Does corporate governance compliance condition information asymmetries? Moderating role of voluntary disclosures

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Abstract

Purpose – This study examines the moderating effects of low and high levels of voluntary disclosures (VDs) between corporate governance and information asymmetry (IA).

Design/methodology/approach – The study used PROCESS macro to construct bootstrap confidence intervals at the 95% level to estimate the model, and "simple slope analysis" to visualize the model.

Findings – The better corporate governance provides a monitoring mechanism that disseminates private information and reduces IA. The effect of corporate governance on IA is contingent on the levels of VDs within a firm, and this relationship is strengthened when the level of VDs within a firm is high, and results remain consistent when levels of sub-indices are high. Additional analysis reveals that effective boards and audit committees reduce IA. Increased inside, an associated company, family and foreign ownership exacerbate IA, whereas institutional owners act as effective monitors to overcome informational disadvantages.

Practical implications – The findings provide implications for policymakers to promote corporate governance and more relevant reporting practices as effective mechanisms for protecting shareholders' rights and attenuating IA in capital markets.

Originality/value – The study is valuable to understand the strength of the relationship between corporate governance and information asymmetries based on the moderating role of different VD levels.

Keywords Voluntary disclosure, Corporate governance, Information asymmetry

Paper type Research paper

1. Introduction

During the last few decades, financial crises and stock market collapses have raised the importance of institutional settings and corporate transparency. The disparity in information between managers and shareholders regarding corporate affairs is called information asymmetry (IA), causing a conflict of interest between management and owners

(Jensen and Meckling, 1976) as well as major and minor shareholders (La Porta *et al.*, 2000). The issue of IA is substantially recognized as a valid concern in the literature concerning capital market functioning (Elbadry *et al.*, 2015). The efficient market hypothesis addresses the information gap between market players and its implications on investor behaviour affecting efficient market functioning (Abdioglu *et al.*, 2015).

The system of corporate governance (CG) is in place to protect the minorities and reduce IA for market participants (Berglund, 2020). Along with this, voluntary disclosure (VD) corporate practices are also motivated by the same cause. It is observed that firms disclose less information serving managerial opportunism resulting in IA (Byun *et al.*, 2011). These tactics encourage more managerial discretion *vis-à-vis* external monitoring, that is, CG and VD. According to Nguyen *et al.* (2020), CG observing firms board structure, audit committee, ownership structure and other practices are intended to align the managerial activities with the shareholders' interests and narrow the information gap between related parties. However, despite the presence of CG, discretion of information by managers and dominant owners still exists and this discretion can be controlled by high corporate disclosures (Enache and Hussainey, 2020). VD has complementary value in this regard. Christensen (2016) also made a call for examining the interacting effect between CG and VD.

The signalling theory supports that high-performing firms strategically disclose superior quality information to the market. On the contrary, stakeholder theory assumes that companies make VD manipulating stakeholders' perceptions (Qu *et al.*, 2013). However, more VD reduces the chances of managerial discretion and IA. The corporate disclosure policy is critical in this regard. The existing literature confirms the negative relationship between CG and IA as well as VD and IA (Ajina *et al.*, 2013; Elbadry *et al.*, 2015; Hinson and Utke, 2016; Berglund, 2020; Zamil *et al.*, 2021). However, this study conditions that different levels of VD have a moderating role in the state of CG and IA, strengthening their negative relationship, which broadly lacks in the existing literature. Further, this study also provides empirical evidence in context of a weak regulatory environment. According to Millar *et al.* (2005) and Gisbert and Navallas (2013), Asian emerging economy's corporate set-ups indicate high ownership concentration, weak investor protection, poor legal infrastructures, low information dissemination, low capital market development and internal institutional ties. Disclosure of corporate information in developing economies' firms is comparatively low, which promotes the opportunistic behaviour of managers, thus causing IA (Byun *et al.*, 2011; Rashid Khan *et al.*, 2020). Therefore, it is believed that the problem of IA is severe in developing countries and that there is a need to investigate this research area.

Pakistan also suffers from these adversities where corporate unwillingness to implement corporate governance codes is a major issue (Khan *et al.*, 2017; Husnain *et al.*, 2021). Corporate ownership is commonly closely held either by institutions, families or internal management that tend to greatly influence management's decisions, thereby creating shareholder-manager and majority-minority shareholder agency problems (Yasser and Mamun, 2015). Sehar and Tufail (2013) further state that disclosure of value-relevant information by Pakistani firms is inadequate due to the ineffective implementation of disclosures laws, as well as a lack of awareness and business ethics.

To fill this gap, we intend to understand the moderating role of VD between CG and IA using a composite measure of corporate governance index (CGI), further categorized in internal and external CG mechanism. Further, this study empirically tests the different levels (low, moderate and high) of VD. This research contributes to the CG, IA and VD literature in multiple ways. For instance, it is the first study that has developed a VD Index (VDI) within the context of a developing economy. Although corporate information reporting has already been attracting a lot of attention in developed countries (Khlif *et al.*, 2017), there is a surprisingly limited amount of research available with respect to developing countries. In the case of Pakistan, there is only one study which has examined the determinants of VD by

using an established checklist of VD (Sehar and Tufail, 2013). Second, the current study examines the moderating effect of VD, specifically the neglected examination of low and high levels of composite as well as sub-indices of VD. Additionally, graphical demonstration of conditional effect of CG on IA with different levels of VD is another unique contribution of this research.

The following section provides a review of the literature. The third section explains the methodological approach, with results, discussion and conclusion in the forthcoming sections.

2. Literature review
2.1 Corporate governance and information asymmetry
Jensen and Meckling (1976) define agency relationship between the owners (the principals) and managers (agents) as a contract to serve the interests of the former. However, the managerial inclination towards serving self-interests raises the issue of agency conflict. Besides this, the separation of ownership and control also stimulates the issue of IA. Agency theory addresses the issue of opportunistic behaviour of managers and suggests viable tactics to resolve the issue. The managerial intent to institute the self-serving structure requires to restrict flow of information to the related stakeholders, particularly shareholders. The agency theory suggests the constitution of corporate governance mechanism essential to mitigate the agency conflicts and reduce IA. Berglund (2020) and Nkuutu et al. (2020) argued that firms with good CG are subject to less IA than the firms with bad CG. Prior empirical studies investigate the effect of limited CG characteristics on IA. Ajina et al. (2013), Elbadry et al. (2015) and Nguyen et al. (2020) proposed that the quality CG (measured via board structure, board independence and board activity) effectively monitors the managerial activities that reduce the IA. In contrast, it is found that insider information is critical to the shareholders, generally exploited by the large shareholders exacerbating the IA (Attig et al., 2006; Byun et al., 2011). This study uses a CGI and expects that better score of CG helps reduce the agency issue and IA. As per literature, it seems valid to postulate as follows:

H1. CG and IA are negatively related to each other.

2.2 The moderating role of voluntary disclosure
Managers have significant motivations to disclose voluntary information. The prior empirical literature has employed signalling, contracting cost theory, legitimacy theory, proprietary cost theory and stakeholder theory to explain managers' motives for disclosing voluntary information (Qu et al., 2013; Charumathi and Ramesh, 2020). VD results in positive communication and relationships between corporations and stakeholders and, thus, are considered important to discharge accountability to various stakeholders. Therefore, CG and VD are considered as two different mechanisms of monitoring in firms (Enache and Hussainey, 2020; Tahir et al., 2021).

Recent studies by Hinson and Utke (2016), Naqvi and Laique (2021) and Zamil et al. (2021) state that quality VD reduces information risk and IA. Jiang et al. (2011) argued that when VD is taken into account, it significantly weakens the IA risk associated with ownership concentration. Shareholders may use improved disclosures as a monitoring tool that allows them to supervise senior management's decisions and alignment of principle-agent interests (Jensen and Meckling, 1976; Zamil et al., 2021). Therefore, the present study proposes that, in the presence of greater information transparency through VD, CG could be more effective in reducing IA, particularly in emerging markets with respect to specific institutional characteristics. The developed testable hypothesis is as follows:

H2. Voluntary disclosure moderates the relationship between CG and IA.

Stakeholders, analysts and investors incorporate particularly strategic information in determining a company's success and making investment decisions since it signals where management intends to take the company. The use of risk disclosures also emerged as a new area of research in the late 1990s, since the regulatory bodies such as FASB [1] and ICEAW [2] started paying attention to the gap in providing risk information in the US and UK firms (Cordazzo *et al.*, 2017). Projected information disclosures are another important source of information that all stakeholders use when they value a company (Kılıç and Kuzey, 2018). However, despite the increasing concerns of forward-looking disclosures in recent years, the research in emerging markets is sparse (Liu, 2015). Moreover, access to historical financial ratios and performance review for investors and analysts serves as a primary source of information in analyzing company's financial operating and investing activities (Taylor and Tower, 2011). Energy disclosures are also important, as energy sources are the key factor in the socioeconomic development of a country; this is especially relevant is Pakistan, as, in recent years, Pakistan has endured the worst energy crisis in its history (Nayyar *et al.*, 2014). Lastly, firms make significant investments in intellectual capital (IC), as it is a key factor for building a competitive advantage (e.g. Curado *et al.*, 2011) and value creation (e.g. Catalfo and Wulf, 2016). However, users of financial reports have limited access to disclosures of intangibles because of the conservative standards for IC in common accounting systems (e.g. GAAP and IFRS), and users of financial reports demand information that adequately reflects such value-creating assets. Based on the above discussion, the following hypothesis is developed:

H3. Voluntary disclosure sub-indices moderate the relationship between CG and IA in Pakistani firms.

Moreover, corporations with high disclosure scores are better able to reduce IA than those with low and moderate scores. Accordingly, this study predicts that the negative CG-IA relationship is strengthened in companies having high VD levels. The conditional effects of CG on IA are stronger when levels of sub-indices are high than when they are low.

H4. The effect of CG on IA is moderated by high (vs. low) VD.

H5. The effect of CG on IA is moderated by high (vs. low) VD sub-indices.

Moderating effect is usually difficult to interpret without a visual demonstration (Hayes and Rockwood, 2017; Hayes and Montoya, 2017). The regression coefficients of the model can be used to plot an interaction to better understand the results. A significant coefficient for the interaction term only means that the effect of CG on IA depends on VD. According to Hayes and Rockwood (2017), interactions can take many forms, so the visualization of interactions is recommended to better understand how the effect of the independent variable varies in the presence of moderators. Thus, the present study visualizes and investigates the interactions to determine how the size of CGs effect on IA varies at different levels of VD.

3. Methodology
3.1 Sample and data sources
Data from 154 firms are collected in 2011–2019, thus generating a total of 1,386 firm-year observations. Total listed firms were 560 on Pakistan Stock Exchange (PSX). The study started with only non-financial firms as they differ considerably from financial firms in terms of their business activities, regulatory oversights and the manner in which they disclose information in annual reports. Different filtration criteria were applied to the remaining 432 non-financial firms to obtain study sample. Firms that were delisted, merged, remained non-operational or unable to provide complete annual reports during the period were excluded. Moreover, firms for which complete market value data are unavailable were also excluded.

Applied filters have removed 262 firms, leaving the study with an initial sample of 170 firms. Further 16 firms with extreme values were excluded (outliers); hence, we had a final sample of 154 firms from 16 sectors. Data are collected from annual reports and PSX website.

3.2 Research method

Analytically, questions of "when, under what circumstances, and in what magnitude does X affect Y?" are most often answered statistically using moderation analyses (Hayes and Hayes, 2015) in the following regression model,

$$\widehat{Y} = \beta_0 + \beta_1 X + \beta_2 W \tag{a}$$

where $\widehat{Y}$ denotes outcome variable and X independent variables while W moderator. The effect of X (β_1) on Y is fixed regardless of the value of W, causing an analytical constraint for testing a moderation hypothesis. According to Baron and Kenny (1986), X's effect on Y is contingent on W if the sign or size of the effect of X on Y varies with W (in other words, if the effect is moderated by W). To perform a regression analysis that investigates the moderation hypothesis, X's effect on Y must be unconstrained. This can be ensured by specifying that X's effect is a linear function of W (i.e. $X = \beta_1 + \beta_3 W$). So, by substituting $\beta_1 + \beta_3 W$ for β_1 in Eqn (1), we get

$$\widehat{Y} = \beta_0 + (\beta_1 + \beta_3 W)X + \beta_2 W \tag{b}$$

and

$$\widehat{Y} = \beta_0 + \beta_1 X + \beta_2 W + \beta_3 XW \tag{c}$$

where β_0 is the regression intercept and β_1, β_2 and β_3 are regression coefficients of linear moderation. The question of the contingent effect of X on Y is statistically answered by the regression coefficient of XW (β_3). If β_3 is different than zero by the confidence interval, this indicates that the effect of X is linearly moderated by W. The regression equations are estimated by PROCESS macro (Hayes, 2013). PROCESS macro has widely been used by researchers for tests moderation and mediation in recent years (Nguyen, 2018; Nguyen *et al.*, 2019). The bootstrapping analysis (randomly resampling the total number of observations with replacements) is used to construct confidence intervals to estimate the model. This study used 5,000 bootstrap samples and constructed upper and lower level of confidence intervals at 95%.

3.3 Measurement of variables

3.3.1 Information asymmetry. IA cannot be directly measured in firms; prior empirical literature has used several proxies for this variable. This study used turn over ratio as proxy of IA (Alves *et al.*, 2015; Tahir *et al.*, 2019).

3.3.2 Corporate governance index. Sajid and Afza (2018) use CGI that includes 29 items of CG. These 29 items are based on seven board indicators, five audit committee indicators, three executive compensation structure indicators and 14 ownership structure indicators. A binary coding system is used to rate the indicators based on information available in companies' annual reports. The score for each firm ranges from 0 to 29, with high scores representing better governance quality.

3.3.3 Construction of the VDI. This study used a self-constructed VDI in the context of Pakistan. The constructs of the index are based on a set of recommendations provided by regulatory and professional bodies and annual reports. Additionally, the disclosure indices used in prior research (e.g. Ho *et al.*, 2013; Rezaee and Tuo, 2017) are also reviewed to identify the

constructs that are not required by law but which are nevertheless considered important in communicating information to stakeholders. Similarly, discussion with reporting managers from different firms has been conducted to gain an overview of existing practices and the selection, modification and identification of good practices that can improve disclosures in the country. The checklist is further reviewed by the Big 4 auditors [3] in Pakistan to ensure that no mandatory disclosure items are included. Moreover, corporate confidentiality, competitive concerns and other associated costs are taken into account while devising the index.

The preceding steps result in the final checklist of 49 VD items classified into six information categories. These are presented in Appendix 2. A binary coding scheme is used to measure the quantity of VD in annual reports, [4] assigning a value of 1 if the scheme identifies the presence of the information item, and 0 [5]. The study employed the widely used content analysis to collect data (Salehi *et al.*, 2019). The study also conducted a correlation analysis between all information categories and their correlations with the VDI by following Botosan (1997) and Rezaee and Tuo (2017) to evaluate the validity of the index.

The measurements of variables is given in Appendix 2.

3.4 Empirical model

For the empirical analysis, the following regression models are formed. First, the linear relationship between CG and IA is validated via the following equation:

$$\text{IA}_{it} = \beta_0 + \beta_1\text{CGI}_{it} + \beta_2\text{Size}_{it} + \beta_3\text{ROE}_{it} + \beta_4\text{Tob\_Q}_{it} + \beta_5\text{Beta}_{it} + \beta_6\text{Lev}_{it} + \varepsilon_{it} \quad (1)$$

where IA_{it} = IA for firm i for year t, CGI_{it} = CG index for firm i for year t, Size_{it} = size of the firm i for year t, ROE_{it} = return on equity for firm i for year t, Tob_Q_{it} = Tobin's Q for firm i for year t, Beta_{it} = risk for firm i for year t, LEV_{it} = leverage for firm i for year t and ε_{it} = residual.

Second, the study conducts a moderation analysis to investigate whether the sign or effect of CG on IA depends in one way or another on VD. Namazi and Namazi (2016) argued that the interaction effect (CG*VD) may exhibit a multicollinearity problem with the main effects of CG and VD. Thus, this study constructs the interaction terms by using mean centred VDI and CGI (Hayes and Rockwood, 2017).

$$\text{IA}_{it} = \beta_0 + \beta_1\text{CGI}_{it} + \beta_2\text{VDI}_{it} + \beta_3\text{CGI}_{it} * \text{VDI}_{it} + \beta_4\text{Size}_{it} + \beta_5\text{ROE}_{it} + \beta_6\text{Tob\_Q}_{it}$$
$$+ \beta_7\text{Beta}_{it} + \beta_8\text{Lev}_{it} + \varepsilon_{it} \quad (2)$$

where VDI_{it} denotes voluntary disclosure index. The effect of CG is further examined by categorizing the CG into internal and external governance structure. The tests of VDI as moderator in the CG-IA relationship are further investigated by separately controlling for these two groups.

$$\text{IA}_{it} = \beta_0 + \beta_1\text{CGI}_{it} + \beta_2\text{VDI}_{it} + \beta_3\text{CGI}_{it} * \text{VDI}_{it}$$
$$+ \beta_4\sum_{k=1}^{10}\text{CGN}_{it} + \beta_5\text{Size}_{it} + \beta_6\text{ROE}_{it} + \beta_7\text{Tob}_{\text{Qit}} + \beta_8\text{Beta}_{it} + \beta_9\text{Lev}_{it} + \varepsilon_{it} \quad (3)$$

and

$$\text{IA}_{it} = \beta_0 + \beta_1\text{CGI}_{it} + \beta_2\text{VDI}_{it} + \beta_3\text{CGI}_{it} * \text{VDI}_{it}$$
$$+ \beta_4\sum_{k=1}^{5}\text{CGX}_{it} + \beta_5\text{Size}_{it} + \beta_6\text{ROE}_{it} + \beta_7\text{Tob\_Q}_{it} + \beta_8\text{Beta}_{it} + \beta_9\text{Lev}_{it} + \varepsilon_{it} \quad (4)$$

where $\sum_{k=1}^{10} \text{CGN}_{it}$ = vector of internal CG variables related to board and audit committee and $\sum_{k=1}^{5} \text{CGX}_{it}$ = vector of external CG variables related to ownership structure (see Appendix 2 for the measurement of variables).

Third, the conditional effect of CG on IA is investigated for VD sub-indices to examine the moderating effect of VD in more detail. To undertake the analysis, the study replaced VDI in Eqn (2) with VD sub-indices separately. Accordingly, at the fourth level, the study examines the differences in the moderating effect of VDI and VD sub-indices at low and high levels. Finally, the results of the study are visualized to provide more insight into the moderating effect of VDI and VD sub-indices.

4. Results and discussion

Descriptive statistics for turnover, CGI, VDI and its sub-indices and control variables for the 154 companies in the final sample are shown in Table 1. The mean turnover of −9.6 indicates a high IA. The average level of CGI is 58%, with a maximum score of 84% and a minimum score of 30%. The composite index for all six categories gave an average of 0.60, with the highest score of 74% for the risk disclosure index. Moreover, firms are likely to disclose performance information (I_Perf = 62%), projected information (I_Proj = 60%) and intellectual capital information (I_IC = 60%). The characteristics of internal audit committees indicate that, on average, committees comprise four members who meet four times in a fiscal year. The standard committee is composed of three non-executive directors, whereas the chairman is independent in only 6.56% companies. Moreover, 54% of companies use the services from the Big 4 auditors when getting their financial reports audited. Regarding board characteristics, the average board size is eight members, with 69% board independence, 22% CEO duality, 25% board diversity and a meeting frequency of more than five times a year. For variables related to ownership structure, on average, insiders of a firm hold 20%, associated companies hold 32%, and foreigners hold 0.04% of a firm's total outstanding shares. The variable of family dominance reveals that in 49.06% of firms, the owners and their family members hold more shares than the sample median. Moreover, the variable of institutional ownership depicts that financial institutions' shareholding is greater than the sample median in 51.22% of all sample firms.

The study estimates Pearson's correlation coefficients, the reported results in Table 2 show that there is no multicollinearity problem. Table 3 present the results for the relationship between CG mechanism and IA. CGI has a strong statistically significant and positive relationship with turnover, indicating that better CG leads to decrease IA. The CG mechanism develops investors' confidence in share prices and leads to higher trading volume. The results accept H1 and support the agency theory and previous literature (Ajina *et al.*, 2015; Alves *et al.*, 2015; Berglund, 2020). Using a bootstrap analysis, Model 2 (Table 3) analyses the impact of VD on IA and showed a significant positive relationship. The liquidity of shares is closely related to the disclosure practices of companies. VD increases firm transparency, reduces IA and enhances market liquidity (Petersen and Plenborg, 2006; Jiang *et al.*, 2011; Naqvi and Laique, 2021; Zamil *et al.*, 2021). Additionally, the coefficient of the interactive variable is significantly positive, suggesting that increased VD in firms with better CG mechanisms considerably increases turnover, therefore supporting H2. Firm size and return on equity (ROE) exhibit significant positive relationship, with turnover implying that investors are more likely to trade in large profitable firms. The coefficients of Tobin's *q*, beta and leverage are significant and negative, indicating that firms with growth opportunities constrain disclosures in order to stay competitive in the market, and investors avoid trading in risky firms (see Table 3).

The conditional effect of CG is further investigated for of VD sub-indices separately in Models 1–6. The results are reported in Table 4. The interactions between CGI and

Variable	N	Mean	Std. Error	Std. Dev	Max	Min
Turnover	1,386	−9.606	0.080	2.255	6.27	−15.37
CG_Index	1,386	0.588	0.005	0.100	0.84	0.30
VD_Index	1,386	0.6015	0.0071	0.2180	1.00	0.00
I_Str	1,386	0.5523	0.0070	0.2387	1.00	0.00
I_Risk	1,386	0.7456	0.0084	0.2857	1.00	0.00
I_Proj	1,386	0.6008	0.0071	0.2825	1.00	0.00
I_Perf	1,386	0.6258	0.0060	0.2015	1.00	0.00
I_En	1,386	0.4666	0.0122	0.4026	1.00	0.00
I_IC	1,386	0.6053	0.0096	0.3185	1.00	0.00
AC_Size	1,386	0.428	0.004	0.095	1.00	0.00
AC_Ind	1,386	0.788	0.007	0.218	1.33	0.00
AC_Act	1,386	4.180	0.019	0.600	8.00	1.00
B_Size	1,386	2.888	0.005	0.185	3.04	1.10
B_Ind	1,386	0.694	0.004	0.168	1.00	0.00
B_Act	1,386	5.968	0.071	2.865	35.00	3.00
Insid_OS	1,386	0.208	0.006	0.235	0.93	0.00
Ass_OS	1,386	0.322	0.008	0.412	0.98	0.00
For_OS	1,386	0.047	0.006	0.158	0.89	0.00
Size	1,386	15.80	0.048	1.635	20.13	11.08
ROE	1,386	0.065	0.018	0.624	5.80	−11.64
Tob_Q	1,386	1.209	0.068	2.038	21.51	0.00
Beta	1,386	0.677	0.021	0.655	4.82	−3.22
Lev	1,386	0.288	0.006	0.241	1.66	0.00

Dichotomous variables	N	Frequency case = 1	% Age	Std. Dev	Max	Min
AC_ChInd	1,386	91	6.56	0.360	1.00	0.00
AQ_Ext	1,386	750	54.11	0.478	1.00	0.00
CEO_D	1,386	300	21.64	0.436	1.00	0.00
B_Div	1,386	350	25.25	0.448	1.00	0.00
Fam_OS	1,386	680	49.06	0.5008	1.00	0.00
Inst_OS	1,386	710	51.22	0.5011	1.00	0.00

Table 1.
Descriptive statistics

sub-indices exhibit significant negative relationship with IA in all models except for Model 5. The result indicates that the increased disclosure for strategic, risk, projected, performance and IC information by firms with CG reduces IA and therefore supports H5. The interaction between the risk information disclosure index and CG in Model 2 shows the highest coefficient value of 7.3, which is statistically significant at the 1% level. Investors and other market participants find risk-related VD as the most relevant form of disclosure in reducing IA and increasing share liquidity. The financial crisis of 2008 has reignited the debate about disclosing information related to risk assessment and management in corporations (OECD, 2010; Ntim *et al.*, 2013). The projected information disclosure is the second most significant moderator of the relationship between CG and turnover. The PWC guide to forward-looking information (PWC, 2007) also recognizes investors' increased demands for forward-looking information. The moderation of the energy disclosure index is positive but statistically insignificant, which is contrary to expectations, as Pakistan is experiencing an energy crisis, meaning there is a high demand for energy disclosure. However, firms are not realizing the importance of energy disclosures due to which they are not disclosing much relevant information regarding alternate energy sources.

CG characteristics attenuate IA depending on different levels of VD (Table 5). The results indicate insignificant conditional effects at low levels of VD. Meanwhile, the conditional effect

	CG_Index	VD_Index	AC_Size	AC_Ind	AC_ChInd	AC_Act	AQ_Ext	B_Size	B_Ind	CEO_D	B_Div	B_Act	Insid_OS	Fam_OS	Ass_OS	For_OS	Inst_OS	Size	ROE	Tob_Q	Beta	LEV
CG_Index	1.00																					
VD_Index	0.34	1.00																				
AC_Size	0.15	-0.08	1.00																			
AC_Ind	0.10	0.10	-0.05	1.00																		
AC_ChInd	0.14	-0.04	-0.05	-0.105	1.00																	
AC_Act	0.01	0.10	-0.10	-0.035	-0.03	1.00																
AQ_Ext	0.44	0.32	-0.12	0.09	-0.05	0.06	1.00															
B_Size	0.10	0.40	0.08	0.15	-0.10	0.08	0.21	1.00														
B_Ind	0.20	0.10	0.07	0.25	-0.16	0.08	0.08	0.30	1.00													
CEO_D	-0.25	-0.19	0.10	-0.08	0.03	0.02	-0.30	-0.18	-0.28	1.00												
B_Div	-0.08	-0.10	0.12	0.008	0.06	-0.01	-0.05	-0.11	-0.24	0.44	1.00											
B_Act	0.14	0.10	0.05	-0.09	0.08	0.01	0.10	0.08	-0.13	-0.02	-0.03	1.00										
Insid_OS	-0.11	-0.27	-0.07	-0.331	0.10	-0.09	-0.28	-0.18	-0.25	-0.13	0.04	0.00	1.00									
Fam_OS	-0.22	-0.20	-0.05	-0.09	0.08	-0.07	-0.17	-0.08	-0.14	-0.24	0.25	0.07	0.31	1.00								
Ass_OS	0.01	0.20	0.04	0.138	-0.05	0.07	0.19	0.13	0.12	0.12	0.04	-0.05	-0.57	-0.30	1.00							
For_OS	0.09	0.17	0.07	0.102	-0.07	0.09	0.15	-0.01	-0.03	0.08	-0.19	0.07	-0.17	-0.05	-0.01	1.00						
Inst_OS	0.15	0.10	-0.06	0.019	0.07	0.15	0.14	0.05	0.06	-0.09	-0.17	-0.06	-0.18	-0.14	-0.10	0.01	1.00					
Size	0.30	0.51	-0.09	0.037	0.05	0.08	0.34	0.38	0.12	-0.07	-0.11	0.25	-0.18	-0.17	0.23	0.06	0.06	1.00				
ROE	0.08	0.07	-0.07	-0.014	-0.07	0.05	0.06	0.00	-0.04	-0.04	0.02	0.01	-0.06	-0.08	0.07	0.04	0.08	0.03	1.00			
Tob_Q	-0.13	-0.08	0.00	-0.006	-0.08	0.10	0.08	0.07	0.13	-0.15	-0.01	-0.04	-0.12	-0.22	0.02	0.18	-0.04	-0.27	0.12	1.00		
Beta	0.30	0.25	0.00	0.019	-0.06	0.11	0.24	0.17	0.13	0.02	-0.11	0.05	-0.14	-0.22	0.08	0.13	0.11	0.34	0.04	0.00	1.00	
LEV	-0.15	-0.30	-0.04	-0.051	0.00	0.05	-0.30	-0.10	-0.10	0.01	0.12	0.03	0.25	0.17	-0.24	-0.11	-0.14	-0.16	-0.11	-0.09	-0.08	1.00

Table 2.
Correlation coefficients
for study variables

Variables	Model 1: OLS		Model 2: Moderation using bootstrap analysis			
	Coeff	p-value	Coeff	p-value	BootLLCI (95%)	BootULCI (95%)
Intercept	−10.54	0.000	−8.824	0.0000	−10.41	−8.350
CGI	1.702	0.007***	1.645	0.0170**	0.3050	2.970
VDI			1.100	0.0018***	0.4508	1.852
Int			6.350	0.0319**	0.6025	11.88
Size	0.081	0.075*	0.010	0.8622	−0.0860	0.108
ROE	0.120	0.132	0.182	0.0848*	−0.3668	0.024
Tob_Q	−0.035	0.150	−0.058	0.0855*	−0.1190	0.007
Beta	−1.61	0.000***	−1.484	0.0001***	1.350	1.700
LEV	−0.480	0.072**	−0.610	0.1481	−0.956	0.138
R^2-adj	0.243			0.26		
F-statistics	0.000***			0.000***		
R^2 change (p-value)				0.031**		
Obs	1,386			1,386		

Note(s): *$p < 0.10$ **$p < 0.05$ ***$p < 0.001$
Int: CG_Index*VD_Index

Table 3.
Impact of CG on IA
(Model 1) and
moderation of VDI on
CG_IA relationship
(Model 2)

is significant at the 1% level for high levels of VD. The results remain consistent when the bootstrap analysis controls for the board-, audit-committee- and ownership-related variables, thus accepting H6. Managers of corporations in emerging markets have the discretion to information disclosures. The greater the extent of VD, the lower the probability that managers will hide information for their personal benefits. These results also remain consistent at different levels of sub-indices, which supports H7.

The visual depiction of probing the interactions is shown in Figures 1–6. These depictions effectively illustrate the contingent relationship between CG and IA. The conditional effect is derived for the three values that represent low, moderate and high levels of VD. Figure 1 shows a visual depiction of the interaction between CG and VDI while demonstrating that CG's effect on turnover varies depending on the VD levels, represented by the three lines with different slopes. This figure indicates that the effect of CG on turnover is larger in companies that have high levels of VD as represented by the increasing gap between the lines as VD level increases. The visual depictions in Figures 2–6 are also consistent with the expectation that firms' increased VD across all information categories with increased CG helps reduce IA and improve the liquidity of shares.

4.1 Additional analysis
This study further investigates the effect of external and internal characteristics of CG mechanism on IA. To characterize internal CG, this study used variables related to the structure of firms' boards of directors and audit committees. To characterize external CG, the study used variables related to ownership structure, because these variables determine the extent to which shareholders monitor managers' actions and, thus, the level of IA in firms.

In Table 6, Model 1 controlled for the effect of the board- and audit-committee-related variables to examine the interactive impact of VD and CG on IA. The results support H2, and consistent with the finding that better CG reduces IA in the presence of corporate transparency through VD. The coefficients for B_Size and B_Ind are positive and significant at the 1% level, demonstrating that larger and independent boards are effective in monitoring managerial activities and are associated with high share turnover. Agency theory argues that boards should be independent of management to limit managerial entrenchment and opportunism (Jensen and Meckling, 1976; Duru et al., 2016). The board activity variable has a significant positive coefficient at 5% level, which is consistent with the findings of prior

Table 4.
Voluntary disclosure sub-indices as moderator of CG-information asymmetry relationship

Dependent variable = information asymmetry

Variable	I_Str Model 1 Coeff	p.val	I_Risk Model 2 Coeff	p.val	I_Proj Model 3 Coeff	p.val	I_Perf Model 4 Coeff	p.val	I_En Model 5 Coeff	p.val	I_IC Model 6 Coeff	p.val
CG_Index	1.750	0.0151**	1.548	0.0200**	1.920	0.0036***	1.821	0.0115**	1.854	0.0128**	1.812	0.0085***
I_Str	1.555	0.0001***										
CG*I_Str	5.065	0.0062**										
I_Risk			0.0456	0.7865								
CG*I_Risk			7.852	0.0085***								
I_Proj					0.5869	0.0017***						
CG*I_Proj					4.445	0.0831**						
I_Perf							1.415	0.0000***				
CG*I_Perf							5.745	0.0575*				
I_En									0.1886	0.2752		
CG*I_En									0.6547	0.8526		
I_IC											0.2700	0.2246
CG*I_IC											3.817	0.0733*
Size	−0.0145	0.8915	0.0852	0.4521	0.0353	0.4352	0.5245	0.5632	0.0493	0.4558	0.0534	0.2513
ROE	0.2102	0.0870*	0.1658	0.1365	0.1854	0.0913*	0.8520	0.1045	−0.6254	0.6325	−0.1601	0.1069
Tob_Q	−0.0654	0.0896*	−0.0556	0.1540	−0.0518	0.1458	−0.0741	0.0477*	−0.0478	0.1125	−0.0485	0.1335
Beta	−1.001	0.0001***	−1.580	0.0025***	−1.501	0.0005***	−1.562	0.0000***	−1.482	0.0000***	−1.502	0.0000***
LEV	−0.2964	0.2882	−0.5420	0.0609*	−0.5421	0.1038*	−0.4528	0.2110	−0.5563	0.0483*	−0.5057	0.0684*
Constant	−9.564	0.0000	−11.63	0.0000	−11.12	0.0000	−11.32	0.0000	−11.48	0.0000	−10.42	0.0000
N	1,386		1,386		1,386		1,386		1,386		1,386	
R^2	0.25		0.25		0.23		0.25		0.23		0.22	
F-stat (p-val)	0.000***		0.000***		0.000***		0.000***		0.000***		0.000***	
R^2 change (p-val)	0.062**		0.008***		0.083*		0.0575*		0.852		0.073*	

Note(s): $*p < 0.10$ $**p < 0.05$ $***p < 0.001$

	VD levels	Conditional effect	p-value	BootLLCI (95%)	BootULCI (95%)
CGI	Low VDI	0.1956	0.8445	−1.700	2.852
	High VDI	3.305	0.0017***	2.281	6.325
CGI	Low I_Str	0.5245	0.6523	−2.365	2.369
	High I_Str	3.365	0.0045***	2.123	6.356
CGI	Low I_Risk	1.654	0.0156**	0.3602	3.069
	High I_Risk	3.589	0.0012***	1.963	5.693
CGI	Low I_Proj	0.6935	0.5698	−1.852	2.562
	High I_Proj	3.856	0.0081***	1.358	6.258
CGI	Low I_Perf	0.6589	0.6589	−0.9632	3.658
	High I_Perf	2.659	0.0032***	2.659	6.302
CGI	Low I_En	–	In-sig	–	–
	High I_En	–	In-sig	–	–
CGI	Low I_IC	0.6325	0.5632	−2.632	2.523
	High I_IC	3.032	0.0066***	2.325	5.075

Note(s): *$p < 0.10$ **$p < 0.05$ ***$p < 0.001$
In-sig = Insignificant

Table 5.
Conditional effects of
corporate governance
at levels of voluntary
disclosure index and
sub-indices
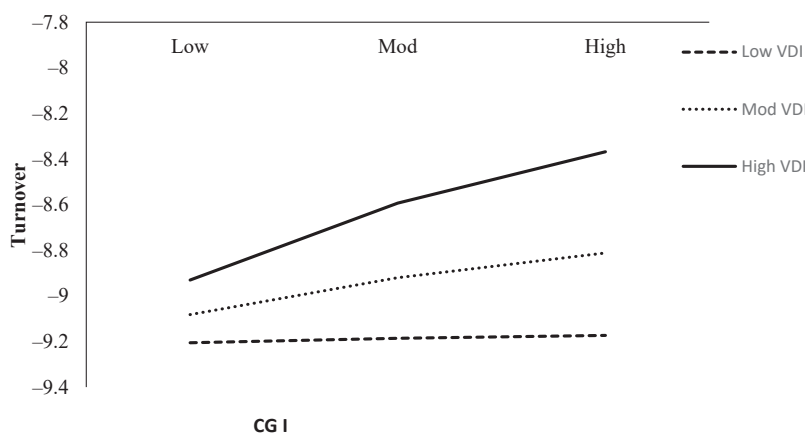
Figure 1.
Visual depiction of CGI
* VD index

studies which have supported the view that boards which meet frequently are more likely to make decisions in line with shareholder's interests than those which do not meet frequently. The variables AC_Size, AC_ChInd and the AC_Act showed positive effect, indicating that the presence of a large, independent audit committee that meets frequently strengthens a firm's internal CG mechanism and reduces IA by enhancing financial reporting quality.

The results reported in Model 2 (Table 6) show that the overall finding remains the same: that additional disclosures with CG mitigate IA and increase market efficiency. Moreover, inside, associated company, family and foreign ownership showed a negative relationship with share turnover, consistent with entrenchment, adverse selection and strategic alliance hypotheses. The results indicate that an increase in CEO, director and other executives' ownership increases IA, as the managers are likely to make entrenched decisions and to hide information that leads to uncertainty in share prices and subsequently lowers trading volumes. The high level of family ownership leads to a low share turnover. In firms with this type of ownership, information transparency, decision-making and the capacity for

Figure 2.
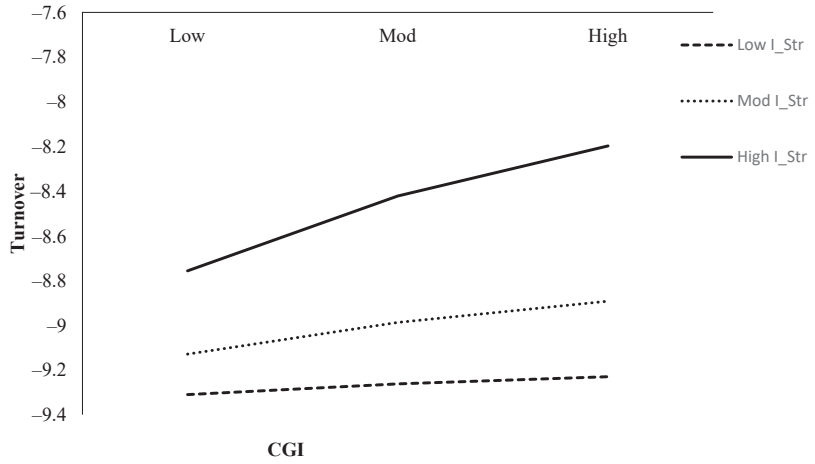Visual depiction of CGI
* strategic inf
disclosure index

Figure 3.
Visual depiction of CGI
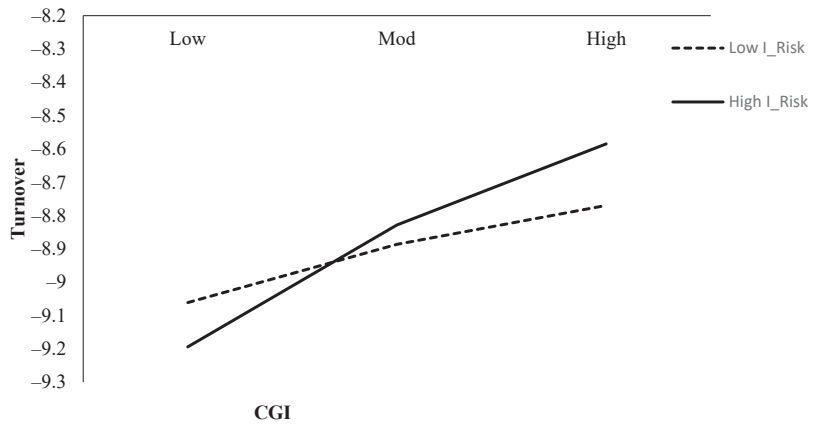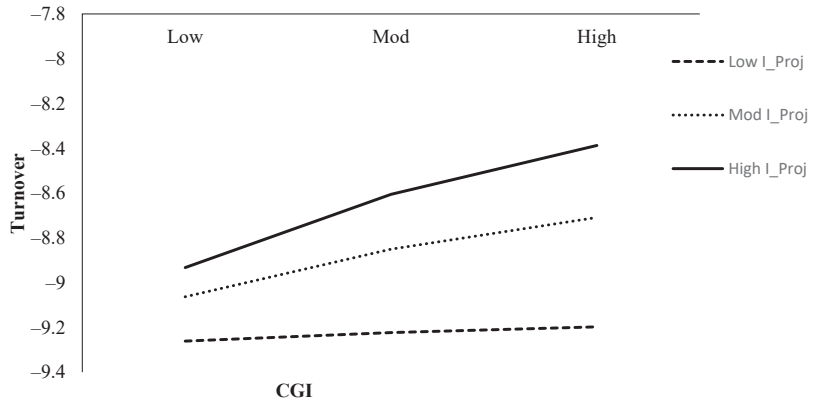* risk info
disclosure index

Figure 4.
Visual depiction of CGI
* projected inf
disclosure index

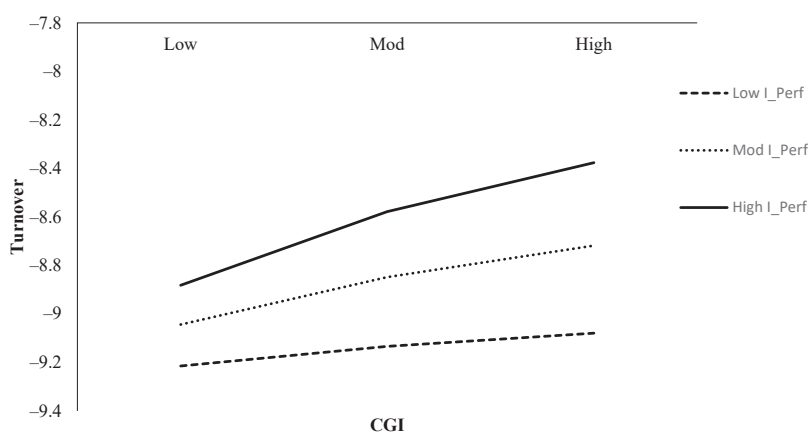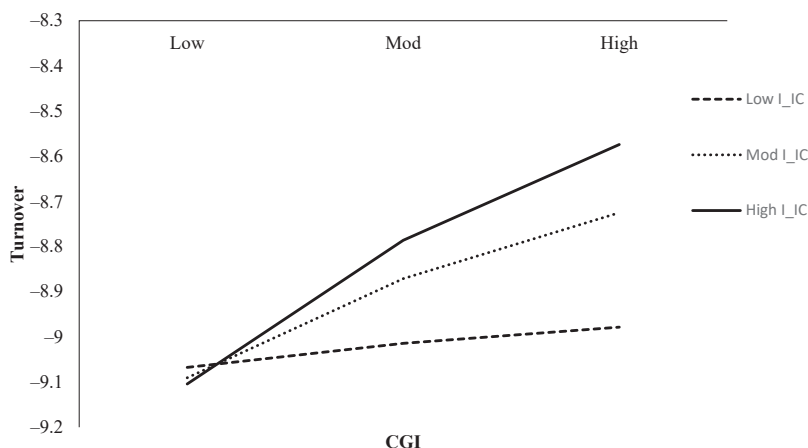supervision are subject to the appraisal of the owning family supporting the entrenchment hypothesis.

The negative effect of associated ownership supports the previous argument that large shareholders limit the access of information to other shareholders, thus increasing IA between equity investors (Attig *et al.*, 2006; Hsu and Liu, 2016). Foreign ownership is generally perceived to promote transparency. However, in Pakistan, it has an unexpected negative and highly significant relationship with turnover. One possible reason for this is that the high ownership stakes of foreigners lead to their long-term involvement in business and close relationships with firm managers, which allows them to access private information. Once foreign investors get informed through private channels, they have little incentive to disseminate information for other market participants, thus increasing IA. Institutional shareholding dominance exhibits a positive and statistically significant relationship at 1% level, which provides support for monitoring hypothesis. This result shows that firms with high institutional ownership experience lower IA and greater liquidity (Liu *et al.*, 2016).

Table 6.
Test of voluntary disclosure index as moderator of the CG-information asymmetry relationship

Variable	Model 1				Model 2			
	Coeff	p-value	BootLLCI	BootULCI	Coeff	p-value	BootLLCI	BootULCI
CGI	1.563	0.0641*	−0.0582	−1.632	2.456	0.0024***	0.9654	2.965
VDI	0.5986	0.0432**	0.0256	2.658	2.312	0.0014****	0.4963	2.013
Int	8.142	0.0036***	3.652	56.32	5.998	0.0364**	0.0325	11.96
B_Size	2.213	0.0000***	2.325	3.652				
B_Ind	1.132	0.0023***	0.5632	3.652				
CEO_D	0.0865	0.3256	−0.5648	0.6589				
B_Div	0.2345	0.3265	−0.2345	0.6594				
B_Act	0.0352	0.0256**	−0.2103	−0.0032				
AC_Size	2.421	0.0040***	0.8456	5.632				
AC_Ind	−0.0236	0.8654	−0.6542	0.4654				
AC_ChInd	0.4652	0.0068***	−0.7985	−0.2314				
AC_Act	0.3215	0.0070***	0.0765	0.5632				
AQ_Ext	0.1236	0.6598	−0.6532	0.3254				
Insid_OS					−1.654	0.0001***	−3.652	−0.9658
Fam_OS					−0.8569	0.0002***	0.6354	2.036
Ass_OS					−0.6598	0.0465**	−1.658	−0.0589
For_OS					−2.132	0.0016***	−3.123	−0.6231
Inst_OS					0.3965	0.0062***	0.1032	0.7865
Size	−0.1652	0.2653	−0.2136	0.0635	0.2154	0.0032***	0.0325	0.3652
ROE	0.2136	0.0795*	−0.7036	0.0354	−0.2154	0.2963	−0.5569	0.6598
Tob_Q	−0.1132	0.0023***	−0.1365	−0.0569	−0.6325	0.3652	−0.9865	0.06523
Beta	−2.365	0.0001***	2.653	2.365	−1.569	0.000***	1.365	1.963
LEV	−0.5623	0.3215	−0.1165	0.0132	0.2015	0.6985	−0.5698	0.6598
Constant	−15.63	0.0000	−16.35	−11.35	−10.62	0,000	−12.69	−9.653
N	1,386				1,386			
R²	0.30				0.186			
F-stat (p-value)	0.000***				0.000***			
R² change (p-value)	0.0036***				0.036**			

Note(s): *p < 0.10 **p < 0.05 ***p < 0.001
Int: CG_Index*VD_Index

5. Conclusion and implications
Present research investigates the moderating effect of different levels of VD on the relationship between CG and IA in the context of ownership concentration, poor legal environment, weak law enforcement and a low level of investor protection. In particular, the study aimed to examine the moderating effect of low, moderate and high levels of overall VD as well as its individual categories in an institutional setting where managers have discretion regarding how much information to disclose. Under these circumstances, the study showed that VD complements mandatory financial disclosures in improving transparency and investor's confidence in firms while reducing IA. A bootstrapping analysis was used to construct confidence intervals by using PROCESS macro for a sample of 154 companies during the period 2011–2019. Additionally, the study visually demonstrated how the conditional effect of CG on IA varies, depending on the level of VD.

The findings of the study help understand how CG attributes to exert an influence on share turnover in the market. The results documented that better CG mechanisms in firms play an information dissemination role and that this relationship is contingent on the VD practices in firms. Effective VD practices produce little private information, mitigating IA from the perspective of uninformed equity investors. The findings presented here are consistent with the calls for increased disclosure in presence of ownership concentration to reduce IA. The conditional effect of CG on IA is robust in terms of the moderation of sub-indices, with risk and projected information category as the most relevant variables enhancing share liquidity. CG characteristics attenuate IA, and this relationship strengthens as a firm's level of VD increases. The greater the extent of VD, the lower the probability that managers hide information for their personal benefits. Moreover, this conditional effect remains consistent at high levels of strategic, projected, performance and IC information disclosure indices. Furthermore, the visual depiction of the probing of the interactions showed how the relationship between CG and turnover is contingent on different levels of disclosures across all information categories.

Additional analysis reveals that the large independent boards and audit committees which meet frequently strengthen firms' internal CG mechanisms in ensuring the credibility of shared information and reducing IA. Increased inside, associated company, family and foreign ownership in firms induce entrenchment, adverse selection and strategic alliances, thus exacerbating IA, whereas institutional owners demand information, allowing shareholders to monitor opportunistic activities and to overcome informational disadvantages.

The findings of the present research lead to some suggestions and implications for policymakers, firm managers and market participants. The Pakistan Institute of Corporate Governance (PICG) must create an environment that ensures board independence and effective audit committees, which will enable the implementation of governance rules. With respect to corporate reporting regulators, the study provides implications for the formulation of reporting standards and their promotion of transparency in publicly traded firms. The Institute of Chartered Accountants of Pakistan (ICAP) and the Institute of Cost and Management Accountants of Pakistan (ICMAP) have taken some significant steps to promote more effective and more relevant reporting practices by launching the Best Corporate Reporting Awards (BCRA). However, the results of the study suggest that much more needs to be done. For example, insignificant results for energy disclosures reveal that despite severe energy crisis in country, no specific disclosure reforms have been provided by the government. The results presented here also help management and investors to understand the role of different ownership types as a market monitoring mechanism rather than focusing only on ownership concentration. This study also provides some important implications for firms' mangers to improve information reporting environment in order to reduce IA among stakeholders. For investors, results clearly indicate that investors use firms' CG and VD as two different monitoring mechanism to evaluate their investment decisions.

The study also opens new research avenues based on its limitations. First, this study is limited to disclosure quantity that has increased the subjectivity in index construction, while ignoring the quality of disclosures. Second, content analysis of annual reports of the firms is used to develop VDI in this study. Future studies should consider other sources of firms' information to develop VDI. Third, the sample size is limited to 154 firms. However, because of the laborious amount of data required to construct disclosure and CGIs, most of the prior empirical literature also used relatively small samples. Lastly, this study used share turnover as proxy of IA. However, there are other proxies available in the literature to measure IA that future research studies should consider.

Notes

1. American Accounting Association/Financial Accounting Standards Board conference 1997 represented that the US companies provide insufficient risk information in annual reports.

2. The Institute of Chartered Accountants in England and Wales (ICEAW) issued three discussion documents, encouraging directors of the UK companies to disclose risk information in detail.

3. (1) A.F. Ferguson and Co., (2) KPMG Taseer Hadi and Co., (3) Ernst Young and (4) Deloitte

4. Annual reports of listed firms, being the most important mean of corporate reporting, are used to compute the disclosure score. According to Botosan (1997), information provided through media and other reports is positively correlated with annual report disclosure levels.

5. The content analysis for the study is executed by a single coder. However, to ensure reliability and validity, two independent coders coded an initial sample of 25 annual reports, and observed differences were discussed to reach an agreement.

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Further reading

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Appendix 1
Voluntary Disclosure Index

The checklist of self-constructed voluntary disclosure index is applicable to Pakistani reporting environment during the study period. This disclosure index provides guidelines on how corporations can provide useful information to investors in a practical way. The items are classified into six categories: strategic information, risk information, projected information, performance indicators, energy information and intellectual capital information.

Sr. No	Items of disclosure	Reference
a. Corporate and strategic information		
1	Management's objectives and strategies	FASB (2001), ICAP (2011)
2	Company's industry review	FASB (2001), ICAP (2011)
3	Legal, political and economic environment	FASB (2001), ICAP (2011)
4	Corporate organogram	BCRA (2013), Ho *et al.* (2013)
5	Directors' background	OECD (2011), BCRA (2013), Rezaee and Tuo (2017)
6	Directors' engagement	OECD (2011), BCRA (2013)
7	Principle product	FASB (2001), Rezaee and Tuo (2017)
8	Business activities	ICAP (2011)
9	Process maintenance and improvement	
10	Principle markets	FASB (2001), Ho *et al.* (2013)
11	Market share information	BCRA (2013), Rezaee and Tuo (2017)
b. Risk information		
12	Operational risk	BCRA (2013), OECD (2014)
13	Strategic risk	BCRA (2013), OECD (2014)
14	Source of risk and impact on performance	
15	Risk mitigating strategies	PWC (2007), OECD (2011), OECD (2014), BCRA (2013)
c. Projected information		
16	Future challenges	PWC (2007)
17	Growth opportunities	FASB (2001)
18	Production forecast	FASB (2001)
19	Earnings forecast	FASB (2001), ICAP (2011), Ho *et al.* (2013)
20	Market share forecast	Gisbert and Navallas (2013)
21	R&D forecast	FASB (2001), Ho *et al.* (2013)
22	Prospective investments	
23	Prospective capital expenditures	FASB (2001), PWC (2007), Ho *et al.* (2013)
d. Performance indicators		
24	Profitability ratios (5 yrs/+)	OECD (2011), BCRA (2013)
25	Liquidity ratios (5 yrs/+)	OECD (2011), BCRA (2013)
26	Turnover ratios (5 yrs/+)	OECD (2011), BCRA (2013)
27	Market ratios (5 yrs/+)	OECD (2011), BCRA (2013)
28	Leverage ratios (5 yrs/+)	OECD (2011), BCRA (2013)
29	Cash flow statement (5 yrs/+)	BCRA (2013)
30	Cash flow statement (direct method)	BCRA (2013)
31	Vertical and horizontal analysis	BCRA (2013)
32	Performance review	ICAP (2011), OECD (2011), Ho *et al.* (2013)
33	Statement of value added	BCRA (2013)
34	Share price sensitivity analysis	BCRA (2013)
e. Energy		
35	Energy consumption	
36	Energy saving measures	FASB (2001), BCRA (2013)
37	Company's plan to overcome energy crisis	BCRA (2013)

(*continued*)

Sr. No	Items of disclosure	Reference
38	Investment in energy projects	
f. Intellectual capital		
39	Employee reward and recognition	
40	Training and development programs	FASB (2001), Gisbert and Navallas (2013)
41	Employee engagement	Fair growth
42	Career opportunities	
43	Workplace well-being	
44	Customer relationships	FASB (2001), ICAP (2011)
45	Product quality	
46	Relationship with suppliers	FASB (2001), ICAP (2011), OECD (2011)
47	Quality assurance	Li *et al.* (2012)
48	Accreditation	Li *et al.* (2012)
49	Investment on research and development	FASB (2001), Rezaee and Tuo (2017)

Appendix 2
Variables measurement

Variable	Symbol	Description
Panel A: Internal governance		
Board size	B_Size	Natural log of total no. of directors on board
Board independence	B_Ind	No. of independent and non-executive directors on board scaled by total no. of directors
CEO duality	CEO_D	If chairman and chief executive officer is same person then 1, otherwise 0
Board diversity	B_Div	If there is a presence of female directors on board then 1, otherwise 0
Board activity	B_Act	No. of meetings attended by the board in a year
Audit committee size	AC_Size	No. of audit committee members scaled by total No of directors
Audit committee independence	AC_Ind	Total independent and non-executive director scaled by total no. of audit committee members
Audit committee chairman independence	AC_ChInd	If chairman of audit committee is an independent/non-executive director then it is 1, otherwise 0
Audit committee activity	AC_Act	No. of audit committee meetings
Audit quality	AQ_Ext	If the company is audited by Big 4 then it is 1, otherwise 0
Panel B: External governance		
Insider ownership	Insid_OS	No. of shares held by insiders (executives, directors and CEO) scaled by total outstanding shares
Foreign ownership	For_OS	No. of shares held by foreigners (individuals and corporations) scaled by total outstanding shares
Associated ownership	Ass_OS	No. of shares held by associated companies scaled by total outstanding shares
Family ownership dummy	Fam_OS	Measure of family dominance is a dummy variable that equals 1 if family members' shareholding is greater than sample median and zero otherwise
Institutional ownership	Inst_OS	Measure of financial institution dominance is a dummy variable that equals 1 if financial institution shareholding is greater than sample median. and 0 otherwise
Panel 3: Control variables		
Firm size	Size	Ln (total assets) as of year end
Profitability	ROE	Return on equity; earnings after interest and taxes/shareholder's equity
Growth opportunities	Tob_Q	Tobin's Q; market capitalization plus total debt/total assets at the year end
Systematic risk	Beta	Empirically estimated via market model regression using daily return observations
Leverage	LEV	Long-term debt/total assets

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