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Article

Managerial ability and firm performance: Evidence from an emerging market

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ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

Managerial ability and firm performance: Evidence from an emerging market

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Abstract: This study empirically examines the impact of managerial ability on firm performance. Using the sample of 246 firms listed at Pakistan Stock Exchange during 2009 to 2017, this study finds that more able managers significantly increase the firm performance while less able managers significantly reduce the firm performance. These findings hold for both accounting and market measures of firm performance as well as alternative measures of managerial ability. Further, we control for endogeneity and cross-sectional variation issues using 2SLS and Fama-MacBeth methods, respectively. Overall, we conclude that able managers enhance the firm value, and the effects are stronger in financially constrained firms. This study provides fresh evidence that able managers bring intangible resources in the firms, which positively contribute to the firm performance even in the challenging environment and the weak legal systems.

Subjects: Finance; Corporate Finance; Business, Management and Accounting; Corporate Governance

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Dr. Aamir Inam Bhutta is an assistant professor at Lyallpur Business School, Government College University, Faisalabad Pakistan. His research interest includes the real estate finance, corporate financial decision making, cost and benefits of business groups and political connections, CEO compensation and Corporate Social Responsibility.

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PUBLIC INTEREST STATEMENT

Managerial ability is an important dimension of human capital in the firms that ensures the best utilization of firms' scarce resources in challenging environment to attain the sustainable growth. The knowledge-based economy is an integral part of long-term competitiveness. However, slow progress in the promotion of access to the quality education and relevant training and development is the major hurdle in human resource development in Pakistan. The lack of skilled labour may affect the quality of production and innovation in Pakistani firms. The robust findings demonstrate that the firms with higher managerial ability outperform their counterparts. The findings of this paper recommend the owners and managers to devise and implement effective policies to enhance the managerial skills. These findings also suggest the investors to consider the level of managerial ability as a valuable resource at the time of investment. Furthermore, this article is purely for academic purposes, and authors have no financial interests against this research.

Keywords: Firm performance; managerial ability; fixed effects; 2SLS Pakistan
GEL codes: G30; L25; M0

1. Introduction

Managers with better ability not only take initiative to make adjustments within firms relative to the changing environments but also take the innovative steps to enhance their resources to survive in the long run (Cyert & March, 1963; Thompson, 2003). Theoretically and practically, the abilities of the management are arguably among the prime human resources that affect the firm value. The scarce resources, such as financial, technical, infrastructure and educated labour force, in the emerging-market settings increase the importance of skilled human resources. The firms may enhance their productivity through careful utilization of skilled human resources to achieve competitive advantages and sustainable success in the market. Tran and Vo (2020) confirm that human capital plays an important role in achieving the sustainable performance, particularly in emerging markets.

The good managers ensure the best utilization of firm's scarce resources in challenging environment with the help of their professional and academic knowledge. Further, they use their skills and experience to attain the sustainable growth. The manager's personality traits and competencies are the main drivers of optimal utilization of resources. The personality traits such as emotional intelligence help an individual to understand and handle the own emotions and others' feelings, and effectively utilize this information in problem solving. Recently, Kim (2020) show that firms with higher emotional intelligence and cognitive ability managers outperform their counterparts.

The extant literature has established that the managerial ability in the firms is an important dimension of human capital in the category of intangible resources. However, to quantify managerial efficiency was a challenging task before the seminal work of P. Demerjian et al. (2012) because of managerial observable (education and experience, etc.) and unobservable (emotional intelligence and cognitive) abilities. P. Demerjian et al. (2012) model has emerged as the most reliable tool to measure the firm's managerial ability. This is a more comprehensive and a simple model that uses financial statements' information of the firm. In addition, this model makes it possible to compare the managerial ability across the competitors. Therefore, this model has become a more popular and frequently used technique to quantify managerial ability as evident from the current decade empirical literature (Andreou et al., 2013; De Franco et al., 2017; Habib & Hasan, 2017; Lee, 2015; Oghani et al., 2020; P.R. Demerjian et al., 2013).

The insightful role of the managers is essential in the achievement of various milestones of the firms. Timely and effective decision making is extremely vital to deploy the firm resources and to reap fruitful results from arising opportunities (Bertrand & Schoar, 2003). De Franco et al. (2017) find that the managers with higher ability improve the basic performance of the firms through optimal utilization of the available resources. The effective internal control system of the able managers prevents the wastage of the cash reserves (Lee, 2015; Siao & Chou, 2013). Further, better risk management by able managers allows the firms to grasp the new profitable investment opportunities through lower cost debt and equity financing, particularly during growth phase (Agarwal et al., 2011; Bui et al., 2018; De Franco et al., 2017; Gan, 2019; Lee et al., 2018; Yung & Chen, 2018). These findings suggest that managers' knowledge related to industry and technology helps them make an accurate forecast of the product demand, select value-enhancing projects and manage firm's resources efficiently. Therefore, relationship between managerial ability and economic outcomes is an important topic for researchers and practitioners in the field of economics and management sciences.

A rich literature is available on the firm operating and market performance both on developed and developing countries' context. However, a few studies have been conducted in the emerging-market context analyzing cost and benefits of the managerial ability. Recently, Chuah and Foong

(2019) conclude that overall managerial ability plays a significant role in firm performance. They further point out that managerial local experience and the environment in which the decision are taken independently significantly improve this relationship. However, the analysis of the literature indicates that the relationship between managerial ability and firm performance is relatively under researched in South Asian region, particularly in Pakistan. Therefore, we aim to empirically investigate the effects of managerial ability on firm performance in Pakistani context.

Pakistan presents unique settings to examine the role of managerial ability. First, being the 5th most populated country in the world with more than 50% young population, Pakistan is facing the crisis of availability of qualified professionals. An executive member of corporate board of a public company label the human resource development as the biggest crisis in Pakistan (see, Masud, 2019). Second, according to the recent survey of organization for economic cooperation and development (OECD), Pakistan stands at the lowest ebb among the nations with respect to quality educated and trained adult individuals. This grim situation does not seem to improve in near future for competitive industries due to poor quality educational supplements and lack of the attractive opportunities for local professionals and substantial brain-drain. Third, although governance structure of Pakistan resembles to the Anglo-American's however governance practices are far away from developed countries due to weak legal system (La Porta et al., 2000), and lack of financial transparency (Fan et al., 2011).

Fourth, Pakistan has been passing through financial and educational reforms since last three decades to improve the financial liberalization and quality of the labour. The country experienced a fast industrial growth until 2008 crisis (Zeeshan, Naeem, & Malik, 2019). However, Pakistani firms could not regain the momentum and lost competitive edge in foreign market (Afzal, 2012) because of significant increase in production cost (Hussain & Javed, 2012). Energy shortage and continuous growth in energy cost are the significant barriers (Amjad et al., 2012; Komal & Abbas, 2015) to the industrial sector growth, particularly for export-oriented firms. Further, Pakistani firms face relatively higher financial constraints as compared to firms operating in higher-income emerging markets (such as Malaysia) and developed markets (Azam & Shah, 2011). Fifth, almost 67% businesses in Pakistan are family-rooted (Javid, 2012) and average 60% shares are in the hand five top shareholders (Ullah et al., 2017). Therefore, the existence of severe agency conflicts between minority and controlling owners may adversely impact the firm performance.

This study uses the robust methodology to test the impact of managerial ability on firm performance on unbalanced panel data from 246 firms listed at Pakistan Stock Exchange during 2009 to 2017. We find that higher managerial ability significantly enhances the firm value. On the other side, firms with lower managerial ability suffer from value loss during the sample period. These findings are valid for both accounting and market measures of performance as well as different measures of managerial ability. Further, the able managers are a more valuable human resource for financially constraints firms. This is confirmed using different proxies of financial constraints. Our results are robust to 2SLS and cross sectional Fama-MacBeth methods that address the endogeneity, heteroscedasticity and serial correlation in the error terms.

The current study makes important contributions to the limited literature on managerial ability and firm value. To the best of our knowledge, this study is the first to examine how managerial ability affect firm performance in Pakistani context where firms face unique constraints. In a constrained environment, this study documents the managerial ability as an important determinant of firm performance and identifies the able managers as valuable intangible assets, which are more effective for financially constrained firms and in challenging environments.

Rest of the article is organized as follows: Section 2 presents the background of the study. Section 3 discusses theoretical literature review. Section 4 reports the empirical literature review and hypothesis development. Section 5 provides research design. Section 6 discusses the empirical results and finally, section 7 concludes the study.

2. Background of the study

World competitiveness report of the International Institute of Management Development (1995) indicates the managerial ability as one of the major influential factors of the companies' competitiveness along with competitive domestic economy, out-ward looking economic policies, less government intervention, global integration of financial sector, well-developed infrastructure, knowledge-based society, and efficient utilization of existing technologies. The management skills such as entrepreneurship and integration of business activities help firm respond to the changing environment effectively. To this end, in a developing market, Mertzanis and Said (2019) find a positive relationship between the firms' access to skilled labour and performance. However, the variations in performance has been noted in the countries with different levels of economic development, income, education and technology.

Despite highly populated country with significant young human capital, Pakistan is ranked as poor in the 2019 Global Competitiveness Index with disparities among different pillars of competitiveness. The most improved pillars of competitive index are market size (29), business dynamics (52) and innovation capacity (79). However, Pakistan is far behind from other South Asian countries standing at overall 110 as compared to India (68), Sri Lanka (84), Bangladesh (105) and Nepal (108). Interestingly, the condition of Pakistan is even worse with respect to industry-relevant skills and product market where it is standing at 125 and 126, respectively, out of 141. It means value addition in Pakistan's economy by per employee is significantly poor compared to the other economies around the world. The knowledge-based economy is essential to gain a long-term competitiveness, however, slow progress in promotion of access to the quality education and relevant training and development is the major hurdle in human resource development in Pakistan (Asrar-ul-Haq, 2015). The lack of skilled labour may affect the quality of production and innovation among the Pakistani firms. According to labour force survey, there are only 8% workers with formal training in Pakistan as compared to 23% in Bangladesh and 90% in China (see, Hisam, 2016).

Aware of the facts, a series of guidelines and policies have been introduced from Pakistani regulatory bodies to improve the availability of skilled managers and workers to Pakistani firms. Higher and vocational training educational monitoring and regulatory bodies (such as Higher Education Commission and Technical Education and Vocational Training Authority) were established under the educational reforms to improve the supply of skilled human resource. Further, National Productivity Organization (NPO) is established to satisfy the needs of corporate sector to improve the productivity of manufacturing and service sector. So that, corporate sector could effectively compete globally. In addition, national training programs were designed to train fresh graduates for the competitive jobs. Recently, to improve the top-level workers' governance skills, the directors' training program has been designed and mandated to the companies in 2017.

Apart from the problem of skilled human resources, the production cost has been continuously increasing due to reversing the rebates on energy pricing and lack of financing from financial sector. Most firms are governed by the controlling owners having ultimate power in the decisions related to operations and distribution of profit. Thus, current challenging environment along with risk of expropriation of wealth from ultimate owners alter the external stakeholders to increase the pressure on the management to revise the firms' policies. Andreou et al. (2013) argue that able managers help firms improve the firm performance through better access to financing and reduction of information asymmetry, particularly, when firms are operating in a challenging environment. Therefore, given the above discussion, it would be interesting to investigate the role of managerial ability in challenging environment where the poor governance has already affected the factors of productions.

3. Theoretical literature review

The firms' accounting and market returns are indispensable for the stakeholders to judge the overall performance of the management. Agency theory suggests that firms that experience lower

firm value have higher agency costs (Jensen & Meckling, 1979). Therefore, management remains under pressure to not only utilize the tangible resources efficiently but to also develop and utilize the intangible resources. In the agency model, management has the sole authority to make policies regarding firm operations and utilize the internal and external resources optimally. The policy making and implementation, and the efficient utilization of the resources requires high-quality management skills. The heterogeneity among the corporate decisions making could be explained through differences in management styles and managers with higher firm performance enjoy relatively higher compensation (Bertrand & Schoar, 2003; Chang et al., 2010).

The literature of managerial ability sheds light on the different aspects of corporate decision making that contribute to the enhancement of firm value. Chemmanur and Paeglis (2005) report that management quality not only facilitates the firms to get a higher premium during IPOs but also, helps the firms enhance operating and market performance. In another study, Chemmanur et al. (2009) document the channels through reputed and quality managers add value to the firms. They show that firms with quality management use low leverage, pay lower dividends, and have lower information asymmetry. The quality managers can make heavy investments in higher positive NPV projects through their ability to generate funds internally and externally by attracting the underwriters and institutional investors (Chemmanur & Paeglis, 2005).

P. Demerjian et al. (2012) point out that the able managers have more knowledge regarding business operations and product demand. In addition, they have a better judgment of industry trends and technological advancement. Further, the able managers improve earning's quality through developing effective internal controls to monitor the financial reporting (Huang & Sun, 2017; Lee, 2015; P.R. Demerjian et al., 2013). They release quality information and give the gesture of superior ability through the accurate forecast (Baik et al., 2012) and are less likely to involve in financial reporting fraud (Wang et al., 2017). The literature (Gan, 2019; Mishra, 2019; Yung & Chen, 2018) also suggests that the capable managers do more efficient investments because they are more innovative and take risks to invest in research and development intensive projects.

The able managers support their investments through access to low-cost bank loans by improving disclosure quality to mitigate the information asymmetries (De Franco et al., 2017). Therefore, firms with higher managerial ability are expected to align resources well with the environment in which they operate, resulting in greater internal profitability. This is particularly important in the presence of growth opportunities, since it can facilitate a continuum of investments, especially if these firms face difficulties in raising external finance. These arguments are consistent with a resource-based view that key resources play a vital role in achieving sustainable operating profitability. The able managers, as intangible assets, are well equipped with resources such as macro-economic, industry, and client-based knowledge. Their better communication skills help build the trust of market participants through effectively portraying the positive aspects of firm future stable earnings at a minimum level of manageable risk. Consequently, market participants charge the lower cost of capital to the firm with quality management team leading to improved firm market performance.

4. Empirical literature review and hypothesis development

The costs and benefits of managerial ability are emerging as part of research questions in the field of finance and accounting. These research questions are generally being answered using a measure of managerial ability developed by P. Demerjian et al. (2012). The empirical findings suggest that able managers have capabilities and are motivated to allocate the firm resources efficiently due to the potential opportunity cost in terms of future compensation and personal reputation. The prior literature investigates whether managerial characteristics and competencies such as ability, talent, quality, or reputation influence corporate decision-making. The heterogeneity in firms' operational and investment practices could be explained through managers' fixed effects (Bertrand & Schoar, 2003). Chang et al. (2010) established a link between managerial style and firm performance. The difference in managerial experience and traits leads to variation in

performance. The strong analytical skills of managers towards industry trends and forecasting of product demand lead them to achieve sustainable earnings, particularly during the economic crisis.

P.R. Demerjian et al. (2013) examine the relationship between managerial ability and earnings quality. They find a higher earnings quality in the firms governed by the more able managers. Further, capable managers involve in fewer subsequent financial restatements and produce error-less provisions for bad debts. Lee (2015) find that more able managers improve the financial reporting quality through effective internal control while Huang and Sun (2017) show that higher managerial ability helps the firms reduce the negative impact of earnings management on the future performance. Another channel by which the able managers improve firms' operating performance is holding and utilizing the cash reserves wisely, particularly when firms have more growth opportunities and multi-segment investments (Siao & Chou, 2013). Park et al. (2016) find that able managers enhance the company value by lessening the negative effects of tax avoidance through efficient utilization of the firm resources in various activities such as sales, investing and financing.

A few studies empirically sum up that managerial ability helps the firms achieve their goals through improving their credit rating and access to cheap financing, particular during the period of financial constraints. For example, Bonsall Iv et al. (2017) show that the credit-rating agencies take the managerial ability as a signal of lower default risk, therefore, assign a more favourable rating. De Franco et al. (2017) show that managerial ability is pertinent to bank loan pricing decisions because it reduces information risk, default risk and operational risk through adequate disclosure, strong financial footings and best selection of the project, respectively. Managers with higher managerial ability develop better understanding with the banking set up based on evaluation of the risks and the project features. They efficiently structure the project and launch it timely to capture the market share.

Park and Jung (2017) study the relationship between managerial ability and stock price crash risk and find that they are negatively associated. Habib and Hasan (2017) find that CEOs personal traits such as overconfidence lead them to investment in inefficient projects. Consequently, future stock price crash risk increases.

While, several studies examine the indirect role of managerial ability on firm value through improvements in financial reporting quality, information disclosure, effective internal control, efficient utilization of cash resources and cheap financing arrangements. However, few studies examine the director impact of managerial ability on firm performance. For example, Andreou et al. (2013) examine the role of managerial ability in the US context, particular during the global financial crisis. They report that more able managers outperform during the crisis period because of utilization of firm resources effectively and efficiently. Keeping the information asymmetry at the minimum level helps the able managers grasp and support the more profitable investment opportunities through preferential access to debt financing during the crisis period. The superior firm performance from able managers is also confirmed in Indonesian market by Anom (2018). Recently, Chuah and Foong (2019) revisit the impact of managerial ability on firm performance in Malaysian Context. They confirm the arguments that overall higher managerial ability enhances the firm value. However, the able managers with local experience outperform the able managers with foreign experience. The findings of Malaysian context suggest that knowledge and experience of the local markets and liberty to implement managers' policies are the key factors of value addition.

According to agency theory prospects, reactions of the individuals are generally rational in response to the regulations and surrounding financial incentives. Therefore, managers should perform homogenously and rationally according to their abilities. However, empirical findings point out several factors that constraint the able managers to perform. These factors include

firm's culture and ownership structure (Park & Jung, 2017), and political connectivity (Wang et al., 2017). The research suggests that more able managers receive more compensation. However, this relationship is ambiguous in Pakistan. For example, Sheikh et al. (2018) show that managerial compensation is determined by the higher ownership concentration and managers do not have incentives to enhance the firm market value. Therefore, able managers may not be effective and take aggressive strategic decisions in Pakistani environment because of family ownership structure and firms' ties through business groups. On the other hand, Pakistani economy is passing through crunch time during our study period. Pakistani firms have been facing the problem of access to financial resources and higher production costs. Consistent with the stewardship theory, managers can take optimal decisions related to operations, financing, and investment apart from controlling shareholders. Andreou et al. (2013) report that able and reputed managers would best utilize their available resources in the challenging environment and attain sustainable growth.

Given the above discussion, the following relationship is expected:

H1: *Managerial ability has a positive impact on firm performance in Pakistan.*

5. Research design

The population of this study is overall non-financial firms (366) of Pakistan listed at Pakistan Stock Exchange (PSX) during 2009 to 2017. Data is retrieved from S&P Capital IQ database that has coverage of financial data of 360 non-financial firms. We omit 114 firms with missing financial observations or have no operations (zero sales). After cleaning the data, we have a final sample of 2046 firm-year observations representing 246 firms containing all variables except Tobin Q. The missing values of market share price and number of shares outstanding drop our sample to 1875 firm-year observations representing 229 firms for Tobin Q as dependent variable.

6. Model

The following model is designed to test the impact of managerial ability on firm performance:

$$\begin{aligned} Performance_{it} = & \alpha_0 + \beta_1 MA_DEC_{it} + \beta_2 Size_{it} + \beta_3 Cash_{it} + \beta_4 Lev_{it} + \beta_5 Growth_{it} \\ & + \beta_6 Investment_{it} + \beta_7 Age_{it} + \beta_8 CFOTA_{it} + \sum Year_dummies + \varepsilon_{it} \end{aligned} \quad (1)$$

6.1. Dependent variable

$Performance_{it}$ is our dependent variable and measured by three different proxies. Following Andreou et al. (2013), we select two accounting-based performance measures, Return on Assets (ROA) and Return on Equity (ROE). ROA defined as earnings after tax to total assets while ROE is measured as earnings after tax to book value of shareholders' equity. In addition, one market-based performance measure, Tobin Q (TQ), is calculated as the share price multiple by the total number of shares outstanding plus total debt divided by total assets following Chuah and Foong (2019).

6.2. Variable of interest

The variable of interest, managerial ability (MA_DEC_{it}), is an industry-year wise decile of managerial ability score calculated following the procedure of P. Demerjian et al. (2012). The researchers (e.g., Baik et al., 2020; Habib & Hasan, 2017) consider Demerjian proxy of managerial ability better as compared to indirect proxies used in the literature such as CEO media citation score, industry-adjusted performance, and CEO pay, etc. We also used industry-adjusted performance and CEO pay as alternative measures of managerial ability in the robust tests. These proxies are also defined in Table 1 and Table 2.

Table 1. Sample selection process	
Selection Process	Observations
Total number of firms listed in PSX	540
Less: financial firms listed in PSX	(174)
Total Number of non-financial firms listed in PSX	366
Coverage of non-financial firms in Capital IQ	360
Less: firms with zero sales and missing observations of related variables	(114)
Total number of non-financial firms for accounting based performance measures	246
Less: firms with missing stock prices and share outstanding data	(17)
Total number of non-financial firms for market based performance measures	229

Demerjian proxy of managerial ability is calculated using two-step process. In the first step, we run an optimization function shown in equation 2 to measure the firm efficiency.

$$\max \theta_t = (\text{Sales}_t) \cdot (\delta_1 \text{COGS}_t + \delta_2 \text{SGA}_t + \delta_3 \text{PPE}_t + \delta_4 \text{Intang}_t)^{-1} \quad (2)$$

where, θ_t is the efficiency score for which the values range from 0 to 1. As an output, we consider non-zero sales of the firms. We make little adjustment in original model due to zero values in some accounting heads and use only 4 inputs. We combine the goodwill and other intangibles into one variable, i.e. intangibles (Intang_t), while operating lease and research and development are already part of the total cost of goods sold and the selling and administrative expenses, respectively.

In the second step, we run the following industry-wise regression consistent with P. Demerjian et al. (2012):

$$\theta_{it} = \beta_0 + \beta_1 \text{Ln}(TA)_{it} + \beta_2 \text{MKTSH}_{it} + \beta_3 \text{FCF}_{it} + \beta_4 \text{Ln}(\text{Age})_{it} + \beta_5 \text{BusSeg}_{it} + \beta_6 \text{Fcurr}_{it} + \text{YearEffects} + \varepsilon_{it} \quad (3)$$

Where, θ_{it} is the firm efficiency. Other variables are defined in Table 2. The unexplained part (ε_{it}) of the firm efficiency is considered as a contribution of management and labelled as managerial ability. In the next step, a variable $\text{MA_DEC}_{i,t}$ is constructed from industry-wise deciles (0 to 9) of managerial ability. This variable is used in equation 1. We expect that firms with higher $\text{MA_DEC}_{i,t}$ enjoy better performance.

The equation 1 also includes set of standard controls of the firm performance. These control variables are firm size ($\text{Ln}(TA)_{it}$), Cash holding (Cash_{it}), level of debt (Lev_{it}), investment in tangible assets (Investment_{it}), firm growth rate (Growth_{it}), firm age, and ability to generate cash from operations (CFOTA_{it}). The definitions of control variables are discussed in Table 2. With respect to relationship between control variables and firm performance, the literature suggests that large firms outperform because of economies of scale and lower production cost. The firms hold more cash have sufficient funds to grasp opportunities in financial constraint environment, therefore, have better firm value. The chances of default and more fixed financial charges lead highly leveraged firms to low performance. The firms having more investments in fixed assets generally have lower resources for operations therefore experience lower performance. Good reputation in the market and better access to resources lead older firm to perform better. The firms with better growth opportunities and positive cash flows from operations outperform their peers.

Table 2. Definitions of dependent and independent

Variables	Definitions
Dependent Variables ROA	Return on Asset is defined as earnings after tax to total assets
ROE	Return on Equity is defined as earnings after tax to book value of shareholders' equity
TQ	Tobin Q (TQ) is defined as share price multiple by total number of shares outstanding plus total debt divided by total assets
Variable of Interest MA_DEC	<p>Decile of continuous variable of managerial ability calculated using two step procedure of P. Demerjian et al. (2012). In step one, we run industry wise optimization function to calculate firm efficiency. $\max \theta_t = (\delta_1 COGS_t + \delta_2 SGA_t + \delta_3 PPE_t + \delta_4 Intang_t)^{-1}$. In second step, we run following industry-wise regression and predict error term as measure of managerial ability (MA).</p> $\theta_{it} = \beta_0 + \beta_1 Size_{it} + \beta_2 MKTSH_{it} + \beta_3 FCF_{it} + \beta_4 Age_{it} \theta_{it}$ $= \beta_0 + \beta_1 Size_{it} + \beta_2 MKTSH_{it} + \beta_3 FCF_{it} + \beta_4 Age_{it} + \beta_5 BusSeg_{it} + \beta_6 Fcurr_{it} + YearEffects + \epsilon_{it} + \beta_5 BusSeg_{it} + YearEffects + \epsilon_{it}$
Sale COGS SGA	Sales of the firm Cost of Goods sold of the firm Selling, general and administration expenses of the firm
PPE Intang	Property Plant and equipment of the firm Is intangible assets of the firm
MKTSH FCF BusSeg Fcurr MA_Up MA_Down Ind_ROA_DEC CEO_DEC	<p>MKTSH is market share of firm sales in industry (a ratio of sale over total industry sale) A dummy value 1 if firm has positive free cash flow during the year Natural log of firm age since date of incorporation Sum of square of ratio of each business segment sale to total sales for year t A dummy equal to 1 if firm-year value of MA_DEC is greater than 7, otherwise 0. A dummy equal to 1 if firm-year value of MA_DEC is lower than 4, otherwise 0 The industry adjusted ROA is defined as ROA minus mean of industry ROA scaled by the standard deviation of ROA across the industry. We rank both proxies from 1 to 10 where firms with score 10 have the highest industry adjusted ROA. CEO_Dec is Industry-year wise rank (1 to 10) of natural log of total CEO Pay. 1 represent the lowest paid CEO while 10 represent the highest paid CEO.</p>
Control Variables Age Size	<p>A dummy value 1 if firm made an adjustment of foreign currency exposure in year t, otherwise 0. Natural Log of total Asset of the firm</p>

(Continued)

Table 2. (Continued)	
Variables	Definitions
Lev	Total liabilities to total asset
Growth	Growth is defined as change in total assets to lag total assets
Investment	Ratio of capital expenditures to total assets
CFOTA	Cash flow from operation to total assets
Financial Constraints Proxies	
KZ Index	$KZ = -1.001909 * [eat + dep]/ppent + 0.2826389 * TQ + 3.139193 * [(dltt + dlc)/(dltt + dlc + seq)] - 39.3678 * [(dividend)/ppent] - 1.314759 * [che/ppent]$, where ppent is the beginning of year t
WW Index	WW equals 1 if the dividend paid is greater than zero, and 0 otherwise
HP Index	HP = $-0.737 * SIZE + 0.043 * SIZE2 - 0.04 * age$, where age is measures as the number of years since the firm's incorporated

7. Empirical results and discussion

7.1. Descriptive analysis

Panel A of [Table 3](#) summarizes the descriptive statistics. All the continuous variables are winsorized at 1% to minimize the effects of outliers. The mean values of ROA and ROE are 0.0287 and -0.0531, respectively, with negative skewness coefficients while TQ is averaged at 5.0527. The average managerial ability score (MA_DEC) is 5.4936 with a standard deviation of 2.857. Average firm size is 15.1145 with minimum and maximum value of 11.3721 and 18.7323, respectively. Cash is averaged at 5.31% while mean debt stands at 69.15% scaled by total assets. On average 75% of assets are invested in capital intensive projects and average firm is generating 5.78% cash flows from operation scaled by total assets.

Panel B of [Table 3](#) reports the mean differences in performance of high and low managerial ability firms. We identify high (low) managerial ability firms in a given year if their managerial ability score falls into a top three (bottom three) decile ranks. Last column of panel B shows the statistical significant higher performance of high managerial ability firms as compared to their counterparts. The difference in the means are 0.0287, 0.3318, and 1.2366 for ROA, ROE, and TQ, respectively, and are significant at 1% level. Overall, initial comparative analysis supports our hypothesis.

[Table 4](#) presents pairwise correlation matrix. The MA_DEC is significantly positively correlated with all the proxies of firm performance. All other variables except the investment and leverage are also positively correlated with firm performance indicators. Further, the correlation matrix suggests that the multicollinearity will not be an issue in the regression analysis as all the correlations are below 0.60. No multicollinearity issue is also confirmed through the variance inflation factor (unreported).

7.2. Regression analysis

This study uses panel data that have time-invariant characteristics. Therefore, firms are more likely to experience the unobserved heterogeneity. It is confirmed through Hausman test. The results of Hausman test (unreported) favour the application of the fixed effect (FE) method. In addition, presences of firm fixed effects in data are also supported by brush-pagan test. Therefore, FE is a more suitable technique to test the hypothesis.

[Table 5](#) presents the findings of FE regressions for alternative measures of firm performance. All the regressions are also controlled by year fixed effects. The variable of interest, MA_DEC, positively and significantly impacts ROA, TQ, and ROE in model 1, 4, and 7, respectively. The coefficients of MA_DEC in column 1, 4 and 7 are significant at 10, 5, and 1% level of significance with values of 0.00462, 0.0467, and 0.0368, respectively.

To test the effect of higher and lower values of managerial ability, we re-estimate the baseline regressions after replacing the MA_DEC with dummies of high managerial ability and low managerial ability. Columns 2, 5, and 8 report the positive impact of high able managers on firm performance. The coefficients (standard errors) of MA_UP are 0.0246 (0.00809), 0.16 (0.174), and 0.0653 (0.0351), and are significant at most 5% level of significance. Columns 3, 6, and 9 reports under performance of low managerial ability firms. The coefficients of MA_Down are statistically significant at 5 and 1% level in columns 6 and 9 with values (standard errors) of -0.141 (0.0672) and -0.14 (0.0315), respectively. Overall, these findings support our hypothesis that higher managerial ability enhances the firm performance, both accounting and market performance. The findings also suggest that firms with higher managerial ability outperform the firms with lower managerial ability. These findings are in the line with previous studies (Andreou et al., 2013; Chuah & Foong, 2019; Lee et al., 2018; Yung & Chen, 2018) and consistent with the argument that high managerial ability improves the basic performance through their influential access to available resources. Further, able managers efficiently utilize the firms' resources in the least risk positive net

Table 3. Descriptive statistics

Panel A. Descriptive analysis

Variables	Obs	Mean	Std.Dev.	Min	Max	p1	p99	Skew.	Kurt.
ROA	2046	.0287	.1097	-.5295	.3254	-.374	.2906	-1.0281	7.657
ROE	2046	-.0531	.5039	-3.5659	.7494	-3.5659	.5665	-5.4969	36.298
TQ	1875	5.0527	1.9383	-1.6872	9.0786	-9.534	9.0211	-.981	4.3555
MA_Dec	2046	5.4936	2.8571	0	9	0	9	.001	1.7853
Size	2046	15.1145	1.5119	11.3721	18.7323	11.4452	18.7111	.128	2.8598
Cash	2046	.0531	.0909	.0003	.5047	.0003	.4502	2.7153	10.6688
Lev	2046	.6915	.3619	.0703	2.3973	.1031	2.2679	1.6748	8.094
Growth	2046	1.1171	.4328	.0083	3.7091	.1027	3.29	2.3271	15.0112
Investment	2046	.7539	.3723	.009	2.0698	.0136	1.9577	.517	3.9752
Age	2046	3.4901	.469	.6931	5.0562	2.0794	4.3944	-.5855	5.0221
CFOTA	2046	.0578	.1206	-.2803	.4864	-.2683	.4553	.5926	4.6481

Panel B. The mean differences in performance of high and low managerial ability firms

Variables	Obs	Mean	Std.Dev.	Obs	Mean	Std.Dev.	Difference in mean
ROA	623	.07495	.09849	631	-0.0169	0.126	0.0287***
ROE	623	.06202	.25319	631	-0.2698	0.8547	0.3318***
TQ	583	5.6578	1.8269	554	4.4212	2.0423	1.2366***

Table 4. Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) ROA	1.000										
(2) ROE	0.549*	1.000									
(3) TQ	0.293*	0.160*	1.000								
(4) MA_Dec	0.343*	0.279*	0.255*	1.000							
(5) Size	0.260*	0.213*	0.173*	0.128*	1.000						
(6) Cash	0.343*	0.128*	0.253*	0.306*	0.215*	1.000					
(7) Lev	-0.555*	-0.456*	-0.224*	-0.264*	-0.264*	-0.296*	1.000				
(8) Growth	0.210*	0.231*	-0.011	0.134*	0.057*	0.001	-0.070*	1.000			
(9) Investment	-0.336*	-0.221*	-0.104*	-0.225*	-0.298*	-0.281*	0.392*	-0.035	1.000		
(10) Age	0.077*	0.027	0.038	0.032	0.065*	0.135*	-0.044*	-0.048*	-0.128*	1.000	
(11) CFOTA	0.452*	0.187*	0.225*	0.188*	0.129*	0.290*	-0.284*	0.039	-0.023	-0.010	1.000

*shows significance at the .05 level

Table 5. Impact of managerial ability on firm performance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	ROA	ROA	ROA	TQ	TQ	TQ	ROE	ROE	ROE
MA_DEC	0.00462* (0.00247)			0.0467** (0.0202)			0.0368*** (0.00862)		
MA_UP		0.0246*** (0.00809)			0.160** (0.0714)			0.0653** (0.0315)	
MA_Down			-0.00685 (0.00994)			-0.141** (0.0672)			-0.14*** (0.0351)
Size	-0.00352 (0.0152)	-0.00436 (0.0156)	-0.00602 (0.0154)	-0.73*** (0.162)	-0.74*** (0.0812)	-0.74*** (0.0812)	0.135* (0.0705)	0.115 (0.0725)	0.124* (0.0703)
Cash	0.0151 (0.0623)	0.0114 (0.0622)	0.0250 (0.0626)	1.075* (0.588)	1.093*** (0.397)	1.165*** (0.395)	-0.481* (0.277)	-0.434 (0.287)	-0.411 (0.279)
Lev	-0.088*** (0.0183)	-0.091*** (0.0183)	-0.090*** (0.0188)	-0.156 (0.178)	-0.189 (0.119)	-0.167 (0.120)	-0.261*** (0.0919)	-0.29*** (0.0951)	-0.26*** (0.0923)
Growth	0.0311*** (0.00535)	0.0326*** (0.00548)	0.0337*** (0.00550)	0.0158 (0.0708)	0.0381 (0.0476)	0.0366 (0.0477)	0.184*** (0.0431)	0.206*** (0.0462)	0.197*** (0.0441)
Investment	-0.0347* (0.0185)	-0.0359* (0.0188)	-0.0376** (0.0185)	-0.0579 (0.158)	-0.0738 (0.119)	-0.0732 (0.119)	-0.0902 (0.110)	-0.113 (0.112)	-0.104 (0.110)
Age	0.00663 (0.0300)	0.0122 (0.0294)	0.0182 (0.0304)	-1.641* (0.939)	-1.56*** (0.428)	-1.54*** (0.427)	0.0983 (0.137)	0.192 (0.141)	0.150 (0.143)
CFOTA	0.163*** (0.0304)	0.166*** (0.0304)	0.166*** (0.0305)	0.605*** (0.223)	0.635*** (0.201)	0.635*** (0.201)	0.218* (0.124)	0.239* (0.125)	0.236* (0.124)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.0471 (0.250)	0.0605 (0.252)	0.0729 (0.255)	20.59*** (4.420)	20.71*** (1.948)	20.75*** (1.949)	-2.513** (1.188)	-2.351* (1.206)	-2.283* (1.183)
Observations	2,046	2,046	2,046	1,875	1,875	1,875	2,046	2,046	2,046
R-squared	0.198	0.198	0.191	0.294	0.291	0.291	0.152	0.132	0.143

present value projects and build effective internal control mechanism to improve firm transparency leading to lower information asymmetry.

In terms of control variables, high growth and ability of the firms to generate more cash flows from operations significantly enhances the firm value. The firms with high leverage and capital intensive investment appear to face losses in Pakistan.

7.2.1. Endogeneity test

Our findings support the strong association between managerial ability and firm performance. However, one may raise the concern on these findings that managers are not randomly distributed across firms. For example, firms may hire able managers from industry and involve them in the operations considered important for the profitability. Therefore, we cannot eliminate the issue of endogeneity in our findings.

To address the potential endogeneity concerns, we select year-wise industry average of managerial ability (AV_MA) as an instrumental variable for managerial ability. Our endogenous variable, MA_DEC, may affect AV_MA however, we do not have evidence that AV_MA affects the individual firm performance. The literature (see, Lee et al., 2018) suggests that 2SLS is a more suitable instrumental variable technique when the endogenous variable is continuous. Therefore, we employ 2SLS technique. Table 6 shows the second-stage regression results from 2SLS regression. In the first stage (un-tabulated), we find a positive significant effect of AV_MA on MA_DEC,

Table 6. Impact on managerial ability on firm performance using 2SLS method

	(1)	(2)	(3)
VARIABLES	ROA	TQ	ROE
MA_DEC	0.00648*** (0.000925)	0.0525** (0.0207)	0.0487*** (0.00596)
Size	0.00522*** (0.00181)	0.0256 (0.0340)	0.0317*** (0.0107)
Cash	0.0914*** (0.0314)	2.059*** (0.534)	-0.168 (0.149)
Lev	-0.105*** (0.00931)	-0.699*** (0.138)	-0.521*** (0.0635)
Growth	0.0359*** (0.00590)	-0.0470 (0.0957)	0.213*** (0.0382)
Invest	-0.0350*** (0.00765)	0.230* (0.126)	-0.0503 (0.0469)
Age	0.00698* (0.00411)	-0.137 (0.0890)	-0.0114 (0.0246)
CFOTA	0.270*** (0.0237)	1.927*** (0.373)	0.200** (0.0920)
Industry & year	YES	YES	YES
Constant	-0.0915** (0.0378)	3.704*** (0.678)	-0.494** (0.211)
Observations	2,046	1,875	2,046
R-squared	0.499	0.264	0.339
Hansen J statistics	1.377	1.569	0.262
Prob > J	0.241	0.210	0.609

consistent with the expectations. The insignificant Hansen J statistics across in all models confirms the validity of our instrumental variable. The findings in Table 6 confirm that our baseline results hold after addressing the endogenous issues. This makes our initial findings robust.

7.3. Robustness tests

We run several robust tests to establish the validity of our baseline findings. Table 7 reports first robustness test using two alternative proxies (industry-adjusted ROA and total CEO pay) of managerial ability. Consistent with De Franco et al. (2017), we calculate deciles (0 to 9) for both proxies using the procedure similar to what we use for MA_DEC. Where, score 0 represents the lowest while 9 represents the highest industry-adjusted ROA and CEO pay. The coefficients of industry adjusted ROA (0.022, 0.045, and 0.038 in column 1, 3 and 5, respectively) are significant at 1% level. On the other hand, CEO_DEC is only positively significant in column 6 (with ROE) with a coefficient of 0.013 at 5% level of significance. These findings are almost in line with baseline findings that managerial ability improves the firm performance in Pakistan.

Table 8 reports Fama and MacBeth (1973) cross sectional regression results based on Newey and West (1987) procedure as an alternative estimation to obtain unbiased standard errors. The coefficients of MA_DEC, MA_UP, and MA_Down are significant at 1% level with their expected signs in all the model except in model 6. In addition, all the control variables are significant with their expected signs in all the models.

Table 7. Impact of managerial ability on firm performance using alternative proxies

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	ROA	ROA	TQ	TQ	ROE	ROE
Ind_ROA_DEC	0.022*** (0.001)		0.045*** (0.013)		0.038*** (0.007)	
CEO_DEC		-0.001 (0.002)		-0.019 (0.028)		0.013** (0.006)
Size	0.018 (0.013)	-0.006 (0.017)	-0.701*** (0.167)	-0.627*** (0.170)	0.152** (0.074)	0.141 (0.087)
Cash	0.005 (0.049)	0.044 (0.066)	1.139* (0.587)	1.241** (0.588)	-0.432 (0.271)	-0.418 (0.301)
Lev	-0.040*** (0.013)	-0.100*** (0.018)	-0.076 (0.184)	-0.311* (0.179)	-0.199** (0.088)	-0.322*** (0.106)
Growth	0.020*** (0.004)	0.035*** (0.006)	0.021 (0.069)	0.027 (0.068)	0.185*** (0.045)	0.218*** (0.048)
Investment	-0.025* (0.014)	-0.035* (0.021)	-0.053 (0.161)	-0.095 (0.169)	-0.096 (0.108)	-0.115 (0.131)
Age	0.023 (0.027)	0.024 (0.034)	-1.476 (0.958)	-0.556 (0.737)	0.220 (0.146)	0.234 (0.170)
CFOTA	0.091*** (0.023)	0.143*** (0.028)	0.484** (0.218)	0.698*** (0.242)	0.108 (0.123)	0.152 (0.120)
Year Effects	YES	YES	YES	YES	YES	YES
Constant	-0.447** (0.209)	0.055 (0.298)	19.585*** (4.546)	15.974*** (3.762)	-3.223** (1.260)	-2.918* (1.509)
Observations	2,046	1,883	1,875	1,744	2,046	1,883
R-squared	0.499	0.190	0.298	0.291	0.175	0.143

Table 8. Fama-macbeth regressions

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	ROA	ROA	ROA	TQ	TQ	TQ	ROE	ROE	ROE
MA_DEC	0.005*** (0.001)			0.112*** (0.022)			0.025*** (0.004)		
MA_UP		0.025*** (0.003)			0.509*** (0.088)			0.038*** (0.010)	
MA_Down			-0.02*** (0.006)			-0.543** (0.170)			-0.15*** (0.028)
Size	0.004* (0.002)	0.003 (0.002)	0.004* (0.002)	0.078*** (0.019)	0.072*** (0.016)	0.079*** (0.019)	0.025** (0.008)	0.025** (0.009)	0.026** (0.008)
Cash	0.087** (0.033)	0.091** (0.034)	0.108** (0.035)	2.422*** (0.529)	2.667*** (0.594)	2.831*** (0.501)	-0.350* (0.176)	-0.233 (0.171)	-0.275 (0.175)
Lev	-0.10*** (0.008)	-0.11*** (0.008)	-0.11*** (0.008)	-0.61*** (0.142)	-0.66*** (0.146)	-0.63*** (0.162)	-0.54*** (0.061)	-0.56*** (0.062)	-0.53*** (0.060)
Growth	0.035*** (0.005)	0.036*** (0.006)	0.038*** (0.005)	-0.026 (0.065)	0.005 (0.063)	0.023 (0.087)	0.272*** (0.051)	0.294*** (0.056)	0.279*** (0.055)
Investment	-0.04*** (0.010)	-0.04*** (0.011)	-0.04*** (0.010)	0.156 (0.126)	0.146 (0.122)	0.105 (0.116)	-0.035 (0.037)	-0.049 (0.039)	-0.048 (0.039)
Age	0.008** (0.003)	0.008** (0.003)	0.007* (0.003)	-0.132 (0.089)	-0.108 (0.087)	-0.155 (0.088)	0.012 (0.016)	0.010 (0.016)	0.006 (0.016)
CFOTA	0.269*** (0.016)	0.274*** (0.015)	0.272*** (0.015)	2.190*** (0.376)	2.260*** (0.371)	2.268*** (0.406)	0.160* (0.079)	0.211** (0.077)	0.170* (0.075)
Constant	-0.040 (0.025)	-0.019 (0.025)	-0.004 (0.024)	3.769*** (0.521)	4.228*** (0.479)	4.585*** (0.418)	-0.504*** (0.172)	-0.370* (0.171)	-0.312 (0.172)
Observations	2,046	2,046	2,046	1,875	1,875	1,875	2,046	2,046	2,046
R-squared	0.512	0.508	0.508	0.157	0.143	0.152	0.316	0.300	0.317

Table 9. Impact of managerial ability on firm performance in high (low) financial constraint firms

Panel A. High Financial Constraints Firms												
	(WW Index)		(HP Index)		(KZ Index)		(WW Index)		(HP Index)		(KZ Index)	
VARIABLES	ROA	TQ	ROA	TQ	ROA	TQ	ROA	TQ	ROA	TQ	ROA	TQ
MA_DEC	0.00564*** (0.00183)		0.00404** (0.00172)		0.00669*** (0.00177)		0.0589*** (0.0218)		0.0631*** (0.0233)		0.0599*** (0.0217)	
Control variables	YES		YES		YES		YES		YES		YES	
Year	YES		YES		YES		YES		YES		YES	
Constant	0.229 (0.245)		0.534 (0.333)		0.127 (0.328)		15.13*** (5.211)		18.60*** (6.133)		22.08*** (6.007)	
Observations	1,156		1,073		1,303		1,083		995		1,191	
R-squared	0.262		0.248		0.211		0.270		0.253		0.298	
Panel B. Low Financial Constraints Firms												
	(WW Index)		(HP Index)		(KZ Index)		(WW Index)		(HP Index)		(KZ Index)	
VARIABLES	ROA	TQ	ROA	TQ	ROA	TQ	ROA	TQ	ROA	TQ	ROA	TQ
MA_DEC	0.00593 (0.00439)		0.00379 (0.00728)		-0.000928 (0.00812)		0.0224 (0.0237)		-0.00659 (0.0365)		0.00248 (0.0348)	
Control variables	YES		YES		YES		YES		YES		YES	
Year	YES		YES		YES		YES		YES		YES	
Constant	0.0431 (0.344)		-0.00260 (0.897)		-0.322 (0.832)		26.37*** (5.090)		12.33* (6.342)		21.58*** (4.478)	
Panel A. High Financial Constraints Firms												
	(WW Index)		(HP Index)		(KZ Index)		(WW Index)		(HP Index)		(KZ Index)	
Observations	721		713		553		644		647		511	
R-squared	0.261		0.183		0.204		0.406		0.338		0.324	

Previous literature suggests that able managers are more knowledgeable, handle the risk better, and have better access to the financial resources in the crisis period (Andreou et al., 2013). Therefore, the high financially constrained firms with capable managers may outperform the lower financially constrained firms through mitigating the underinvestment problems. To test this proposition, we use KZ index (Kaplan & Zingales, 1997), WW index (Whited & Wu, 2006) and HP index (Hadlock & Pierce, 2010) to segregate the high (low) financially constrained firms. We consider a firm as a high (low) financially constrained if it has a value above (low) the mean value in a particular year within the same industry.

We re-estimate our baseline equation 1 separately on data of high (low) financial constraint firms. Panel A of Table 9 reports a positive significant impact of managerial ability on firm performance in all the models across both accounting and market proxies of firm performance for high financially constrained firms. However, we do not find similar results in low financially constrained firms in Panel B. Thus, the findings of Andreou et al. (2013) that managerial ability is more beneficial for financially constrained firms in a constrained environment also hold in emerging market context.

8. Summary and conclusion

This study investigates the effect of managerial ability on firm performance using a sample of 246 non-financial firms listed at PSX for the period 2009 to 2017. We use fixed effects to address the unobserved heterogeneity across firms and macroeconomic shocks over time. Further, 2SLS estimation is employed to control for endogeneity issues. We find that the firms that are run by more able managers have higher profitability. In addition, able managers outperform their counterparts more in financially constrained firms than unconstrained firms. Our results hold for both accounting and market measures of profitability. Further, our findings are robust to alternative measures of managerial ability and regression methods such as 2SLS and Fama-MacBeth. Overall, our findings are consistent with the resource-based hypothesis that able managers use their knowledge and experience wisely and make optimal decisions that lead to greater firm value. A higher firm value mitigates the agency problems in the firms having higher managerial ability. This is also consistent with agency theory.

This study is unique and first of its kind in Pakistani context. Therefore, it provides fresh and comprehensive guidance to the stakeholders such as managers, practitioners and investors. This study suggests that able managers proactively manage firm resources in the optimal projects, and in a situation when firms are facing the financial constraints. Importantly, these findings provide a hint to interested parties about effectiveness of high managerial ability firms in terms of utilization of resources.

Given that group affiliation and family ownership are common in Pakistan. Therefore, future research may find it worthwhile to focus on testing and comparing the impact of managerial ability on firm performance in business groups and family firms.

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