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ORIGINAL RESEARCH

Military directors and stock price informativeness: What's all the fuss about?

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Abstract
Exploiting a unique hand-built dataset, belonging to non-financial firms, operating in an emerging economy, this study, first of its kind, reports that stock prices of firms with military-experienced board of directors reflect more firm specific information after controlling for board attributes, agent heterogeneity and firm level variation. The results robust to alternative specifications of informativeness and military director proxy support the notion that military-trained directors may enhance transparency in public listed companies and encourage the incorporation of more firm-specific information into stock prices. Further analysis suggests that military directors may enfeeble CEO–board nexus and settle the directional variations at the corporate board level: military directors bring discipline in the board room that translates into rigorous CEO monitoring and improved corporate governance quality.

Keywords Military directors · Stock price informativeness · Strategic military praetorianism · Interventionist emerging economy

JEL Classification G32 · G34 · J24

1 Introduction

The notion that prices aggregate information that is *dispersed among market participants* can be traced back to Hayek (1945). The modern view however is that stock markets produce and aggregate information as a *direct consequence of trading between informed and uninformed/less-informed investors*. Price-relevant public disclosures are

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incorporated into stock prices *directly* whereas privately held information by informed investors is incorporated *through trading* (Ferreira et al. 2011). An emerging view is that this type of information is useful for the provision of incentives in firms as well as for the corporate board structure (see Gul et al. 2011; Huang and Ni 2017; Sila et al. 2017, among others). Ostensibly, informative prices bring new information to the markets and the corporate boards. Directors could use information revealed by stock prices as an *input to their monitoring* and *advising task* (Ferreira et al. 2011), thereby, becoming a *better informed* and *vigilant* board (Huang et al. 2016).

Agency theory maintains that corporate boards have the *fiduciary responsibility* to protect shareholders' interest by *effectively monitoring the agents* (Fama and Jensen 1983). The theory further posit that the primary role of the corporate board is to *monitor* and *advice* the agents on matters pertaining to corporate interests and that effective monitoring and advising translates into higher performance outcomes. However, board's ability to monitor and advise the agents is largely determined by the knowledge, experience, and expertise of the board of directors. Diversified boards, in terms of gender (Adams and Ferreira 2009), expertise and experience (Huang et al. 2016) as well as with particular backgrounds such as with *military service experience* (Benmelech and Frydman 2015; Nawaz et al. 2023) have direct implications for corporate outcomes.

Prior research suggests that corporate elites such as the *executives* and *directors* with military service experience possess *heterogeneous talents* and *abilities* that shape the corporate strategic posture (Simpson and Sariol 2019). Military directors develop *personal discipline*, rely on *established procedures*, have greater sense of *loyalty* to the team and tend to improve board's *vigilance* (Benmelech and Frydman 2015; Wong et al. 2003).

Earlier studies on the influence of military experienced directors on corporate boards are concentrated in the US due to their significant presence in the country's corporations. Those studies largely account for the impact of military-experienced *executive directors* such as CEOs on corporate strategic preferences and outcomes (e.g., Benmelech and Frydman 2015; Koch-Bayram and Wernicke 2018). Of those limited research conducted outside the US, studies report that military directors *reduce economic performance* (An et al. 2020) but *lower the cost of debt* for the incumbent firm (Harymawan 2018). Nawaz et al. (2023) report that directors with military service experience *curtail excessive rent seeking*—CEO compensation—behaviour of the agent and *reduce free cashflow opportunities* by awarding higher dividend payouts thereby protecting shareholders' wealth.

Despite the suggestive anecdotes and scant empirical evidence, the existing studies have focused on the economically strong and politically stable environments i.e. developed economies and no study to date, to our knowledge, has analysed the impact of military directors on stock price informativeness. This study heeds this gap and provides the first direct empirical evidence, analysing the impact of military directors on stock price informativeness from *an emerging economy*. In doing so, we aim to contribute to the literature that explores what type of directors protect shareholders' interests and improve corporate governance quality (e.g., Adams and Ferreira 2009; An et al. 2020; Gul et al. 2011; Huang et al. 2016; Nawaz et al. 2023).

We use a unique hand-build dataset belonging to 267 non-financial firms listed on the Pakistan Stock Exchange (PSX) for the period 2009–2019. Pakistan offers a *unique milieu* due to the heavy involvement of the Pakistani military in the *reconfiguration of the economic* and

international trade policy to resolve the macroeconomic challenges the country faces since its independence in 1947. As Nawaz et al. (2023) explain, unlike Korea Pakistan military's role has not *diminished* neither has it increased to an *absolute control* as is the case for Egypt. Instead, Pakistan military is *strategically* involved in the economic affairs, using corporate board appointments as one of the alternatives to *revive the corporate sector* and *enhance investors' confidence* and to *strengthen its volatile economy*. Thus, *military praetorianism* in Pakistan is *strategic not consequential*.

Consistent with our theorising, the analysis suggests that stock prices of firms with military-experienced board of directors reflect more firm specific information after controlling for board attributes, agent heterogeneity and firm level variation. Our results are robust to alternative specifications of informativeness and military director proxy and thus support the notion that military-trained directors may enhance transparency in public listed companies and encourage the incorporation of more firm-specific information into stock prices.

Our study contributes to the accounting and finance as well as governance literature in several ways. Firstly, this study adds to the scant albeit growing literature, analysing the role of *outside military-trained directors* on corporate strategic preferences and outcomes by submitting new empirical evidence from an emerging economy (e.g., Benmelech and Frydman 2015). Second, we contribute to the literature that analyses the causal effect of *board structure on stock price informativeness* (i.e., Huang and Ni 2017; Sila et al. 2017) by providing, first of its kind, empirical evidence showing that inclusion of military directors *enhances transparency* in publicly held companies and *encourages the incorporation of more firm-specific information* into stock prices. Third, by drawing empirical evidence from an *interventionist emerging economy* i.e. Pakistan, our finding *broadens the scope of the current theory* on military directors in another cultural context characterised by lower shareholder protection, weak governance, higher market volatility, lower corporate growth, dominance of family-owned business groups, strong corporate-political connections, and high military interventions in political and economic affairs (Nawaz et al. 2023). Fourth, we enrich and supplement the ongoing scholarly debate around *outside directs' attributes* (e.g., Armstrong et al. 2014; Ferreira et al. 2011; Gul et al. 2011; Huang and Ni 2017). To that end, we provide, empirical evidence, suggesting that military directors may *settle the directional variations* at corporate board level thereby improving corporate governance quality. These results imply that directors with military service experience could potentially improve the *quality of decisions* by bringing in *new perspectives* and *enriching the information set* available to the incumbent firm, thereby, *decreasing divisiveness* and *conflict* at the corporate board level (Simpson and Sariol 2019).

Finally, the interaction analysis suggests that inclusion of military directors to the corporate board improves *board's monitoring capability*. These results add new insights to the board structure and monitoring literature (e.g., Guo et al. 2015), by documenting that the presence of military directors in the corporate boardrooms leads to more *rigorous CEO monitoring* and *discipline*. Specifically, these results are attributed to the earlier findings of Gul et al. (2011), who posit that board diversity improves the *quality of board discussions* and increases board's ability to provide *better oversight* of firm's disclosures and reports, which *facilitates a greater diffusion of information from the board to investors*.

The paper is organised as follows. Section 2 provides background and discussion on hypotheses development, followed by data, sample and descriptive statistics in Sect. 3. Section 4 presents the regression results and discussion whereas Sect. 5 provides robustness analysis and Sect. 6 concludes the paper.

2 Background and hypotheses development

2.1 Military praetorianism

Traditionally, military have taken the role to *protect the severity* of the country and ensuring nation's capability to defend itself against any foreign intervention or internal insurgence. However, the role of the military in world affairs has expanded since the beginning of the new millennium. Today the warfare has rather shifted from *pure military muscles encounter* to the *economic war*, in which militaries take an active role. Military personnel especially, the retired officers, take on the key leadership roles in the respective country's political affairs and offer their services to support the political and civic authorities (An et al. 2020). Wong et al. (2003) further stresses that *military relies on leaders and not managers* to produce results such as winning wars, overcoming internal conflicts as well as making success in international military alliances. Leadership is and continues to be a *mainstay* of the military. Culturally, militaries are enamoured by leadership, and they endeavour to develop leader competencies and skills needed for the next level of leadership through formal education, operational assignments, and self-development (Hannah et al. 2009; Wong et al. 2003).

Military is one of the *strongest* and *well-established organs* of the state and business corporations often look up to the military institutions to fulfil their human capital needs especially, at the strategic i.e. corporate board level (Nawaz et al. 2023) and tend to staff their boards with military experienced directors because military-trained individuals possess *superior decision-making* and *leadership* skills (Hannah et al. 2009).[1] Militaries offer *hands-on leadership experience* through organised, sequential training programmes that combine education with an on-the-job experience and are intended to develop *command and control skills* that are difficult to learn otherwise.[2] These salient training programmes and experiences shape the service[wo]men's behaviours through *instilling* in them specific values such as *integrity, discipline,* and *morality* (Duffy 2006). Military directors imprinted by the incumbent military culture are more likely to reflect on these values when they join organisations outside the military such as the corporate sector.[3]

This is supported by the empirical evidence, which suggests that directors with military service experience reduce agency costs (Lin et al. 2011), enhance the corporate governance and audit quality (Benmelech and Frydman 2015), are better at making decisions under pressure and are more resilient to unethical behaviour crisis and financial fraud (Simpson and Sariol 2019), thus are well placed to protect shareholders' interests, especially in publicly traded firms (Nawaz et al. 2023).

[1] Companies such as General Electric and Wal-Mart decrying a lack of leadership and dedication among young managers and have recruited junior military officers who served in Afghanistan and Iraq to solve a shortage of leadership talent, signifying the demand for military leadership in the corporate sector (for a normative analysis on military experienced corporate elites see, Benmelech and Frydman 2015).

[2] Duffy (2006, p. 3) note that "some of the most powerful [lessons in leadership] were learning how to work as part of a team; organizational skills, such as planning and effective use of resources; good communication skills; defining a goal and motivating others to follow it; a highly developed sense of ethics; and calmness under pressure."

[3] The imprinting theory (e.g., Marquis and Tilcsik 2013, p. 199) holds that individuals are exposed to the *impact of an environment during a brief period of susceptibility* (i.e. rendering a military service) and tend to develop "characteristics that reflect prominent features of the environment, and these characteristics continue to persist despite significant environmental changes in subsequent periods."

In Pakistan, military officials are *directly* involved in state's political and economic affairs. Many ex-military officials hold positions is state-run economic entities. An et al. (2020) note that *military praetorianism* is common in *war-affected economies* in which militaries strategically *endorse* appointments of their retired servicewomen and men to the corporate boards as a proxy for *control* over the publicly held corporations.

Pakistan military has strong presence in state's political and economic affairs both in the public and the private sector organisations. While the ongoing—decades long—terrorism have caused a great deal of socio-economic distress, the *economic terrorism* coordinated by the *depravity of corrupt political- and social-elite* have destabilised the country thereby *paving way* for military involvement is state's matters. Consequently, it is not surprising to note that Pakistani military has *directly ruled* the country for 33 years since its independence in 1947. The fact that military officials, including the ex-military, run a military-owned conglomerate in the country suggest that military-trained business leaders possess *excellent business acumen*, which is necessary to run diversified businesses. However, the impact of military directors on corporate strategies and outcomes in general and in the context of developing economies such as Pakistan remains unexplored to date. The noted military's politico-economic involvement thus creates a *unique economic setting* to test the relationship between military directors and corporate strategic outcomes such as stock price informativeness.

2.2 Development of hypotheses

Production and aggregation of information into market prices is one of the main functions of the financial markets (Ferreira et al. 2011; Gul et al. 2011). While information delimited in securities prices guide key decisions by corporate managers and other market participants in the real economy, *information asymmetries* between managers and outside investors prevent investors from pricing *firm-specific information accurately* (Sila et al. 2017). It is thus imperative to understand how corporations facilitate and sustain high levels of transparency across economic agents. Corporate boards are tasked to monitor the managers and lower the information advantages that managers have over outside investors (Huang and Ni 2017).

Due to the separation of ownership and control in publicly held companies, shareholders proxy board of directors to *safeguard* their interests (Fama and Jensen 1983). However, board's ability to monitor the agents is largely dependent upon its *structure* and *construct* (Huang and Ni 2017; Nawaz et al. 2023). Adams and Ferreira (2009), for instance, note that board composition in terms of knowledge, skills, expertise, and experience of directors has *direct* implications for corporate outcomes. Gul et al. (2011) shows that stock prices of firms with *gender-diverse* boards reflect more firm-specific information. The study further posits that board gender diversity potentially improves the *quality of board discussions* and increases board's ability to provide better *oversight* of firm's disclosures and reports, which facilitates a greater diffusion of information from the board to investors. Likewise, Sila et al. (2017) report that firms with *higher fraction of independent directors exert higher levels of firm-specific information content in their stock prices*. As argued earlier, stock price informativeness is the result of aggregating information among *arbitragers, speculators,* and *uninformed/less-informed investors* and it is primarily concerned with *stock returns* and *stock price volatility* (Huang and Ni 2017). Exposure to market forces *discipline* corporate managers' reporting and *protects* the less-informed investors. Higher levels of public disclosure price protect less-informed investors and is likely to *enhance confidence*

and *encourage ownership* by less resourceful investors. This in turn, *attracts* more less-informed investors making *informed trading*, which also increases the marginal benefit of collecting and deploying privately held firm-specific information even *more rewarding* for informed and resourceful investors. Trading by *informed investors* then allows *private information to flow into the stock price* at an *early stage* and thereby *increases* stock price informativeness (Gul et al. 2011).

While the afore-cited studies argue for the monitoring and advising benefits of different types of directors and how they improve the quality of public disclosure through better monitoring, they are silent on how directors with military service experience potentially affect corporate strategic posture and outcomes such as *transparency* and *disclosure*, including the stock price informativeness. Previous literature on military directors shows that directors with previous military service experience could potentially improve the *quality of decisions* by bringing in *new perspectives* and *enriching the information set* available to the incumbent firm, thereby, *decreasing divisiveness* and *conflict* at the corporate board level (Benmelech and Frydman 2015; Lin et al. 2011; Simpson and Sariol 2019).

Arguably, military-trained directors—when appointed to the corporate boards—could improve the quality of board discussions and increase the ability of the board to provide better oversight of corporate's reporting and disclosure practices. In effect, increased oversight by the board, make the managers more *transparent* and *curtail* them from *exploitation* of private information to their *personal gain*, which creates a *richer information environment* that encourages investors to collect more firm-specific private information at relatively lower cost, which in turn *improves* stock price informativeness (Ferreira et al. 2011; Gul et al. 2011). With this backdrop, this study analyses whether the presence of military directors on the corporate boards of Pakistani public listed companies make them more *transparent* and *encourage* the incorporation of more firm-specific information into stock prices.

We use two distinct measures for military directors: (i) *military director ratio*, measured as the fraction of directors with military service experience to total board size and (ii) *military director (dummy)*, which is a binary variable indicating that at least one board of directors has served in the military. We extend our hypotheses accordingly. Formally stated:

H1 There is a significant positive relationship between military director ratio and stock price informativeness.

H2 There is a significant positive relationship between military directors and stock price informativeness.

3 Data, research variables and econometric specification

According to Bloomberg, Pakistan Stock Exchange (PSX) has risen to become *Asia's best-performing stock market* and the *fourth-best performer in the world*, defying the odds amid the coronavirus outbreak (Mangi 2020). The report further suggests that PSX benchmark index, KSE100 has *outperformed* its regional counterparts by offering *double-digit returns* to the market. KSE-100 Index is up 36% from the end of March 2020, *the best rebound among major Asian equity indexes* for the period.

Initially, we wanted to include all publicly listed companies in our sample. However, we were constrained by the data availability. Our final sample consists of 267 non-financial firms listed on the PSX for the period 2009–2019. We collect financial data from DataStream and supplement this with firm-specific data, which is hand-collected from annual reports retrieved from sampled firms and State Bank of Pakistan's websites. Data on corporate governance features, including data on military directors, is hand-collected from various sources such annual reports, corporate governance reports, company bulletins, press releases, individual company websites, and local newspapers archives. Both datasets are then combined to perform the analysis.

3.1 Research variables and descriptive statistics

3.1.1 Stock price informativeness

Our main variable of interest is stock price informativeness, which is proxied by the *stock return non-synchronicity*. The stock return non-synchronicity was devised by Roll (1988) to capture firm private information revealed by speculative traders, which essentially explains the *variation in the idiosyncratic stock return* that is otherwise not explained by the market or industry returns. The measure has been improved since then by later studies (e.g., Durnev et al. 2004). The key notion is that idiosyncratic return variations of a stock are *correlated* with the *privately held information* by the traders, who do not communicate *directly* with the issuing firms, but they rather trade within the financial market (Sila et al. 2017). Earlier research submit that stock return non-synchronicity relates positively with price informativeness (Durnev et al. 2004; Ferreira et al. 2011; Gul et al. 2011). Consistent with these studies we measure the firm specific stock return using non-synchronicity, which is the main proxy for stock price informativeness.

3.1.2 Military directors

The main purpose of this study is to analyse the impact of military directors on stock price informativeness. Consistent with the aim our study, we use two separate measures as proxies for military directors: (i) military director ratio, which is the fraction of directors with military service experience to total board size and (ii) military director (dummy), which is a binary variable indicating that at least one board of directors has served in the military. Earlier studies, analysing the impact of military directors on corporate outcomes such as performance, agency cost, and dividend payout policy advocate the use of these proxies (see An et al. 2020; Nawaz et al. 2023).

3.1.3 Control variables

We use three sets of control variables. First, board attributes, which include board size, measured as the number of directors on the board and board independence, which is the number of non-executive directors scaled by the board size. Second, agent heterogeneity, including CEO role duality which is a binary variable indicating that the board chair is also the company CEO and CEO tenure i.e. the total number of years as CEO in the current position. Firm-attributes, which include return on assets (ROA), family ownership, firm size, capital expenditure, leverage, growth in sales, tangibility, and firm age for their potential impact. Table 1 provides definitions and operationalisation of research variables.

3.2 Descriptive statistics and correlation matrix

Table 2 present descriptive statistics and correlation matrix. The mean values for the main dependent variable, stock price informationness are 1.95 and 2.15 for *Non_SYN* and *ILLIQ,* respectively. Furthermore, average ratio of military-directors on the corporate boards is around 2% during the study period whereas one-fifth of the corporations included in the sample have had at least one military director serving on their boards. Figure 1 illustrate trends in military directors' presence on corporate boards of Pakistani publicly listed firms during the study period 2009–2019.

As for the corporate governance mechanisms, the results indicate that the average board size of sampled firms during the study period is 8 with majority i.e. 59% of the board is represented by the independent directors. Turning to the agent heterogeneity, about one-fifth of the sample firms are led by a dual CEO while the average CEO tenure is 6 years. As for the firm-related control variables, ROA, family ownership, firm size, leverage, capital expenditure, sales growth, firm age etc. illustrate the firm-specific characteristics of the sampled public listed companies. Results for the multicollinearity diagnostics, using the variance inflation factor (VIF). The mean VIF value of 1.57 indicates that there are no concerns of multicollinearity for the independent variables.

3.3 Econometric specification

Stock return non-synchronicity is commonly measured using R^2 of a standard regression model. Based on daily return data, following two models are used to calculate R^2:

$$Ret_{i,t} = \alpha_i + b_{im} r_{mt} + \varepsilon_{i,t} \tag{1}$$

where $Ret_{i,t}$ is the return of firm i at time t and r_{mt} is the market return at time t.

$$Ret_{i,t} = \alpha_i + b_{im} r_{mt} + \gamma_{im} r_{mt-1} + \varepsilon_{i,t} \tag{2}$$

To account for the delays in incorporating information into the stock prices, market lags are calculated using model (ii). R-squared from both models are then log transformed to replace a bounded dependent variable ($0 \leqslant R^2 \leqslant 1$) with an unbounded continuous variable in Eq. 3.

$$Non\_SYN_i^k = Ln\left(\frac{1 - R_{i,k}^2}{R_{i,k}^2}\right) \tag{3}$$

Illiquidity ratio of Amihud (2002) is used as an alternative proxy for stock price informativeness in Eq. 4 that is considered as an approximation for the price impact of trades, which has a positive relationship with private information impounded in stock prices i.e. higher illiquidity ratio implies higher stock price informativeness (Fresard 2012).

$$ILLIQ_i = \frac{1}{D_i} \sum_{t=1}^{D_{i,y}} \frac{|Ret_{i,t}|}{dtVOL_{i,t}} \tag{4}$$

where $D_{i,y}$ is the valid trading days for firm i in year y, $|Ret_{i,t}|$ is firm stock return absolute value at time t, and $dtVOL_{it}$ is the dollar trading volume of firm i at time t.

Table 1 Operationalisation of Variables

Variables	Acronym	Measures
Dependent		
Firm specific stock return	Non-SYN	Stock return non-synchronicity
Illiquidity	ILLIQ	The ratio of absolute return and dollar traded volume
Independent		
Military director ratio	MilDirect ratio	Number of military directors on the corporate board scaled by board size
Military director (dummy)	MilDirect	Binary variable indicating that at least one board of directors has served in the military
Board attributes		
Board size	Board-size	Total number of directors on the board
Board independence	NED-ratio	Number of non-executive directors scaled by board size
Agent heterogeneity		
CEO role duality	CEO duality	Binary variable indicating that the board chair is also the company CEO
CEO tenure	CEO tenure	Total number of years the CEO serves in the current firm
Firm-specific characteristics		
Return on assets	ROA	Net income available to stockholder/average total assets
Family ownership	Family own	The percentage of shares outstanding owned by the founding family
Firm size	Firm size	Total assets (Ln)
Capital expenditure	Capex	Capital expenditure divided by total assets
Leverage	Leverage	Ratio of total current liabilities and long-term debt to total assets
Growth in sales	Growth	One year growth in sales
Tangibility	Tangibility	Property, plant and equipment scaled by total assets
Firm-age	Firm age	Number of years since inception

Table provides operationalisation of the research variables

Table 2 Descriptive Statistics and Correlation Matrix

Variables	Mean	Std. Dev	VIF	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1.Non-SYN	1.952	2.384		1														
2.ILLIQ	2.153	5.062		**0.348**	1													
3.MilDirect ratio	0.018	0.063	2.231	**0.222**	**0.268**	1												
4.MilDirect	0.191	0.432	2.512	**0.327**	**0.177**	**0.257**	1											
5.Board size	8	2.497	1.521	**0.228**	**0.302**	**−0.059**	**0.294**	1										
6.NED ratio	0.592	0.239	1.962	**0.202**	**0.337**	**−0.068**	**0.280**	**0.545**	1									
7.CEO duality	0.213	0.536	1.063	**0.297**	**−0.336**	**0.461**	**0.311**	**0.108**	0.013	1								
8.CEO tenure	6	2.32	1.031	**−0.142**	**−0.418**	**0.086**	**−0.302**	**−0.188**	**−0.196**	**0.152**	1							
9.ROA	0.151	0.213	1.235	**0.038**	−0.009	**0.066**	**0.109**	**0.077**	0.029	**0.112**	0.006	1						
10.Family own	0.632	0.416	2.012	**−0.365**	**0.303**	**−0.306**	**−0.123**	−0.014	**0.109**	**−0.317**	**−0.271**	**−0.095**	1					
11.Firm size	9.014	1.812	1.861	**−0.290**	0.034	**−0.313**	**−0.389**	**−0.289**	**−0.103**	**−0.307**	**−0.229**	**−0.101**	**0.317**	1				
12.Capex	0.064	0.072	1.334	−0.024	−0.041	0.022	−0.012	−0.024	0.007	0.006	−0.008	−0.044	0.012	0.019	1			
13.Leverage	0.543	0.314	1.551	−0.008	−0.001	0.012	−0.019	−0.005	−0.015	−0.014	−0.002	0.022	0.016	0.015	−0.004	1		
14.Growth	0.172	1.032	1.012	−0.008	0.003	0.029	−0.016	−0.016	−0.019	0.001	0.005	−0.013	−0.015	−0.004	0.006	−0.011	1	
15.Tangibility	0.981	0.034	1.655	−0.007	0.016	0.022	0.011	−0.011	0.004	0.014	0.023	−0.009	0.024	0.021	−0.005	−0.002	**0.163**	1
16.Firm age	17	8.042	1.084	**0.265**	**−0.061**	**0.391**	**0.435**	**0.316**	**0.177**	**0.523**	**0.163**	**0.125**	**−0.263**	**−0.292**	−0.014	−0.016	0.002	−0.002

Table present descriptive statistics and correlation matrix for all research variables i.e., dependent, and independent variables, used in the analysis along with the multicollinearity diagnostics, using the variance inflation factor (VIF). Refer to Table 1 for other variable definitions

Variables significant at $p < 0.05$ are in bold

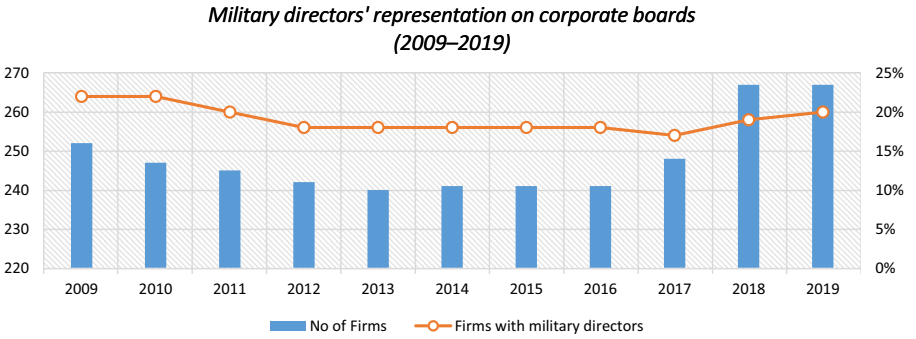

Fig. 1 Military directors' representation on corporate boards (2009–2019)

$$Non\_SYN_i^k = \alpha + \beta MilDirect_{i,t} + \gamma CG'_{i,t} + \delta X'_{i,t} + \theta_i + \eta_i + \varepsilon_{i,t} \quad (5)$$

Multivariate regression equation (Eq. 5) is regressed to analyse the impact of military directors on stock informativeness proxied by $Non\_SYN_i^k$ and $ILLIQ_i$, respectively. $\gamma CG_{i,t}{}'$ and $\delta X_{i,t}{}'$ control for corporate governance and firms-specific variables, respectively while θ_i and η_i represent firm fixed effects and year fixed effects to mitigate the concern on omitted variables.

4 Results and discussion

4.1 Military directors and stock return non-synchronicity (Non_SYN)

Table 3 reports the regression results of panel data estimation. The study uses Eq. (5) to analyse the impact of military directors on firm specific return variation, *Non_SYN*. Columns (1, 2, and 3) give the results when military director is proxied by the ratio of military directors to board size (MilDirect ratio) whereas columns (4, 5, and 6) give the results when military director is a dummy variable (MilDirect = 1).

The coefficients associated with the MilDirect ratio and MilDirect dummy are positive and statistically significant at the 5% (except for Model 3 in which results are significant at the 1% level) and 1% level, respectively. The statistically significant and consistent results across models provide strong statistical support for our research hypotheses, suggesting that firms with military directors (ratio/dummy) reflect more informative stock prices. Besides offering new insights to the scant literature on board attributes and stock price informativeness (e.g., Ferreira et al. 2011; Gul et al. 2011), results observed in this study confirm that military directors improve the informational efficiency in equity market in emerging economies.

Results for the corporate governance related controlled variables, board attributes i.e. board size (negatively) and board independence (positively) relate with stock price informativeness proxied by *Non_SYN*. These results suggest that large boards are detrimental for firm transparency, which is consistent with the earlier findings of Sila et al. (2017). Similarly, the latter results imply that firms with independent boards reflect more firm specific information, echoing Huang and Ni (2017). On the other hand, the analysis shows that CEO attributes i.e. CEO role duality and CEO tenure reduce stock price informativeness

Table 3 Effects of Military Directors on Stock Price Informativeness (Non-SYN)

	Panel A			Panel B		
Models	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Variables	Non−SYN	Non−SYN	Non−SYN	Non−SYN	Non−SYN	Non−SYN
MilDirect ratio	0.0251**	0.0274**	0.137***			
MilDirect				1.763***	1.754***	1.967***
Board size		−0.0561*	−0.158***		−0.104***	−0.207***
NED ratio		0.272***	0.187***		0.283***	0.213***
CEO duality			−0.724***			−0.707***
CEO tenure			−0.0459***			−0.0332***
ROA	0.00185	0.00193	0.00278**	0.000935	0.00115	0.00165
Family own	−0.00366***	−0.00589***	−0.0100***	−0.00847***	−0.00951***	−0.0172***
Firm size	0.101***	0.104***	0.126***	0.141***	0.131***	0.210***
Capex	−0.00113	−0.00131	−0.000999	−0.00108	−0.0013	−0.000748
Leverage	−0.0161	−0.015	−0.00948	−0.00975	−0.00897	−0.000897
Growth	−0.00326	−0.00334	−0.00858*	−0.00231	−0.00232	−0.00558
Tangibility	−0.00678	−0.00571	0.024	−0.0101	−0.0103	0.0148
Firm age	0.0324***	0.0303***	0.0621***	0.0299***	0.0281***	0.0644***
Constant	−0.404**	−0.427**	−0.451***	−0.768***	−0.675***	−0.793***
Firm-fixed effects	Included	Included	Included	Included	Included	Included
Year-fixed effects	Included	Included	Included	Included	Included	Included
R-squared	0.242	0.256	0.422	0.274	0.286	0.432
Observations	2114	2114	2114	2114	2114	2114

Table present results for the effects of military directors on stock price informativeness (Non-SYN). In Panel A, we use military director ratio whereas in Panel B we use military director dummy as proxy for military directors' presence on the corporate board. Furthermore, Models 1 and 4 are our baseline models and we amend them to include board attributes and agent heterogeneity in Models 2 and 3 in Panel A and Models 5 and 6 in Panel B, respectively. Refer to Table 1 for other variable definitions

Robust t-statistics in parentheses: ***$p<0.01$, **$p<0.05$, *$p<0.1$

proxied by *Non_SYN*. Results for the CEO role duality are contrary to those reported by Huang and Ni (2017) whereas the latter results suggest that longer tenured CEOs may hold back information thereby reducing transparency (Ferreira et al. 2011). As for the firm-related control variables, results suggest that firm attributes relate with stock price informativeness with varying degrees of statistical significance and direction, which add new insights to the existing literature (e.g., Ferreira et al. 2011; Gul et al. 2011; Huang and Ni 2017; Nawaz et al. 2023).

4.2 Military directors and illiquidity ratio (ILLIQ)

Likewise, we repeat the same econometric specifications using the illiquidity ratio *(ILLIQ)* as an alternative measure of stock price informativeness. Table 4 presents the results. As before, columns (1, 2, and 3) give the results when military director is proxied by the ratio

Table 4 Effects of Military Directors on Stock Price Informativeness (ILLIQ)

	Panel A			Panel B		
Models	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Variables	ILLIQ	ILLIQ	ILLIQ	ILLIQ	ILLIQ	ILLIQ
MilDirect ratio	0.696***	0.567***	0.312***			
MilDirect				2.585***	1.636***	1.003**
Board size		−0.241***	−0.0299**		−0.558**	−0.295
NED ratio		0.227**	0.0424*		0.225**	0.0440*
CEO duality			−1.412***			−1.492***
CEO tenure			−0.127***			−0.121***
ROA	−0.00249	−0.00255	−0.000519	−0.00178	−0.00298	−0.000951
Family own	0.0815***	0.0743***	0.0670***	0.0960***	0.0786***	0.0652***
Firm size	−1.055***	−0.987***	−1.002***	−1.228***	−1.052***	−0.977***
Capex	−0.00473**	−0.00440*	−0.00389*	−0.00525**	−0.00495**	−0.00389*
Leverage	−0.0370	−0.0308	−0.0184	−0.0348	−0.0315	−0.0156
Growth	0.000879	0.00364	−0.00830	0.00266	0.00156	−0.00814
Tangibility	0.0673	0.0716	0.148***	0.0402	0.0618	0.142***
Firm age	−0.0695***	−0.0595***	0.000753	−0.0717***	−0.0741***	0.00196
Constant	5.269***	5.604***	6.082***	6.461***	5.129***	5.750***
Firm-fixed effects	Included	Included	Included	Included	Included	Included
Year-fixed effects	Included	Included	Included	Included	Included	Included
R-squared	0.373	0.386	0.531	0.331	0.378	0.532
Observations	2114	2114	2114	2114	2114	2114

Table present results for the effects of military directors on stock price informativeness (Non-SYN). As before, in Panel A, we use military director ratio whereas in Panel B we use military director dummy as proxy for military directors' presence on the corporate board. Furthermore, Models 1 and 4 are our baseline models and we amend them to include board attributes and agent heterogeneity in Models 2 and 3 in Panel A and Models 5 and 6 in Panel B, respectively. Refer to Table 1 for other variable definitions

Robust t-statistics in parentheses: ***$p<0.01$, **$p<0.05$, *$p<0.1$

of military directors to total board size (MilDirect ratio) whereas columns (4, 5, and 6) give the results when military director is a dummy variable (MilDirect = 1).

The coefficients associated with the MilDirect ratio are positive and statistically significant at the 1% level. Similarly, the coefficients associated with the MilDirect dummy are positive and statistically significant at the 1% level in Models 4 and 5 and at the 5% level in Model 6. The statistically significant and consistent results across models suggest that firms with military directors (ratio/dummy) reflect more informative stock prices.

The positive and statistically significant results across models reaffirm that military directors induce stock price informational efficiency. Results for the corporate governance and firm specific-variables are also largely consistent across models with varying degrees of statistical significance, which suggests that firms with small and independent boards reflect more firm-specific information (Benmelech and Frydman 2015; Gul et al. 2011).

We afford the opportunity to run the interaction analysis to determine the combined impact on stock price informativeness information proxies. Table 5 presents the results. We perform two separate interactions. Specifically, we take Model 3 and Model 6 from Table 3 and Table 4 and augment them with the interaction variables. First, we interact board size

with CEO-tenure (Board-size*CEO-tenure) with *Non-SYN* as the dependent variable in Model 1 and Model 3, reported in Table 5. The statistically significant, at the 1% level, negative relationship suggest that *Non-SYN* decreases when board size and CEO tenure increase. We find similar results when we run the same analysis with *ILLIQ* as the alternative dependent variable in Model 5 and Model 7, reported in Table 5.

These consistent and statistically significant results across models clue that a larger board may offer *free riding* opportunities and promote *grey directorship*. CEOs may capitalise on such opportunities to *entrench* the board to their personal gains. In such a scenario, a test of the presence of outside military-trained directors in *waning off* the CEO–board nexus would offer a better understanding of the phenomenon. Put simple, results from the first interaction analysis (Board-size*CEO-tenure) suggests that firms led by large corporate boards with longer tenured CEOs are less transparent. We further test, if the inclusion of military directors to the equation returns same effect or it would reduce free-riding and entrenchment opportunities? Accordingly, we perform a triple interaction i.e. Board-size, CEO-tenure, and MilDirect ratio (Board-size*CEO-tenure*MilDirect ratio) to analyse if the inclusion of military director impacts the directional relationship. Results are reported in Model 2, Model 4, Model 6 and Model 8, respectively, in Table 5. Interestingly, the statistically significant, at the 1% level, positive results suggest that military directors may settle the directional variations at board level as the sign changes from negative to positive at the 1% level of statistical significance. Although speculative, these results suggest that inclusion of military trained directors to corporate board *weakens the CEO–board nexus*, which could be attributed to large boards with higher probability of *free ridding* and *grey directorships*. This also hints that military directors brining *discipline in the board room* that would potentially translate in *enhanced governance quality*. Although we don't test directly, plausibly, the presence of military directors *may ebb away board level entrenchment*. We note this test for the future research.

Interestingly, our main results remain unchanged and super significant. The statistically significant strong results, across all models support our argument that military directors improve the informational efficiency in equity market in emerging economies. We interpret this as evidence that directors with military service experience improve firm transparency. We argue that military directors rely on a *transparent information environment* and *accurate firm-specific information* to monitor and advise effectively (Sila et al. 2017). As argued earlier, military *instils* its personnel with certain values such as integrity, loyalty, discipline and working ethics and trains them to keep *larger interests*—first country, then army, battalion and one-self—ahead of their *personal interests* thus directors with military service experience exhibit a character that is comparatively more *vigilant* in monitoring the agents to ensure the agents work in the *best interest of the stakeholders*, rather than pursuing *personal agenda*.

Our results consent us to speculate that military trained directors are *wary* of private information volunteered by managers since managers may be *hesitant* to disclose information that could be used to *discipline* them. Furthermore, publicly held firm-specific information is subject to *scrutiny* by various market participants such as *investors, traders, analysts, regulators, auditors,* and the *public* via the media (Armstrong et al. 2014; Kim et al. 2014) and such coverage and scrutiny arguably makes the military directors more *cautious*. Linking these results to the director reputation literature (e.g., Sila et al. 2017), we argue that military directors *act more vigilantly* as they are *protective of their personal reputation* because they do realise that they have been appointed to the board because of their military service backgrounds. Such directors are motivated to maintain *personal integrity* and *reputation* because by training they always associate themselves with the previous

Table 5 Interaction Impact

Variables	Panel A. Dependent variable: Non-SYN				Panel B. Dependent variable: ILLIQ			
Models	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
MilDirect ratio	0.137***	0.141***			0.0279***	0.0142***		
MilDirect			2.228***	2.239***			2.486***	2.721***
Board size	−0.212***	−0.174***	−0.278***	−0.239***	−0.0476**	−0.163**	−0.108*	−0.0903*
NED ratio	0.184***	0.285***	0.210***	0.385***	0.0194**	1.000***	0.0280**	1.132***
CEO duality	−0.359***	−0.617***	−0.600***	−0.528***	−0.804***	−0.364***	−0.916***	−0.364***
CEO tenure	−0.0434***	−0.0467***	−0.0285***	−0.0330***	−0.111***	−0.136***	−0.0940***	−0.119***
Board-size*CEO-tenure	−0.287***		−0.350***		−1.915***		−1.986***	
Board-size*CEO-tenure*MilDirect ratio		0.0701***		0.122***		0.687***		0.771***
Control variables	*Included*	*Included*	*Included*	*Included*	*Included*	*Included*	*Included*	*Included*
Constant	−0.748***	−0.488***	−1.229***	−0.924***	1.103***	3.712***	3.278***	3.925***
Firm-fixed effects	Included	Included	Included	Included	Included	Included	Included	Included
Year-fixed effects	Included	Included	Included	Included	Included	Included	Included	Included
R-squared	0.440	0.425	0.457	0.440	0.458	0.575	0.565	0.584
Observations	2114	2114	2114	2114	2114	2114	2114	2114

Table present regression results of the interaction analysis to determine the combined impact of military directors on stock price informativeness proxies: Non-SYN in Panel A and ILLIQ in Panel B, respectively. Refer to Table 1 for other variable definitions

Robust t-statistics in parentheses: ***$p<0.01$, **$p<0.05$, *$p<0.1$

institution *i.e. military* and as such will not jeopardise its reputation. Therefore, military directors *elicit greater corporate transparency* as they realise these *reputation incentives*. This avenue however qualifies for further investigation.

5 Robustness analysis

Adams and Ferreira (2009) warn that *reverse causality* is one of the main sources of *endogeneity*, which may *bias* the estimation results due to the *omitted unobservable firm characteristics* such as corporate culture, management quality and norms, which are considered to be *time-invariant*. Although there are few reasons to believe that our empirical estimation might have reverse causality, we run robustness tests using the system Generalized Method of Moments (GMM) estimator that combines in a system the equation in first differences with the same equation expressed in levels as in Eq. 3. As Table 6 shows, the central tenets of our findings remain unchanged in a battery of sensitivity test, mentioned above.

6 Conclusion

The main purpose of this paper is to analyse the impact of military directors on stock price informativeness. We use a *unique hand-built dataset* belonging to 267 non-financial firms listed on the Pakistan Stock Exchange for the 2009–2019 period. Our analysis suggests that stock prices of firms with military directors reflect more firm specific information after controlling for corporate governance attributes and firm level variations. Furthermore, our results are robust to alternative specifications of informativeness i.e. stock return non-synchronicity and Illiquidity ratio and military director proxy, which support the view that military-trained directors may *enhance transparency* in publicly held companies and *encourage* the incorporation of more firm-specific information into stock prices.

Our study makes several incremental contributions. While our study adds to the very few articles that use military directors' characteristics (e.g., Benmelech and Frydman 2015; Lin et al. 2011; Simpson and Sariol 2019) to explain corporate strategic outcomes and is the first to analyse the impact on stock price informativeness. These results also provide *divergent acumens* to the limited literature, which investigates the relationship between military directors and corporate performance outcomes (e.g., An et al. 2020). Although speculative, perhaps the positive association between military directors and stock price informativeness evidence the *strategic focus* of Pakistani military in enhancing its capabilities to fight the *non-conventional i.e. economic wars*, to protect their *resource endowments* but also to confront the *menacing threat* posed by neighbouring China and India's economic development while confronting economic terrorism. These insights merit further *incisive* and *rigorous* research investigation, analysing the role of military in *prudent policymaking* to influence patterns of trade policy, international cooperation, economic development, and international relations scholarship in the region.

Furthermore, we note that our study is the first to ascertain the *incentives* of military directors on board in relations to firm transparency reflected in their stock prices. Our study therefore adds to the literature on board structure, which argues that board of directors are appointed to satisfy firm's needs for diversity (Adams and Ferreira 2009; Gul et al. 2011), specialised industry knowledge and expertise (Benmelech and Frydman 2015; Duffy 2006)

Table 6 Robustness Analysis

	Panel A		Panel B	
Models	Model 1	Model 2	Model 3	Model 4
Variables	Non-SYN	Non-SYN	ILLIQ	ILLIQ
MilDirect ratio	0.120***		0.723***	
MilDirect		0.0676**		0.251***
Board size	−0.106***	−0.115***	−0.503***	−0.603***
NED ratio	0.168***	0.162***	0.0305**	0.0176**
CEO duality	−0.818***	−0.747***	−1.431***	−1.715***
CEO tenure	−0.0298***	−0.0306***	−0.135***	−0.0938***
ROA	−0.00135	−0.00195	−0.00260	−0.00227
Family own	−0.00699***	−0.00887***	0.0602***	0.0339***
Firm size	0.0842***	0.108***	−0.903***	−0.470***
Capex	−0.000990	−0.000717	−0.00391	−0.00331
Leverage	−0.00139	0.00106	−0.0274	−0.0118
Growth	−0.00940*	−0.00791	−0.00980	−0.00342
Tangibility	0.0528**	0.0457*	0.213***	0.140**
Firm age	0.0651***	0.0690***	0.0232***	0.0528***
R-squared	0.363	0.491	0.444	0.479
F-stat	124.25***	129.78***	194.11***	273.39***
Wald test (p-value)	0	0	0	0
Arellano-bond test for AR(1) p-value	0.003	0.006	0.005	0.004
Arellano-bond test for AR(2) p-value	0.131	0.126	0.132	0.141
Hansen test (p-value)	0.416	0.501	0.508	0.692

Table present results of the robustness test, using the system Generalized Method of Moments (GMM) estimator that combines in a system the equation in first differences with the same equation expressed in levels as in Eq. 5. Dependent variables in Panel A and Panel B are Non-SYN and ILLIQ, respectively. Refer to Table 1 for other variable definitions

Robust t-statistics in parentheses: ***$p<0.01$, **$p<0.05$, *$p<0.1$

as well as to satisfy internal information environment (Ferreira et al. 2011). More specifically our study adds to the literature, analysing the relationship between board structure and stock price informativeness (e.g., Ferreira et al. 2011; Gul et al. 2011; Huang and Ni 2017). Our study adds to this literature by providing empirical evidence that having directors with military background improves flow of information across economic agents. Broadly, we add new insights to the developing literature on stock price informativeness and corporate governance (Armstrong et al. 2014; Huang et al. 2016) as well as to studies analysing the determinants of stock price informativeness in emerging markets, confirming that military directors *improve the informational efficiency in equity market in emerging economies*. Thus, our study appeals and interests international audiences.

Our assertions and results have insights for similar establishments operating within similar economic environments. Findings observed in this study, however, have broad strategic, economic and policy implications, which extend beyond the emerging economics. While we measure the impact of military directors' presence on corporate boards and its impact on stock price informativeness. The future research may explore the *incentives for military directors* who occupy corporate board positions in public listed companies.

Similarly, the interaction analysis suggest that military directors may settle the *directional variations* at board level. Arguably, directors with military service experience potentially improve the *quality of board discussions* and increases *board's ability to provide better oversight* of firm's disclosures and reports, which facilitates a greater *diffusion of information* from the board to investors. These insights merit further incisive and rigorous research investigation by the future researchers.

Declarations

Conflict of interest There is no conflict of interest with any individual or organisation.

Ethical approval The manuscript fully complies with the ethical standards set by the journal.

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