication of Cadbury Committee report in the UK during the 1990s, but in Bangladesh, it is relatively a new area of research. To the best of knowledge, no works have been found to explore the relationship between bank performance and risk-taking behavior concerning the impact of corporate governance on compliance basis, financial crisis and non-linearity of corporate governance with a particular reference to Bangladesh as an emerging economy.

This study contributes many ways to the existing literature. First, our study is extended to a concurrent study by Adams *et al.* (2010); Beltratti and Stulz (2012); Erkens *et al.* (2012); Peni and Vähämaa (2012); Hoque *et al.* (2013); Zagorchev and Gao (2015) those who examine how firm-level and country-level factors such as bank characteristics, governance, and macroeconomic factors relate to bank performance and risk-taking. We augment their approach by showing both linear and non-linear impact of corporate governance on bank profitability and risk-taking behavior.

Second, similar to countries with more developed economies, the primary objective of Bangladeshi bank businesses appears to be creating wealth for the shareholders. In Bangladesh, there are different types of banks operating since 1971. Regarding profitability indicators, Islamic banks perform significantly better than other types of banks.² Therefore, one cannot expect the similar effect of corporate governance to different kinds of banks in Bangladesh. Therefore, we extend our study by focusing bank types.

Third, we emphasis on emerging markets, which present different governance practice than developed markets (Black, 2001; Bebchuk and Hamdani, 2009). Prior firm-level studies can be divided into those who examine whether a measure of corporate governance predicts substantial market value, usually proxied by Tobin's q (governance-to-value studies), and those who investigate the factors that predict firm-level governance choices (predict-governance studies); some do both. This article seeks to fill a critical research gap between a bank's level of corporate governance comply or explain the disclosure and bank's financial performance measured by ROA, ROE, Tobin's Q and Efficiency. We also empirically used multiple measures of risk-taking behavior in governance literature such as SROA, SROE, Z-score, and Stability Efficiency (SE). Financial performance and risk-taking measures are not difficult to measure, but the association between the degrees of corporate governance complies or explains disclosure to performance and risk-taking are insufficiently developed in emerging economy like Bangladesh as the prior literature section reveals. One reason is that it is not clear in the literature how corporate governance complies or explains disclosure may be adequately quantified.

Fourth, this study is the first to examine the effect of corporate governance on bank performance and risk-taking during the financial crisis while few works have been discussed on performance. Few studies that highlighted governance as a good mechanism during financial crisis such as Beltratti and Stulz (2012) who focus on bank stock returns in 31 countries over the period from July 2007 to December 2008, and document that large banks with lower leverage ratios had less negative stock returns during the crisis. Interestingly, their results also suggest that banking regulation differences across countries are not related to bank performance. Concerning corporate governance aspects, they also find that banks with strong and shareholder-friendly boards performed worse amidst the market turmoil. Similarly, Erkens *et al.* (2012); Aebi *et al.* (2012); Peni *et al.* (2013) among others investigate the effect of the financial crisis in their governance literature.

² Please see Bangladesh Bank Annual Report: 2015-16 available at <https://www.bb.org.bd/pub/annual/anreport/ar1516/chap5.pdf>

Finally, this study covers the latest balanced panel bank-year observations that drive to focus the linear and non-linear effect of corporate governance on bank performance and risk-taking behavior of Bangladeshi commercial banks by applying system generalized method of the moments (GMM) and dynamic ordinary least square (DOLS).

The remainder of the study is divided into six sections. Section 2 discusses the institutional background and corporate governance in Bangladesh. Section 3 describes relevant literature. Section 4 discusses data and variables and empirical methodology followed by Section 5. Discusses the empirical findings and an overview of our conclusions are presented in Section 6 and 7 respectively.

2. INSTITUTIONAL SETTINGS AND CORPORATE GOVERNANCE

2.1. Institutional Settings

After the independence, the banking system in Bangladesh started its journey with only eleven banks, including two state-owned specialized banks, six nationalized commercialized banks and three Foreign Banks. During 1980's banking industry significantly expanded due to the active entrance of private commercial banks. Currently, banks in Bangladesh are mainly of two types i.e. (i) Scheduled Banks: Those banks which get a license to operate under Bank Company Act, 1991 (Amended up to 2013) are termed as Scheduled Banks. (ii) Non-Scheduled Banks: The banks which are built for particular and definite objective and operate under the acts that are enacted for meeting up those goals are termed as Non-Scheduled Banks. These banks cannot perform all functions of scheduled banks.

At present 56 scheduled banks (till December' 2015) are operating under full supervision and control of Bangladesh Bank (the Central Bank) ³ as per Bangladesh Bank (BB) Order, 1972 and Bank Company Act, 1991. Besides, four categories of Scheduled Banks are available in Bangladesh like:

- (i) State-owned Commercial Banks (SOCBs): There are 4 SOCBs which are wholly owned by the Government of Bangladesh.
- (ii) Specialized Development Banks (SDBs): 4 specialized banks are now operating which were established for specific objectives like agricultural or industrial development. The Government of Bangladesh majorly owns These banks.
- (iii) Private Commercial Banks (PCBs): There are 39 private commercial banks which are majorly owned by shareholders or institutional owners. PCBs can also be categorized into two groups i.e. (a) 31 Conventional PCBs are now operating in the industry. They perform the banking functions in conventional fashion i.e. interest-based operations. (b) on the one hand, there are 8 Islamic PCBs based on Islamic Shari'ah principles i.e. Profit-Loss Sharing (PLS) mode in Bangladesh, and they execute banking activities according to Islamic Shari'ah.
- (iv) Foreign Commercial Banks (FCBs): 9 FCBs are operating in Bangladesh as the branches of the banks which are incorporated in abroad.

In October 2016, Bangladesh Bank maintains 31895.30 million US \$ as an international reserve⁴which replicates the instantaneous growth of banking systems of Bangladesh. According to Bangladesh Bank statistics, currently 9,131 branches of all scheduled banks are working in Bangladesh, and this focuses a view to forecasting a sound, efficient and stable financial system. The banking industry is emerging rapidly with an incremental change of some banks, branches, assets, deposits, policies, and strategies, etc. However, the overall assets of this industry amount to BDT (the local currency of Bangladesh) 9693.8 billion in 2015 which shows an overall increase in assets compared to 2014 (Table 1). On the one hand, deposits also increased from 2014 and the overall deposits in 2015 show BDT 7406.5 billion.

³Annual Report of Bangladesh Bank 2014-2015

⁴Accounts & Budgeting Department, Bangladesh Bank (available at: <https://www.bb.org.bd/econdata/intreserve.php>)

Table-1. Banking scenario of Bangladesh*

Year	Number of banks	Percentage change of number of banks	Number of branches	Percentage change of number of branches	Total assets (in billion Taka)	Percentage change in total assets	Deposits (in billion Taka)	Percentage change of deposits
2006	48	0.00	6562	0.00	2406.7	0.00	1860.6	0.00
2007	48	0.00	6717	2.36	2773.9	15.26	2148.9	15.50
2008	48	0.00	6886	4.94	3313.5	37.68	2561.4	37.67
2009	48	0.00	7095	8.12	3965.80	64.78	3037.60	63.26
2010	47	-2.08	7246	10.42	4411.98	83.32	3329.08	78.93
2011	47	-2.08	7961	21.32	5867.60	143.80	4509.70	142.38
2012	47	-2.08	8322	26.82	7030.70	192.13	5396.00	190.01
2013	55	14.58	8685	32.35	8000.2	232.41	6273	237.15
2014	56	16.67	9040	37.76	9143	279.90	6965.1	274.35
2015	56	16.67	9131	39.15	9693.8	302.78	7406.5	298.07

Source: Annual Reports 2009-2014, Bangladesh Bank (BB)

*Percentage change determined by considering 2006 as the base year.

With the faster progression of the banking industry, it faces financial crises as well. So, recent financial turmoil's have demonstrated some weaknesses in the global regulatory framework and banks' risk management practices. To adapt with the international practices and to make the bank's capital more risk absorbent as well as more shock resilient, Guidelines on Risk-Based Capital Adequacy (RBCA) for banks has been introduced from January 01, 2009 (BRPD Circular No. 9) parallel to existing BRPD Circular No. 10, dated November 25, 2002. These guidelines are arranged based on BASEL II which has come fully into force on January 01, 2010 with its successive supplements. As per BASEL II, in the banking sector of Bangladesh maintain the Minimum Capital Requirement (MCR) or Capital Adequacy Ratio (CAR) at 10% of the Risk Weighted Assets (RWA) or Taka 4,000 million in capitals whichever is higher. According to Supervisory Review Process (SRP), banks should be directed to maintain sufficient level of capital higher than the minimum level of required capital and cover all possible risks in their business.

Moreover, Bangladesh Bank has recently circulated a road map to implement Basel III capital accord (BRPD Circular No. 7, March 2014) to boost this sector more, as well as to increase the credibility worldwide. Where corporate governance and risk management has given top priority concern among others.

2.2. Corporate Governance in Bangladesh

As a developing economy, Bangladesh has to be given emphasis in its different financial sectors, and that could be done by ensuring proper and efficient operations of business activities. To reach that goal it is a primary condition to practice good Corporate Governance (CG) in all the business houses and companies. Banking companies are mainly addressed here due to their unique position as lubricating the wheels of the real economy. Banks deal in public money; public trust and confidence are of utmost importance in this industry.

From previous literature, Corporate Governance is broadly defined by a set of rules that help to ensure the trust, accountability, and confidence of stakeholders and motivate the organization to operate efficiently by generating economic value. In Bangladesh, regulatory bodies are responsible for enforcing corporate governance standards comprise Bangladesh Securities and Exchange Commission (BSEC), Stock Exchanges, Bangladesh Bank (BB), Registrar of the Companies, National Board of Revenue (NBR) and occasionally the Ministry of Finance with the Parliament at the top of the regulatory pyramid.

In Bangladesh, corporate governance came to light after the stock market debacle in 1996. In March 2004 Bangladesh Enterprise Institute (BEI) published a code of corporate governance for Bangladesh suited for private sectors, financial institutions, State Owned Enterprises and NGOs. Securities and Exchange Commission (turned into BSEC on December 10, 2012) has issued the corporate governance guidelines on February 20, 2006. In the

year of 2012/BSEC published an amendment on corporate governance guidance; these guidelines have been made mandatory by the listed companies on "comply or explain" basis. To ensure proper corporate governance, Bangladesh Bank also takes initiative steps. They continuously publish any change relating to corporate governance. The salient features of the first order are:

- Board's size has been limited between 5 to 20
- Independent Director (ID) should be at least one-fifth and should have the following qualifications:
 - a) Does not hold any share in the company (i.e. a non-share holder); or
 - b) Holds less than 1% shares of paid-up shares of the company; or
 - c) Does not have pecuniary or otherwise relationship with the company or its subsidiary or associate companies; or
 - d) Is not connected with the company's promoters or director or shareholders holding 1% or more shares in the company by family relationship; or
 - e) Is not a member, director or officer any stock exchange, and who is not a shareholder, director or officer of any member of a stock exchange or an intermediary of the capital market.
- Chairman and CEO should preferably be different individuals.
- Appointment of CFO, head of Internal Audit and company secretary with defined roles, responsibilities and duties, The CFO and the Secretary, should attend the Board meeting.
- Directors' annual report should include statement that
 - (a) The company's accounts fairly present the state of affairs, result of operations, cash flows, changes in equity and were prepared by the management applying accounting policies consistently and using estimates with reasonable and prudent judgment and following IASs as applicable in Bangladesh,
 - (b) Proper books of accounts were maintained, (c) the system of internal control is sound in design and implemented and monitored: and (d) the company is in a position to continue as a going concern.

Directors' report should also include: Disclosures on (a) plans and decisions regarding expansion and discontinuation of operations with prospects, risks, and uncertainties surrounding the company; (b) deviations from the last year's operating result with reasons; (c) summary of key operating and financial data of previous three years; (d) numbers of board meetings held and attendance of directors (e) aggregate number of shares (along with names) held by (i) parent, subsidiary, associate companies and related parties, (ii) Directors, CEO, Secretary, CFO, Head of Internal Audit, and their spouse and minor children, and another top five salaried employees, and (iii) voting interest of shareholders holding 10% and above.

- Formation of Audit Committee.

BB and BSEC have recently enforced the new CG guidelines in parallel to the execution of Basel Accord. The directors of the company shall state whether the bank has complied with these conditions or not. The main aim of the guidelines above issued by Bangladesh Securities and Exchange Commission (SEC) is to enhance corporate governance in the listed companies in the interest of the investors and capital market. The guidelines have drawn the attention of different stakeholders of the listed companies. Various professional institutes, chambers, and associations are examining the BSEC guidelines and holding discussions on the acceptance and effects of the practice of the same on the business, behavior of management and investors.

Also, BB has taken several measures for the improvement of corporate governance in banks in line with their one of the top priority concerns. These include a "fit and proper" test for appointment of chief executive officers of PCBs, specifying the formation of the audit committee of the board, enhanced disclosure requirements, etc. In continuation of the above transformations, the roles, and functions of the board and management have been redefined and clarified to (or "intending to") specifying the powers of the management and restricting the

intervention of directors in the day- to-day administration of the bank. In this connection, related clauses of Bank Company Act 1991 have already been amended.

It is worth highlighting the differences in corporate governance in emerging markets and developed markets. Emerging economies differ from developed economies and specifically from Anglo-Saxon economies in several important ways. The distribution and concentration of ownership; and the prevalence and economic importance of diversified business groups involving clusters of firms under common ownership and coordination are the most noticeable differences.

3. LITERATURE REVIEW

Over hundreds of articles and dozens of books have been written about corporate governance in the last few years. The two books that should be mentioned are Corporate Governance by Monks and Minow (2004) and Incentives, Control and Development (Governance in Private and Public Sector with Special Reference to Bangladesh) by Chowdhury (2012). Davis Global Advisors publishes an Annual Leading Corporate Governance Indicators (Advisors, 2007) which measures corporate governance compliance using a variety of indicators. The Cadbury Report (Cadbury, 1992) published the findings of the Committee on Financial Aspects of Corporate Governance.

3.1. Corporate Governance and Performance

The major cross-country studies which include emerging markets are Klapper and Love (2004); Dahya *et al.* (2008); Morey *et al.* (2009); Black *et al.* (2014) among others. There are also some single-country studies, mostly built on governance to value relationship. A representative list of countries with stronger governance-to-value studies might include Brazil (Di Miceli *et al.*, 2010; Braga-Alves and Shastri, 2011; Black *et al.*, 2012), Hong Kong (Cheung *et al.*, 2007; Cheung *et al.*, 2011; Lei and Song, 2012) India (Dwivedi and Jain, 2005; Balasubramanian *et al.*, 2010) Korea (Black and Kim, 2012) Russia (Black, 2001; Black *et al.*, 2006; Kuznecovs and Pal, 2012) and Thailand (Kouwenberg, 2006; Connelly *et al.*, 2012).

The literature on the relationship between corporate governance and firm performance is extensive. However, the findings are inconclusive. One research stream finds that corporate governance is positively associated with firm performance. The research shows a positive correlation is based on the theory that an active board of directors can significantly reduce agency costs. By following this line of reasoning, Brown and Caylor (2004) find a strong correlation between corporate governance and performance, valuation and dividend payout for a large sample of US firms. While the likelihood of financial statement fraud can be reduced if a firm has non-executive directors and an audit committee (Beasley, 1996). Along similar lines, Denis and Sarin (1999) find that firms would have above-average stock price returns if they substantially increased the proportion of independent directors.

In contrast to these studies, some others fail to show a positive association between corporate governance and firm performance. Larcker *et al.* (2007); Aebi *et al.* (2012) for example, discover that the association between corporate governance and firm performance is inconsistent although they concede that their findings may result from difficulty in identifying reliable and robust measurements of corporate governance. Still, researchers have failed to find a convincing connection between corporate governance and organizational performance (Heracleous, 2001).

The detrimental impact of poor corporate governance on the value of the firm's and performance in financial organization reported by Caprio *et al.* (2007) and De Andres and Vallelado (2008). Firms with the poor quality of corporate governance may not provide enough incentives and controls that can increase shareholder value (Diamond and Rajan, 2009). While the reverse impact also found by by Erkens *et al.* (2012) during the 2007–2008 period documents that as a part of corporate governance, greater board independence and larger institutional ownership of financial firms is related to lower stock returns. In the similar strand, Fahlenbrach and Stulz (2011)

also find a negative association between a chief executive officer of the firm with higher profitability. In other words, if CEO motivates by a shareholder value maximization principles have incentives to take risks that enhanced their compensation and, as a result, their firms' experienced inferior stock returns. While [Peni and Vähämaa \(2012\)](#) based on US banks find that strong corporate governance improves bank performance during 2008 financial crisis but detrimental for stock return. They also documented higher valuation of the stock market in the aftermath of the financial meltdown. In different strand, [Short et al. \(1999\)](#) find a non-linear effect between managerial ownership and firm performance for UK companies, due to possible effects of alignment ([Jensen and Meckling, 1976](#)) and entrenchment ([Morck et al., 1988](#)).

Besides of the above connection, the majority of the literature focuses corporate governance on compliance basis. However, it should be noted that compliance is more than disclosure. One of the first other studies that analyzed the relationship between company performance and compliance is [Alves and Mendes \(2004\)](#) who studied Portuguese listed firms. The Portuguese Code was issued in 1999 and was modeled on the OECD guidelines. The code includes 17 indicators, which are directly related to firms, but it also contains two separate recommendations directed towards institutional investors. The analysis is based on dummy variables i.e. if a firm complies with a recommendation, it takes the value of 1, and otherwise, the value is zero this measure also used by [Goncharov et al. \(2006\)](#) and [Rose \(2016\)](#) and show a positive effect of CG on firms' performance. A study by [Renders and Gaeremynck \(2012\)](#) also documents a positive relationship between performance and corporate governance compliance. Their methodology addresses the serious endogeneity problem, which is widespread in many corporate governance studies by using instruments and 2SLS.

But the link between compliance and financial performance is scarce in Asia. Recently, [Tariq and Abbas \(2013\)](#) evaluate the efficacy of the Pakistani Code of Corporate Governance using a panel of 119 firms during eight years. They construct a score on each requirement that ranges from zero to five depending on the quality of information reported. Given that all clauses apply to a firm each given year, the score ranges from a minimum of 101 to a maximum of 501. They find a significant positive link between compliance and financial performance.

3.2. Corporate Governance and Risk-Taking

A central question of governance study is whether CG acts as a hedge against or favor of risk-taking. Recent governance literature is growing to delve the importance of investor protection based on the seminal work of [La Porta et al. \(2000\)](#). In one strand of literature built on focusing the relationship between investor protection and cost of capital such as [Shleifer and Wolfenzon \(2002\)](#), and [Castro et al. \(2004\)](#). Poor investor protection creates the need for dominant owners ([Burkart et al., 2003](#)). But, since the owners cannot be trusted to protect minority shareholders' rights, the equilibrium outcome is a high cost of capital, and in turn under-utilization of outside capital and suboptimal investment. In different strand, [Morck et al. \(2000\)](#) show that lack of governance framework led inadequate investor protection and associated with a low level of informed risk arbitrage. From a complementary study, [Durnev et al. \(2004\)](#) suggest that a low level of informed risk negatively associated with corporate governance, resource allocation, and ultimately productivity growth. Corporate insiders' private benefits affect their choices on investment risks. All else equal, corporate insiders would choose to use corporate resources to pursue their self-interest, including diverting corporate resources for personal benefits, at the expense of shareholders. The corporate resources that insiders can divert before settling the cash flow claims of the firm make insiders behave like debt holders.

Stay in safe; insiders may even avoid some firm value-enhancing projects only to preserve their private benefits, undertaking a risky project only if its expected outcome in high cash flow states is sufficient to compensate for the lower level of diversion in less profitable states. Some corporate resources diverted for private benefits depend on the degree of investor protection. The better the investor protection, the lower the expected diversion ([Shleifer and Wolfenzon, 2002](#)). Hence, with better investor protection, aggressively increased risky investment. The link

between investor protection and corporate risk-taking also arises from agency problem. Agency theory of dominant insiders also suggests a positive link between corporate governance with better investor protection and corporate risk-taking. Prowse (1992); Edwards and Fischer (1994); Berglöf and Perotti (1994) first pointed out that the world corporations have controlled by principal owners.

In contrast to the arguments above, other cases suggest a negative relationship between the degree of investor protection and the riskiness of the substantial investment. One such argument conjectures that as soon as investor protection improves, there is less fear of expropriation by managers. Thus the benefits of having dominant shareholders serve as monitors of managerial behavior decrease (Burkart *et al.*, 2003). Hence, overriding shareholders become less dominant across firms, and their cash flow rights also decline in firms. This reduced proportion of dominant shareholding allows managers greater discretion to reduce risk-taking, potentially giving rise to a negative relationship between investor protection and corporate risk-taking. Besides, it is also plausible that corporate governance is also unsuccessful if the project riskiness increase or the cost of executing better corporate governance higher than its return (John *et al.*, 2008; Pathan, 2009; Fortin *et al.*, 2010; Beltratti and Stulz, 2012). Thus, financial firms will not find advantageous to improve the quality of their governance if it does not help them to identify project risk and potential return better. From the analysis of Japanese firms, Nguyen (2011) also shows that corporate governance generates higher idiosyncratic risk when family control and ownership concentration higher. Also, he finds that family-controlled firms drive better performance over bank controlled firms. Recently, Liao *et al.* (2014) show that Taiwanese IPO firms have the positive effect of CG on stability while the main findings of Akhigbe and Martin (2006); Akhigbe and Martin (2008); Zagorchev and Gao (2015) show that better corporate governance is associated with less non-performing loans and higher Tobin's Q for financial institutions.

3.3. What's going on in Bangladesh

Rashid *et al.* (2007) and Kirkpatrick (2009) have made an overview of corporate governance in Bangladesh. In their study, various corporate governance characteristics, as well as the problems about its current practices in Bangladesh, are mentioned namely legal and regulatory framework, weak institutional control, pre-dominant of individual investors, limited transparency, financial crisis, the disappointment of the board performance and poor disclosure practices, etc.

Huq and Bhuiyan (2012) highlight some problems involved in corporate governance practice (i.e. the composition of the board, role of shareholders, annual general meeting of the board, the role of senior management, the role of auditors and position of a capital market for corporate control). Earlier, Kutubi (2011) has examined the size of the board of director's, independence and performance by considering private commercial banks in Bangladesh. This study has tried to show the impact of independent directors and size of the board of director's, and it has proved that there is statistical significance positive relationship existed between the proportions of the independent directors and the performance of the banks. Moudud-Ul-Huq (2015a) analyzes the practice of corporate governance by differentiating conventional and Islamic banks. Later, Moudud-Ul-Huq (2015b) empirically shows the effect of corporate governance and corporate social responsibility on the performance of Bangladeshi commercial banks. So, from the above evidence it truly articulates the absence of literature on both linear and non-linear effect of corporate governance on bank's profitability and risk-taking along with considering bank types and recent financial crisis.

Therefore, to assess these certain issues, we develop the following hypotheses to unfold the area of research. Firstly, we postulate that corporate governance enables the bank to minimize excessive risk-taking and enhance the profitability during the sample period including 2007-2008 financial turmoil. Secondly, we hypothesize that corporate governance has a non-linear effect on bank performance and risk-taking. Finally, we develop a hypothesis

that the corporate governance has heterogeneous impact on bank performance and risk-taking across conventional and Islamic banks.

4. DATA AND VARIABLES

4.1. Data Collection

Our data on banks' characteristics are derived from audited annual published reports from Dhaka Stock Exchange (DSE) and Bureau Van Dijk's Bankscope database of 26 conventional banks and 6 Islamic banks and industry-level data collected from the Heritage Foundation.⁵ At present, 56 scheduled banks are working in Bangladesh. We have excluded 10 banks as they have been formed very recently. We have also excluded another 14 banks for unavailability and irrelevancy in data. Thus our sample comprises a balanced panel of 320 bank-year observation for 32 commercial banks of which 260 observations for conventional banks and 60 observations for Islamic banks. We use a dynamic balanced panel data for the period between 2006 and 2015.

4.2. Definition of Variables

4.2.1. Bank Corporate Governance Measure

By following the approach of Moudud-Ul-Huq (2015b) we also quantify CG on the basis of compliance and non-compliance, it has given score 1 and 0 respectively. All the sub-indicators are also scored on this same basis. Such as in corporate governance if there are 6 sub-indicators and any of them do not comply then it will use 0.0. If 5 sub-indicators comply, then it will be scored 5/6 (0.83). Again, if out of 7 indicators, total score is 6.83. Then, it will use the arithmetic mean (6.83/7). The banks which disclose the CG information fully then providing them as score 1 against this compliance and 0 otherwise. However, one of the problems with the "comply or explain" principle is that some banks may provide explanations that are poorly justified. This issue has already been addressed by the authors, Arcot *et al.* (2010) who studies the effectiveness of the principle using a unique database of 245 non-financial UK firms for six years.

4.2.2. Bank Performance Measures

After global financial crisis 2007-2008, performance is a most talked issue in the world. Which country, which region and which type of banks had better survivability during that period? And how? The solution can be derived through analysis of overall bank performance by using several bank performance measures (i.e. profitability and efficiency). In this regard, some literature suggests to use return on average assets (ROA) as the best measure of performance (Rivard and Thomas, 1997; Hassan and Bashir, 2003) but it is a backward-looking. So, the extant literature indicates that bank performance is best measured by a group of indicators rather than one single indicator (Berger *et al.*, 2009; Lee *et al.*, 2014). Thus, this study also drives performance by return on total assets (ROA), including others such as return on equity (ROE), Tobin's Q, and Cost Efficiency (EFF).

4.2.3. Bank Risk Measures

For a comprehensive analysis of the risk-taking behavior of banks, we emphasize on a series of risk measures not depending on the single measure. For example, in response to corporate governance we examine: (i) volatility of overall performance by using the standard deviation of return on assets, (SROA); (ii) stock return volatility as the standard deviation of return on stock, (SROE); stability efficiency (SE); and (iv) stability as an inverse proxy for risk and which is measured by natural logarithm of Z-score (LNZ).⁶ Z-score is a highly skewed measure of bank risk-

⁵ The industry-level data available at <http://www.heritage.org/index/ranking>

⁶ We use a 3-year overlapping periods for (SROA) and (SROE).

taking, and higher values of Z-score indicate the lower probability of bank default and higher stability. For brevity, we name it stability or LNz throughout the rest of the study. As Fang *et al.* (2011) argue that potential stability of banks cannot be necessarily reflected by the Z-score. The deviation from the bank's current stability and the maximum should be considered. Hence, we provide a measure of the bank's stability efficiency by estimating stochastic frontier (Aigner *et al.*, 1977).

4.2.4. Bank Control Measures

Some control variables are included in this study to reflect banks strategic choices and characteristics that can affect bank risk-taking and performance. These variables are commonly used in studies of governance literature such as Mashayekhi and Bazaz (2008). The primary objective of including these variables is to make sure that any potential independent effects they may have on performance and risk do not influence the main relationship under investigation. Table 2 shows the list of variables and their description.

Table-2. Variables' definition and sources used

Classification	Variable	Description	Source
Dependent variable:			
Performance measure	ROA	Return on average assets.	(Farooque <i>et al.</i> , 2007; Aebi <i>et al.</i> , 2012; Peni and Vähämaa, 2012; Hoque <i>et al.</i> , 2013; Moudud-Ul-Huq, 2015b)
	ROE	Return on average equity.	(Aebi <i>et al.</i> , 2012; Peni and Vähämaa, 2012; Hoque <i>et al.</i> , 2013)
	Tobin's Q	Tobin's Q = $\frac{(\text{Market value of equity} + \text{Book value of liability})}{\text{Total Assets}}$ The higher ratio indicates the higher value of banks.	(Farooque <i>et al.</i> , 2007; Imam and Malik, 2007; Peni and Vähämaa, 2012; Hoque <i>et al.</i> , 2013)
	EFF	Cost efficiency. ^a	Authors' calculation based on Bankscope and published annual reports.
Risk measure	SROA	The standard deviation of return on assets.	(Pennathur <i>et al.</i> , 2012; Zhou, 2014)
	SROE	The standard deviation of return on equity.	(Anderson and Fraser, 2000; Chen <i>et al.</i> , 2006; Peni and Vähämaa, 2012)
	NPLTL	The ratio of the non-performing loan to total loans.	(Zagorchev and Gao, 2015; Zheng <i>et al.</i> , 2017; Zheng and Moudud-Ul-Huq, 2017; Zheng <i>et al.</i> , 2018)□
	Z-score	Z-score = $\log\left(\frac{ROA + EQTTA}{\sigma(ROA)}\right)$, where ROA is an annual return on assets before loan loss provisions and taxes, EQTTA is annual equity to total assets ratio, and $\sigma(ROA)$ is the standard deviation of annual values of return on assets before loan loss provisions and taxes calculated over 3-year overlapping periods. A Higher value indicates greater stability of banks and lower probability of bank failure.	(Laeven and Levine, 2009; Pathan, 2009; Liao <i>et al.</i> , 2014; Zheng <i>et al.</i> , 2017; Zheng and Moudud-Ul-Huq, 2017)□
	SE	Stability efficiency. ^b	Authors' calculation based on Bankscope and published annual reports.
Independent variable:			
Corporate governance	CG	Corporate governance is a measure of Weighted Factor Scoring Model. ^c	(Moudud-Ul-Huq and Noman, 2011; Moudud-Ul-Huq, 2014; Moudud-Ul-Huq, 2015b)

Bank-level control variable:			
Bank size	SIZE	Natural logarithm of total assets.	(Nguyen, 2011; Aebi <i>et al.</i> , 2012; Peni and Vähämaa, 2012; Zheng and Moudud-Ul-Huq, 2017)□
Income diversification	ID	Income diversification = $\frac{\text{Non-interest income}}{\text{Total operating income}}$	(Stiroh and Rumble, 2006; Edirisuriya <i>et al.</i> , 2015)□
Employee productivity	EP	Employee productivity = $\frac{\text{Total operating income}}{\text{Number of employees}}$	(Tan, 2016)□
Liquidity	LIQ	Ratio of total loans to total assets.	(Aebi <i>et al.</i> , 2012)
Industry-level variable:			
Freedom	FF	Financial freedom. The indicator of the openness of the banking system is a composite index of whether government interference exists in the financial sector, such as regulation, financial products, allocation of credit, whether foreign banks are free to operate. Higher values indicate fewer restrictions on banking freedoms	The Heritage Foundation 2017
Macroeconomic variable:			
Global financial crisis	GFC	Global financial crisis is a dummy variable. Takes on values of 1 for crisis years (2008–2009) and 0 otherwise.	(Peni and Vähämaa, 2012)

^a By using software package-Frontier 4.1 versions, we estimate cost efficiency in considering a three output (loans, securities and deposits and short-term funding), three input (price of the fund, price of physical capital and price of diversification). By considering these, we have developed the multiproduct trans log cost function as follows:

$$\ln TC = \alpha_0 + \sum_i \alpha_i \ln Q_i + \sum_j \beta_j \ln P_j + \frac{1}{2} \sum_i \sum_k \gamma_{ik} \ln Q_i \ln Q_k + \frac{1}{2} \sum_j \sum_k \delta_{jk} \ln P_j \ln P_k + \sum_i \sum_j \lambda_{ij} \ln Q_i \ln P_j + \varepsilon$$

Where, $\ln TC$ the natural logarithm of total costs (operating and interest expenses); $\ln Q_i$ the natural logarithm of outputs, (gross loans, total securities and deposit and short-term funding); $\ln P_h$ the natural logarithm of i th input prices (i.e. price of funds, price of physical capital and price of labor).

^b we estimate stability efficiency by following the same approach of cost efficiency. Where, we replaced $\ln TC$ with Z-score as dependent variable of the translog specification.

$$c \text{ CGS}_i = \sum_{j=1}^n (\text{CGS}_{ij} w_j)$$

Where, CGS_i = Total corporate governance score; CGS_{ij} = score of the j th indicator incase of overall score and score of the j th sub-indicator incase of each indicator. Score is calculated in scale of 0 to 1.

Table-3. Descriptive statistics

Variable	Mean	Median	Maximum	Minimum	Std. Dev.
ROA	1.317	1.280	6.050	-13.520	1.435
ROE	17.697	16.865	155.600	-274.080	21.855
Tobin's Q	1.056	1.028	3.140	0.087	0.240
EFF	1.082	1.046	1.412	1.013	0.085
SROA	0.557	0.300	12.617	0.000	1.131
SROE	7.221	3.162	173.207	0.000	19.028
NPLTL	5.927	4.232	44.592	0.000	6.292
LNZ	2.970	3.195	7.424	-3.966	1.606
SE	1.146	0.832	3.783	0.590	0.217
CG	0.845	1.000	1.000	0.000	0.105
SIZE	5.041	5.064	6.012	4.227	0.355
ID	58.304	57.453	172.149	12.472	19.708
EP	165.725	144.735	944.705	5.359	107.525
LIQ	66.806	68.298	83.748	33.933	8.360
EF	50.920	52.750	54.100	44.200	3.321
GFC	0.200	0.000	1.000	0.000	0.401
Obs.	320	320	320	320	320

Notes: ROA (ROE): return on average assets (equity); Tobin's Q is the ratio of market value of equity plus book value of liability divided by total assets; EFF is the cost efficiency; SROA (SROE): standard deviation of return on assets (equity). NPLTL is the ration non-performing loan to total loans; LNZ is the natural logarithm of Z-score and proxy of stability while SE is the stability efficiency. The first four (next five) variables are performance (risk) measures. Where corporate governance (CG) is our main explanatory variable. Bank size (SIZE), income diversification (ID), employee productivity (EP), and liquidity (LIQ) are the bank-level control variables. Economic freedom (EF) is the industry-level and global financial crisis (GFC) is a dummy macroeconomic variable.

4.3. Descriptive Statistics

Table 3 presents descriptive statistics about the key and control variables used in the regression. It is worth noting that among four measures of performance (ROA, ROE, Tobin’s Q and EFF); the average return on equity (ROE) shows the highest profitability for banks. On the one hand, among five measures of risk (NPLTL, SROA, SROE, LNZ, SE), the average of SROE and NPLTL are the highest. These imply that involvements of risk are higher for return on equity and credit. For stability issues, banks of Bangladesh are financially stable as the average value of LNZ is 2.970 ranges from -3.966 to 7.424. The negative value represents few banks are not financially stable. Apart from this, the average of stability efficiency (SE) is 1.146, implies that banks of Bangladesh are also showing better stability in cost efficiency. The mean score of corporate governance (CG) for the conventional bank is 0.765 while for Islamic banks the score is 0.925 (Table 4) and the overall score is 0.845. Moreover, the CG score of Islamic bank is gradually increased and climbed above of conventional bank through the period (Figure 1). This implies that the governance practice is better than conventional banks which are underlying below the standard.

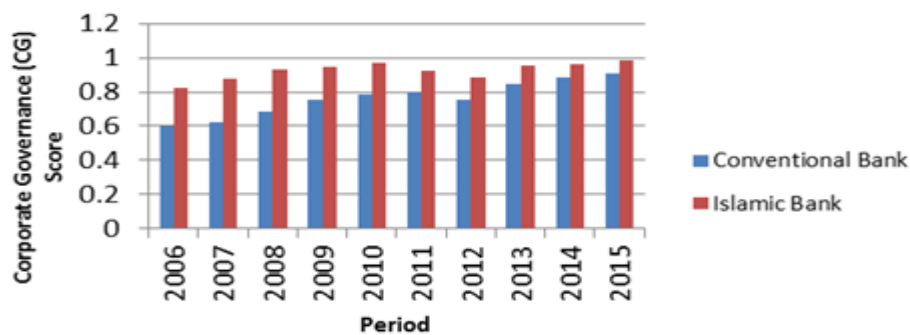


Figure-1. Trends in Corporate Governance for the period 2006-2015.

Table-4. Corporate governance score by bank types

Variable	Type of bank	Mean	Median	Maximum	Minimum	Std. Dev.	Obs.
CG	Conventional	0.765	1.000	1.000	0.000	0.135	260
CG	Islamic	0.925	1.000	1.000	0.600	0.075	60
CG	Overall	0.845	1.000	1.000	0.000	0.105	320

Notes: Corporate governance (CG) which is our main explanatory variable.

Except for financial stability (LNZ), corporate governance (CG), bank sizes (SIZE), liquidity (LIQ) and financial freedom (FF), all other variables have higher means corresponding to their medians. This implies that sample is slightly skewed. The standard deviations of all variables, however, are small except for return on equity (ROE), non-performing loan to total loans (NPLTL), the standard deviation of return on equity (SROE), income diversification (ID), employee productivity (EP) and liquidity (LIQ).

5. EMPIRICAL RESEARCH FRAMEWORK AND MODELS

Based on corporate governance literature, Laeven and Levine (2009); Aebi et al. (2012) used ordinary least square (OLS); Nguyen (2011) used generalized least squares (GLS); Farooque et al. (2007); John et al. (2008) used ordinary least square (OLS) and two-stage least squares (2SLS); in a rare study of Hoque et al. (2013) who used 2-step generalized method of moments (2GMM).

In this study, we apply dynamic panel data approach suggested by Arellano and Bover (1995) and Blundell and Bond (2000) and use the dynamic panel generalized method of moments (GMM) techniques to address potential endogeneity, heteroscedasticity, and autocorrelation problems. Given emphasized on the previous theoretical and empirical studies described above, the core regression model takes the form:

$$Y_{i,t} = \beta_0 + \beta_1 Y_{i,t-1} + \beta_2 CG_{i,t} + \sum_{j=1}^k \beta_j BCV_{i,t} + \sum_{k=1}^k \beta_k SIT_{i,t} + \beta_7 FF_{i,t} + \beta_{10} GFC_t + \lambda_i + \varepsilon_{i,t} \quad (1)$$

Where, in separate regressions, the dependent variable $Y_{i,t}$ represents: (1) return on average assets (ROA), (2) return on average equity (ROE), (3) Tobin's Q , (4) cost efficiency (EFF), (5) the standard deviation of return on assets, ($SROA$), (6) the standard deviation of return on equity, ($SROE$), (7) non-performing loan to total loans, ($NPLTL$), (8) Z-score (LNZ), and (9) stability efficiency (SE) respectively. Where, the first four measures refers as performance measures and rest indicates measures of bank risk. Besides, for the ease of our results discussion, return on average assets (ROA) and stability efficiency (SE) are considered as main measure of performance and inverse proxy of risk respectively. β is the series of parameters to be estimated. The $Y_{i,t-1}$ variable represents lagged dependent variable. A positive (negative) and significant value implies that performance and risk levels will be followed (inverse) from one year to the next. But it is difficult to consider the persistence of performance (risk) in a dynamic panel data. The $CG_{i,t}$ variable is our main explanatory variable that presents corporate governance for bank i in year t . The $BCV_{i,j,t}$ is a proxy of exogenous bank-level control variables, such as bank size ($SIZE$), the income diversification (ID), and the employee productivity (EP), the liquidity (LIQ). The SIT is also a proxy of two variables such as: squared corporate governance (CG^2) and interaction between corporate governance and global financial crisis ($CG * GFC$). The financial freedom (FF) and global financial crisis (GFC) are the industry and macroeconomic dummy variable respectively. J and k signify the number of variables. Besides, λ_i is an unobserved individual effect, and $\varepsilon_{i,t}$ is the error term.

Corporate governance and bank types may have a different effect on bank performance, and risk-taking as the bank varies with their structure and capacity. Therefore, we further modify our baseline equation to address the above issues as:

$$Y_{i,t} = \beta_0 + \beta_1 Y_{i,t-1} + \beta_2 CG_{i,t} + \sum_{j=2}^4 \beta_j CG * BT_{i,j,t} + \sum_{k=3}^6 \beta_k BT_{i,k,t} + \sum_{l=7}^{10} \beta_l BCV_{i,l,t} + \sum_{m=11}^{22} \beta_m SIT_{i,m,t} + \beta_{23} FF_{i,t} + \beta_{24} GFC_t + \lambda_i + \varepsilon_{i,t} \quad (2)$$

By extending Eq. 1, we use the product of corporate governance and bank types ($CG * BT$) and bank types (BT) as new variables where bank types are classified as conventional and Islamic banks. In addition, the other variables remain unchanged in this equation.

To address the above issue, we consider two specification tests suggested by Stata's `xtabond2` and Windmeijer's correction. The first is the Hansen J test of over-identifying restrictions, which examines the overall validity of the instruments by analyzing the sampled analog of the moment conditions used in the estimation process. The second test confirms the hypothesis that the error term is not serially correlated.⁷

In both the difference and the system difference-level regression, we check whether the differenced error term is second-order serially correlated.

⁷ Both test results are reported bottom part of the tables in main regression result section.

Table-5. Correlations matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	ROA	1															
2	ROE	.232**	1														
3	Tobin's Q	-0.04	0.01	1													
4	EFF	0.016	-0.104	0.005	1												
5	SROA	-.216**	-0.041	.115*	-0.026	1											
6	SROE	-.247**	-.269**	.150**	-0.015	.498**	1										
7	NPLTL	-.528**	-.139*	0.003	0.039	.370**	.415**	1									
8	L	.201**	-0.03	-0.087	-0.011	-.386**	-.319**	-.290**	1								
	Z																
9	SE	.120*	0.035	-0.058	.118*	-0.089	-0.098	-.236**	0.038	1							
10	CG	.270**	0.02	.081*	.044**	-.142*	-0.096	-.490**	.335**	.151**	1						
			**														
11	SIZE	-.281**	-.196**	-.114*	0.017	.125*	.251**	.412**	.217**	-.155**	0.021	1					
12	ID	-.188**	-0.049	-0.026	0.062	0.09	.236**	.514**	-0.081	-.149**	-.192**	.255**	1				
13	EP	.302**	0.068	-0.038	0.007	-0.037	-.125*	-.432**	.198**	-0.051	.352**	-0.033	-0.093	1			
14	IQ	.273**	.164**	0.079	-0.021	-.116*	-.293**	-.665**	0.014	.212**	.216**	-.461**	-.591**	.358**	1		
15	FF	.110*	0.026	-0.012	0.018	-.167**	-.226**	-.271**	0.088	.580**	.121*	-.296**	-.249**	0.02	.281**	1	
16	GFC	-.140*	-0.026	-0.024	-0.01	.215**	.288**	.373**	-.129*	-.344**	-.206**	.371**	.370**	-0.019	-.335**	-.564**	1

Pearson's correlation matrix for the variables used in the study. The dependent variables in regression models are: return on average assets (ROA), return on average equity (ROE), Tobin's Q, cost efficiency (EFF), standard deviation of return on assets (SROA), standard deviation of return on equity (SROE), non-performing loan to total loans (NPLTL), natural logarithm of Z-score (LNZ), stability efficiency (SE). The primary explanatory variable is corporate governance (CG). Bank size (SIZE), income diversification (ID), employee productivity (EP), and liquidity (LIQ) are the bank-level control variables. Financial freedom (FF) is the industry-level variable and global financial crisis (GFC) is a dummy macroeconomic variable. **, *. Correlation is significant at the 0.01 level and 0.05 level (2-tailed) respectively.

Moreover, to address the potential multicollinearity issue, we demonstrate Pearson's correlation matrix. As can be seen in Table 5, the highest correlation coefficient between two independent variables (LIQ and ID) is -0.591 and statistically significant at 1% level. To the consistent with previous studies, the issue of multicollinearity does not a challenge for our study.⁸

By following Abdul *et al.* (2017) approach we apply Dynamic OLS to extend our study in the long-run (where we only show the impact of corporate governance on bank performance and risk-taking). The dynamic panel methodology has been chosen as the central theme for data analysis because of the dynamic nature of profitability and risk-taking activities that vary over time. The traditional OLS cannot be employed for dynamic estimation as the OLS estimator suffers from the endogeneity bias, heteroscedasticity, and autocorrelation problems that cater to the inefficiency problem. Thus, it is not feasible to establish an efficient long-run relationship estimator using the traditional OLS. One of the alternatives in estimating consistent long-run estimator is by employing Stock and Watson (1993) model, namely DOLS. Stock and Watson (1993) have shown through the Monte Carlo simulation that DOLS is much better than other models, especially for small observations. By utilizing DOLS, it provides several benefits such as allowance for different orders of integration among regressors (more than order 1) and caters for the simultaneity problem among regressors. Stock and Watson (1993) adopt the parametric approach in dealing with the different order of integrated variables with the assumption that those variables are found to be cointegrated. Besides that, the DOLS can solve the simultaneity bias, especially for the small sample by incorporating the leads and lags value of the change in the regressors (Masih and Masih, 1996). The application of DOLS in our estimation seems to be practical since our data spans are just too short (320 observations) and possess the higher potential for simultaneity bias if the traditional OLS is implemented. Therefore, we aim to provide a unified methodological approach that employs DOLS in time-series analysis to investigate the long-run relationship between bank performance and risk-taking appetite. By establishing the long-run relationship, we have dealt with the theoretical part, which is beneficial for policy implication.

6. EMPIRICAL RESULTS

In this section, it empirically examines both linear and non-linear effect of corporate governance on bank performance and risk-taking with macroeconomic shocks. To support non-linearity of corporate governance, it also explores the long-run relationship between corporate governance practice and bank performance and risk-taking. Also, it also discovers the differential impact of corporate governance on bank performance and risk-taking concerning two major types of banks such as a conventional and Islamic bank. The baseline regression results of Eq. (1) have displayed in Table 6 where Table 7 shows the differential behavior of corporate governance according to bank types through estimating Eq. (2). At the end of this section, precisely, it reports the long-run effect of corporate governance.

6.1. The Linear and Non-Linear Effect of Corporate Governance

We estimate two model (Model I and Model II) types. Table 6 reports the empirical results from 2006 to 2015 for the baseline regression, showing that the persistent coefficients of (performance and risk) models, meaning that performance and risk of banks will be followed from one year to the next. When the CG effect is considered, the coefficients of banking corporate governance practice on profitability are positively significant. Particularly, good practice of CG improves cost efficiency and bank value (Tobin's Q) by mitigating agency cost and make banks lucrative for investors. These results partly are in line with Denis and Sarin (1999); Goncharov *et al.* (2006); Renders and Gaeremynck (2012); Tariq and Abbas (2013) and Zagorchev and Gao (2015). On the one hand, in risk

⁸ Kennedy, P., 2008. A guide to modern econometrics. Oxford: Blackwell Publishing. confirmed that multicollinearity is a challenge when the correlation is above 0.70 between two independent variables, which is not the case here.

models, the coefficients for SROA, SROE, and NPLTL (LNZ and SE) are negatively (positively) significant, indicating that risk (financial stability and stability efficiency) can be reduced (improved) through practicing corporate governance.

Table-6. The effect of corporate governance on performance and bank risk-taking behavior

Variable	Model I				Model II				
	Profitability				Risk-taking				
	ROA	ROE	Tobin's Q	EFF	SROA	SROE	NPLTL	LNZ	SE
Dep. (-1)	-0.026** (-0.971)	-0.052** (-2.353)	-0.170* (-1.708)	-0.812*** (-4.185)	0.215** (0.384)	0.071*** (5.188)	0.455** (0.260)	- 0.149*** (-3.725)	-1.326*** (-4.235)
CG	0.703** (2.025)	10.624*** (2.597)	0.118*** (3.388)	0.022** (0.950)	-0.405* (-1.917)	-11.616** (-2.432)	-1.298*** (-5.797)	0.283** (1.953)	0.055** (0.950)
SIZE	-0.994*** (-3.719)	-12.682** (-2.220)	-0.031* (-0.915)	-0.100** (-2.219)	0.240*** (2.475)	10.712* (1.940)	2.293*** (2.483)	- 1.316*** (-2.483)	-0.004** (-1.988)
ID	0.003** (0.952)	0.028** (0.971)	0.027** (0.956)	-0.005** (-0.955)	-0.003 (-0.544)	0.053 (0.737)	0.047*** (4.303)	-0.003 (-0.396)	0.000 (0.028)
EP	0.003*** (5.066)	0.013** (1.957)	0.020* (0.906)	0.000 (0.484)	-0.020*** (-2.095)	-0.007* (-1.928)	-0.008*** (-3.222)	0.001** (2.077)	-0.021 (-1.289)
LIQ	-0.005 (-0.210)	0.302 (4.200)	0.002 (0.784)	0.000 (-1.323)	0.001 (0.104)	-0.323 (-1.461)	-0.192*** (-4.286)	0.012** (0.957)	-0.005 (-0.500)
CG ²	-0.004** (-1.998)	-0.058*** (-2.566)	-0.001*** (-3.439)	-0.000 (-0.912)	-0.002 (-1.167)	-0.065** (-2.419)	-0.007*** (-5.052)	-0.002 (-0.945)	-0.000 (-0.258)
CG*GFC	0.010 (0.281)	-1.076 (-2.075)	0.000 (-0.080)	0.000 (-0.174)	-0.035 (-3.184)	-0.126 (-0.418)	-0.338*** (-2.716)	0.058** (2.350)	0.020** (1.854)
FF	0.015 (1.216)	0.138 (0.583)	-0.006 (-1.158)	0.000 (0.455)	-0.011 (-0.789)	-0.118 (-0.551)	-0.053 (-0.970)	0.027 (1.050)	0.001 (1.063)
GFC	-0.814 (-0.240)	-0.637** (-2.201)	0.027 (0.080)	-0.022** (-4.049)	3.932*** (4.162)	22.180 (0.796)	33.670*** (2.811)	-6.170** (-2.437)	-0.024** (-1.928)
J-statistic	0.545	0.789	0.413	0.802	0.582	0.695	0.688	0.800	0.916
AR (1)	0.000	0.123	0.005	0.124	0.000	0.008	0.000	0.000	0.125
AR (2)	0.281	0.249	0.188	0.228	0.515	0.177	0.656	0.118	0.314
No. of obs. (banks)	320 (32)	320 (32)	320 (32)	320 (32)	320 (32)	320 (32)	320 (32)	320 (32)	320 (32)

Note: The table shows the system-GMM estimation results of Eq. (1): $Y_{it} = \beta_0 + \beta_1 Y_{it-1} + \beta_2 CG_{it} + \sum_{j=1}^5 \beta_j BCV_{it-j} + \sum_{k=1}^5 \beta_k SIT_{it-k} + \beta_{SROE} SROE_{it} + \beta_{EFF} EFF_{it} + \beta_{GFC} GFC_{it} + \lambda_i + \epsilon_{it}$ where the dependent variable (Y_{it}) represents: (i) return on average assets (ROA), (ii) return on average equity (ROE), (iii) Tobin's Q, (iv) cost efficiency (EFF), (v) standard deviation of return on assets (SROA), (vi) standard deviation of return on equity (SROE), (vii) non-performing loan to total loans (NPLTL), (viii) Z-score (LNZ), (ix) stability efficiency (SE) for bank i and year t . The first four (next five) columns of the table indicate performance (risk) measures of Bangladeshi banks. The Y_{it-1} is the one-year lagged dependent variable. Corporate governance (CG_{it}) represents the main explanatory variable. The BCV_{it-j} is a proxy of exogenous bank-level control variables, such as bank size (SIZE), the income diversification (ID), and the employee productivity (EP), the liquidity (LIQ). The SIT is also a proxy of two variables such as: squared corporate governance (CG²) and interaction between corporate governance and global financial crisis (CG*GFC). The financial freedom (FF) and global financial crisis (GFC) are the industry and macroeconomic dummy variable respectively. Besides, λ_i is an unobserved individual effect, and ϵ_{it} is the error term. J-statistic shows the p-value that cannot reject null hypothesis. AR (1) and AR (2) are 1st and 2nd-order autocorrelation. The values in parentheses are t -values. *Significance at 10 percent; ** 5 percent; and *** 1 percent level.

These results can be explained by following the arguments of Burkart *et al.* (2003) and Zagorchev and Gao (2015) that strong corporate governance lessens the dominance of overriding shareholders and restrain managers to take higher risk in the firms. The above findings are also corroborated to that of Durnev *et al.* (2004); Liao *et al.* (2014) and Zagorchev and Gao (2015) who relatively confirm that the impact of corporate governance on bank's risk-taking is negative and positive for stability. The coefficient of bank size (SIZE) is negative and significant for profitability models and positive (negative) for SROA, SROE, and NPLTL (stability and stability efficiency), which implies that the performance of bank declines as size increase and large banks are less stable and risky. The coefficient of income diversification (ID) is positive and significant for bank performance except for the model of efficiency, implying that diversification of income can generate more revenue in banks, but sometimes it may be less efficient if the diversification is expensive. On the one hand, ID has no such significant effect on risk except it can potentially reduce the non-performing loan. As per our prediction, the productivity of employee (EP) is significant and positive (negative) for bank profitability (riskiness) except for efficiency and stability efficiency models, indicating that increased number of productive employees can enhance bank performance and reduce risk

significantly though it increases costs regarding salary. Unfortunately, the coefficient of liquidity (LIQ) is not significant in profitability model but significant for improving stability and reducing credit risk.

When we identify corporate governance (CG) as squared, then it suggests modifying corporate governance through other means as the negative coefficient provides evidence for such a view. This also implies that only up to a point, beyond which these performance and risk indicators are negatively associated with higher standard of corporate governance. It appears that a continued dependence of corporate governance away from customization and standardization does not of itself imply an improved market performance though corporate governance has a long-run effect on bank's performance and risk-taking behavior of Bangladesh (Table 8). Only from different measures of bank performance a more generalized form of the relationship confirm the general finding of [Morck et al. \(1988\)](#); [Short and Keasey \(1999\)](#) literature of a non-linear relationship between firm performance and corporate governance and results are rare in line with risk measures. However, corporate governance optimistically acts as an excellent mechanism during the financial crisis to minimize non-performing loan and keep banks stable financially and efficiently as the coefficients of CG*GFC are positive for stability (LNZ) and stability efficiency (SE) and negative for a non-performing loan to total loans (NPLTL). But unfortunately, contrary to our hypothesis and findings of [Peni and Vähämaa \(2012\)](#) corporate governance cannot be a significant determinant of bank performance during the crisis in a developing economy like Bangladesh. While financial freedom (FF) is also an insignificant determinant for bank performance and risk-taking as there is no significant relationship between them, as it could be explained as Bangladeshi financial sector is mostly restricted and therefore, it is yet to open the financial market. The coefficient of global financial crisis in performance (risk) models showing a negative (positive) and significant relation except in Tobin's Q (SROE), implying that during the period of economic shocks the performance of banks become vulnerable and unstable.

6.2. The Differential Impact of Corporate Governance

To address potential differences in the impact of corporate governance on performance and risk-taking between conventional and Islamic banks, we estimate the regression Eq. 2 by using return on average assets (ROA) as a measure of bank performance and stability efficiency (SE) as an inverse measure of bank risk-taking. Table 7 offers the empirical results of the corporate governance based on different types of the bank when ROA and SE are considered and shows both coefficients of corporate governance as being positive at the 5% significance level. Hence, bank performance and stability efficiency can be improved through corporate governance. Similar to Table 6, here the level of profitability and risk are also determined persistently from one year to the following year. Considering the type of bank, analogously the coefficients for both conventional and Islamic bank are significant and positive in profitability model, but in risk model both the coefficients are insignificant. Interestingly, along with the corporate governance, an Islamic bank is positively significant for both models while along with the CG conventional bank is positively significant for profitability model. Above instance implying that Islamic banks have some superiority of using corporate governance to improve bank performance and higher stability efficiency over the conventional bank which also profitable but no evidence of improving stability efficiency. The possible argument of such imperative effect of Islamic banks on performance and risk-taking behavior over conventional bank is their continuous improvement of applying corporate governance guidelines (Figure 1).

Table-7. Interplay of corporate governance across banks

Variable	Profitability	Risk-taking
	ROA	SE
Dep. (-1)	-0.051** (-2.014)	-0.146*** (-3.257)
CG	0.137** (1.973)	0.103*** (5.921)
CG*CONVENTIONAL	0.429** (1.944)	0.078 (3.169)
CG*ISLAMIC	0.394** (1.977)	0.136** (1.963)
CONVENTIONAL	0.054* (1.920)	0.344 (3.341)
ISLAMIC	0.166** (1.955)	0.202 (1.740)
SIZE	-0.252*** (-2.827)	-0.135*** (-2.968)
ID	-0.010 (-0.076)	-0.001 (-0.179)
LIQ	0.270*** (3.576)	-0.009 (-0.534)
EP	0.013 (0.972)	0.001* (1.667)
CG ²	-0.034* (-0.900)	-0.005* (-0.912)
CG*GFC	-0.551 (-0.754)	0.041** (1.951)
FF	0.188 (1.213)	0.025 (1.355)
GFC	0.051 (0.815)	-0.506* (-1.857)
J-statistic	0.588	0.675
AR (1)	0.122	0.155
AR (2)	0.311	0.489
No. of obs. (banks)	320 (32)	320 (32)

Note: The table shows the system-GMM estimation results of Eq. (2):

$$Y_{it} = \beta_0 + \beta_1 Y_{it-1} + \beta_2 CG_{it} + \sum_{j=1}^3 \beta_j CG \cdot BT_{it,j} + \sum_{k=1}^3 \beta_k BT_{it,k} + \sum_{l=1}^3 \beta_l BCV_{it,l} + \sum_{m=1}^3 \beta_m SIT_{it,m} + \beta_{11} FF_{it} + \beta_{12} GFC_{it} + \lambda_i + \epsilon_{it}$$
 where the dependent variable (Y_{it}) represents: (i) return on average assets (ROA), and (ii) stability efficiency (SE) for bank i and year t . The first (next) column of the table indicates performance (risk) measure of Bangladeshi banks. The Y_{it-1} is the one-year lagged dependent variable. Corporate governance (CG_{it}), interaction term of corporate governance and bank types ($CG \cdot BT$), and bank types (BT) i.e. conventional and Islamic are the main explanatory variables. The $BCV_{it,l}$ is a proxy of exogenous bank-level control variables, such as bank size (SIZE), the income diversification (ID), and the employee productivity (EP), the liquidity (LIQ). The SIT is also a proxy of two variables such as: squared corporate governance (CG²) and interaction between corporate governance and global financial crisis (CG*GFC). The financial freedom (FF) and global financial crisis (GFC) are the industry and macroeconomic dummy variable respectively. Besides, λ_i is an unobserved individual effect, and ϵ_{it} is the error term. J-statistic shows the p-value that cannot reject null hypothesis. AR (1) and AR (2) are 1st and 2nd-order autocorrelation. The values in parentheses are t -values. *Significance at 10 percent; ** 5 percent; and *** 1 percent level.

Thus, as per our expectations, the effect of corporate governance across banks is not homogenous on bank performance and their risk-taking behavior. Resembling Table 6, bank-level, industry-level and macroeconomic control variables preserve almost the same coefficient in Table 7.

Table-8. Long-run effect of corporate governance

Variable	ROA	ROE	Tobin's Q	EFF	SROA	SROE	NPL/TL	LNZ	SE
CG	0.014*** (18.017)	0.187*** (13.822)	0.011*** (71.207)	0.011*** (99.228)	-0.006 (-7.806)	-0.077*** (-7.307)	-0.063*** (-19.957)	0.032*** (37.930)	0.008*** (18.044)
Adjusted R ²	0.178	0.262	0.193	0.174	0.216	0.167	0.212	0.109	0.119
No. of obs. (banks)	320 (32)	320 (32)	320 (32)	320 (32)	320 (32)	320 (32)	320 (32)	320 (32)	320 (32)

Note: The table shows the Dynamic OLS estimation results of baseline equation. Where the dependent variable (Y_{it}) represents: (i) return on average assets (ROA), (ii) return on average equity (ROE), (iii) Tobin's Q (iv) cost efficiency (EFF), (v) standard deviation of return on assets (SROA), (vi) standard deviation of return on equity (SROE), (vii) non-performing loan to total loans (NPL/TL), (viii) Z-score (LNZ), (ix) stability efficiency (SE) for bank i and year t . The first four (next five) columns of the table indicate performance (risk) measures of Bangladeshi banks. Corporate governance (CG_{it}) represents the main explanatory variable. The adjusted R² signify the explanatory power of the model. The values in parentheses are t -values. *Significance at 10 percent; ** 5 percent; and *** 1 percent level.

7. CONCLUDING REMARKS

This study empirically investigates the linear and non-linear impact of corporate governance on bank's performance and risk-taking behavior in the emerging Bangladeshi economy. We use weighted scoring model

(WSM) to quantify compliance or explain based corporate governance and showing its impact on a series of bank performance and risk-taking measures. To test the short-run relationship between corporate governance and performance and risk, we primarily use system-GMM, and for a long-run relationship, we use Dynamic Ordinary Least Square (DOLS). Later, we also check whether corporate governance has any differential impact on bank's performance and risk-taking across bank types.

The findings of the present study support that corporate governance drives benefit for banks. Notably, it not only enhances efficiency in cost management and value of banks but also acts as a dynamic mechanism that can reduce bank risk and keep them financially and efficiently stable over time even in a crisis. Also, we also capture the differential impact of corporate governance on bank types. Where corporate governance practice in private banks is as good as Islamic bank from the profitability context but bit far from Islamic bank to minimizing risk and ensure better stability. Therefore, the regulators should be given emphasized on the private bank to improve corporate governance. Moreover, they should customize corporate governance in the long-run by following developed economy. For expansion, the government can introduce more Islamic Shari'ah bank as it can absorb risk and generate more return. Finally, we recommend corporate governance as one of the most successful indicators during the crisis as it may keep financial markets stable.

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