

# The determinants of risk disclosure by banking institutions

## Evidence from Bangladesh

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### Abstract

**Purpose** – The purpose of this paper is to investigate the extent of risk disclosure and the factors determining this for all listed banks in Bangladesh.

**Design/methodology/approach** – Relying on a theoretical framework based on agency theory and the creation of a risk disclosure index (RDI) based on International Financial Reporting Standard (IFRS) 7, Basel II: market discipline, and prior literature, hand-collected data from the annual reports of all 30 banks traded on the Dhaka Stock Exchange over 2007-2012, creating 180 bank-year observations, are analysed.

**Findings** – The study suggests that implementation of IFRS 7 and Basel II: market discipline standards in a non-mandated environment raised the extent of risk disclosure in every category of financial institution risk (market, credit, liquidity, operational and equities). The effect can be attributed to regulatory concerns and voluntary adoption of international disclosure standards in the banking industry in Bangladesh. Specifically, whilst the determinants of disclosure vary across types of risk, the number of risk committees, leverage, company size, the existence of a risk management unit, board size and a Big4 affiliate auditor are significant determinants of at least one category of risk disclosure.

**Research limitations/implications** – The source of risk disclosures is limited to listed banks' annual reports.

**Practical implications** – The RDI, developed in this paper, contributes to the literature by: first, quantifying the extent of each of five types of risk disclosure; and second, identifying the factors determining them. Stakeholders, particularly depositors and investors, can use this index to select or monitor their bank of interest.

**Originality/value** – The RDI was developed according to the most relevant standards – IFRS 7 and Basel II: market discipline, plus prior scholarly literature. This type of benchmarking has not been conducted to date in previous studies. Inferences about risk disclosure are based on archival data derived from all listed banks in a virtually unregulated environment. Further, the study complements the literature by providing support for the applicability of agency theory in investigating the level of risk disclosure by banks.

**Keywords** Agency theory, Basel II, Corporate risk disclosure, IFRS 7, Risk disclosure index

**Paper type** Research paper

### 1. Introduction

Changes in the business environment have motivated bank supervisors and regulators to rethink the rationale of banking regulations. The global financial crisis (hereafter, GFC) (2007-2008) also created significant concerns about risk disclosures by financial institutions (Beltratti and Stulz, 2012; Erkens *et al.*, 2012). This concern is consistent with the argument that corporate risk disclosures are fundamental to business risk disclosures in providing transparent information and building stakeholders' confidence (Abraham and Cox, 2007; Beretta and Bozzolan, 2004; Cabedo and Tirado, 2004; Hassan 2009; Linsley *et al.*, 2006). The GFC led to a slowdown in the global economy and the



consequential increased demand for risk reporting resulted, to some extent, in regulatory amendments, such as to International Financial Reporting Standard (IFRS) 7 Financial Instruments: Disclosure, to govern accounting practices and disclosures.

While a considerable body of literature reflects detailed academic work on disclosures concerning corporate governance, there is limited research on corporate risk disclosures (Beasley *et al.*, 2005; Lajili and Zéghal, 2005; Lajili, 2009). This research scarcity is even stronger for the context of developing economies. The majority of risk disclosure studies is limited to developed countries, such as Anglo-Saxon, Dutch and German countries (Abraham and Cox, 2007; Deumes and Knechel, 2008; Lajili, 2009; Lajili and Zéghal, 2005; Linsley and Lawrence, 2007; Linsley *et al.*, 2006; Solomon *et al.* 2000); European countries (Barakat and Hussainey, 2013; Oliveira *et al.*, 2011) and French and Latin countries (Beretta and Bozzolan, 2004; Thuélin *et al.*, 2006).

It can be argued that the differences in institutional and socio-economic settings between developed and developing economies might influence the level of corporate risk disclosure differently. For example, institutional pressure might create doubts about the effectiveness of the Anglo Saxon model of corporate governance in developing countries (Khan *et al.*, 2013). Developing countries, which are economically more vulnerable, might, thus, be benefited by implementing international disclosure standards. Specifically, Bangladesh makes an ideal site in which to examine risk disclosures and their determinants because risk disclosures are effectively voluntary.

Unlike many other developing countries, in Bangladesh the corporate sector faces weak enforcement of international standards (International Monetary Fund, World Bank, etc.) along with poor legal structure (Khan *et al.*, 2013). However, corporate accountability, governance and transparency are vital for the development of and sustainable growth in any country (Abhayawasnsa and Azim, 2014). Despite these governance issues, O'Neill *et al.* (2005) include Bangladesh in a group of countries entitled the “next eleven (or N-11)”, which comprises potentially large and fast-growing markets with the ability to rival the G-7 countries (Abhayawasnsa and Azim, 2014).

Bangladesh, among the developing countries, marked the beginning of an evolution in its financial reporting through “adopting” international standards after the GFC. However, compliance remains effectively voluntary with little consequence for non-compliance. Given this, corporate risk disclosure, particularly within the banking industry in Bangladesh, creates an ideal setting in which to examine changes in risk disclosure practices over time. The goal of this study is to add to the literature on risk disclosures, particularly across periods before and after the GFC and particularly in relation to different types of risk, using a sample of all listed banks in Bangladesh, a developing country.

The study is important as it is based on hand-collected longitudinal data over six years from 2007 to 2012, which are rare in existing corporate risk disclosure studies due to problems arising from extracting data. Unlike this study, very few risk disclosure studies investigated diversified risk disclosures with balanced, cross-sectional panel data. This paper extends previous research on risk disclosure. For example, Barakat and Hussainey (2013) examined operational risk disclosure in European banks. Taylor *et al.* (2010) examined only financial risk disclosures. Our risk assessment instrument encompasses diversity in risk disclosure and focusses on five types of disclosures, including market, credit, liquidity, operational and equities risk.

Our findings report that risk disclosure by banks in Bangladesh ranges from 63 to 75 per cent, on average, compared with optimal disclosures based on a risk disclosure index developed from international standards, with operational risk disclosures at the

highest level. Whilst the determinants vary across types of risk, the number of risk committees (RC), leverage, company size, the existence of a risk management unit (hereafter, RMU), board size and a Big4 affiliate auditor are significant determinants of at least one of the types of risk disclosure.

The study contributes to the literature in five ways: first, in an attempt to redress in part the empirical scarcity in risk disclosure studies in South Asian developing countries, this study is the first to provide knowledge of corporate risk disclosure practices and their underlying factors. Second, it helps assess the impact of new international standards upon the extent of risk disclosures in a weak economic period (GFC) and beyond. Third, a comprehensive risk disclosure index is developed based on international standards and is used as a benchmark against which to score actual risk disclosures. The risk disclosure index constructed in this study is of relevance to financial institutions seeking to provide information for stakeholders and, indeed, to all relevant parties seeking to assess or evaluate information in relation to risk disclosure. The risk disclosure index developed in this study is the first, in our knowledge, developed for the banking industry. Finally, the risk disclosure index could be used as a guideline for corporate risk disclosure in financial reporting and could be used as an early warning system for banking institutions in any country.

The remainder of this paper proceeds as follows: Section 2 briefly reviews the conceptual framework to contextualise the regulatory setting in Bangladesh. Section 3 presents data and methods. Section 4 reports empirical findings, and Section 5 concludes with some policy implications and suggestions for future research.

## 2. Conceptual framework

### 2.1 Defining risk disclosure

Risk can be defined variously as the “occurrence of natural events” (Dobler *et al.*, 2011), “positive and negative outcomes of events” (Linsley and Shrives, 2006), “potential gain and loss” (Solomon *et al.*, 2000). The broad definition of risk is the communication of factors having the potential to affect the expected results upside (potential to gain) and downside (events that to some extent may go wrong) (Beretta and Bozzolan, 2004). Linsley and Shrives (2006), more specifically, define risk disclosures as information related to opportunities, prospect, hazard, harm, threat or exposure that have already impacted or may impact on a company in the future (p. 389).

Risk disclosure assists the board of directors in achieving its responsibility to oversee the company’s material risks by providing up-to-date information that helps users of corporate annual reports understand and evaluate the interrelated risks, the effect of risks on the company’s financial position and the risk management strategies (Caldwell, 2012). From the stakeholders’ perspective, risk profile, risk appetite and risk management are key elements in making sound investment decisions (Lajili, 2009). Appropriate explanation of risk factors permits stakeholders to better understand the complexity of business operations and facilitates sound decision making. For the purpose of this study, risk disclosures are categorised according to IFRS 7 and Basel II: market discipline, as “market”, “credit”, “liquidity”, “operational” and “equities”.

The Basel Committee (2010) defined market risk as the risk that the value of an investment will decrease due to movement in market factors, such as changes in interest rates, foreign exchange rates and equity and commodity prices. According to IFRS 7, three types of market risks are: interest rate risks, currency risks and price risks, the later including equity price risks, commodity price risks, prepayment risks and residual value risks. Types of risk are explained in more detail below.

Credit risk is defined by the Bank of International Settlements (2010) as potential loss if a bank borrower or counterparty fails to meet obligations in accordance with agreed terms and conditions. The qualitative and quantitative nature of credit risk exposure, collateral and credit quality information disclosures assist internal risk management processes and stakeholders' demands for information. According to IASB (2007) liquidity risks in banks occur when banks encounter difficulty in meeting obligations associated with financial liabilities. Annual reports should present liquidity risks through maturity analysis, the management of liquidity risk and the remaining contractual liabilities. Cabedo and Tirado (2004) and the Basel Committee (2010) explained operational risks as the direct and indirect loss from inadequate internal processes, people or systems, or from external events. The supervisory review process and market discipline in the Basel Accord are put forward in an operational risk framework. Equities risks arise from holding equity in a particular investment through purchase of common or preferred stock. Basel Guidelines recommend qualitative disclosures of capital gains through the policies and procedures of equity holding and quantitative disclosure of the nature of the investment and capital requirements.

### 2.2 Regulatory context

The importance of risk reporting is apprehended by international standard setters (Cabedo and Tirado, 2004). The International Accounting Standards Board presented International Accounting Standards (IAS) 1: Presentation of financial statements and IAS 32: Financial Instruments: presentation to provide for disclosures of risk and uncertainties information. The Financial Accounting Standards Board established compulsory disclosures of market risks under SFAS 133 Accounting for Derivative Instruments and Hedging Activities.

IFRS include IFRS 7 Financial Instruments: Disclosure (IASB, 2007) to improve financial disclosures about the significance of financial instruments, and the risks arising from those financial instruments. In addition, the Basel II Framework provides requirements for risk management and supervision of regulation in the banking sector. Pillar 3 of the framework, market discipline, requires detailed disclosure of risk information, the risk profile, the risk assessment process and capital adequacy. Each of these represents enhanced bank disclosures to strengthen market discipline.

In the case of Bangladesh, the Bangladesh Securities and Exchange Commission (BSEC) regulates financial reporting by listed companies. The Bank Company Act of 1991 directs reporting format and disclosures based on Bangladesh Accounting Standards (BAS). Of particular relevance is BAS 30: Disclosures in the Financial Statements of Banks and Similar Financial Institutions (similar to IAS 30). Further, there are no risk reporting standards included in the Bank Company Act 1991 or Company Act 1994. Recently, the Central Bank of Bangladesh (Bangladesh Bank) established "Risk Management Guidelines for Banks (2012)". These guidelines introduced a structured way of identifying and analysing potential risks. However, in the absence of mandatory requirements, compliance with these guidelines is voluntary.

### 2.3 Prior literature on risk disclosure

The existing literature on risk disclosure focusses on specific disclosure items (e.g. market risk) or on a specific section (e.g. management report) in the annual report (Dobler *et al.*, 2011). Previous literature has examined risk disclosures and

performance, value, and stock price decisions (Aebi *et al.*, 2012; Amran *et al.*, 2008; Beasley *et al.*, 2005; Hoitash *et al.*, 2009; Uddin and Hassan, 2011). These studies noted the inadequacy of, and the qualitative and backward looking nature of risk disclosure. Kajüter (2006) and Linsley and Lawrence (2007) highlight the vagueness and inadequacy of disclosures for determining risk profile and the unstandardised presentation of risk disclosures in annual reports (Oliveira *et al.*, 2011). More recently, Ntim *et al.* (2013) investigate the association between corporate governance and risk disclosure in South Africa. Barakat and Hussainey (2013) examine direct and joint effects of bank governance, regulation, supervision and risk reporting for European banks, proxied by operational risk disclosure. However, our paper extends previous risk disclosure studies in its use of a comprehensive lens, focussing on five sub-categories of disclosure.

The risk disclosure index developed for this paper overcomes the narrow focus on specific types of risk disclosure in previous research, because to date no research has been conducted employing these two standards (IFRS 7 and Basel II: market discipline) as the benchmark. The study also establishes the nature and extent of risk disclosures in the banking sector in a virtually voluntary setting where enforcement is minimal. Basel II: market discipline requires detailed disclosure of risk information, risk profile, risk assessment processes, capital adequacy and more bank disclosures to strengthen market discipline. The IFRS set guidelines to enhance the financial disclosure requirements globally; IFRS 7 (Financial Instruments: Disclosure) requires disclosure of risk information in annual reports and IFRSs offer insights into the information available to investors.

#### *2.4 Theoretical perspective and hypothesis development*

Prior literature on disclosure has focussed on stakeholder theory (Amran *et al.*, 2008), institutional theory (Hassan, 2009), agency theory (Abraham and Cox, 2007; Aziz, 2009; Bertomeu *et al.*, 2011; Deumes and Knechel, 2008; Helbok and Wagner, 2006; Lajili, 2009; Linsley and Shrivess, 2000; Oliveira *et al.*, 2011), legitimacy theory (Oliveira *et al.*, 2011), signalling theory (Helbok and Wagner, 2006; Linsley and Shrivess, 2000; Marshall and Weetman, 2002), political cost theory (Helbok and Wagner, 2006; Linsley and Shrivess, 2000), capital need theory and proprietary theory (Kajüter, 2006; Mohobbot, 2005). However, there is no single theory that can articulate the phenomenon of disclosure completely (Linsley and Shrivess, 2000). Relying on the agency theory notion of “monitoring consequences”, this paper develops a set of hypotheses for the determinants of risk disclosure in a developing country, since risk disclosure practices depend on specific monitoring and institutional features of the economy (Lang and Lundholm, 1996; Lopes and Rodrigues, 2007; Wallace and Naser, 1995).

*2.4.1 Number of RC.* Agency theory assists in explaining managers’ motivation to make corporate disclosures when regulations are absent. The key idea of this theory is that the principal-agent relationship should efficiently use information in the organisation to minimise information asymmetry and risk bearing costs (Eisenhardt, 1989). Information asymmetry can also be reduced by monitoring managerial attitude (Jensen and Meckling, 1976). Monitoring of risk governance instruments can reduce uncertainty and increase flow of information (Aebi *et al.*, 2012). In the absence of monitoring mechanisms, such as RC, managers are more likely to be opportunistic by manipulating or making misleading disclosures (Latham and Jacobs, 2000).

The monitoring mechanism of RC underlies the risk governance characteristics of banks. By measuring, monitoring and maintaining an acceptable level of risks, RC assist banks to improve their sustainable risk management processes, strengthen their monitoring mechanisms, and achieve their strategic risk management policy. For example, the objective of an Asset and Liabilities Committee is to achieve a bank's financial goal while maintaining market risks at the desired level. Dedicated and prudent RC can efficiently monitor risk exposure, policies and procedures affecting loans, non-performing loans, market and operational areas. The empirical evidence provided by Mongiardino and Plath (2010) and Aebi *et al.* (2012) suggests that banks' RC can manage risk strongly and ensure better corporate governance than would otherwise exist. This is consistent with the notion that RC review and update risks on a systematic basis. Having a risk committee indicates better risk management and better corporate governance (Aebi *et al.*, 2012; Lajili, 2009) compared with not having one. The first hypothesis is based on the premise that an increased number of RC enhances the extent of risk monitoring activities by deploying a risk management framework. Therefore, the first hypothesis, expressed in terms of the sub-components of risk, is:

*H1.* There is a positive association between the number of RC and the extent of risk (market, credit, liquidity, operational and equities) disclosure.

*2.4.2 Level of debt in capital structure.* In an active capital market, disclosure reduces information asymmetry and hence lessens the monitoring burden between principals and agents (Marshall and Weetman, 2002). If managers choose not to disclose relevant information in annual reports, the information gap results in less transparency (Marshall and Weetman, 2002) and the withheld disclosure consequence is a possible conflict of interest concerning principal and agent. This information may also affect users' perceptions and may cause agency problems. For example, adverse selection may arise because of misrepresentation of the agent's abilities. Therefore, companies disclose risk-related information to explain the causes of high-level risks to creditors and thus provide justification and explanation for inside information concerning the business (Linsley and Shrivs, 2006). Previous studies suggest that bank creditors (i.e. depositors) demand disclosure transparency (Barth *et al.*, 2004). The more the bank depends on debt financing, the more likely the creditors' power is exercised in risk reporting (Barth and Landsman, 2010; Barth and McNichols, 1994; Cormier *et al.*, 2004). When a company has a disproportionately high level of debt in its capital structure, creditors may demand more disclosure of information to understand better the risk profile of the business (Ahn and Lee, 2004). Therefore, the next hypothesis, again expressed in terms of risk sub-components, is:

*H2.* There is a positive association between leverage and the extent of risk (market, credit, liquidity, operational and equities) disclosure.

*2.4.3 Bank size.* Existing studies have found that larger rather than smaller banks characterise themselves by disclosing more risk information, which results in reduced monitoring costs and reduced information asymmetry (Abraham and Cox, 2007; Aebi *et al.*, 2012; Oliveira *et al.*, 2011). A higher extent of disclosure assists larger firms to be more visible to relevant shareholders (Mashayekhi and Bazaz, 2008). Therefore, larger banks have incentives to enhance investors' confidence by reducing political sensitivity (Milne, 2002; Watts and Zimmerman, 1978) and achieving lower transaction costs (Grossman and Hart, 1980). Larger banks are more likely to consider a higher level of

risk disclosure to imply closer scrutiny from stakeholders and thus enhance corporate reputation (Amran *et al.*, 2008; Oliveira *et al.*, 2011). Accordingly the next hypothesis, again expressed in terms of the sub-components of risk, is:

*H3.* There is a positive association between bank size and the extent of risk (market, credit, liquidity, operational and equities) disclosure.

*2.4.4 Existence of RMU.* Shareholders may have limited ability to assess managerial decisions. Consequently, managers may take advantage of greater information access to increase their individual wealth (Foerster *et al.*, 2013). Information asymmetry creates moral hazard issues and may lead to imprudent decisions by agents from shareholders' perspective. Jensen and Meckling (1976) hypothesised that if principals and agents seek to maximise their own self-interest, agents become opportunistic and maximise their own welfare by serving their own best interest. As a result, they do not pursue the maximisation of principals' wealth. However, using a monitoring system through financial disclosure may assist to reduce the agency problem (Miller and Noulas, 1996). Without appropriate skills and abilities, the agent makes the wrong decisions regarding the organisation's policies and disclosure decisions. Therefore, professional legitimacy could be achieved by establishing a RMU to manage the overall risk management strategy, lessen agency problems and at the same time increase risk disclosure. That is, stronger risk communication is expected in annual reports of these organisations compared to those that do not have a RMU.

The RMU has the unique responsibility of risk management and monitoring processes and practices that inform risk information provided to that section of the bank responsible for compiling disclosures in the annual report. However, given that data proxies for RMU effectiveness (such as, percentage of top managers who hold a professional qualification, number of meetings, etc.) is not disclosed for many banks in the data set, the last hypothesis, again expressed in terms of risk sub-components, is:

*H4.* The presence of a RMU is positively associated with the extent of risk (market, credit, liquidity, operational and equities) disclosure.

### 3. Method

#### 3.1 Data

There are in total 30 banks listed on the Dhaka Stock Exchange (DSE), Bangladesh. This research is based on 180 bank-year observations which consist of all 30 listed banks over a six-year period, i.e. from 2007 to 2012. The data set commences in 2007 to capture the effect of the GFC and also captures data from 2006 for lagged measures. The data set specifically captures the period of the GFC; its initiation, transition and post effects, not because Bangladesh was impacted severely but rather because this period triggered changes to risk disclosure benchmarks in international standards. The data are hand-collected and compiled from annual reports published by all the listed banks. The annual reports are not available from a single source; different sources such as the DSE, the head offices of banks and the BSEC are used as sources from which to collect all these reports.

#### 3.2 Research design

This study aims to explore the extent of reporting of diverse risks and identify the factors influencing such reporting. Following the approach of investigating risk reporting through content analysis (Abraham and Cox, 2007; Beretta and Bozzolan, 2004;

Lajili, 2009; Lajili and Zéghal, 2005; Linsley *et al.*, 2006), the development of a risk disclosure scoring mechanism (Cabedo and Tirado, 2004; Oliveira *et al.*, 2011; Solomon *et al.*, 2000; Uddin and Hassan, 2011) and case study analysis (Linsley and Shrives, 2009), our study develops a unique risk disclosure index for each of the five significant risk exposures, these being market, credit, liquidity, operational and equities risks. Our indices are unique in the sense that these incorporate the guidelines provided by the IFRS 7, the Basel II: market discipline guideline, and the accounting literature, to create a benchmark, rather than using annual report disclosures to create a benchmark as previous studies by Cabedo and Tirado (2004) and Oliveria *et al.* (2011) have done.

The risk disclosure index expressed in terms of risk sub-components is developed primarily on the basis of IFRS 7, and amended with additional disclosure requirements (i.e. Basel II: market discipline, previous literature) for certain transactions during the sample period. The index[1] was developed in two phases. In the first phase, an extensive review of prior studies provided the common items across the studies and identified the items for an initial benchmark risk disclosure index for each component. These items were then categorised under regulatory requirements (IFRS 7[2], Basel II: market discipline).

In the second phase, additional items from the regulatory framework requirements were included within the benchmark risk disclosure index. In total, 107 items constitute the risk disclosure index for this paper and according to the characteristics of disclosed risks, they are grouped into market, credit, liquidity, operational and equities risks. In deriving the indices, each of these risk items is assigned a score of “1” if the particular risk is disclosed in the banks’ annual reports and “0” otherwise and then summed for each of the banks in a year. Following Oliveira *et al.* (2011), the indices are derived without giving any weight to any particular risk item because our study does not focus on any particular user group.

The construct validity of the risk disclosure index is ensured through multiple and different sources of information (international standards, previous literature) to form the Index items or categories for study (Creswell and Clarke, 2011). In addition, two academics in accounting with financial reporting expertise and five research associates acting as independent evaluators coded the data set to ensure the reliability of the scale. Krippendorff (1980) considered it important that at least two researchers do this type of analysis independently and compare results for reliability checking. An independent evaluator reviewed 20 annual reports (11.11 per cent) from the total 180 reports. The main researcher also reviewed the same 20 reports. The unweighted risk disclosure index coded by both was compared to ascertain if there were any significant differences. A *t*-test for differences in the means from each coder’s risk disclosure index scoring was applied. The results are shown in Table I.

Table I indicates the results are not statistically different ( $p > 0.100$ ) between the researcher and the evaluator. Hence, the scores for annual report contents after applying the risk disclosure index can be considered reliable.

	Mean	<i>t</i> -tests	Sig.(2 tailed)
Researcher	0.374	1.147	0.152
Evaluator	0.316		

**Notes:** *N* = 20. Comparing the mean risk disclosure index scores of both researcher and evaluators

**Table I.**  
Reliability tests of  
risk disclosure index  
comparability



3.3 Statistical model

The data set is a cross-sectional time series or strongly balanced panel, however, the Hausman test statistics failed to reject the null of no systematic differences in coefficients between pooled OLS and panel fixed effects. Hence, we estimate the regressions using the following pooled OLS model for each of the five risk indices:

$$RDI_{it} = \beta_0 + \beta_1 RC_{it} + \beta_2 DE_{it} + \beta_3 LnTA_{it} + \beta_4 RMU_{it} + \beta_5 LnBS_{it} + \beta_6 Big4_{it} + \sum \beta_{7-12} year \text{ dummies} + \varepsilon_{it}$$

where  $RDI_{it}$  = risk (market (MRDI), credit (CRDI), liquidity (LRDI), operational (ORDI) and equities (ERDI)) disclosure index for bank  $i$  in year  $t$ ;  $RC_{it}$  = number of risk committees for bank  $i$  in year  $t$ ;  $DE_{it}$  = debt to equity ratio for bank  $i$  in year  $t$ ;  $LnTA_{it}$  = natural logarithm of total assets for bank  $i$  in year  $t$ ;  $RMU_{it}$  = presence of a RMU for bank  $i$  in year  $t$ . Control variables:  $LnBS_{it}$  = natural logarithm of board size for bank  $i$  in year  $t$ ;  $Big4_{it}$  = Big4 affiliate audit firm for bank  $i$  in year  $t$ ;  $\beta_0$  = intercept,  $\beta_{7-12}$  = year effects to control for events peculiar to each year in the analysis period;  $\varepsilon_{it}$  = error term.

Our regression specification also incorporates the logarithm of board size (Abraham and Cox, 2007), and Big4 affiliated auditors (Abraham and Cox, 2007; Adams and Mehran, 2003; Amran *et al.*, 2008; Cabedo and Tirado, 2004; Erkens *et al.*, 2012; Linsley and Shrivs, 2009; Marshall and Weetman, 2002; Solomon *et al.*, 2000) as control variables. Following the prior literature, we use the natural logarithm of the number of board members, LnBS, and the dummy variable, Big4, representing “1” if the bank is linked to a Big4 auditor, and “0” if otherwise.

4. Empirical analysis

4.1 Descriptive statistics

Table II reports descriptive statistics for variables included in the model, whereas Table III presents the longitudinal distribution of the mean risk disclosure index during the tested period for each of the five types of risk.

Table II reports that risk disclosures by the sampled banks based on the five types of risk (MRDI, CRDI, LRDI, ORDI and ERDI) range from 63 per cent (CRDI and ERDI)

	Mean	Median	Minimum	Maximum	SD
MRDI	0.70	0.79	0.18	1.00	0.23
CRDI	0.63	0.68	0.18	0.94	0.19
LRDI	0.67	0.66	0.27	0.97	0.18
ORDI	0.75	0.85	0.00	1.00	0.29
ERDI	0.63	0.66	0.00	1.00	0.30
RC	1.98	2.00	0.00	6.00	1.38
DE	0.68	0.70	0.01	1.61	0.16
TA (Tk in billion)	91.30	74.95	15.12	824.11	85.67
RMU	0.66	1.00	0.00	1.00	0.47
BS	14	14	5	23	4
Big4	0.78	1.00	0.00	1.00	0.40

**Table II.**  
Descriptive statistics for variables with 180 bank-year observations during 2007-2012

**Notes:** MRDI, market risk disclosure indices; CRDI, credit risk disclosure indices; LRDI, liquidity risk disclosure indices; ORDI, operational risk disclosure indices; ERDI, equities risk disclosure indices; RC, number of risk committees; DE, the debt equity ratio; TA, total assets, RMU; the risk management unit; BS, number of board members; Big4, the presence of a Big4 linked auditor

to 75 per cent (ORDI) of the optimal, based on the benchmark. The operational and equities risk disclosures are different from others because, as the table reports, their minimum scores are zero. This suggests there are banks preferring not to disclose such risk information. Equities risk disclosure (ERDI) and credit risk disclosures experience the lowest level compared with optimal of all types of risk disclosures (63 per cent). The number of RC and total assets average 1.98, and Tk91.30 billion, respectively. The mean debt to equity ratio (DE) is 0.68, indicating that debt averages around two-thirds of equity for the sample banks. Indicator variables for the presence of a RMU and a Big4 affiliate audit firm reveal 66 and 78 per cent of the sample respectively. These suggest that two-thirds of the banks have RMUs while one-fifth of the banks are without association with an international auditor. The average number of board members (BS) is 14.

Table III reports that disclosure for each type of risk gradually increases over time (2007-2012). The upward trend for all types of risk disclosure over the period likely reflects the influence of international standards, even though they are not mandated in Bangladesh. The upward trend depicts that the most significant change in risk disclosures occurred in 2010 and 2011 and this trend stagnated after 2011.

To better understand the trend, along with the marginal effect of changes in international standards and their implementation, Table IV reports the mean difference (*t*-statistics in parentheses) of each of the five risk disclosures between groupings over a number of the years. The benchmark year is 2007, which is when the GFC began. We have compared the extent of risk disclosures in 2009, 2010, 2011 and 2012 with 2007 respectively. The mean difference in the marginal changes between years is

**Table III.**  
Longitudinal  
distribution of  
average disclosures  
for five types of risk  
with 180 bank-year  
observations during  
2007-2012

Year	(N)	Types of risk				
		Market	Credit	Liquidity	Operational	Equities
2007	30	0.52	0.48	0.54	0.51	0.44
2008	30	0.55	0.51	0.56	0.57	0.51
2009	30	0.66	0.60	0.62	0.74	0.54
2010	30	0.80	0.69	0.72	0.85	0.69
2011	30	0.85	0.76	0.77	0.90	0.79
2012	30	0.86	0.77	0.78	0.90	0.79
Pooled average	180	0.70	0.63	0.67	0.75	0.63

**Table IV.**  
Mean difference in  
risk disclosure  
indices between  
different mimicking  
sub-periods

	$\Delta(2007-2009)$	$\Delta(2007-2010)$	$\Delta(2007-2011)$	$\Delta(2007-2012)$
Market risk	0.14 (5.03)***	0.25 (6.47)***	0.06 (3.04)***	0.19 (6.42)***
Credit risk	0.12 (4.95)***	0.18 (6.51)***	0.08 (3.22)***	0.16 (6.79)***
Liquidity risk	0.08 (6.25)***	0.16 (6.58)***	0.07 (2.66)**	0.15 (5.40)***
Operational risk	0.23 (3.61)***	0.28 (4.18)***	0.06 (2.42)**	0.18 (3.70)***
Equities risk	0.09 (3.08)***	0.18 (4.39)***	0.10 (2.23)***	0.25 (5.09)***

**Note:** Where  $\Delta(2007-2009)$  reports the change in risk disclosure index between years 2007 and 2009;  $\Delta(2007-2010)$  reports the change in risk disclosure index between years 2007 and 2010;  $\Delta(2007-2011)$  reports the change in risk disclosure index between years 2007 and 2011;  $\Delta(2007-2012)$  reports the change in risk disclosure index between years 2007 and 2012. The results are on average and the parenthesis reports *t*-statistics. \*\*,\*\*\*Denote the level of significance at 5, 1 per cent levels, respectively

always positive. Furthermore, all five sub-risk disclosure indices experience substantial changes after 2009 and until 2011. These findings suggest that the effect of the international standards was heightened in 2010 and increased in 2011.

4.2 *Multivariate results and analysis*

Prior to running regression specifications, we tested the multicollinearity of the explanatory variables to examine whether observations were lying beyond  $\pm 3$  standard deviations. The White (1980) heteroscedasticity test statistics are reported in Table V. The Pearson correlation coefficient results reveal no multicollinearity concern among variables with the highest correlation less than 0.05 (not shown for brevity) for independent variables in the regression model. Table V reports the regression results estimating the factors influencing the five categories of risk disclosure made using 180 bank-year observations over the six years from 2007 to 2012. These risks are market, credit, liquidity, operational and equities risks, which are derived as indices following the accounting literature and international risk disclosure standards. Each of these indices is used separately as a dependent variable in the pooled OLS regressions.

4.2.1 *H1: number of RC.* A previous study by Mongiardino and Plath (2010) documents that RC are able to assess the level of liquidity risks through their involvement in monitoring assets and liabilities. The coefficient for the number of RC is positively significant (at  $p < 0.01$  level) only in the specification for liquidity risk (LRDI). This indicates that the greater the number of RC, the more a bank discloses its liquidity risk. The finding suggests that banks with a higher number of RC are more focussed on disclosing liquidity risks than other risks. This could also be explained as sample banks promoting the short-term resilience of their liquidity risk profiles in their annual reports.

4.2.2 *H2: Level of debt in capital structure.* Previous studies reveal mixed results in relation to the association between corporate risk disclosure and the DE. Hassan (2009)

Variables	Market risk index	Credit risk index	Liquidity risk index	Operational risk index	Equities risk index
Constant	0.311 (4.49)***	0.097 (1.93)*	0.242 (1.69)*	-0.051 (-0.19)	-0.220 (-1.64)
RC	0.008 (0.71)	-0.003 (-0.46)	0.017 (2.63)***	-0.007 (-0.97)	0.020 (1.34)
DE	-0.114 (-4.47)***	-0.037 (-0.83)	-0.031 (-0.46)	0.223 (3.24)***	0.286 (3.10)***
LnTA	0.041 (4.29)***	0.059 (9.05)***	0.038 (1.99)**	0.093 (4.50)***	0.115 (5.47)***
RMU	0.175 (4.54)***	0.156 (5.62)***	0.015 (0.63)	0.016 (1.20)	0.126 (2.36)***
LnBS	0.020 (1.01)	0.039 (2.58)***	0.033 (1.94)*	-0.020 (-0.32)	-0.025 (-0.74)
Big4	0.066 (7.56)***	0.086 (3.58)***	0.105 (3.32)***	0.144 (2.26)***	0.065 (1.47)
Adj R <sup>2</sup>	0.42	0.48	0.31	0.34	0.27
F-stat.	12.63***	15.80***	8.33***	9.36***	7.12***
Year dummies	Yes	Yes	Yes	Yes	Yes
White stat.					
(p-value)	12.23	31.54	16.40	31.95	6.31
Pooled OLS	0.76	0.20	0.82	0.19	0.38
Sample size (n)	180	180	180	180	180

**Table V.** Pooled OLS regression results for five types of risks with a sample of 180 bank years during 2007-2012

**Notes:** RC, the number of risk committees; DE, the debt to equity ratio; LnTA; the natural logarithm of total assets; RMU, the risk management unit; LnBS, the number of board members; Big4, the presence of a Big4 linked auditor. White (1980) heteroscedasticity consistent robust *t*-statistics are reported in parentheses beneath each coefficient. \*, \*\*, \*\*\* Denote the level of significance at 10, 5 and 1 per cent levels, respectively

and Linsley and Shrides (2006) found a positive association, whereas Abd-Elsalam and Weetman (2003) detected a negative association, while Lopes and Rodrigues (2007) concluded there was an insignificant relationship.

The coefficient of the DE is highly significant and positive in specifications of operational and equities risk (at  $p < 0.01$  level), however, it is significantly negative for market risk (at  $p < 0.01$  level). This indicates that banks with higher DEs are less likely to disclose market risk exposures, but more likely to disclose operational and equities risks. This implicitly reflects the power of creditors in disclosure of operational and equities risks. Banks with a high level of debt require proper supervision (directly or indirectly) and regular independent evaluations of bank policies, processes and operational systems.

Those who are charged with governance should ensure that there are appropriate mechanisms in place to maintain operational risks at a manageable level. For equities risk, Basel Guidelines recommend qualitative disclosures of capital gains through the policies and procedures and quantitative disclosure of the nature of the investment and capital requirements.

*4.2.3 H3: bank size.* We use the natural logarithm of total assets (LnTA) as a proxy for bank size. The regression results show that coefficient estimates for total assets (LnTA) are significantly positive for all regressions (at  $p < 0.01$  level), suggesting that asset size is positively associated with bank disclosure of all categories of risk exposure. This result is consistent with Beretta and Bozzolan (2004), Linsley *et al.* (2006) and Lopes and Rodrigues (2007) and suggests that banks with more assets disclose more risk exposures. Previous literature documents that larger organisations have greater political costs and tend to disclose more information (Watts and Zimmerman, 1978). However, the findings in this study are incremental to those of previous studies as we examine not only equities risk, but also market, credit, liquidity and operational risk, and find for each increasing disclosure with size.

*4.2.4 H4: existence of RMU.* Table V presents the regression results for the association between existence of RMU and the extent of risk disclosure (MRDI, CRDI, LRDI, ORD and ERDI). Consistent with *H4*, the coefficients of the relationship between RMU and all types of risk disclosure are positively correlated. The positive direction of the coefficients implies that banks with a RMU are more likely than those without, to disclose all types of risk because of normative pressures applied through professionalisation of international disclosure standards. The positive relationship could also be interpreted as: banks with greater risk exposure being more likely to set up a RMU, leading to a positive association between RMU and risk disclosure. The results reveal a significant (at  $p < 0.01$  level) relationship only with market, equities and credit risk. The existence of a RMU enhances the extent of market, equities and credit risk disclosure. No significant relations were found between RMU and liquidity risk or operational risk. Both these risks were the main driver of the GFC. As our sample companies were not affected by the GFC it is not surprising that the results failed to find any significant relationship between RMU and liquidity and operational risks. These findings are consistent with the theoretical prediction discussed earlier in this paper from an agency theory perspective. The regression estimates support the view that a RMU possesses the skills and resources to identify and monitor market, equities and credit risk processes and encourage reporting of them in the annual report.

In terms of the coefficients for the control variables, multinational affiliated audit firm (Big4) is positively associated with all types of risk disclosure except for equities risk, while the number of BS is significantly and positively associated with liquidity and credit risk.

**5. Sensitivity analysis**

To ascertain robustness of our findings, we perform a number of additional tests. First, to ascertain the impacts of regulatory standards on risk disclosure, we compare the extent of risk sub-component disclosures for the two sub-periods, 2007-2009 and 2010-2012 (Table VI). The analysis presents the implied impacts of international standards implemented after the GFC period. The following regression model predicts the marginal effect of explanatory variables with respect to the year 2007[3]:

$$\Delta RD_{it \text{ and } t-n} = \beta_0 + \beta_1 \Delta RC_{it \text{ and } t-n} + \beta_2 \Delta DE_{it \text{ and } t-n} + \beta_3 \Delta LnTA_{it \text{ and } t-n} + \beta_4 \Delta RMU_{it \text{ and } t-n} + \beta_5 \Delta LnBS_{it \text{ and } t-n} + \beta_6 \Delta Big4_{it \text{ and } t-n} + \epsilon_{it}$$

Table VI reports the intercept terms estimated from the above OLS regression for each of the five types of risk disclosure. The intercept term reveals the average change in risk disclosures between the years. Table VI shows average risk disclosures for each of the five risk types increased in 2009, 2010, 2011 and 2012 compared to 2007. In 2009, liquidity risk and credit risk disclosure are positive and weakly significant ( $p < 0.10$  level) and equities risk disclosure more significant ( $p < 0.05$  level). In 2010, all the risk disclosure types are positive but none are significant. In 2011, all types are positive with operational risk, equities risk and credit risk weakly significant ( $p < 0.10$  level). In 2012, except for market risk, the change in other type of risk disclosure is significant; with liquidity risk weakly significant ( $p < 0.10$  level) and operational risk, equities risk and credit risk more significant ( $p < 0.05$  level). These results likely reflect the impact of international standards implemented during the post-GFC period even in a context of effectively voluntary compliance.

Second, following Ntim *et al.* (2013) and Barakat and Hussainey (2013), we re-estimate the hypothesis variables including additional control variables[4], specifically, profitability, liquidity and board independence. Table VII reports the results of hypothesis variables with additional control variables. The results of this inclusion do not change the substantive significance of the coefficients reported in Table V.

Third, endogeneity is a major concern in corporate governance studies (Aebi *et al.*, 2012). However, the focus of this paper is not corporate governance in the traditional sense; instead we are interested in identifying bank characteristics that are related specifically to bank risk governance and risk management. In view of concerns about the potential endogeneity problem, similar to Ntim *et al.* (2013) we re-estimated all regression specifications using a lagged risk disclosure index measure. The results remain unchanged (tabular results not reported for brevity).

Variables	$\Delta(2007-2009)$	$\Delta(2007-2010)$	$\Delta(2007-2011)$	$\Delta(2007-2012)$
Market risk disclosure	0.230 (1.438)	0.116 (0.487)	0.307 (1.085)	0.312 (1.190)
Credit risk disclosure	0.304 (1.978)*	0.352 (1.566)	0.530 (1.928)*	0.523 (2.128)**
Liquidity risk disclosure	0.139 (1.770)*	0.187 (1.402)	0.537 (1.679)	0.511 (1.919)*
Operational risk disclosure	0.606 (0.981)	0.853 (1.453)	1.169 (2.022)*	1.046 (2.134)**
Equity risk disclosure	0.365 (2.736)**	0.276 (1.111)	0.473 (2.068)*	0.446 (2.430)**

**Table VI.**  
OLS regression  
intercept for each of  
the five types of  
risks disclosure  
changes with respect  
to year 2007

**Notes:** Where  $\Delta(2007-2009)$  reports the changed disclosure between year 2007 and 2009;  $\Delta(2007-2010)$  reports the changed disclosure between year 2007 and 2010;  $\Delta(2007-2011)$  reports the changed disclosure between year 2007 and 2011;  $\Delta(2007-2012)$  reports the changed disclosure between year 2007 and 2012. The results are on average and the parenthesis reports *t*-statistics. \*,\*\*Denote the level of significance at 10, 5 per cent levels, respectively

Variables	Market risk index	Credit risk index	Liquidity risk index	Operational risk index	Equities risk index
Constant	0.217 (3.42)***	0.161 (1.83)*	0.227 (1.69)*	-0.144 (-0.57)	-0.243 (-1.57)
RC	0.128 (0.33)	-0.059 (-0.75)	0.178 (2.88)***	-0.019 (-0.58)	0.034 (1.22)
DE	-0.125 (-2.59)***	-0.052 (-0.87)	-0.157 (-0.52)	0.167 (2.59)***	0.252 (2.69)***
LnTA	0.472 (3.21)***	0.046 (7.05)***	0.135(1.80)**	0.140 (3.51)***	0.164 (3.36)***
RMU	0.141 (3.41)***	0.452 (4.61)***	0.352 (0.73)	0.421 (1.52)	0.362 (2.59)***
LnBS	0.121 (1.41)	0.439 (3.57)***	0.083 (1.95)*	-0.120 (-0.28)	-0.475 (-0.93)
Big4	0.071 (4.52)***	0.076 (3.24)***	0.114 (2.62)***	0.143 (2.29)***	0.162 (1.59)
ROA	0.031 (1.01)	0.039 (1.58)	0.032 (1.34)	-0.101 (-0.32)	-0.025 (-0.74)
BI	0.155 (1.54)	0.126 (1.25)	0.015 (0.63)	0.119 (1.20)	0.128 (1.36)
LnLR	0.008 (0.71)	-0.003 (-0.46)	0.017 (1.33)	-0.007 (-0.97)	0.020 (1.34)
Adj R <sup>2</sup>	0.47	0.49	0.34	0.35	0.29
F-stat.	12.72***	14.76***	9.73***	9.57***	8.27***
Year dummies	Yes	Yes	Yes	Yes	Yes
Sample size (n)	180	180	180	180	180

Table VII.

Pooled OLS regression results for five types of risks with a sample of 180 bank years during 2007-2012

**Notes:** RC, the number of risk committees; DE, the debt to equity ratio; LnTA, the natural logarithm of total assets; RMU, the risk management unit; LnBS, the number of board members; Big4, the presence of a Big4 affiliate auditor; ROA, return on assets; BI, board independence (measured as proportion of independent directors on the board); LnLR, liquidity ratio (measured a logarithm of assets over liabilities). White (1980) heteroscedasticity consistent robust *t*-statistics are reported in parentheses beneath each coefficient. \*, \*\*, \*\*\*Denote the level of significance at 10, 5, 1 per cent levels, respectively

Fourth, in consideration of potential endogeneity concerns due to omitted variable(s) bias, we examine the relationships using two-stage least squares (2SLS) regression (Dhaliwal *et al.*, 2011; Ntim *et al.*, 2013). The data set in this study is a cross-sectional time series or strongly balanced panel, however, the Hausman test statistics reject the null hypothesis of no endogeneity and 2SLS simultaneous regression models were applied as a robustness test to obtain unbiased results. Following Ntim *et al.* (2013) we assume that risk governance variables will be ascertained by control variables in the first stage and in the second stage, we re-estimate the hypothesis variables with the expected measures as the instrument. The 2SLS results are qualitatively similar to our main findings (tabular results not reported for brevity).

## 6. Conclusion

This paper attempts to redress in part the empirical scarcity in risk disclosure studies in developing countries. It provides insights into risk disclosure practices by financial institutions and fills a gap in the literature by providing a comprehensive and longitudinal study of corporate risk disclosure information in Bangladesh banks' annual reports. This research also overcomes the gap that is apparent in the corporate risk disclosure literature. That is, it lacks an interrogative framework conceptualising multifaceted determinants of risk disclosure and the significance of risk disclosure in sub-components (market, credit, liquidities, operational and equities) in developing countries. Overall, the analysis suggests that listed banks in Bangladesh significantly improved their risk disclosure over time, predominantly on a voluntary basis, and this improvement is associated with disclosure of specific risks, consistent with agency theory.

We focus on five categories of risk disclosures: market, credit, liquidity, operational and equities. Prior to calculating these major risk sub-indices, an unweighted risk disclosure index is calculated for each bank using 107 risk items drawn from

international standards IFRS 7, Basel II: market discipline and prior literature. The paper provides evidence for the extent of risk disclosures in the pre- and post-reform phases concerning international standards in the socio-economic context of one developing country, Bangladesh.

Our results show that the highest level of risk disclosures takes place in the operational risk information category, whereas the lowest is in market risk information. Results also report that the international disclosure standards are associated with an increase in the extent of risk disclosures. This effect is more prevalent in 2010 and 2011, suggesting that the impact increased in 2010. Analysis of the results reveals that the more RC there are, the more a bank discloses its liquidity risk. The DE is highly significant in specifications of operational and equities risk disclosure; however, it is significantly negative for *market* risk. The asset size of banks is a significant determinant of all categories of risk disclosures. Finally, the existence of a RMU is significantly associated with market, equities and credit risk disclosures.

These findings will help regulatory agencies in Bangladesh and elsewhere in monitoring banking institutions by identifying the impact of particular standards. Both existing and potential clients of banks can use these findings in strategically choosing their preferred bank of interest. More particularly, the significance of bank characteristics will help clients identify the potential risks of the banks they are interested in doing business with.

As our study is based entirely on information published in annual reports, future studies may investigate such risk disclosures incorporating information from banks' websites, press releases, and prospectuses. Also, this research uses equal weighting for each item in the risk disclosure index. Therefore, items may not reflect the level of significance as perceived by users of annual reports. Future research can address this issue. Additionally, qualitative data from interviews with regulators and users of annual reports could be a useful complement to our results. Finally, this study provides a platform for future research that can be developed further with reference to banks' risk governance issues. In the light of significant challenges in the global economy, this study will encourage other researchers to pursue research in the area of risk disclosure.

## Notes

1. The risk disclosure index is not reported in the paper for space reason. Please contact the corresponding author for the index.
2. The authors acknowledge that IFRS 7 was amended with additional disclosure requirements for certain transactions during the sample period.
3.  $\Delta RD_{it \text{ and } t-n}$  = change in risk disclosure index (market (MRDI), credit (CRDI), liquidity (LRDI), operational (ORDI) and equities (ERDI)) for bank  $i$  in year  $t$  and  $t-n$ ,  $\Delta RC_{it \text{ and } t-n}$  = change in number of risk committees for bank  $i$  in year  $t$  and  $t-n$ ,  $\Delta DE_{it \text{ and } t-n}$  = change in debt to equity ratio for bank  $i$  in year  $t$  and  $t-n$ ,  $\Delta \ln TA_{it \text{ and } t-n}$  = change in natural logarithm of total assets for bank  $i$  in year  $t$  and  $t-n$ ,  $\Delta RMU_{it \text{ and } t-n}$  = change in the presence of a risk management unit for bank  $i$  in year  $t$  and  $t-n$ , Control variables:  $\Delta \ln BS_{it \text{ and } t-n}$  = change in natural logarithm of board size for bank  $i$  in year  $t$  and  $t-n$ ;  $\Delta \text{Big}4_{it \text{ and } t-n}$  = change in Big4 affiliate audit firm for bank  $i$  in year  $t$  and  $t-n$ ; " $n$ " is the number of years for which the difference is taken from the base value.
4. The authors acknowledge that variables proxying for ownership structure, bank stability, number of board meetings, and professional and educational experience of board members are desirable for inclusion, but data were not available in the sample annual reports.

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