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Article

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The role of the boards' financial expertise in the investment dynamics of businesses in emerging markets

Rehana Naheed¹, Sohail Rizwan², Muhammad Jawad^{2*} and Munazza Naz³

Abstract: This study examines the impact of the financial expertise of the board of directors (BOD's) on the investment decisions of firms by integrating Sarbanes-Oxley (SOX) regulations. The study has taken into account two emerging markets China and Pakistan from 2009-2020 with 8000 and 1120 firm-year observations respectively. The study has used fixed effect, random effect, and generalized method of moments (GMM) estimation techniques. The findings of the study are twofold. Firstly, BFE is positively related to firm investment and shows that financial experts on the board help firms to access financial resources for the firms. Secondly, the sub-sample results show the impact of BFE on investment is more profound for the firms that are large, financially unconstrained, with a strong balance sheet position, and faceless competition. This study introduces BFE as a contributing factor in the investment decisions of the firm. To the researchers' best knowledge, no previous study has focused on BFE as a contributing factor in firms' investment. The findings of the study are following the resource-based view.

Subjects: Finance; Business, Management and Accounting; Industry & Industrial Studies

Keywords: Investment; boards' financial expertise; resource-based view; emerging markets

1. Introduction

Investment decisions of the firms are administered by managers who are responsible for initiating, accessing, and evaluating investment projects (Lehn & Zhao, 2006). Sometimes, in the process of project selection, managers only think about their benefits without considering shareholders' interests. Similarly, less managerial compensations or rewards provoke them to work for their benefit (Chen et al., 2006). Consequently, an agency conflict arises when there is a conflict of interest between principals and agents (Jensen & Meckling, 1976). Therefore, to reduce this conflict and information asymmetry, the board of directors (BODs) plays an important role. Moreover, the two most important functions of BODs are monitoring and advising managers to safeguard the shareholders' rights (Jensen, 1986). The monitoring of managers is related to agency cost and investment projects, while advising is part of key strategic management decisions (Dass et al., 2014). Thus, BODs play a key monitoring and advisory role in the investment decisions of the firms.

Theoretically, the resource-based view identifies that firm resources are unique, congruent, and transcendent so it is not easy to copy or purchase them (Cho & Pucik, 2005). The unique resources help the firm in getting a competitive advantage, therefore, talented top management is an intangible asset for the firm that helps in attaining competitive advantage. (Gallego-Álvarez

et al., 2011). It is illustrated that BODs see the “Big picture” to ensure the company’s financial sustainability by keeping an eye on the manager’s activities and stewards the company’s assets that significantly affect financing choices for the firms (Güner et al., 2008). The formation of an effective board (background, knowledge, and expertise) is necessary for ethical and effective decision making, so the board characteristics are important for good information flow, and effective decision making (Terjesen et al., 2016).

There is a vast literature that identifies the relationship between board characteristics and investment decisions of the firms (Chen & Al-Najjar, 2012; Harjoto et al., 2018; Hussain et al., 2020; M. Khan et al., 2019; Linck et al., 2008; Lu & Wang, 2015). Thus, so far, the current study has taken into account the financial expertise of board members to investigate investment dynamics in emerging economies. The motivation behind the study is twofold: firstly, after the accounting scandals at Enron, HealthSouth, Tyco, and WorldCom in 1990, and 2007, the financial crisis has shaken investors’ confidence, and it has made it mandatory to have financial experts on the board where the presence of financial experts on the board makes the financial reporting process transparent and effective. Financial experts are knowledgeable because of their education or work experience in the field of accounts or finance (Anderson et al., 2004). Secondly, the growing literature on board characteristics has identified that the presence of financial experts on the board increases firm performance (Dionne & Triki, 2005; Francis et al., 2012), improve firm efficiency (Agrawal & Chadha, 2005; Karamanou & Vafeas, 2005; Krishnan, 2005), and leads them to implement good corporate governance practices (Krishnan, 2005; Robinson et al., 2012). Despite all this, there is still room for board financial expertise role in the investment decisions of the firms in the emerging market literature.

This study introduces the financial expertise of board members as a contributing factor in investment literature. To the researchers’ best knowledge, sparse work exists that focuses on board-level financial expertise as a contributing factor to investment literature. The current study answers the question of what proportion of financial experts on board plays a vital role in firm investment decisions. The study estimates the results for panel regression. For robustness analysis, the study employs a two-step generalized method of moments (Mark Arellano & Bond, 1991), and instruments variable regression to control potential endogeneity.

Results show that the presence of financial experts on the board increases firm investment for both economies. Moreover, the study identifies the impact of board financial expertise on investment by varying the construction firms in two different ways. Firstly, the study separately identifies the role of financial expert BOD in the investment decisions by constructing a sample set based on financial constraints (small and large firms, constrained and unconstrained firms, strong and weak BS firms) and the results report that the relationship is more pertinent for the firms that are in good in financial position (large, unconstrained and strong BS). Secondly, competitiveness negatively affects investment, thus the presence of financial experts on the board tries to overcome the negative impact of competition. Moreover, firms with financial experts on the board increase their cash flow and are less vulnerable to financial constraints

The study contributes to the existing literature in several ways. Firstly, previous researchers have identified the impact of board financial expertise on earning management (Karamanou & Vafeas, 2005), restatement reporting problems (Agrawal & Chadha, 2005; Krishnan, 2005), hedging (Dionne & Triki, 2005), firm investment (Dionne & Triki, 2005), taxes (Robinson et al., 2012), firm performance (Francis et al., 2012) and dividend payout (Jo & Pan, 2009; Sarwar et al., 2018), but has not found considerable attention for board financial expertise and investment literature for an emerging market of China and Pakistan. Board financial expertise has a significant impact on the financial activities of the firms like investment policy so the current study is trying to fill this gap. Secondly, the study has used a novel measure to calculate the financial expertise of the board members. Thirdly, it provides a detailed analysis of the relationship between board financial expertise and investment for the firms under financial and economic constraints. So, the study

contributes to the existing literature that the financial expertise of the board members significantly affects firm policies.

The test of the chapter is organized as follows. Section 2 discusses theoretical perspectives and hypotheses development. Section 3 concerns data, sample selection, model, and variables identification. Section 4 describes in detail empirical results and their interpretation. Section 4 provides the conclusion, limitations, and implications of the study.

2. Literature review

Imperfect capital market, information asymmetry, and agency conflict increase agency cost, financial distress, moral hazard, and bankruptcy. Therefore, firms need to look at the issues regarding investment decisions. So, this section includes the conceptual framework and hypotheses of the study.

2.1. Financial experts of the corporate board

The composition of the board is a debatable topic in corporate governance literature that answers important questions regarding BODs' work in the best interest of shareholders. The composition of the board has gained significance in the wake of accounting scandals at Enron, HealthSouth, Tyco, and WorldCom in the 1990s and 2007s financial crisis which grabbed investors' confidence. that led the policymaker to enact new laws which made it mandatory for every firm to include at least one financial expert on the board (Agrawal & Chadha, 2003).

As a result of the mentioned enacted laws and guidelines, Minton, Minton et al. (2014) (illustrated that having more financial experts on the board has resulted in less difficulty in acquiring information and better monitoring of management. Financial experts, being knowledgeable about the financial market, help firms borrow and acquire financing (Booth & Deli, 1999), play a significant role in alleviating agency problems by monitoring TMTs (Jensen, 1986; Shleifer & Vishny, 1997), and provide timely guidelines to managers for firms operations (Jensen, 1986). BOD's responsibilities are divided into three broad roles namely control, service, and resource-based role(Huse, 2000). In providing control, BODs monitor managers to align their interests with shareholders by providing them some benefits and firing them if necessary. In performing the service role, BODs advice and counsel the CEO as well as managers (Adams & Ferreira, 2009). Moreover, in these roles, financial experts on the board are playing a more critical role in financial reporting, financial announcement statement, and reassurance of potential creditors and investors to engage more financial resources for the firms.

2.2. Board financial expertise and investment decisions

Agency problems affect investment through project selection and the cost of raising funds (Verdi, 2006). Firstly, managers prefer to invest in projects that are in the best interest of shareholders (Jensen & Meckling, 1976). Investment inefficiency is due to the quiet life hypothesis (Bertrand & Mullainathan, 2003), career concerns (Holmström, 1999), and perquisite consumption (Jensen, 1986). Secondly, agency problems give a rise in the cost of capital and avert financing investment opportunities because of the lack of availability of funds (Lambert et al., 2007). There is significant literature on governance mechanisms and investment efficiency. Corporate control alleviates over-investment (Jensen, 1986). Firms that focus on shareholders' right and institutional ownership has high firm value, fewer acquisitions, and lower capital expenditure, and institutional ownership alleviates over-investment (Ferreira & Matos, 2008). In addition to the dividend policy of the firm also affect the investment policy (Ramalingegowda et al., 2013). Due to adverse selection problems and moral hazards, firms have limited access to external resources, while limited access to internal resources leads the firms to choose between paying a dividend or pursuing investment opportunities. Managers are hesitant about cutting dividends (Lintner, 1956), so firms prefer to pay a dividend and reduce valued investment opportunities (Daniel et al., 2007).

Investment decisions are quite important to increase firm growth and future cash flow, but sometimes, due to information asymmetry between managers and shareholders, empire-building managers work for their benefits, prestige, career, and higher compensation which results in overinvestment, moral hazard, and adverse project selection (Jensen, 1986). In the process of project selection, without considering shareholders' interests, managers only think about their benefits. They only evaluate non-risky projects by following a quiet life hypothesis (Bertrand & Mullainathan, 2003), and the projects that give benefits in the short run compared to the long run to the firm or managers (Holmstrom & Costa, 1986). In this case, funds raising becomes difficult if investors perceive that managers will confiscate sponsored resources (Lambert et al., 2007). Therefore, an agency problem arises between managers and shareholders, which proliferates the monitoring of managers.

BODs have received substantial attention from researchers, academia, and practitioners. BODs secure resources for their firms. Managers and BODs work together to achieve organizational goals. The traditional definitions of upper echelon theory and top management team include only executives (Hambrick & Mason, 1984), albeit, researchers have also included BODs in TMT (Golden & Zajac, 2001; Jensen & Zajac, 2004; Mueller & Barker III, 1997; Pugliese et al., 2009), particularly regarding their role in strategic management decisions. BODs view the "Big picture" to ensure the company's financial sustainability by keeping an eye on the manager's activities and stewards of the company's assets.

Board characteristics, such as talent, ability, quality, and reputation have a significant impact on the strategic decisions of the firms. Board members of some financial whiz, for example, the Chief finance officer, may not only better exploit profitable investment opportunities but also evaluate and make investment decisions for the firm (Sun & Rakhman, 2013). (Khan et al., 2021) described that Donors and governments are demanding increased openness and information exchange in the humanitarian sector, putting pressure on both for-profit and nonprofit groups to be more open.

Prior work indicates different proxies for measuring the expertise of the TMT and identifies a person as a financially expert if he or she processes a degree in the field of finance, accounting, or auditing (Khan et al., 2022; Minton et al., 2014; Sarwar et al., 2018; Jawad et al., 2021a), is a chief finance officer, accounts officer, working as an executive in an investment or commercial bank, or is a financial expert on an audit or a finance committee (Güner et al., 2008). Financial experts are well informed about the market, so they can better identify a risk that is unlikely or bad for the firm's financial stability and risk that is likely to be advantageous for the firm. Francis et al. (2012) state that financial experts help firms to prevent losses in crisis periods by advising managers and helping firms in accessing external resources for the firms (Francis et al., 2012).

Financial experts are knowledgeable about the financial market, so they can help firms to borrow and acquire financing (Booth & Deli, 1999). Karamanou and Vafeas (2005) added that more financial experts on the board can update managerial predictions, that's why a firm faces fewer internal control problems (Krishnan, 2005). Firms with financially educated directors can monitor and mitigate risk and understand the firm's behavior concerning hedging policies. Firms that have more financial experts on their boards have strong oversight of their strategies and policies (Gore, Matsunaga, & Eric Yeung, 2011) and can understand and control risk (Francis et al., 2012). Güner et al. (2008) proposed that financial experts on the board help firms to be financially unconstrained because they have low-risk rates, but this lending is sometimes not effective, as overconfident managers can overinvest, decreasing cash flow sensitivity (Güner et al., 2008; Jensen, 1986; Jensen & Meckling, 1976).

Directors on an audit committee whose degrees in accounting or finance are valuable in providing effective oversight in financial reporting (Agrawal & Chadha, 2005), which positively affect investment efficiency (Verdi, 2006). A firm's financial reporting quality positively affects investment efficiency (Jung, Lee, & Weber, 2014). Financial experts are necessary on audit

committees because their responsibilities are dependent on the directors' accounting and financial experience to calculate firms' financial position, evaluate reserves, and review and evaluate firms' financial reports. It is also evident that adding more financial experts to the board results in a favorable market reaction, even if the firm's governance is weak (DeFond et al., 2005).

Empire building managers' quiet life leads to underinvestment, thus financial experts on the board help the firms to increase investment level. According to the resource-based view, skilled and knowledgeable directors bring resources to the firms that increase firm value. Jensen and Meckling (1976) found that BOD must have some substantial expertise to fulfill their duties. BOD's skills and qualifications are human and social capital for the firms, so they help the firms in acquiring financial resources for the firm (Kor & Sundaramurthy, 2009 Jawad et al., 2021b). Therefore, the identification of appropriate board members is central to effective oversight of investments because BOD is involved not only in monitoring but also in using their cognitive resources to process information (Harjoto et al., 2018). Directors with expertise in the fields of finance, accounting, management, law, and bankers can better acquire resources for the firms and increase firm investment, so it is hypothesized that

H1₁: Board of financial expertise is positively related to corporate investment.

According to the "MM" theory of investment, firms will invest in projects with positive NPV, irrespective of the firm's financial structure or method, so the firm faces no financial constraints in a perfect capital market (Modigliani & Miller., 1958). Myers and Majluf (1984) introduced an information asymmetry theory and analyzed the investment dynamics when firms are under some constraints. Firms prefer to use internal resources for investment, but when they have inadequate internal resources, they rely on external capital for investment, so firms that face investment constraints face high investment to cash flow sensitivity (Fazzari et al., 1988). Therefore, financial constraints reduce their investment activity due to a lack of resources (Bloom et al., 2007; Guariglia, 2008).

Large firms have a well-designed corporate governance structure and resources available for investment, less information asymmetry, and agency conflicts as compared to small firms (Leary & Roberts, 2005). Large firms have better access to the external market based on three factors. Firstly, they enjoy low transaction costs, have less information asymmetry, and lastly large institutional shareholding work as a constraint against managerial decisions (Kadapakkam et al., 1998). Large firms can easily get financing from internal resources, new debt, or equity financing while it is not easy for small firms to get external financing so they have to rely on the internal resources of the firm (Audretsch & Elston, 2002). Due to a well-designed corporate governance structure, the role of BOD's is more prominent in large firms. So, it is hypothesized that

H2₁: The impact of board financial experts on capital investment is more profound for large firms.

There exists a significant link between investing and financing decisions of a firm (De Jong et al., 2012). Thus, we have further sample is subdivided based on the financial condition of the firm (C et al., 2018). First firms are divided into financially constrained and unconstrained based on Kaplan and Zingales Index. Firms try to use their internal resources first, then debt, and in the end equity issuance and it is different for different firms based on information asymmetry (Myers & Majluf, 1984). The high value of KZ index shows, that firms that rely more on external resources are financially constrained (Denis & Sibilkov, 2009), but all firms can't get easy access to external resources so firms sidestep some good investment projects because of difficulty in accessing external financing resources (Almeida & Campello, 2007). The firms that have more than the required funds are financially unconstrained and less than required are financially constrained

(Kaplan & Zingales, 1997). Moyen (2004) depicts that financially unconstrained firms are more cash flow-sensitive than constrained firms so unconstrained firms use debt for their financing so the investment range is high for them. Financially constrained firms try to invest their resources in new capital or R&D and thus make acquisitions (Jawad & Naz, 2019). Financial experts of less financially constrained or stable firms can easily get access to external financing, which only increases overinvestment, while this additional investment is beneficial for creditors rather shareholders because it worsens firm's profitability (Güner et al., 2008), while lending to financially unconstrained firms is beneficial because they have less default risk. Whereas, the second financial condition measure is Altman Z-Score, that divides the firms into strong and weak balance sheets. It is also called a bankruptcy index or shows the financial distress of a company. High/Low value of the Z-Score index shows the firm is financially strong/ weak and has less/ high chance of bankruptcy and it is financially unconstrained/ constrained. Firms that have a low value of Altman Z-Score have limited access to external capital but also have a low value of internal cash flows and are risk-averse investors (Harjoto et al., 2018). Due to supply shocks to external financing, firms decrease investment in capital resources (Duchin et al., 2010). Thus the firms are unconstrained if they are financially healthy companies with a high value of cash and lower debt (Cleary, 1999). Firms that are in financial distress affect the investment decisions of financially non-distressed competitors (Garcia-Appendini, 2018). Some studies that have used Z-Score are (Altman, 1968; Cleary, 1999; C et al., 2018; Park et al., 2017). Firms in strong balance sheet conditions have more cash available for investing and financial experts help the firms to enhance their resource availability for the firms. So, it is hypothesized that

H3₁: The impact of board financial experts on capital investment is more profound for good financial position firms.

We go further to examine the possibility that boards matter more for firms in particular economic environments. The relationship may test whether the degree of competition in an industry can influence the relationship we are interested in. Here, Herfindahl-Hirschman Index (HHI) is a measure of industry competitiveness. The cost and benefits of the companies in the same business are correlated, when one firm faces financial difficulty then the competitor takes benefit of the situation, due to high competition among the firms, firms in the same industry have less investment opportunities (C et al., 2018). Competition among the firms alleviates agency problems, thus in a competitive environment firms are more knowledgeable about one another which also reduces moral hazard problems (Kannan & Tang, 2018). More expert board keenly evaluates the projects before investing. As firms in a competitive industry have limited investment opportunities, more financial experts in the competitive industries try to use their resources in the new risky projects to gain a competitive advantage. With more experts on the board, the less-competitive firms have more investment opportunities that help firms to increase their investment. Competition negatively affects access to financial resources and this effect is more mitigated by directors on the board

H4₁: The impact of board financial experts on capital investment is more profound for good financial economic firms.

2.3. Importance of financial experts in the Asian markets

The reason for selecting two Asian countries is due to the following reasons. First, there are no legal requirements for having financial experts on the board for both Asian markets of Pakistan and China, while both the countries require to have at least one person on the audit committee with having finance or accounting degree (Sarwar et al., 2018). In addition to that, the corporate governance structure in both neighboring countries is providing the guidelines regarding board size, board meetings, shareholders' rights, and the presence of independent directors on the board, while both the economies do not have any code of corporate governance that govern the

number of financial experts or financial literacy into account, whereas these practices are common in worldwide. Thus, the presence of financial experts on the board helps to understand both governance evaluators and policymakers as an important determinant of effective corporate governance formation. Organization for Economic Cooperation and Development (2011) illustrates that Chinese companies have successfully developed their corporate governance structure which is accredited to exceptional representatives of their enterprises. Where, the corporate governance system has provided grounds for the Chinese market, enlarged its attractiveness, and given a noticeable improvement in the development of a healthy and steady Chinese market. On the other hand, in 2002, the Securities and Exchange Commission of Pakistan introduced the code of corporate governance in Pakistan. This reform has identified that the board of directors is accountable to the shareholders, and better disclosure increases audit quality, but it does not provide any information regarding risk management, internal control, and board compensation policies (Javid, 2010). That's why it is quite interesting to know the role of financial experts on the board and by comparing it with one neighboring country Pakistan. So, the development of corporate governance structure has provided the ground for enterprises and is an effective boost in the steady and healthy equity market development.

Secondly, China increased its investment from 0.4 billion US dollars to 2.3 billion US dollars in the 1990s. Thus there is a drastic increase in investment from 19.1 billion to 531.49 billion US dollars in 179 countries for more than 16,000 firms. China is increasing its investment in infrastructure, real estate, and manufacturing that is concentrated in coastal areas (Geng & N'Diaye, 2012) because the low cost of capital and high return on investment contributes positively to firm performance. So, the corporate governance structure of China is very important. The friendship between Pakistan and China has its meaning (Rabbi, 2017), It has been started when Pakistan accepted the independence of China in the 1950s. Pakistan and China started their trade transactions and signed an agreement in 1963, so the reason behind selecting both Asian countries is because of a strong association in the field of energy, investment, and trade and infrastructure development. So recently, this friendship has been boosted because of the bilateral framework of the China-Pakistan Economic Corridor (CPEC) to increase the trade between the two countries. It is a 75 billion USD cost project with a 3,218 kilometer-long corridor that contains agriculture, highways, pipelines, railways, and massive energy projects. This idea is inspired by the success of the one belt one road project. So, the Pakistani cover with the Chinese Yuan is the exchange of currency between two countries which is expected to increase cross-border investment opportunities. So, the firms should have financial experts on the board for both the firms to grab the best investment opportunities in the local and the international market. That's why this study identifies the importance of board financial expertise and investment in Pakistan and China.

3. Research methodology

3.1. Data collection and sample identification

No approach in a statistical presentation should be viewed as either excellent or poor, but it is important to comprehend the technique that might be used (Khan et al., 2022). The initial sample of the study consists of 1256 Chinese firms, and 327 Pakistani firms. The sample span is from 2009 to 2020. Data for Chinese firms is collected from China Stock Market and Accounting Research and RESSET database (CSMAR) and RESSET database. Whereas, data for Pakistani companies is collected from the Bloomberg database and the companies' annual reports. Financial firms are excluded from the data sample because of different capital structures. Firms with missing values are excluded, gaps are filled with 3 year moving average and all the data is winsorized at 1% by using Stata-14. Due to the exclusion of financial sectors, and missing data for directors' profiles, we are left with 140 Pakistani non-financial firms with 1115 firm-year observations, while 1082 Chinese firms for a total of 8002 firm-year observations.

3.2. Econometric model

Board composition is quite important to increase the profitability of a firm. To analyze the impact of the financial expertise of BOD on a firm's investment, and to measure this relationship under financial and economic constraints, the study is based on theoretical perspectives of the resource-based view. So, the model is of the form as

$$CE_{i,t} = \alpha_0 + \alpha_1 BFE_{i,t} + \alpha_2 Tang_{i,t} + \alpha_3 Lev_{i,t} + \alpha_4 MTB_{i,t} + \alpha_5 AG_{i,t} + \alpha_6 Sales_{i,t} + \alpha_7 SR_{i,t} + \alpha_8 CF_{i,t} + \varepsilon_{i,t}$$

3.3. Variables explanation

This section describes the studied variables in the study. Our main dependent variable is a corporate investment, while the independent variables are BFE.

The dependent variable is a corporate Investment is calculated as capital expenditure divided by total assets where capital expenditure is the sum of cash paid for the acquisition of fixed assets, intangible assets, and other long-term assets. (Andreou et al., 2017). The Independent variable is board financial expertise and is the proportion of financial experts on the board and it is a measure of Financial Literacy. A financial expert is a person who has a financial background and has a bachelor's, or master's degree in accounting, finance, and economics, has professional education (chartered accountant degree or Chartered accountant), is Banker with an MBA degree or bank job), Professor in the field of finance, accounting, management or economics, and professional investor or contain law degree as LLM, LLB; DeFond et al., 2005; Khan et al., 2022).

Control variables are defined in the Appendix under the definition of variables. The current study has used firm-related variables that affect the investment decisions of the firms are firm size, profit, leverage, cash flow, stock and asset growth opportunities based on the previous literature (Andreou et al., 2017; Balakrishnan et al., 2016; Chemmanur et al., 2010; Duchin et al., 2010). Here all the variables are measured for the year 2009–2016 based on the availability of data. Tangibility (tang) is computed as a natural log of total assets. Leverage (Lev) is the ratio of debt to assets. Market to book ratio (MTB) is the ratio of the market value of equity to the book value of equity, where the market value of equity is computed by multiplying the number of shares outstanding by the share price. Asset Growth (AG) is computed by taking a difference between 2006 and 2005 total assets divided by 2005 total assets. Sales revenue (sales) is measured as cash received from sales (goods+services) divided by total assets. SR is stock return and Cash flow (CF) is a ratio of net operating cash flow to total assets.

4. Results and discussion

This section describes results for summary statistics, regression analysis for the overall sample, and firms under financial and economic constraints of the firms and then the additional analysis for robustness and sensitivity analysis for the relationship between board financial expertise and investment decisions of the firms.

4.1. Descriptive statistics

Analysis in Table 1 (Panel A) describes overall and sector-wise (14-sectors) financial experts considered in the equity market of China. It is noted that most of the companies in China are manufacturing. On average 47% of persons are financial experts on the board. All the sectors have more than 40% of financial experts on the board except for the Research industry which has 30%, financial experts. Table 1 (Panel B) shows overall and sector-wise (11-sectors) financial experts considered in the Pakistani equity market. The results of the study show that approximately 58% of BOD's are financial experts. Every sector has more than 50% of financial experts on the board, but IT and transport only contain 45%, of financial experts.

Table 1. Industry-wise descriptive statistics

Panel A: China

Industry	N	Mean	S.D	Min	Max
Construction	176	0.4305	0.1810	0.00	0.75
Culture	112	0.4997	0.1874	0.2143	0.9091
Energy	448	0.5587	0.1969	0	1
Farming	128	0.4764	0.1962	0.1	0.7692
Hotels	64	0.5245	0.1845	0.3333	0.8889
IT	296	0.4243	0.2015	0.10	1
Integrated	80	0.4063	0.1559	0	0.625
Manufacturing	4,800	0.4625	0.1803	0	1
Mining	256	0.4489	0.1637	0.0909	0.8889
Real State	744	0.5030	0.1630	0.0833	1
Research	24	0.3009	0.3484	0	0.7778
Transport	216	0.4472	0.1793	0.1333	1
Water	104	0.5049	0.1673	0.1667	0.8889
Wholesale	552	0.5231	0.2061	0.1429	0.9167

Panel B: Pakistan

Cement	112	0.6675	0.1878	0.30	0.8750
Chemical & pharmacy	136	0.5429	0.1857	0.2222	0.8889
Energy	96	0.5350	0.1288	0.3333	0.7143
Food products	88	0.5216	0.1390	0.2353	0.7778
IT & transport	72	0.4589	0.1586	0.20	0.7273
Manufacturing	104	0.5350	0.1226	0.30	0.6667
Transport	24	0.5984	0.1158	0.4444	0.7143
Paper & products	80	0.5641	0.1539	0.3333	0.7778
Petroleum	24	0.5655	0.2607	0.25	0.8750
Sugar	72	0.5836	0.2193	0.2857	0.8889
Textile	312	0.6644	0.1820	0.2857	0.8750

Descriptive Statistics: Table 1 reports sector-wise board financial expertise for an emerging market of China and Pakistan in Panel A and B respectively.

Table 2 reports descriptive statistics of the whole sample. The current study has divided descriptive statistics into three panels based on the nature of the variables. Panel A reports descriptive statistics of the main regression equation. It reports mean, Std. Dev and percentiles (25th, 50th, and 75th). In Panel A (China) on average, a firm is investing 39.4% of its assets in corporate investment with a standard deviation of 24.78%. While 47.36%, BOD has a financial whiz, which means that business or finance-related education or experience affects their investment decisions. Panel B (Pakistan) illustrates that on average a firm is investing 26.23% of its resources as corporate investment, whereas it contains 58.63% financial experts with a 10.25% standard deviation.

Table 3 reports a correlation analysis for all variables that are employed in the main regression equation. Panel A reports results for the equity market of China and coefficients among all the variables are small which means there is no problem of multicollinearity. The correlation between Lev and SR is negative with CE and is positive for all other variables. All the coefficients are statistically significant. The study has also indicated the Variance inflation factor (VIF) for all the variables ranges from 1 to 1.13 for the emerging equity market of China, which is below the standard threshold. Similarly, panel B reports results for the Pakistani equity market, the results

Table 2. Descriptive statistics of the whole sample

Panel A: China					
Variable	N	Mean	S.D	Min	Max
CE	8,000	0.3943	0.2478	0.1001	0.9961
BFE	8,000	0.4736	0.1855	0	1
Tang	8,000	20.0076	2.4945	7.5944	27.7431
Lev	8,000	0.5261	0.1963	0.1001	1.1899
MTB	8,000	2.7153	1.2054	0.7523	5.6841
AG	8,000	0.3047	0.4251	-0.3949	2.4398
Sales	8,000	0.7003	0.5437	0.1001	3.4741
SR	8,000	0.0638	0.1931	-0.5133	3.8103
CF	8,000	0.0600	0.1786	-0.8911	3.8907
Panel B: Pakistan					
CE	1,120	0.2623	0.1025	0.0045	0.5715
BFE	1,120	0.5865	0.1834	0.2	0.8889
Tang	1,120	16.3626	1.8410	0.0757	20.2644
Lev	1,120	0.6690	0.8049	0.0205	5.5641
MTB	1,120	0.1713	0.1097	-0.3191	0.7829
AG	1,120	0.1035	0.1786	-0.7471	1.9885
Sales	1,120	0.4539	0.3198	-2.6546	1.4017
SR	1,120	0.1279	0.4364	-0.9994	1.4770
CF	1,120	0.0401	0.1303	-1.9231	0.6341

Descriptive Statistics: Table 2 reports descriptive statistics of the whole sample for 1082 non-financial firms in China and 140 non-financial firms in Pakistan.

show that all the variables are statistically significant except for with Variance Inflation Factor (VIF) ranging between 1.05 to 1.27 respectively which confirms that there's no issue of multicollinearity.

4.2. Board financial expertise and investment analysis

Table 4 reports regression estimates for the relationship between the presence of financial expertise on the board and investment dynamics by using FE, RE, and GMM two-step estimation for the equity market of China and Pakistan. The results for FE and RE are significant and positive for both equity markets. Hausman's test depicts that there is no relationship between the stochastic error term and explanatory variable for the Chinese and Pakistani equity markets, so a fixed effect model is appropriate for both markets. The estimations from fixed effect are biased (Nickell, 1981), so the current study has taken into account the dynamic panel data technique (Mark Arellano & Bond, 1991) and (Manuel Arellano & Bover, 1995), which takes lag-dependent and explanatory variables as an instrument after considering the dynamic nature of investment policy that overcomes the problem of autocorrelation, multicollinearity, heterogeneity, and endogeneity. The results are significant and positive for both equity markets.

Theoretically, the findings are in accordance with the resource-based view (J. B. Barney, 2001; J. Barney, 1991) and identify that more financial experts on the board can have better access to financial resources for the firms where the resource-related role of BOD is measured by the professional or work-related background of directors significantly affects board composition (Hillman et al., 2000). It also includes control variables in addition to BFE and found statistically significant coefficients for all the variables.

Table 3. VIF and correlation analysis

Panel A: China

	VIF	CE	BFE	Tang	Lev	MTB	AG	Sales	SR	CF
CE		1								
BFE	1.01	0.3181*	1							
Tang	1	0.0502*	0.0272*	1						
Lev	1.02	-0.0260*	0.0016	-0.0372*	1					
MTB	1.03	0.1026*	0.0848*	0.0033	-0.1117*	1				
AG	1.13	0.0644*	0.0209*	0.0119	0.013	0.0236*	1			
Sales	1.02	0.1314*	0.0416*	0.0337*	0.0220*	0.0922*	0.0202*	1		
SR	1.13	-0.0114	0.0336*	0.013	0.0165	0.0176	0.3367*	0.0064	1	
CF	1.02	0.0561*	0.0358*	0.002	-0.0897*	0.0312*	0.0488*	0.0803*	0.0281*	1

Panel B: Pakistan

CE		1								
BFE	1.07	0.4472*	1							
Tang	1.21	-0.0995*	-0.0681*	1						
Lev	1.29	-0.3174*	-0.0740*	-0.2797*	1					
MTB	1.23	0.6066*	0.2164*	-0.1072*	-0.1922*	1				
AG	1.07	0.1861*	0.0518*	-0.0515*	-0.0428	0.2066*	1			
Sales	1.18	0.3569*	0.0614*	-0.1206*	-0.2409*	0.2072*	0.0914*	1		
SR	1.09	-0.4087*	-0.1729*	0.0698*	0.1782*	-0.1872*	-0.0295	-0.0913*	1	
CF	1.26	0.2596*	0.0409	0.1701*	-0.3009*	0.2594*	0.1770*	0.2731*	-0.1096*	1

Correlation Analysis: Table 5 reports results for variance inflation factor and correlation matrix for dependent, independent and control variables at a 10% significance level.

4.3. Board financial expertise and investment analysis: heterogeneous analysis

Financial and economic constraints significantly affect the investment decisions of the firms (Almeida & Campello, 2007). Thus, the current study further analyzes that the financial condition of the firms significantly affects the relationship between board financial expertise and the investment policy of the firms. Panel A reports results for the equity market of China, while on the contrary Panel B is about the Pakistani market.

Model (1) divides the firms based on firm size; large, small, and medium (SME). This measure is based on total assets owned by the firms, firms having a value above the median are large, and below the median are SME firms. The relationship between BFE and investment is statistically significant for large firms and is insignificant for SME firms in China and Pakistan.

In model (2) for Panel A&B, firms are divided into two segments based on Altman Z-score, which is a combination of five financial ratios to predict bankruptcy and this is a measure designed by (Altman, 1968). Firms are divided into four quartiles. If Z-Score >Q3 then the financial condition of the firm is good (strong balance sheet firms) and has fewer chances of bankruptcy, while on the contrary if Z-Score <Q1 then the financial condition of the firm is not good (weak balance sheet firms) and have more chance of bankruptcy. Results report the impact of BFE on investment for strong and weak balance sheet firms and illustrate that firms with conventional leverage policy and financial flexibility are accompanied by good investment opportunities for the firms (Marchica & Mura, 2010). Thus, the relationship between BFE and investment is positive for strong balance sheet firms, while insignificant for weak balance sheet firms for both emerging economies.

Table 4. Board Financial Expertise and Investment Analysis (Full Sample)

	China					Pakistan				
	FE	RE	GMM(a)	GMM(b)		FE	RE	GMM(a)	GMM(b)	
Var—CE										
BFE	0.4815*** (0.1111)	0.4058*** (0.0221)	0.5333** (0.2363)	0.3171* (0.1846)		0.2204*** (0.0381)	0.1627*** (0.0194)	0.0319*** (0.0099)	0.1999*** (0.0411)	
Tang	0.0025** (0.0010)	0.0028*** (0.0010)	0.0024** (0.0012)	0.0029** (0.0012)		0.0164*** (0.0019)	0.0073*** (0.0015)	-0.0493*** (0.0082)	-0.0105** (0.0045)	
Lev	-0.0986*** (0.0215)	-0.0514*** (0.0165)	-0.1302*** (0.0285)	-0.1310*** (0.0313)		-0.0136*** (0.0035)	-0.0152*** (0.0030)	-0.0019 (0.0030)	-0.0093** (0.0042)	
MTB	0.0228*** (0.0026)	0.0188*** (0.0024)	0.0221*** (0.0035)	0.0232*** (0.0033)		0.1735*** (0.0127)	0.2006*** (0.0132)	0.0979*** (0.0195)	0.1237*** (0.0154)	
AG	0.0577*** (0.0079)	0.0590*** (0.0076)	0.0137* (0.0073)	0.0211*** (0.0071)		0.0146*** (0.0053)	0.0175*** (0.0057)	0.0052 (0.0035)	0.0085 (0.0064)	
Sales	0.0982*** (0.0066)	0.0737*** (0.0056)	0.1063*** (0.0107)	0.1043*** (0.0087)		0.0458*** (0.0054)	0.0503*** (0.0055)	0.0286*** (0.0061)	0.0420*** (0.0074)	
SR	-0.0540*** (0.0165)	-0.0536*** (0.0161)	-0.0557*** (0.0148)	-0.0569*** (0.0154)		-0.0066*** (0.0024)	-0.0117*** (0.0026)	-0.0021 (0.0020)	-0.0043 (0.0028)	
CF	0.0387*** (0.0146)	0.0391*** (0.0141)	0.0377* (0.0213)	0.0371** (0.0183)		0.0255*** (0.0085)	0.0232*** (0.0090)	0.0191* (0.0099)	0.0380*** (0.0101)	
L.CE			-0.0004 (0.0231)	0.0394*** (0.0133)				0.0084 (0.0237)	0.2433*** (0.0372)	
R2	0.2349	0.2591				0.3595	0.3219			
Hausman Test	0.0000					0.0000				
Wald test	0.0000					0.0000				
N	8000	8000	6000	7000		1112	1112	840	980	

Regression and GMM Analysis: The above table reports fixed effect, random effect, the GMM two-step estimation techniques by Arellano-Bond (1991) GMM (a) and Arellano-Bond/Blundell-Bond (1995) GMM(b). ***, **, * shows significance at 1%, 5%, and 10% respectively with p-values.

In model (3) firms are divided into two types based on a firm's dependence on external funds and are financially constrained and unconstrained developed by (Kaplan & Zingales, 1997). Firms having high (low) KZ value are financially constrained (unconstrained) firms and they rely more (less) on external financing. If $KZ < Q1$ then firms are financially unconstrained (sufficient internal resources), while on the contrary if $KZ > Q3$ then financially constrained where firms face difficulty in arranging external resources for the firm. The impact of BFE on investment is statistically significant for unconstrained firms, firms that rely less on external resources and utilize their resources and invest in R&D projects. If financially constrained firms have high cash available for investment because of the efforts of the board and managers then the firms have more cash available for investment and will be a good signal for financially constrained firms (Faulkender & Petersen, 2006), where more cash in hand helps firms to invest in value-enhancing projects (Denis & Sibilkov, 2009). Thus, financial experts on the board arrange cash for firms to increase investment opportunities and the relationship is positive which indicates financial experts of financially unconstrained firms invest in risk-free securities.

So, based on the above-mentioned financial constraints, the relationship is only significant for the firms that have a good financial conditions (Large, financially unconstrained and have a strong balance sheet). So the board role is pertinent only if the firms are in a good financial position. And they can better play their monitoring and supervisory role.

Model (4) in Panel A&B divides the firms based on industry competitiveness, firms that have $HHI > Q2$ show firms are competitive and $HHI < Q2$ are less competitive (C et al., 2018) and assigned a value of 1 for competitive firms and 0 for less competitive firms. Competition negatively affects investment expenditure because they have limited resources available for investment due to competition. More competitive industries have fewer investment opportunities, so the board invests in R&D projects to get a competitive advantage over the other firms. Where financial experts on the board arrange more financial resources for the firms in less competitive firms because of more investment opportunities. In highly competitive industries, the effect of the competition is negative on investment. The results show that in high competitive firms, the role of the board is not pertinent, and financial experts play a significant role in increasing investment for the firms in non-competitive firms of China, moreover, the results are insignificant for Pakistani firms.

4.4. Additional analysis

Results in Table 4 by using different estimation techniques show robustness in the model. Thus, to control endogeneity, the study has employed GMM instrument variable regression (Table 6).. The study has taken average financial experts in an industry and board size as an instrument of board financial expertise. The insignificant p-value for the Hansen test reports the significance of instrument variables for testing the over-identifying restrictions and validity of instruments. Thus the insignificant p-value reports that instruments are valid. Moreover, C (difference in Sargan) is a test for endogeneity, and our independent variable confirms endogeneity and shows that more financial experts on the board will encourage firms to invest more.

5. Conclusion

BODs play a pertinent role in the formation of effective corporate governance. This study analyzes the impact of BFE on firm investment in two emerging economies; China and Pakistan. BOD's plays an important role in the investment decisions of a firm, so the formation of effective corporate governance is quite important nowadays. The formation of effective corporate governance is quite important because the hiring board with financial and economics expertise helps them ineffective investment decisions for a firm. In early 2000, after accounting scandals at Enron, Xerox and WorldCom, there is a need for an effective corporate governance structure or hiring a board with financial and economics expertise, which helps them ineffective investment decisions for a firm. The study has used a novel measure for measuring BOD's expertise and according to the researcher best, this is the first study in the emerging economy literature that investigates the impact of board expertise on firm investment decisions.

Table 5. Board of Financial Expertise and Investment Analysis (Heterogeneous Analysis)

Panel A: China

	Firm Size		Z-Score		KZ Index		HHI	
	Large	Small	SBS	WBS	Unconstrained	Constrained	Non-Comp	Comp
Var—CE								
BFE	0.6631*** (0.2522)	0.2527 (0.3043)	0.7776** (0.3401)	0.3853 (0.6088)	1.2408*** (0.2431)	0.2042 (0.3625)	1.2409*** (0.3029)	0.0201 (0.2489)
Tang	0.0021 (0.0015)	0.0026 (0.0018)	0.0042* (0.0024)	0.0044** (0.0018)	0.0036* (0.0020)	0.0007 (0.0024)	0.0028* (0.0017)	0.0030** (0.0015)
Lev	-0.1691*** (0.0425)	-0.0884** (0.0367)	-0.0985* (0.0592)	-0.1021*** (0.0391)	-0.0363 (0.0451)	-0.0641 (0.0514)	-0.1064*** (0.0373)	-0.1537*** (0.0427)
MTB	0.0196*** (0.0044)	0.0248*** (0.0050)	0.0238*** (0.0071)	0.0226 (0.0055)	0.0144*** (0.0055)	0.0226*** (0.0068)	0.0208*** (0.0050)	0.0223*** (0.0044)
AG	0.0166* (0.0101)	0.0111 (0.0103)	0.0307* (0.0169)	0.0079*** (0.0105)	0.0086 (0.0135)	0.0196 (0.0139)	0.0178 (0.0116)	0.0194** (0.0091)
Sales	0.0978*** (0.0155)	0.1102*** (0.0141)	0.1555*** (0.0177)	0.0858 (0.0213)	0.0881*** (0.0197)	0.1057*** (0.0200)	0.1356*** (0.0136)	0.0830*** (0.0144)
SR	-0.0674*** (0.0233)	-0.0458** (0.0181)	-0.0506* (0.0266)	-0.0513*** (0.0235)	-0.0162 (0.0239)	-0.0642** (0.0276)	-0.0674*** (0.0224)	-0.0492*** (0.0183)
CF	0.0149 (0.0211)	0.0619* (0.0352)	0.0868*** (0.0317)	0.0637** (0.0438)	0.0477** (0.0235)	0.0898 (0.0577)	0.0672 (0.0439)	0.0204 (0.0223)
L.CE	-0.0347 (0.0328)	0.0239 (0.0367)	0.0279 (0.0499)	0.0094 (0.0449)	-0.0333 (0.0465)	0.0050 (0.0514)	0.0242 (0.0361)	-0.0289 (0.0316)
Wald test	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N	3146	2854	1547	1646	1423	1441	2892	3107

Panel B: Pakistan

BFE	0.4014*** (0.0072)	0.1433 (0.0938)	0.4038*** (0.0061)	0.1037 (0.0755)	0.4065*** (0.0112)	0.0636 (0.0503)	0.4050*** (0.0088)	-0.0003 (0.0481)
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(Continued)

Table 5. (Continued)

Tang	-0.0480*** (0.0096)	-0.0459*** (0.0083)	-0.0563*** (0.0085)	-0.0282*** (0.0104)	-0.0438*** (0.0114)	-0.0523*** (0.0097)	-0.0267** (0.0115)	-0.0620*** (0.0105)
Lev	-0.0150*** (0.0028)	0.0069** (0.0035)	-0.0116*** (0.0024)	-0.0108* (0.0056)	-0.0080 (0.0058)	-0.0061 (0.0040)	-0.0115 (0.0076)	-0.0067* (0.0037)
MTB	0.1024*** (0.0249)	0.0993*** (0.0183)	0.1591*** (0.0338)	0.0906*** (0.0266)	0.0822*** (0.0273)	0.1108*** (0.0256)	0.2314*** (0.0436)	0.0783*** (0.0209)
AG	0.0099** (0.0046)	0.0063* (0.0038)	-0.0032 (0.0048)	-0.0094** (0.0038)	0.0046 (0.0069)	0.0017 (0.0040)	0.0057 (0.0046)	-0.0071 (0.0048)
Sales	0.0234*** (0.0064)	0.0353*** (0.0065)	0.0120*** (0.0044)	-0.0104 (0.0081)	0.0185*** (0.0066)	0.0083 (0.0091)	0.0081 (0.0060)	0.0385*** (0.0093)
SR	-0.0032 (0.0025)	-0.0007 (0.0015)	-0.0111*** (0.0025)	0.0053*** (0.0014)	-0.0094*** (0.0034)	0.0042** (0.0020)	-0.0027 (0.0022)	-0.0023 (0.0018)
CF	0.0240* (0.0145)	0.0067 (0.0087)	0.0455*** (0.0111)	0.0624*** (0.0122)	0.0445*** (0.0114)	0.0572*** (0.0122)	0.0352*** (0.0120)	0.0375*** (0.0108)
LCE	0.0147 (0.0233)	-0.0565** (0.0225)	0.0091 (0.0196)	0.0318 (0.0273)	-0.0534* (0.0323)	-0.0834* (0.0432)	-0.0440 (0.0270)	-0.0958*** (0.0169)
Wald test	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N	432	408	218	211	216	203	213	210

GMM for financial and economic constraints: Table 7 describes regression analysis results for 1082 and 140 non-financial firms of China (Panel A) and Pakistan (Panel B) respectively for firms under financial and economic constraints. Coefficients are reported above and below are the standard error of estimates in brackets. **, ***, *** shows significance at 1%, 5%, and 10% respectively with p-values.

Table 6. Instrument Variable Regression

VAR-CE	China	Pakistan
BFE	2.2290** (0.9023)	0.7936*** (0.1157)
Tang	0.0002 (0.0026)	0.0005 (0.0028)
Lev	−0.0453* (0.0268)	−0.0116** (0.0050)
MTB	−0.0100 (0.0119)	0.1945*** (0.0613)
AG	0.0345*** (0.0123)	0.0224 (0.0249)
Sales	0.0308** (0.0129)	0.0574*** (0.0129)
SR	−0.1105*** (0.0361)	−0.0194 (0.0123)
CF	−0.0156 (0.0382)	0.0423 (0.0314)
Constant	−0.6384* (0.3470)	−0.2638*** (0.0833)
Sargan Stat	0.7897	0.3544
GMM C-Statistics	0.00002	0.0000
N	8000	1120

GMM IV analysis: Coefficients are reported above and below are the standard error of estimates in brackets. ***, **, * shows significance at 1%, 5%, and 10% respectively with p-values.

Empirical results show that the presence of more financial experts on the board plays a vital role in increasing firm investment because they help the firms in grabbing more financial funds for investment. This relationship varies under financial and economic constraints, and the results demonstrate that the relationship between board characteristics and firm investment is only significant for the firms that are large, are financially unconstrained, and have a strong balance sheet position. Competitive funds have difficulty in getting financial resources and BOD helps them in accessing financial resources, results are only significant for less competitive firms because they help firms in accessing financial resources for the firms in China but are insignificant for the Pakistani economy. A study has used a static model and two dynamic models—the two-step GMM technique (Mark Arellano & Bond, 1991) and (Manuel Manuel Arellano & Bover, 1995). Moreover, the GMM instrument variable technique identifies the relationship between board characteristics and investment behavior.

Financial experts on the board are not only helpful in financial disclosure but also significantly affect firm economic policy. More financial experts on the board help the firms in accessing financial resources and enhancing their profitability of the firms. Moreover, it is necessary for policymakers and corporate governance structure formulation authorities to identify the number of financial experts on the board.

Board financial expertise is quite a new area in the field and has not received considerable attention from the previous literature, so using a different financial literacy measure this study can be extended to corporate governance literature and particularly for the crisis period. Moreover, the study can extend the literature for debt, or cash policy dynamics.

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Ethical approval

This article does not contain any studies with human participants performed by any of the authors.

Data

The data will be available on request. The data was collected China Stock market, Accounting Research (CSMAR) database, and Pakistan Stock Exchange, which is the most reliable data source for corporate governance variables.

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Appendix

Appendix—CSMAR database)

<i>Variable</i>	<i>Measurement</i>
CSR	Corporate Investment is calculated as capital expenditure divided by total assets where capital expenditure is the sum of cash paid for the acquisition of fixed assets, intangible assets and other long-term assets.
BFE	A financial expert is a person who has an educational degree in the field of accounting, economics, and finance, have work experience in the relevant field at the managerial level like Chief finance officer, finance manager, auditor, financial analyst or advisor or professor in these fields. So, the variable of financial expertise is to be calculated as a proportion of financial experts on the board
Tang	It is computed as the natural logarithm of total assets.
Lev	It is the ratio of a firm's total debt divided by total assets.
MTB	Market to book ratio (MTB) is the ratio of the market value of equity to book value of equity, where the market value of equity is computed by multiplying the number of shares outstanding with the share price.
AG	Asset Growth (AG) is computed by taking a difference between 2006 and 2005 total assets divided by 2005 total assets.
Sales	Sales revenue (sales) is measured as cash received from sales (goods+services) divided by total assets.
SR	Stock return (SR) is computed by taking a difference between 2006 and 2005 stock prices divided by 2005 stock prices.
CF	It is the sum of cash flow from financing, investing and operating activity divided by total assets.



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