THE IMPACT OF MANAGERIAL ABILITY ON CORPORATE FINANCIAL DECISION-MAKING: EVIDENCE FROM INDIA

A THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE

FELLOW PROGRAMME IN MANAGEMENT

INDIAN INSTITUTE OF MANAGEMENT

INDORE

BY

AKANKSHA CHADHA

May 26, 2023

Thesis Advisory Committee

Prof. Pradip Banerjee **[Chairman]**

[----------]

Prof. L. V. Ramana **[Member]**

[----------]

Prof. Sutirtha Bandyopadhyay **[Member]**

[----------]

Indian Institute of Management Indore

सिद्धिमूलं प्रबन्धनम्
भा. प्र. सं. इन्दौर
IIM INDORE

Table of Contents

List of Tables – Essay 1

List of Tables – Essay 2

List of Tables – Essay 3

Abstract

The objective of this study is to determine whether managerial ability is a determinant of corporate financial decision-making. Prior research demonstrates that managerial ability, or skill, has a bearing on corporate strategy and performance (Hambrick and Mason, 1984; Bertrand and Schoar, 2003).

To analyse the impact of managerial ability on firm financial policies, the first step is to define and estimate managerial ability for a large sample of firms. The first essay, titled ***Measurement of Managerial Ability for Indian Firms,*** focuses on estimating a managerial ability score for a wide sample of Indian firms (both publicly listed and private firms), from the financial year 2000 to 2020. Historically, widely accepted proxies of managerial ability included managerial remuneration – such as pay premiums (Carter et al., 2011) and stock options (Arya and Mittendorf, 2005); and performance based evaluations of talent – such as Return on Assets (Rajgopal et al., 2006) and stock market performance (Fee and Hadlock, 2003). Later, Demerjian et al. (2012) developed a managerial ability measure employing firm-level accounting data using a two-step procedure. The first step involves calculating firm efficiency using Data Envelopment Analysis (DEA), and the second step involves eliminating the impact of contextual firm-specific variables that may have an effect on efficiency, in order to determine the managerial contribution to firm efficiency or estimates of managerial ability.

Following Demerjian et al. (2012), this essay develops a measure of managerial ability for Indian firms. Demerjian et al. (2012) use the Charnes-Cooper-Rhodes (CCR) model (Charnes et al., 1978) to estimate firm efficiency in the first step. This model has limitations because it is unable to account for the depth of inefficiency, as it fails to take input excesses and output shortfalls, or slacks, into consideration (Tone, 2001). This study uses the Slacks Based Method (SBM) proposed by Tone (2001) as the DEA model of choice. The SBM can provide a scalar measure of efficiency that is able to incorporate slacks, maximize the virtual

profit, and incorporate Variable Returns to Scale (VRS) orientation. In the second stage, the study employs the Fractional Regression Model (FRM) suggested by Ramalho et al. (2010) in addition to the Tobit regression employed by Demerjian et al. (2012), in order to generate a more methodologically appropriate assessment. The study additionally runs the second stage regression using an Ordinary Least Squares (OLS) to check the robustness of the results. The essay contributes to the literature in the following two ways. First, the essay computes a more methodologically accurate measurement of managerial ability by substituting the CCR model with the SBM model as the choice of the DEA model. Second, the study adapts the managerial ability measure to the Indian market by employing contextual variables unique to the Indian context, and provides an opportunity to study the impact of managerial ability on a range of firm-level outcomes.

The second essay, titled ***The Impact of Managerial Ability on Firm Investment Decision Making,*** examines the impact of managerial ability on the investment levels of Indian firms, and the implications of the same for firm performance. The essay uses two competing hypotheses to identify the association between managerial ability, firm investments and firm performance. The "efficient contracting hypothesis" argues that managers evaluate long-term objectives of the organization and make efficient decisions that are consistent with the maximization of shareholder wealth. According to this view, high-ability managers make higher investments due to greater availability of investment opportunities (Lee et al., 2018), and greater ability to raise funds even in crisis periods (Andreou et al., 2017). The higher investments by high-ability managers lead to the generation of shareholder wealth, as they are able to make informed decisions (Demerjian et al., 2013), and have a greater understanding of the environment, resulting in successful outcomes (Chemmanur et al., 2009).

The alternative hypothesis, the "rent extraction hypothesis", suggests that the manager's primary objective is to extract rent by prioritizing their own welfare, which may result in a loss in the value of the firm. According to this perspective, higher levels of firm investment may be the outcome of managerial opportunism (Jensen, 1986) on the part of low-ability managers (Custodio and Metzger, 2014). The high investments made by low-ability managers result in a decline in shareholder wealth, which may be attributable to their propensity to make reckless decisions (Jacobsen, 2014) and engage in herding behavior (Scharfstein and Stein, 1990).

The study finds that high-ability managers invest more than low-ability managers, and investment spending is one of the channels through which high-ability managers increase the value of the firm. This verifies the conjecture of the "efficient contracting hypothesis" that high-ability managers boost shareholder value through higher investments than low-ability managers.

The third essay, ***Managerial Ability and Cash Holding Motives of Indian Firms,*** aims to comprehend the relationship between managerial ability and the levels of cash holdings in Indian firms. Cash on hand acts as a safety net for firms, by enhancing corporate preparedness in crisis situations (Chen et al., 2018). Further, cash-rich firms have greater growth potential, are better able to handle unforeseen shocks, have less investment sensitivity to the availability of external capital, and have a lower failure rate (Harford, 1999). The cash policy of firms is in the hands of managers (Liu and Mauer, 2011), and managerial ability may be a significant factor impacting the cash holding levels among Indian firms. In addition, this study also seeks to determine whether managerial ability influences the reasons why organisations retain larger cash reserves. The essay focuses on the two most important motives of cash holdings: the transaction motive, which asserts that firms incur transaction costs when converting non-cash

assets into cash (Baumol, 1952; Opler et al., 1999); and the precautionary motive, which suggests that cash is maintained as a hedge against adverse external shocks, so that investment is not affected by these shocks (Keynes, 1936; Almeida et al., 2004).

The study demonstrates that high-ability managers hold greater cash reserves, and there is a positive correlation between managerial ability and excess cash levels. The results also indicate that high-ability managers maintain more cash for the precautionary motive, as opposed to the transaction motive. In addition, this essay confirms the findings of past research that indicates a positive association between managerial ability and the value of excess cash holdings (Gan and Park, 2017). Further, the market value of excess cash held by high-ability managers is greater in non-Business Group (BG) firms, characterised by high transaction costs of cash conversion due to absence of network effects (Khanna and Palepu, 2005), indicating that the impact of managerial ability on the market value of cash is in firms which hold higher cash to avoid transaction costs. Similarly, the excess cash holdings by high-ability managers are valued higher in the period following the Global Financial Crisis (GFC), which is associated with an increase in risk, suggesting that the association between managerial ability and the market value of excess cash is stronger when cash is held for precautionary motives.

References

Alvarez, R., & Crespi, G. (2003). Determinants of technical efficiency in small firms. *Small business economics*, *20*(3), 233-244.

Andersen, P., & Petersen, N. C. (1993). A procedure for ranking efficient units in data envelopment analysis. *Management science*, *39*(10), 1261-1264.

Anthony, J. H., & Ramesh, K. (1992). Association between accounting performance measures and stock prices: A test of the life cycle hypothesis. *Journal of Accounting and economics*, *15*(2-3), 203-227.

Arora, S., Sharma, M., & Vashisht, A. K. (2017). Impact of managerial ability and firm-specific variables on insider's abnormal returns. *Decision*, *44*(4), 275-286.

Arya, A., & Mittendorf, B. (2005). Offering stock options to gauge managerial talent. *Journal of Accounting and Economics*, *40*(1-3), 189-210.

Augier, M., & March, J. G. (2008). A retrospective look at a behavioral theory of the firm. *Journal of Economic Behavior & Organization*, *66*(1), 1-6.

Augier, M., & Teece, D. J. (2009). Dynamic capabilities and the role of managers in business strategy and economic performance. *Organization science*, *20*(2), 410-421.

Bamber, L. S., Jiang, J., & Wang, I. Y. (2010). What's my style? The influence of top managers on voluntary corporate financial disclosure. *The accounting review*, *85*(4), 1131-1162.

Banker, R. D., Charnes, A., & Cooper, W. W. (1984). Some models for estimating technical and scale inefficiencies in data envelopment analysis. *Management science*, *30*(9), 1078-1092.

Banker, R., Natarajan, R., & Zhang, D. (2019). Two-stage estimation of the impact of contextual variables in stochastic frontier production function models using data envelopment analysis: Second stage OLS versus bootstrap approaches. *European Journal of Operational Research*, *278*(2), 368-384.

Banker, R., Park, H. U., & Sahoo, B. (2022). A statistical foundation for the measurement of managerial ability. Working Paper.

Belenzon, S., & Tsolmon, U. (2016). Market frictions and the competitive advantage of internal labor markets. *Strategic Management Journal*, *37*(7), 1280-1303.

Berger, A. N., & Humphrey, D. B. (1997). Efficiency of financial institutions: International survey and directions for future research. *European journal of operational research*, *98*(2), 175-212.

Bertrand, M., & Schoar, A. (2003). Managing with style: The effect of managers on firm policies. *The Quarterly journal of economics*, *118*(4), 1169-1208.

Brown, R., & Sarma, N. (2007). CEO overconfidence, CEO dominance and corporate acquisitions. *Journal of Economics and business*, *59*(5), 358-379.

Carter, M. E., Franco, F., & Tuna, A. (2011, November). Premium pay for executive talent: An empirical analysis. AAA 2011 Management Accounting Section (MAS) Meeting Paper. http://dx.doi.org/10.2139/ssrn.1658903

Chang, S. J. (2006). Business groups in East Asia: Post-crisis restructuring and new growth. *Asia Pacific Journal of Management*, *23*(4), 407-417.

Charnes, A., Cooper, W. W., & Rhodes, E. (1978). Measuring the efficiency of decision making units. *European journal of operational research*, *2*(6), 429-444.

Charnes, A., Cooper, W. W., Golany, B., Seiford, L., & Stutz, J. (1985). Foundations of data envelopment analysis for Pareto-Koopmans efficient empirical production functions. *Journal of econometrics*, *30*(1-2), 91-107.

Chatterjee, A. (2009). Transition of the Indian steel industry into the twenty-first century. *Ironmaking & Steelmaking*, *36*(7), 491-499.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative science quarterly*, 128-152.

Cyert, R. M., & March, J. G. (1963). A behavioral theory of the firm. *Englewood Cliffs, NJ*, *2*(4), 169-187.

DeAngelo, H., DeAngelo, L., & Stulz, R. M. (2006). Dividend policy and the earned/contributed capital mix: a test of the life-cycle theory. *Journal of Financial economics*, *81*(2), 227-254.

Debnath, R. M., & Sebastian, V. J. (2014). Efficiency in the Indian iron and steel industry–an application of data envelopment analysis. *Journal of Advances in Management Research*.

Demerjian, P., Lev, B., & McVay, S. (2012). Quantifying managerial ability: A new measure and validity tests. *Management science*, *58*(7), 1229-1248.

Dickinson, V. (2011). Cash flow patterns as a proxy for firm life cycle. *The accounting review*, *86*(6), 1969-1994.

Fan, J. P., Wei, K. J., & Xu, X. (2011). Corporate finance and governance in emerging markets: A selective review and an agenda for future research. *Journal of Corporate Finance*, *17*(2), 207-214.

Fee, C. E., & Hadlock, C. J. (2003). Raids, rewards, and reputations in the market for managerial talent. *The Review of Financial Studies*, *16*(4), 1315-1357.

Fee, C. E., Hadlock, C. J., & Pierce, J. R. (2011). Managers who lack style: Evidence from exogenous CEO changes. *Available at SSRN 1805028*.

Ferrier, G. D., & Lovell, C. K. (1990). Measuring cost efficiency in banking: Econometric and linear programming evidence. *Journal of econometrics*, *46*(1-2), 229-245.

Fujii, H., Managi, S., & Matousek, R. (2014). Indian bank efficiency and productivity changes with undesirable outputs: A disaggregated approach. *Journal of banking & finance*, *38*, 41-50.

Granovetter, M. (2005). Business Groups and Social Organization In Handbook of Economic Sociology. Princeton University Press. 429-450.

Grinstein, Y., & Hribar, P. (2004). CEO compensation and incentives: Evidence from M&A bonuses. *Journal of financial economics*, *73*(1), 119-143.

Gupta, A., Nadkarni, S., & Mariam, M. (2019). Dispositional sources of managerial discretion: CEO ideology, CEO personality, and firm strategies. *Administrative Science Quarterly*, *64*(4), 855-893.

Hackbarth, D. (2008). Managerial traits and capital structure decisions. *Journal of financial and quantitative analysis*, *43*(4), 843-881.

Halford, J. T., & Hsu, H. C. S. (2020). Beauty is wealth: CEO attractiveness and firm value. *Financial Review*, *55*(4), 529-556.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of management review*, *9*(2), 193-206.

Hart, O., Shleifer, A., & Vishny, R. W. (1997). The proper scope of government: theory and an application to prisons. *The quarterly journal of economics*, *112*(4), 1127-1161.

Jameson, M., Prevost, A., & Puthenpurackal, J. (2014). Controlling shareholders, board structure, and firm performance: Evidence from India. *Journal of Corporate Finance*, *27*, 1-20.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American economic review*, *76*(2), 323-329.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, *3*(4), 305-360.

Jovanovic, B. (1982). Selection and the Evolution of Industry. *Econometrica: Journal of the econometric society*, 649-670.

Khan, W. A., & Vieito, J. P. (2013). CEO gender and firm performance. *Journal of Economics and Business*, *67*, 55-66.

Khanna, T., & Palepu, K. (1997). Why focused strategies. *Harvard business review*, *75*(4), 41-51.

Khanna, T., & Yafeh, Y. (2007). Business groups in emerging markets: Paragons or parasites?. *Journal of Economic literature*, *45*(2), 331-372.

Kumar, M., & Goswami, R. (2021). Managerial Ability and Real Earnings Management Among Indian Listed Firms. *Vision*, 09722629211046065.

Leverty, J. T., & Grace, M. F. (2012). Dupes or incompetents? An examination of management's impact on firm distress. *Journal of Risk and Insurance*, *79*(3), 751-783.

Li, H., Fang, K., Yang, W., Wang, D., & Hong, X. (2013). Regional environmental efficiency evaluation in China: Analysis based on the Super-SBM model with undesirable outputs. *Mathematical and Computer Modelling*, *58*(5-6), 1018-1031.

Malmendier, U., & Tate, G. (2005a). CEO overconfidence and corporate investment. *The journal of finance*, *60*(6), 2661-2700.

Malmendier, U., & Tate, G. (2005b). Does overconfidence affect corporate investment? CEO overconfidence measures revisited. *European financial management*, *11*(5), 649-659.

Miller, D., & Friesen, P. H. (1984). A longitudinal study of the corporate life cycle. *Management science*, *30*(10), 1161-1183.

Murthi, B. P. S., Choi, Y. K., & Desai, P. (1997). Efficiency of mutual funds and portfolio performance measurement: A non-parametric approach. *European Journal of Operational Research*, *98*(2), 408-418.

Pierce, J. L., Boerner, C. S., & Teece, D. J. (2008). Dynamic capabilities, competence and the behavioral theory of the firm. *Technological know-how, organizational capabilities, and strategic management*, 53-68.

Pisano, G., & Teece, D. (1994). The dynamic capabilities of firms: an introduction. *Industrial and Corporate Change*, *3*(3), 537-556.

Premachandra, I. M., Chen, Y., & Watson, J. (2011). DEA as a tool for predicting corporate failure and success: A case of bankruptcy assessment. *Omega*, *39*(6), 620-626.

Rajgopal, S., Shevlin, T., & Zamora, V. (2006). CEOs' outside employment opportunities and the lack of relative performance evaluation in compensation contracts. *The Journal of Finance*, *61*(4), 1813-1844.

Ramalho, E. A., Ramalho, J. J., & Henriques, P. D. (2010). Fractional regression models for second stage DEA efficiency analyses. *Journal of Productivity Analysis*, *34*(3), 239-255.

Rangan, N., Grabowski, R., Aly, H. Y., & Pasurka, C. (1988). The technical efficiency of US banks. *Economics letters*, *28*(2), 169-175.

Romer, P. M. (1990). Endogenous technological change. *Journal of political Economy*, *98*(5, Part 2), S71-S102.

Sanyal, P., & Shankar, R. (2011). Ownership, competition, and bank productivity: An analysis of Indian banking in the post-reform period. *International Review of Economics & Finance*, *20*(2), 225-247.

Seiford, L. M., & Zhu, J. (1999). Profitability and marketability of the top 55 US commercial banks. *Management science*, *45*(9), 1270-1288.

Serfling, M. A. (2014). CEO age and the riskiness of corporate policies. *Journal of Corporate Finance*, *25*, 251-273.

Sherman, H. D., & Gold, F. (1985). Bank branch operating efficiency: Evaluation with data envelopment analysis. *Journal of banking & finance*, *9*(2), 297-315.

Shleifer, A., & Vishny, R. W. (1997). A survey of corporate governance. *The journal of finance*, *52*(2), 737-783.

Sun, R., & Zou, G. (2021). Political connection, CEO gender, and firm performance. *Journal of Corporate Finance*, *71*, 101918.

Teece, D.J. (1988), 'Technological change and the nature of the firm', in, Dosi, G., Freeman, C., Nelson, R., Silverberg, G., & Soete, L. *Technical change and economic theory*.

Laboratory of Economics and Management (LEM), Sant'Anna School of Advanced Studies, Pisa, Italy.

Tone, K. (2001). A slacks-based measure of efficiency in data envelopment analysis. *European journal of operational research*, *130*(3), 498-509.

Yang, C. H., & Chen, K. H. (2009). Are small firms less efficient?. *Small Business Economics*, *32*(4), 375-395.

Zhong, K., Wang, Y., Pei, J., Tang, S., & Han, Z. (2021). Super efficiency SBM-DEA and neural network for performance evaluation. *Information Processing & Management*, *58*(6), 102728.

Appendix 1.A Variable Definitions

The table below includes a definition of all the variables included in Essay 1.

Variable	Description
Output for Firm Efficiency – DEA Analysis	
Sales	Net Sales
Inputs for Firm Efficiency – DEA Analysis	
COGS	Costs related to raw materials, labor, packaging and other operational costs
SG&A expenses	Selling, general and administration expenses – including advertising expenses
PPE, net	Net Property, plant and equipment reported on balance sheet
Lease rent	Operating lease charges paid during the year
R&D	Capitalized Research & Development (R&D) expenses using a five-year capitalization period as: $\sum_{t=-4}^{0}(1+0.2t) \times RDexp$
Goodwill	Addition of goodwill (from acquisitions) during the year
Other intangibles	Other intangibles including patents, copyrights – addition during the year
Firm Specific Variables Affecting Firm Efficiency	
Firm Size	Measured using log of Total Assets
Market Share	Sales by firm within industry (2-digit NIC code)
Free Cash Flow indicator	Coded as1 when firm has non-negative FCF; 0 otherwise FCF = Earnings before depreciation–change in working capital–capital expenditures
Firm stage in life cycle	Measured by the ratio of Retained Earnings to Total Assets, according to the definition of DeAngelo et al. (2006)
Foreign Operations	Indicator coded as 1 if firm reports adjustment due to forex gain/loss; 0 otherwise
Business Segment Concentration	Sum of concentration ratio summed across segments
BG	Indicator coded as 1 if firm affiliated to Business Group; 0 otherwise
PSU	Indicator coded as 1 if firm is a Public Sector Undertaking; 0 otherwise

Appendix 1.B: List of Industry Classifications & Merged and Dropped Industries

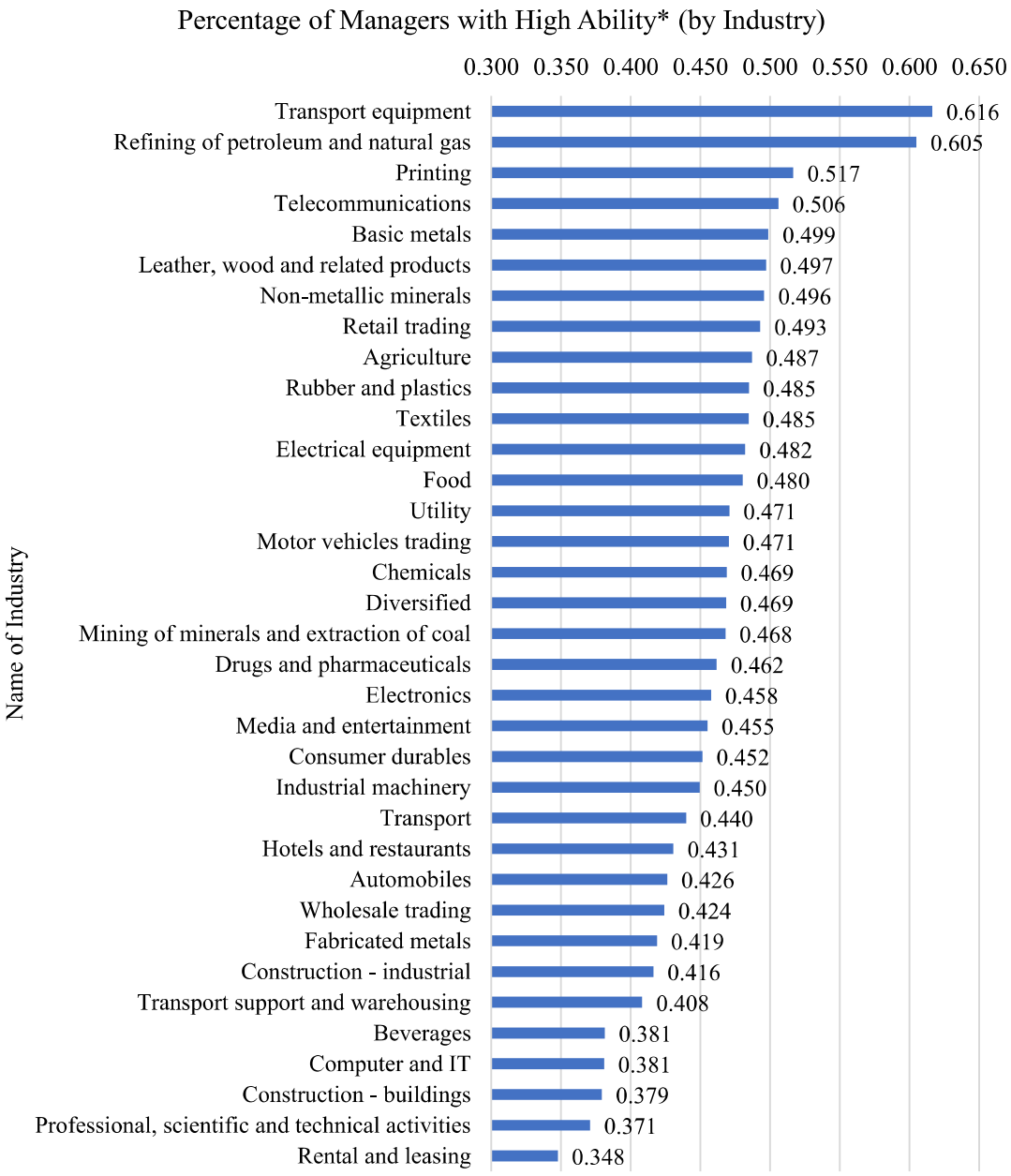
The table below presents an exhaustive list of the industry classifications in the dataset, and provides detailed names of the industry codes that have been merged or dropped. The original dataset consisted of 69 2-digit National Industrial Classification (NIC) codes, out of which 17 were dropped. Of the remaining 52, industries with similar nature were merged, and this may be observed from the table given below.

NIC Code	Original Industry Name	New Industry Name
1	Crop and animal production, hunting and related service activities	Agriculture
2	Forestry and logging	
5	Mining and quarrying	Mining of minerals and extraction of coal
6	Extraction of crude petroleum and natural gas	
7	Mining of coal	
8	Other mining and quarrying	
10	Manufacture of food products	Food
11	Manufacture of beverages	Beverages
12	Tobacco	*(Dropped)*
13	Manufacture of textiles	Textiles
14	Manufacture of wearing apparel	
15	Manufacture of leather and related products	Leather, wood and related products
16	Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	
17	Manufacture of paper and paper products	Paper and printing
18	Printing and reproduction of recorded media	
19	Refining of petroleum and natural gas	Refining of petroleum and natural gas
20	Manufacture of chemicals and chemical products	Chemicals
21	Manufacture of pharmaceuticals, medicinal chemical and botanical products	Drugs and pharmaceuticals
22	Manufacture of rubber and plastics products	Rubber and plastics
23	Manufacture of other non-metallic mineral products	Non-metallic minerals

NIC Code	Original Industry Name	New Industry Name
24	Manufacture of basic metals	Basic metals
25	Manufacture of fabricated metal products, except machinery and equipment	Fabricated metals
26	Manufacture of computer, electronic and optical products	Electronics
27	Manufacture of electrical equipment	Electrical equipment
28	Manufacture of machinery and equipment n.e.c.	Industrial machinery
29	Manufacture of motor vehicles, trailers and semi-trailers	Automobiles
30	Manufacture of other transport equipment	Transport equipment
31	Manufacture of furniture	Consumer Durables
32	Other manufacturing	
34	Diversified	Diversified
35	Electricity, Gas, Steam and Air Condition Supply	Utility
36	Water collection , treatment and supply	
37	Sewerage	
38	Waste collection, treatment and disposal activities materials recovery	
41	Construction of buildings	Construction - buildings
42	Civil engineering	Construction - industrial
43	Specialized construction activities	
45	Motor vehicles trading	Motor vehicles trading
46	Wholesale trading	Wholesale trading
47	Retail trading	Retail trading
49	Land transport and transport via pipelines	Transport
50	Water transport	
51	Air Transport	
52	Warehousing and support activities for transportation	Transport support and warehousing
53	Postal and courier activities	
55	Accommodation	Hotels and restaurants
56	Food and beverage service activities	

NIC Code	Original Industry Name	New Industry Name
58	Publishing activities	Media and entertainment
59	Motion picture, video and television programme production, sound recording and music publishing activities	
61	Telecommunications	Telecommunications
62	Computer programming, consultancy and related activities	Computer and IT
63	Information service activities	
68	Real estate activities	Professional, scientific and technical activities
69	Legal and accounting activities	
70	Activities of head offices; management consultancy activities	
71	Architecture and engineering activities; technical testing and analysis	
72	Scientific research and development	
73	Advertising and market research	
74	Other professional, scientific and technical activities	
75	Veterinary activities	*(Dropped)*
77	Rental and leasing activities	Rental and leasing
79	Travel agency, tour operator and other reservation service activities	*(Dropped)*
80	Security and investigation activities	*(Dropped)*
82	Office administrative, office support and other business support activities	*(Dropped)*
84	Public administration and defence; compulsory social security	*(Dropped)*
85	Education	*(Dropped)*
86	Human health activities	*(Dropped)*
93	Sports activities and amusement and recreation activities	*(Dropped)*
95	Repair of computers and personal and household goods	*(Dropped)*

Appendix 1.C: Industry-Wise Distribution of High-Ability Managers[4]



*Managers in a particular firm-year are considered high-ability if the managerial ability score is greater than zero

[4] The industries are sorted from high to low with respect to the percentage of high-ability managers in the industry. It may be observed that the percentage of high-ability managers is higher in industries which are more efficient. This implies that there is a high correlation between managerial ability and firm efficiency, which is a logical culmination of the view that high-ability managers culminate into better efficiency levels for firms.

References

Andreou, P. C., Louca, C., & Petrou, A. P. (2017). CEO age and stock price crash risk. *Review of Finance*, *21*(3), 1287-1325.

Baik, B., Choi, S., & Farber, D. B. (2020). Managerial ability and income smoothing. *The Accounting Review*, *95*(4), 1-22.

Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *The quarterly journal of economics*, *131*(4), 1593-1636.

Belenzon, S., & Berkovitz, T. (2010). Innovation in business groups. *Management Science*, *56*(3), 519-535.

Bernanke, B. S. (1983). Irreversibility, uncertainty, and cyclical investment. *The quarterly journal of economics*, *98*(1), 85-106.

Bertrand, M., & Schoar, A. (2003). Managing with style: The effect of managers on firm policies. *The Quarterly journal of economics*, *118*(4), 1169-1208.

Blaylock, B. S. (2016). Is tax avoidance associated with economically significant rent extraction among US firms?. *Contemporary Accounting Research*, *33*(3), 1013-1043.

Blaylock, B. S. (2016). Is tax avoidance associated with economically significant rent extraction among US firms?. *Contemporary Accounting Research*, *33*(3), 1013-1043.

Bloom, N. (2014). Fluctuations in uncertainty. *Journal of Economic Perspectives*, *28*(2), 153-76.

Brunnermeier, M. K. (2009). Deciphering the liquidity and credit crunch 2007-2008. *Journal of Economic perspectives*, *23*(1), 77-100.

Campbell, T. S., & Marino, A. M. (1994). Myopic investment decisions and competitive labor markets. *International Economic Review*, 855-875.

Chandra, M. S., & McConaughy, D. L. (1999). Founding family control and capital structure: The risk of loss of control and the aversion to debt. *Entrepreneurship theory and practice*, *23*(4), 53-64.

Chang, S. J. (2006). Business groups in East Asia: Post-crisis restructuring and new growth. *Asia Pacific Journal of Management*, *23*, 407-417.

Charnes, A., Cooper, W. W., & Rhodes, E. (1978). Measuring the efficiency of decision making units. *European journal of operational research*, *2*(6), 429-444.

Chemmanur, T. J., He, S., & Nandy, D. K. (2010). The going-public decision and the product market. *The Review of Financial Studies*, *23*(5), 1855-1908.

Chemmanur, T. J., Paeglis, I., & Simonyan, K. (2009). Management quality, financial and investment policies, and asymmetric information. *Journal of Financial and Quantitative Analysis*, *44*(5), 1045-1079.

Chen, S. S., & Lin, C. Y. (2018). Managerial ability and acquirer returns. *The Quarterly Review of Economics and Finance*, *68*, 171-182.

Chen, Y., Podolski, E. J., & Veeraraghavan, M. (2015). Does managerial ability facilitate corporate innovative success?. *Journal of empirical finance*, *34*, 313-326.

Chittoor, R., Kale, P., & Puranam, P. (2015). Business groups in developing capital markets: Towards a complementarity perspective. *Strategic Management Journal*, *36*(9), 1277-1296.

Chittoor, R., Ray, S., Aulakh, P. S., & Sarkar, M. B. (2008). Strategic responses to institutional changes:'Indigenous growth'model of the Indian pharmaceutical industry. *Journal of International Management*, *14*(3), 252-269.

Chung, K. H., & Pruitt, S. W. (1994). A simple approximation of Tobin's q. *Financial management*, 70-74.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative science quarterly*, 128-152.

Cornaggia, K. J., Krishnan, G. V., & Wang, C. (2017). Managerial ability and credit ratings. *Contemporary Accounting Research*, *34*(4), 2094-2122.

Custódio, C., & Metzger, D. (2013). How do CEOs matter? The effect of industry expertise on acquisition returns. *The Review of Financial Studies*, *26*(8), 2008-2047.

Custódio, C., & Metzger, D. (2014). Financial expert CEOs: CEO ′s work experience and firm ′s financial policies. *Journal of Financial Economics*, *114*(1), 125-154.

Davis, S. J. (2016). *An index of global economic policy uncertainty* (No. w22740). National Bureau of Economic Research.

Demerjian, P. R., Lev, B., Lewis, M. F., & McVay, S. E. (2013). Managerial ability and earnings quality. *The accounting review*, *88*(2), 463-498.

Demerjian, P., Lev, B., & McVay, S. (2012). Quantifying managerial ability: A new measure and validity tests. *Management science*, *58*(7), 1229-1248.

Duchin, R. (2010). Cash holdings and corporate diversification. *The Journal of Finance*, *65*(3), 955-992.

Dutta, S. (1997). *Family business in India*. SAGE Publications Pvt. Limited.

Dutta, S., 1997, Family Business in India, New Delhi: Response Books/Sage Publications

Gan, H. (2015). *CEO managerial ability, corporate investment quality, and the value of cash* (Doctoral dissertation, Virginia Commonwealth University).

Gan, H. (2019). Does CEO managerial ability matter? Evidence from corporate investment efficiency. *Review of Quantitative Finance and Accounting*, *52*(4), 1085-1118.

García-Meca, E., & García-Sánchez, I. M. (2018). Does managerial ability influence the quality of financial reporting?. *European Management Journal*, *36*(4), 544-557.

García-Sánchez, I. M., & García-Meca, E. (2018). Do talented managers invest more efficiently? The moderating role of corporate governance mechanisms. *Corporate Governance: An International Review*, *26*(4), 238-254.

Ghemawat, P., & Khanna, T. (1998). The nature of diversified business groups: A research design and two case studies. *The Journal of Industrial Economics*, *46*(1), 35-61.

Gulen, H., & Ion, M. (2016). Policy uncertainty and corporate investment. *The Review of Financial Studies*, *29*(3), 523-564.

Gulen, H., & Ion, M. (2016). Policy uncertainty and corporate investment. *The Review of Financial Studies*, *29*(3), 523-564.

Habib, A., & Hasan, M. M. (2017). Managerial ability, investment efficiency and stock price crash risk. *Research in International Business and finance*, *42*, 262-274.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of management review*, *9*(2), 193-206

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica: Journal of the econometric society*, 1251-1271.

Hermalin, B. E., & Weisbach, M. S. (2017). Assessing managerial ability: Implications for corporate governance. In *The handbook of the economics of corporate governance* (Vol. 1, pp. 93-176). North-Holland.

Hope, O. K., & Thomas, W. B. (2008). Managerial empire building and firm disclosure. *Journal of Accounting Research*, *46*(3), 591-626.

Jacobsen, S. (2014). The death of the deal: Are withdrawn acquisition deals informative of CEO quality?. *Journal of Financial Economics*, *114*(1), 54-83.

Jameson, M., Prevost, A., & Puthenpurackal, J. (2014). Controlling shareholders, board structure, and firm performance: Evidence from India. *Journal of Corporate Finance*, *27*, 1-20.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American economic review*, *76*(2), 323-329.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, *3*(4), 305-360.

Jensen, M. C., & Meckling, W. H. (1994). The nature of man. *Journal of applied corporate finance*, *7*(2), 4-19.

Jensen, M. C., & Meckling, W. H. (2019). Theory of the firm: Managerial behavior, agency costs and ownership structure. In *Corporate Governance* (pp. 77-132). Gower.

Jian, M., & Lee, K. W. (2011). Does CEO reputation matter for capital investments?. *Journal of Corporate Finance*, *17*(4), 929-946.

Julio, B., & Yook, Y. (2012). Political uncertainty and corporate investment cycles. *The Journal of Finance*, *67*(1), 45-83.

Khanna, T., & Rivkin, J. W. (2001). Estimating the performance effects of business groups in emerging markets. *Strategic management journal*, *22*(1), 45-74.

Khurana, I. K., Moser, W. J., & Raman, K. K. (2018). Tax avoidance, managerial ability, and investment efficiency. *Abacus*, *54*(4), 547-575.

Kim, Y., & Lui, S. S. (2015). The impacts of external network and business group on innovation: Do the types of innovation matter?. *Journal of Business Research*, *68*(9), 1964-1973.

Knight, F. H. (1921). *Risk, uncertainty and profit* (Vol. 31). Houghton Mifflin.

Krull, J. L., & MacKinnon, D. P. (2001). Multilevel modeling of individual and group level mediated effects. *Multivariate behavioral research*, *36*(2), 249-277.

Kumaraswamy, A., Mudambi, R., Saranga, H., & Tripathy, A. (2012). Catch-up strategies in the Indian auto components industry: Domestic firms' responses to market liberalization. *Journal of International Business Studies*, *43*, 368-395.

Laverty, K. J. (1996). Economic "short-termism": The debate, the unresolved issues, and the implications for management practice and research. *Academy of Management Review*, *21*(3), 825-860.

Lee, C. C., Wang, C. W., Chiu, W. C., & Tien, T. S. (2018). Managerial ability and corporate investment opportunity. *International Review of Financial Analysis*, *57*, 65-76.

Leland, H. E., & Pyle, D. H. (1977). Informational asymmetries, financial structure, and financial intermediation. *The journal of Finance*, *32*(2), 371-387.

Lensink, R., Van der Molen, R., & Gangopadhyay, S. (2003). Business groups, financing constraints and investment: The case of India. *The Journal of Development Studies*, *40*(2), 93-119.

Li, Y., Xu, X., Zhu, Y., & Haq, M. (2021). CEO decision horizon and corporate R&D investments: an explanation based on managerial myopia and risk aversion. *Accounting & Finance*, *61*(4), 5141-5175.

Mahoney, J. T. (1995). The management of resources and the resource of management. *Journal of business research*, *33*(2), 91-101.

Malmendier, U., & Tate, G. (2005). CEO overconfidence and corporate investment. *The journal of finance*, *60*(6), 2661-2700.

Malmendier, U., & Tate, G. (2008). Who makes acquisitions? CEO overconfidence and the market's reaction. *Journal of financial Economics*, *89*(1), 20-43.

Morck, R., & Yeung, B. (2003). Agency problems in large family business groups. *Entrepreneurship theory and practice*, *27*(4), 367-382.

O'Toole, C. M., Lawless, M., & Lambert, D. (2015). Non-bank financing in Ireland: A comparative perspective. *The Economic and Social Review*, *46*(1, Spring), 133-161.

Pan, Y., Wang, T. Y., & Weisbach, M. S. (2016). CEO investment cycles. *The Review of Financial Studies*, *29*(11), 2955-2999.

Pawlina, G., & Renneboog, L. (2005). Is investment-cash flow sensitivity caused by agency costs or asymmetric information? Evidence from the UK. *European Financial Management*, *11*(4), 483-513.

Rajgopal, S., Shevlin, T., & Zamora, V. (2006). CEOs' outside employment opportunities and the lack of relative performance evaluation in compensation contracts. *The Journal of Finance*, *61*(4), 1813-1844.

Ramalho, E. A., Ramalho, J. J., & Henriques, P. D. (2010). Fractional regression models for second stage DEA efficiency analyses. *Journal of Productivity Analysis*, *34*(3), 239-255.

Ross, S. A. (1977). The determination of financial structure: the incentive-signalling approach. *The bell journal of economics*, 23-40.

Scharfstein, D. S., & Stein, J. C. (1990). Herd behavior and investment. *The American economic review*, 465-479.

Serfling, M. A. (2014). CEO age and the riskiness of corporate policies. *Journal of Corporate Finance*, *25*, 251-273.

Sun, R., & Zou, G. (2021). Political connection, CEO gender, and firm performance. *Journal of Corporate Finance*, *71*, 101918.

Tone, K. (2001). A slacks-based measure of efficiency in data envelopment analysis. *European journal of operational research*, *130*(3), 498-509.

Trueman, B. (1986). The relationship between the level of capital expenditures and firm value. *Journal of Financial and Quantitative Analysis*, *21*(2), 115-129.

Wu, J., Zhang, J., Zhang, S., & Zou, L. (2020). The economic policy uncertainty and firm investment in Australia. *Applied Economics*, *52*(31), 3354-3378.

Yim, S. (2013). The acquisitiveness of youth: CEO age and acquisition behavior. *Journal of financial economics*, *108*(1), 250-273.

Yung, K., & Chen, C. (2018). Managerial ability and firm risk-taking behavior. *Review of Quantitative Finance and Accounting*, *51*(4), 1005-1032.

Appendix 2.A: Variable Definitions

This table presents the definitions of the key variables used in Essay 2.

Variable	Description
Dependent Variable for Main Analysis	
Investment	Following the definition of ***Blaylock (2016)*** $Investment_t$ = (Capital $Expenditure_t$ + Mergers and $Acquisition_t$ + Research & Development Expenditure – Cash Flow from Sale of P PE_t – Depreciation$t$)/Total $Asset_{t-1}$.
Independent Variable for Main Analysis	
MA Score	As calculated using the two-step estimation process following Demerjian (2012)
Control Variables	
MTB	Market Value of Equityt/Book Value of Equityt
Cash	Cash and cash equivalentst/Total Assett-1
ROA	Net Profitt/Total Assett-1
Leverage	Long-term Debtt/Total Assett-1
Age	Firm Age, measured from the year of incorporation
Lag TA	Log of Total Assets, lagged by one year
Other Variables of Interest	
Tobin's Q	Market Value of Firm/Book Value of Firm
Business Group	Measured as an Indicator Variable that takes value =1 if the firm belongs is affiliated to a Business Group
EPU	Borrowed from the global EPU calculated by Davis (2016) based on Baker et al. (2016)

Appendix 2.B: Hausman Test to Check for Fixed Effects vis-à-vis Random Effects

This table presents the coefficients of the Hausman Test which is used to identify whether firm-specific heterogeneity is associated with the other independent variable. The null hypothesis states that the unique errors of the model are not correlated with the other regressors, which is consistent with a random effects model.

	(b)	(B)	(b-B)	sqrt(diag(V_b))
Investment	**fixed**	**random**	**Difference**	**S.E.**
MA Score	0.053	0.055	-0.003	0.002
MTBt-1	0.004	0.004	-0.001	0.000
ROAt-1	0.257	0.280	-0.023	0.003
Casht-1	0.141	0.096	0.045	0.006
Levt-1	0.001	0.001	-0.001	0.000
Aget-1	-0.001	0.000	-0.002	0.001
Log TAt-1	-0.036	0.004	-0.041	0.002
Investt-2	0.157	0.276	-0.119	0.002
b = consistent under Ho and Ha; obtained from xtreg				
B = inconsistent under Ha, efficient under Ho; obtained from xtreg				
Test: Ho: difference in coefficients not systematic				
chi2(26) = (b-B)'[(V_b-V_B)^(-1)](b-B)				
= 6533.72				
Prob>chi2 = 0.0000				

Appendix 2.C: Robustness Test: To Determine if the Relationship Between Managerial Ability and Firm Investment Holds even after controlling for Macroeconomic Factors

The table below provides the robustness analysis of the regression analysis of the impact of managerial ability on firm investment decision making. The models below include the macroeconomic factors that may impact the investment levels of the firms. The models include various macroeconomic variables. Inflation is the annual Consumer Price Index (CPI), the GDP is the annual growth rate of GDP, the GFCF is the percentage of GDP spent by the government on investment activities, and the Term Spread is the difference between the yield of the 10 year government bonds and the 1 year government bonds. Investment is the dependent variable investment which is measured following the definition of Blaylock (2016) as $Investment_t$ = (Capital $Expenditure_t$ + Mergers and $Acquisition_t$ + Research & Development $Expenditure_t$ – Cash Flow from Sale of PPE_t – Depreciationt)/Total $Asset_{t-1}$. The independent variable is MA Score which is calculated using the two-step estimation process building along the lines of Demerjian et al. (2012). MTB is the market value of equity to the book value of equity. CASH is the cash and cash equivalents, scaled by Total Assets. ROA is the Return on Assets of the Firm, LEV is the leverage ratio, Age is the age of the firm calculated from the year of incorporation. Log TA is the log of total assets and represents the size of the firm. All the variables are winsorized at 1% levels. The table presents the coefficients of the variables from the regression analyses, and the standard error are included in the parentheses. The models control for heteroskedasticity by using robust standard errors. *, ** and *** indicate statistical significance art 99%, 95% and 90% respectively.

Model Number	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Dependent Variable	**Investment**	**Investment**	**Investment**	**Investment**	**Investment**
MA Score	0.0347***	0.0349***	0.0359***	0.0361***	0.0356***
	(0.00648)	(0.00649)	(0.00645)	(0.00648)	(0.00646)
MTB	0.00519***	0.00491***	0.00472***	0.00505***	0.00449***
	(0.000672)	(0.000668)	(0.000660)	(0.000670)	(0.000660)
CASH	0.0990***	0.107***	0.110***	0.105***	0.118***
	(0.0199)	(0.0199)	(0.0198)	(0.0202)	(0.0200)
ROA	0.298***	0.304***	0.281***	0.303***	0.281***
	(0.0161)	(0.0161)	(0.0159)	(0.0161)	(0.0159)
LEV	-0.0876***	-0.0825***	-0.0804***	-0.0825***	-0.0764***
	(0.0102)	(0.0102)	(0.0101)	(0.0106)	(0.0104)

Model Number	(1)	(2)	(3)	(4)	(5)
Dependent Variable	**Investment**	**Investment**	**Investment**	**Investment**	**Investment**
Age	0.00169***	0.00120***	0.00212***	0.00156***	0.00184***
	(0.000341)	(0.000339)	(0.000339)	(0.000337)	(0.000335)
Size	-0.0297***	-0.0263***	-0.0292***	-0.0272***	-0.0274***
	(0.00277)	(0.00275)	(0.00276)	(0.00276)	(0.00275)
Inflation (CPI)	0.00326***				-0.00171***
	(0.000447)				(0.000561)
GDP (% Annual)		0.00569***			0.00487***
		(0.000466)			(0.000459)
GFCF (% of GDP)			0.00641***		0.00733***
			(0.000469)		(0.000547)
Term Spread				0.00413***	-0.00110
				(0.00136)	(0.00145)
Constant	0.210***	0.184***	0.0162	0.213***	-0.0368
	(0.0175)	(0.0176)	(0.0222)	(0.0175)	(0.0225)
Firm Fixed Effects	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Year Fixed Effects	**No**	**No**	**No**	**No**	**No**
Observations	**42,288**	**42,288**	**42,288**	**42,288**	**42,288**
Adj. R-squared	**0.079**	**0.079**	**0.079**	**0.079**	**0.079**

References

Almeida, H., Campello, M., & Weisbach, M. S. (2004). The cash flow sensitivity of cash. *The journal of finance*, *59*(4), 1777-1804.

Andreou, P. C., Louca, C., & Petrou, A. P. (2017). CEO age and stock price crash risk. *Review of Finance*, *21*(3), 1287-1325.

Baik, B., Choi, S., & Farber, D. B. (2020). Managerial ability and income smoothing. *The Accounting Review*, *95*(4), 1-22.

Baker, H. K., Powell, G. E., & Veit, E. T. (2002). Revisiting the dividend puzzle: Do all of the pieces now fit?. *Review of Financial Economics*, *11*(4), 241-261.

Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *The quarterly journal of economics*, *131*(4), 1593-1636.

Bates, T. W., Kahle, K. M., & Stulz, R. M. (2009). Why do US firms hold so much more cash than they used to?. *The journal of finance*, *64*(5), 1985-2021.

Baumol, W. J. (1952). The transactions demand for cash: An inventory theoretic approach. *The Quarterly journal of economics*, *66*(4), 545-556.

Bertrand, M., & Schoar, A. (2003). Managing with style: The effect of managers on firm policies. *The Quarterly journal of economics*, *118*(4), 1169-1208.

Bloom, N. (2014). Fluctuations in uncertainty. *Journal of economic Perspectives*, *28*(2), 153-176.

Chen, H. C., Chou, R. K., & Lu, C. L. (2018). Saving for a rainy day: Evidence from the 2000 dot-com crash and the 2008 credit crisis. *Journal of Corporate Finance*, *48*, 680-699.

Chen, Y., Podolski, E. J., & Veeraraghavan, M. (2015). Does managerial ability facilitate corporate innovative success?. *Journal of empirical finance*, *34*, 313-326.

Custódio, C., & Metzger, D. (2014). Financial expert CEOs: CEO ′s work experience and firm ′ s financial policies. *Journal of Financial Economics*, *114*(1), 125-154.

Davis, S. J. (2016). *An index of global economic policy uncertainty* (No. w22740). National Bureau of Economic Research.

Demerjian, P. R., Lev, B., Lewis, M. F., & McVay, S. E. (2013). Managerial ability and earnings quality. *The accounting review*, *88*(2), 463-498.

Demerjian, P., Lev, B., & McVay, S. (2012). Quantifying managerial ability: A new measure and validity tests. *Management science*, *58*(7), 1229-1248.

Demir, E., & Ersan, O. (2017). Economic policy uncertainty and cash holdings: Evidence from BRIC countries. *Emerging Markets Review*, *33*, 189-200.

Dittmar, A., & Mahrt-Smith, J. (2007). Corporate governance and the value of cash holdings. *Journal of financial economics*, *83*(3), 599-634.

Dittmar, A., Mahrt-Smith, J., & Servaes, H. (2003). International corporate governance and corporate cash holdings. *Journal of Financial and Quantitative analysis*, *38*(1), 111-133.

Duchin, R. (2010). Cash holdings and corporate diversification. *The Journal of Finance*, *65*(3), 955-992.

Fama, E. F. (1990). Stock returns, expected returns, and real activity. *The journal of finance*, *45*(4), 1089-1108.

Fama, E. F., & French, K. R. (1998). Taxes, financing decisions, and firm value. *The journal of Finance*, *53*(3), 819-843.

Fama, E. F., & French, K. R. (2002). Testing trade-off and pecking order predictions about dividends and debt. *Review of financial studies*, 1-33.

Faulkender, M., & Wang, R. (2006). Corporate financial policy and the value of cash. *The journal of finance*, *61*(4), 1957-1990.

Fazzari, S., Hubbard, R. G., & Petersen, B. (1988). Investment, financing decisions, and tax policy. *The American economic review*, *78*(2), 200-205.

Foley, C. F., Hartzell, J. C., Titman, S., & Twite, G. (2007). Why do firms hold so much cash? A tax-based explanation. *Journal of financial economics*, *86*(3), 579-607.

Gan, H. (2019). Does CEO managerial ability matter? Evidence from corporate investment efficiency. *Review of Quantitative Finance and Accounting*, *52*(4), 1085-1118.

Gan, H., & Park, M. S. (2017). CEO managerial ability and the marginal value of cash. *Advances in accounting*, *38*, 126-135.

García-Meca, E., & García-Sánchez, I. M. (2018). Does managerial ability influence the quality of financial reporting?. *European Management Journal*, *36*(4), 544-557.

García-Sánchez, I. M., & García-Meca, E. (2018). Do talented managers invest more efficiently? The moderating role of corporate governance mechanisms. *Corporate Governance: An International Review*, *26*(4), 238-254.

Ghemawat, P., & Khanna, T. (1998). The nature of diversified business groups: A research design and two case studies. *The Journal of Industrial Economics*, *46*(1), 35-61.

Graham, J. R., Leary, M. T., & Roberts, M. R. (2015). A century of capital structure: The leveraging of corporate America. *Journal of financial economics*, *118*(3), 658-683.

Guizani, M. (2017). The financial determinants of corporate cash holdings in an oil rich country: Evidence from Kingdom of Saudi Arabia. *Borsa Istanbul Review*, *17*(3), 133-143.

Habib, A., & Hasan, M. M. (2017). Firm life cycle, corporate risk-taking and investor sentiment. *Accounting & Finance*, *57*(2), 465-497.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of management review*, *9*(2), 193-206.

Han, S., & Qiu, J. (2007). Corporate precautionary cash holdings. *Journal of corporate finance*, *13*(1), 43-57.

Harford, J. (1999). Corporate cash reserves and acquisitions. *The Journal of Finance*, *54*(6), 1969-1997.

Harford, J., Mansi, S. A., & Maxwell, W. F. (2008). Corporate governance and firm cash holdings in the US. *Journal of financial economics*, *87*(3), 535-555.

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica: Journal of the econometric society*, 1251-1271.

Hoshi, T., Kashyap, A., & Scharfstein, D. (1991). Corporate structure, liquidity, and investment: Evidence from Japanese industrial groups. *the Quarterly Journal of economics*, *106*(1), 33-60.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American economic review*, *76*(2), 323-329.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, *3*(4), 305-360.

Jiang, J., & Wu, S. (2022). The effects of cash-holding motivation on cash management dynamics. *Research in International Business and Finance*, *59*, 101542.

Jiraporn, P., Leelalai, V., & Tong, S. (2016). The effect of managerial ability on dividend policy: how do talented managers view dividend payouts?. *Applied Economics Letters*, *23*(12), 857-862.

Kalcheva, I., & Lins, K. V. (2007). International evidence on cash holdings and expected managerial agency problems. *The review of financial studies*, *20*(4), 1087-1112.

Keynes, J. M. (1936). Fluctuations in Net Investment in the United States. *The Economic Journal*, *46*(183), 540-547.

Khanna, T., & Palepu, K. (2005). The evolution of concentrated ownership in India: broad patterns and a history of the Indian software industry. In *A history of corporate governance around the world: Family business groups to professional managers* (pp. 283-324). University of Chicago press.

Khanna, T., & Yafeh, Y. (2005). Business groups and risk sharing around the world. *The Journal of Business*, *78*(1), 301-340.

Khurana, I. K., Moser, W. J., & Raman, K. K. (2018). Tax avoidance, managerial ability, and investment efficiency. *Abacus*, *54*(4), 547-575.

Kim, W. S., & Sorensen, E. H. (1986). Evidence on the impact of the agency costs of debt on corporate debt policy. *Journal of Financial and quantitative analysis*, *21*(2), 131-144.

Koester, A., Shevlin, T., & Wangerin, D. (2017). The role of managerial ability in corporate tax avoidance. *Management Science*, *63*(10), 3285-3310.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1997). Legal determinants of external finance. *The journal of finance*, *52*(3), 1131-1150.

Lee, C. C., Wang, C. W., Chiu, W. C., & Tien, T. S. (2018). Managerial ability and corporate investment opportunity. *International Review of Financial Analysis*, *57*, 65-76.

Lensink, R., Van der Molen, R., & Gangopadhyay, S. (2003). Business groups, financing constraints and investment: The case of India. *The Journal of Development Studies*, *40*(2), 93-119.

Liu, Y., & Mauer, D. C. (2011). Corporate cash holdings and CEO compensation incentives. *Journal of financial economics*, *102*(1), 183-198.

Magerakis, E. (2022). The importance of managerial discretion on managerial ability–firm cash holding nexus. *Management Decision*.

Malmendier, U., & Tate, G. (2005). CEO overconfidence and corporate investment. *The journal of finance*, *60*(6), 2661-2700.

Martin, K. J. (1996). The method of payment in corporate acquisitions, investment opportunities, and management ownership. *The Journal of finance*, *51*(4), 1227-1246.

Miller, M. H., & Orr, D. (1966). A model of the demand for money by firms. *The Quarterly journal of economics*, *80*(3), 413-435.

Moolchandani, R., & Kar, S. (2022). Family control, agency conflicts, corporate cash holdings and firm value. *International Journal of Emerging Markets*, *17*(10), 2636-2654.

Mun, S., Han, S. H., & Seo, D. (2020). The impact of CEO educational background on corporate cash holdings and value of excess cash. *Pacific-Basin Finance Journal*, *61*, 101339.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of financial economics*, *13*(2), 187-221.

Opler, T., Pinkowitz, L., Stulz, R., & Williamson, R. (1999). The determinants and implications of corporate cash holdings. *Journal of financial economics*, *52*(1), 3-46.

Orens, R., & Reheul, A. M. (2013). Do CEO demographics explain cash holdings in SMEs?. *European Management Journal*, *31*(6), 549-563.

Qin, X., Huang, G., Shen, H., & Fu, M. (2020). COVID-19 pandemic and firm-level cash holding—moderating effect of goodwill and goodwill impairment. *Emerging Markets Finance and Trade*, *56*(10), 2243-2258.

Rozeff, M. S. (1982). Growth, beta and agency costs as determinants of dividend payout ratios. *Journal of financial Research*, *5*(3), 249-259.

Samaan, D., & Schott, I. (2016). Corporate liquidity under financial constraints and macroeconomic uncertainty. In *Dynamic Modeling, Empirical Macroeconomics, and Finance* (pp. 221-259). Springer, Cham.

Shin, H. H., & Park, Y. S. (1999). Financing constraints and internal capital markets: Evidence from Koreanchaebols'. *Journal of corporate finance*, *5*(2), 169-191.

Singh, M., & Davidson III, W. N. (2003). Agency costs, ownership structure and corporate governance mechanisms. *Journal of banking & finance*, *27*(5), 793-816.

Song, K. R., & Lee, Y. (2012). Long-term effects of a financial crisis: Evidence from cash holdings of East Asian firms. *Journal of Financial and Quantitative analysis*, *47*(3), 617-641.

Thukral, S., Sridhar, S., & Joshi, M. S. (2015). Review of factors constraining the development of Indian corporate bond markets. *Qualitative Research in Financial Markets*, *7*(4), 429-444.

Tsai, J. F., Mai, N. T., & Bui, D. G. (2022). Managerial ability, financial constraints, and the value of cash holding. *Applied Economics Letters*, *29*(5), 462-468.

Whited, T. M. (2006). External finance constraints and the intertemporal pattern of intermittent investment. *Journal of Financial Economics*, *81*(3), 467-502.

Yung, K., & Chen, C. (2018). Managerial ability and firm risk-taking behavior. *Review of Quantitative Finance and Accounting*, *51*(4), 1005-1032.

Zacharias, N. A., Six, B., Schiereck, D., & Stock, R. M. (2015). CEO influences on firms' strategic actions: A comparison of CEO-, firm-, and industry-level effects. *Journal of Business Research*, *68*(11), 2338-2346.

Appendix 3.A: Variable Definitions

This appendix defines the variables used in this study. The variables are clubbed into heads to facilitate easy identification of the models in which the variables have been used.

Variable	Measurement
Cash/TA	Cash (including bank deposits) and Cash Equivalents scaled by Total Assets
XCash/TA	Excess cash calculated by methodology used in Opler et al., (1999), and modified by Bates et al. (2009)
MA Score	Managerial Ability, calculated by building on the methodology of Demerjian et al. (2012), in Essay 1.
	Determinants of cash balances
MTB	Market Value of Equity, scaled by Book Value of Equity
CF/TA	Operating Income (EBITDA) - Interest, Tax and Dividends, scaled by Total Assets
NWC/TA	Non-cash working capital = Current Assets - Current Liabilities, scaled by Total Assets
Capex/TA	Capital expenditure, scaled by Total Assets
Lev	Long Term Debt, scaled by Total Assets
R&D/TA	Research and Development Expenses, scaled by Total Assets
DIV/TA	Dividend scaled by Total Assets
Sales Gr	Growth in Sales from year t-1 to t, however, lagged at 2 years
	Excess cash is the residual from regression of cash holdings on determinants of cash holdings, using fixed effects regression and controlling for time fixed effects as well.
Market Value	Market Value of Firm (Equity+ Debt-long term and short term)/Total Assets
	Transaction Motive
Firm Size	Natural Logarithm of Total Assets of Firm
BG	Dummy variable that takes the value of 1 if firm is affiliated to a BG; 0 otherwise
	Precautionary Motive

Variable	Measurement
CFO_SD	Standard Deviation of the Operating Cash Flows, scaled by Total Assets, calculated using a rolling window of 3 years following Han and Qiu (2007). It is a measure of volatility of cash flows
EPU	Economic Policy Uncertainty, downloaded from www.policyuncertainty.com
	Market Value Model
EBIT/TA	Earnings Before Interest and Taxes, scaled by Total Assets
R&D/TA	Research and Development Expenses, scaled by Total Assets;
Int/TA	Interest Expenses, scaled by Total Assets
DIV/TA	Dividend Expenses, scaled by Total Assets
dE_{t-2}	Percentage change in EBIT/TA from t-2 to t
dE_{t+2}	Percentage change in EBIT/TA from t to t+2
dA_{t-2}	Percentage change in Total Assets from t-2 to t
dA_{t+2}	Percentage change in Total Assets from t to t+2
dR_{t-2}	Percentage change in R&D/TA from t-2 to t
dR_{t+2}	Percentage change in R&D/TA from t to t+2
dI_{t-2}	Percentage change in Int/TA from t-2 to t
dI_{t+2}	Percentage change in Int/TA from t to t+2
dD_{t-2}	Percentage change in DIVTA from t-2 to t
dD_{t+2}	Percentage change in DIV/TA from t to t+2
dV_{t+2}	Percentage change in MV/TA from t to t+2

Appendix 3.B: Estimation of Excess Cash

This table presents the average of the coefficients from the industry-wise estimations of the model used to compute excess cash. Excess cash is calculated as the deviation from the normal cash needed by the firms to continue operations. It is calculated using the modified methodology of Opler et al. (1999) as the residual from the 2SLS estimation $\frac{Cash_{i,t}}{TA_{i,t}} = \beta_0 + \beta_1 * \frac{Cash\ Flow_{i,t}}{TA_{i,t}} + \beta_2 * \frac{NWC_{i,t}}{TA_{i,t}} + \beta_3 * \frac{Capex_{i,t}}{TA_{i,t}} + \beta_4 * Lev_{i,t} + \beta_5 * \frac{R\&D_{i,t}}{TA_{i,t}} + \beta_6 * \frac{DIV_{i,t}}{TA_{i,t}} + \beta_7 * \widehat{MTB}_{i,t} + YFE + FFE + e_{i,t}$, where $\widehat{MTB}_{i,t}$ is the predicted Market to Book ratio using second lag of the sales growth as the instrumental variable. The firm fixed effects component is also included in the excess cash following the literature (Dittmar and Mahrt-Smith, 2007; Bates et al., 2009). The instrumental variable – sales growth – is positively and significantly associated with the Market-to-Book ratio. The table provides the average coefficients of the industry-wise estimates. The models are performed using the FFE regressions to control for unobserved firm-level heterogeneity. Column (1) presents the results of the instrumental variable where sales growth is used as an instrument to predict the MTB ratio, and the predicted value of the MTB is used as an independent variable in the second step, and the results are presented in Column (2). The table also presents the average coefficients of the variables from the regression analyses, and the average of the standard errors is included in the parentheses. The models control for heteroskedasticity by using robust standard errors. *, ** and *** indicate statistical significance at 99%, 95% and 90% respectively.

Model Number	**(1)**	**(2)**
Regression Method	**FFE**	**FFE**
Dependent Variables	**$MTB_{i,t}$**	**$Cash/TA_{i,t}$**
$\widehat{MTB}_{i,t}$		0.0006
		(0.0043)
$CF/TA_{i,t}$	1.2064***	0.0505***
	(0.1520)	(0.0119)
$NWC/TA_{i,t}$	0.1701**	-0.0151
	(0.0705)	(0.0073)
$Capex/TA_{i,t}$	0.3608***	0.0029
	(0.0936)	(0.0055)
$Lev/TA_{i,t}$	0.5631***	-0.0654
	(0.198)	(0.0172)
$R\&D/TA_{i,t}$	10.2312	-0.479

Model Number	**(1)**	**(2)**
Regression Method	**FFE**	**FFE**
Dependent Variables	**$MTB_{i,t}$**	**$Cash/TA_{i,t}$**
	(14.6292)	(0.6883)
$DIV/TA_{i,t}$	15.4939***	0.3244***
	(1.465)	(0.0495)
Sales $Gr_{i,t-2}$	0.0222*	
	(0.0115)	
Cons	0.1299***	-0.0035
	(0.0511)	(0.0021)
Year Fixed Effects	**Yes**	**Yes**
Firm Fixed Effects	**Yes**	**Yes**
Average Adj. R-squared	**0.301**	**0.247**

Appendix 3.C Hausman Test to test for the use of Random Effects Model vs. Fixed Effects Model

This table presents the coefficients of the Hausman Test which is used to identify whether firm-specific heterogeneity is associated with the other independent variable. The null hypothesis states that the unique errors of the model are not correlated with the other regressors, which is consistent with a random effects model. The Hausman test rejects presented below rejects the null hypothesis, and suggests using the fixed effects model.

	(b)	(B)	(b-B)	sqrt(diag(V_b))
	fixed	**random**	**Difference**	**S.E.**
MA Score	0.0087	0.0088	0.0000	0.0005
CF/TA	0.0422	0.0449	-0.0026	0.0010
NWC/TA	-0.0100	-0.0109	0.0009	0.0005
Capex/TA	0.0000	-0.0011	0.0010	0.0008
Lev/TA	-0.0581	-0.0576	-0.0004	0.0010
R&D/TA	-0.0167	-0.0306	0.0139	0.0483
DIV/TA	0.3341	0.4109	-0.0768	0.0104
b = consistent under Ho and Ha; obtained from xtreg				
B = inconsistent under Ha, efficient under Ho; obtained from xtreg				
Test: Ho: difference in coefficients not systematic				
chi2(24) = (b-B)'[(V_b-V_B)^(-1)](b-B)				
= 107.35				
Prob>chi2 = 0.0000				

Appendix 3.D: Sensitivity Analysis of the Regression Analysis of Impact of Managerial Ability on the Market Value of Excess Cash with respect to Market Efficiency

The table below conducts a sensitivity analysis of the regression analysis of the impact of managerial ability on the market value of excess cash, while considering variations in the market efficiency assumed. Fama and French (1998) assumed the market to be efficient for 2 years, which is the baseline case presented in Table 3.10. This table provides a sensitivity analysis considering market efficiency for 1 year and 3 years. MA Score is the managerial ability score calculated using the two-step estimation process by building on Demerjian et al. (2016). XCash/TA is the excess cash and is calculated as the deviation from the normal cash needed by the firms to continue operations. It is calculated using the modified methodology of Opler et al. (1999) as the residual from the 2SLS estimation $\frac{Cash_{i,t}}{TA_{i,t}} = \beta_0 + \beta_1 * \frac{Cash\ Flow_{i,t}}{TA_{i,t}} + \beta_2 * \frac{NWC_{i,t}}{TA_{i,t}} + \beta_3 * \frac{Capex_{i,t}}{TA_{i,t}} + \beta_4 * Lev_{i,t} + \beta_5 * \frac{R\&D_{i,t}}{TA_{i,t}} + \beta_6 * \frac{DIV_{i,t}}{TA_{i,t}} + \beta_7 * \widehat{MTB}_{i,t} + Year\ Fixed\ Effects + Firm\ Fixed\ Effects + e_{i,t}$, where $\widehat{MTB}_{i,t}$ is the predicted Market to Book ratio using second lag of the sales growth as the instrumental variable. The firm fixed effects component is also included in the excess cash following the literature (Dittmar and Mahrt-Smith, 2007; Bates et al., 2009). The remaining variables are the key financial variables that impact market value of the firm and have been derived from Fama and French (1998). EBIT/TA is the Earnings Before Interest and Taxes, scaled by Total Assets; R&D/TA is the Research and Development Expenses, scaled by Total Assets; Int/TA is the Interest Expenses, scaled by Total Assets; DIV/TA is the Dividend Expenses, scaled by Total Assets. The model also includes past and future change variables, due to the assumption of market efficiency. The dE_{t-1} is the percentage change in EBIT/TA from t-1 to t, while dE_{t+1} is the percentage change in EBIT/TA from t to t+1. The dA_{t-1} is the percentage change in Total Assets from t-1 to t, while dA_{t+1} is the percentage change in Total Assets from t to t+1. The dR_{t-1} is the percentage change in R&D/TA from t-1 to t, while dR_{t+1} is the percentage change in R&D/TA from t to t+1. The dI_{t-1} is the percentage change in Int/TA from t-1 to t, while dI_{t+1} is the percentage change in Int/TA from t to t+1. The dD_{t-1} is the percentage change in DIV/TA from t-1 to t, while dD_{t+1} is the percentage change in DIV/TA from t to t+1. Finally, dV_{t+1} is the percentage change in MV/TA from t to t+1. Similarly, for 3 years as the period of analysis, the variables are adjusted so that the changes are measured from t-3 to t and t to t+3. The table presents the coefficients of the variables from the regression analyses, and the standard error are included in the parentheses. The models control for heteroskedasticity by using robust standard errors. *, ** and *** indicate statistical significance at 99%, 95% and 90% respectively.

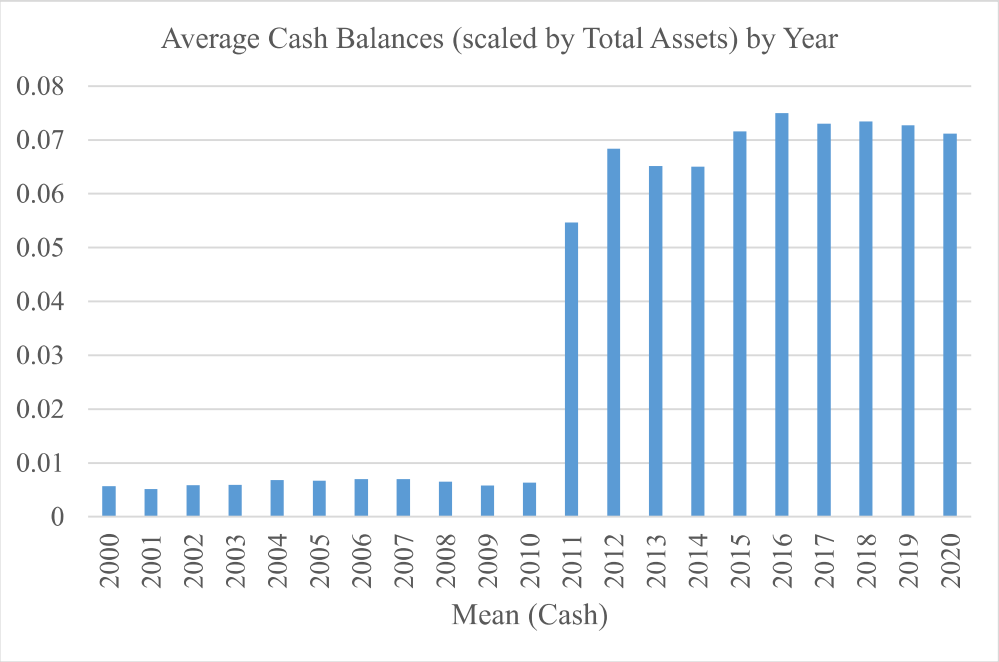
Model Number	(1)	(2)	(3)	(4)
Regression Method	OLS	FFE	OLS	FFE
Market Efficiency	1 year	1 year	3 years	3 years
Dependent Variable	MV_t	MV_t	MV_t	MV_t
MA Score	0.408***	0.357***	0.327***	0.279***
	(0.0391)	(0.0282)	(0.0437)	(0.0310)
Xcash/TA	0.826***	0.942***	0.684***	0.716***
	(0.104)	(0.105)	(0.115)	(0.116)
MA * Xcash	1.234**	0.551*	1.130*	0.404
	(0.564)	(0.302)	(0.592)	(0.339)
EBIT/TA	0.602***	0.457***	0.778***	0.727***
	(0.103)	(0.0348)	(0.109)	(0.0406)
dE_{t-1}	1.078**	0.604***		
	(0.522)	(0.151)		
dE_{t+1}	2.280**	1.274***		
	(1.043)	(0.279)		
dA_{t-1}	-0.0561***	-0.0689***		
	(0.0139)	(0.00685)		
dA_{t+1}	0.0580**	0.0473***		
	(0.0257)	(0.00399)		
R&D/TA	21.03***	6.566***	20.61***	1.548
	(1.618)	(1.640)	(1.747)	(1.822)
dR_{t-1}	889.4	759.3**		
	(1,071)	(332.0)		
dR_{t+1}	812.9	-445.8		
	(1,338)	(517.2)		
Int/TA	-3.017***	-3.058***	-3.245***	-3.299***
	(0.296)	(0.203)	(0.362)	(0.221)
dI_{t-1}	-61.52*	-47.37***		
	(32.16)	(7.095)		
dI_{t+1}	-188.3***	-157.1***		

Model Number	**(1)**	**(2)**	**(3)**	**(4)**
Regression Method	**OLS**	**FFE**	**OLS**	**FFE**
Market Efficiency	**1 year**	**1 year**	**3 years**	**3 years**
Dependent Variable	**MV_t**	**MV_t**	**MV_t**	**MV_t**
	(39.03)	(12.57)		
DIV/TA	30.21***	16.82***	28.51***	15.37***
	(0.783)	(0.478)	(0.843)	(0.506)
dD_{t-1}	-882.3***	-518.0***		
	(240.5)	(96.12)		
dD_{t+1}	704.9***	358.7***		
	(267.3)	(99.14)		
dV_{t+1}	-1.568**	-1.486***		
	(0.707)	(0.0980)		
dE_{t-3}			-1.082	-2.254***
			(1.003)	(0.393)
dE_{t+3}			2.046*	1.046***
			(1.120)	(0.357)
dA_{t-3}			-0.00390	-0.00836
			(0.0196)	(0.00535)
dA_{t+3}			0.0235***	0.0113***
			(0.00873)	(0.00179)
dR_{t-3}			1,755**	1,797***
			(836.3)	(246.4)
dR_{t+3}			1,740***	493.5
			(524.7)	(449.2)
dI_{t-3}			-28.04	53.30***
			(94.94)	(17.85)
dI_{t+3}			-144.0*	-38.46*
			(84.32)	(20.32)
dD_{t-3}			-205.0*	-135.4***
			(112.5)	(43.07)

Model Number	**(1)**	**(2)**	**(3)**	**(4)**
Regression Method	**OLS**	**FFE**	**OLS**	**FFE**
Market Efficiency	**1 year**	**1 year**	**3 years**	**3 years**
Dependent Variable	**MV_t**	**MV_t**	**MV_t**	**MV_t**
dD_{t+3}			369.4***	66.56
			(134.0)	(59.49)
dV_{t+3}			-1.206***	-1.418***
			(0.444)	(0.0825)
Cons	0.167**	0.226***	0.0925	0.223***
	(0.0688)	(0.0231)	(0.0675)	(0.0231)
Observations	**32,440**	**32,440**	**25,820**	**25,820**
Adj. R-squared	**0.310**	**0.215**	**0.317**	**0.224**

Appendix 3.E: Histogram for the Mean Cash Balances of Firms, by Year

The chart below presents the average cash balances by year. Cash is defined as the sum of cash and bank balances (including deposits), and this is scaled by Total Assets.



Limitations of the Study

The aim of this study is to estimate managerial ability and understand its implications on corporate financial decision-making. The first essay uses accounting data taken from Prowess to compose a measure of managerial ability that is available for a wide sample of Indian firms – listed and unlisted. The essay uses the Slacks Based Method (SBM) model of Data Envelopment Analysis (DEA) to compute firm efficiency, as opposed to the Charnes-Cooper-Rhodes (CCR) model used by Demerjian et al. (2012). Secondly, the managerial ability score is defined as the deviation between actual firm efficiency and the firm efficiency predicted by using the firm-specific determinants. The managerial ability measure suffers from certain limitations, as explained below.

First, the managerial ability measure, having been derived from accounting data, is only as accurate as the accounting data reported by firms in their balance sheets. The data is affected by accounting conventions, changes in definitions or any other accounting-related procedures. Second, the grouping of Decision Making Units (DMUs) may prove as a point of deference for firm efficiency measures, because firm efficiency is reference-set dependent (Tone, 2001). Further, there is some loss of data due to the DEA constraint that the efficiency scores are biased if the number of observations in any grouping is less than 30. Third, as pointed out by Banker et al. (2022), the firm efficiency scores may appear to be correlated with the size of the reference-set. However, this does not seem bias the efficiency scores, as the average efficiency in an industry is inversely associated with competition, hence, the larger number of firms operating in an industry, the lesser is the efficiency (Martin, 1993). Finally, there may be certain variables that may be omitted while predicting the efficiency levels of firms in the second stage regressions. While the industry and time groupings help to control for industry-specific and temporal variations, there may still be certain omitted variable that may alter the current results.

The second and third essays estimate the impact of managerial ability on corporate financial decisions, such as the investment decision and the cash holding decision. These essays find that high-ability managers are associated with greater investment, and add value to the firm through the channel of investment. Secondly, high-ability managers are associated with greater cash holdings, and that the high cash holdings are held in accordance with the precautionary motive. The studies are limited in scope as they consider only the listed firms, as market data is only available for listed firms. The studies may also suffer from endogeneity concerns, as it may be that high-ability managers self-select high investment and cash-rich firms, and therefore the relationship may be biased. However, this possibility is limited in the case of India, as managers are generally insiders and there is limited possibility to self-select.

Future Scope and Research Directions

The managerial ability measure is computed by grouping firms on both industry and year, and then computing efficiency separately for each group. However, the measure of firm efficiency may be subject to look-ahead bias (Banker et al., 2022). Banker et al. (2022) suggests grouping firms by year so as to maintain uniformity in the number of firms in each grouping. Future studies may try to estimate the managerial ability for Indian firms following the methodology suggested by Banker et al. (2022). This shall also increase the sample size for which managerial ability scores may be calculated.

The future studies may also estimate the impact of managerial ability on other firm decisions, such as earnings management, financial reporting, tax evasion, cost of capital, and dividend policies, including others. This measure opens the gates for behavioral research in the Indian context, as it has numerous applications in financial research.

Discussion and Practical Implications of the Study

The findings of this study have implications for behavioral research and the extent to which managerial ability has an impact on corporate decision-making processes (Hambrick and Mason, 1984). In addition to composing a composite score of managerial ability, the study has implications for the strategic aspect of leadership and also contributes to the literature on managerial discretion. According to a significant stream of past research, managerial skill or ability has a significant impact on firm outcomes (Bertrand and Schoar, 2003; Demerjian et al., 2012). The majority of the studies have been conducted in the context of US firms, and this study ascertains the impact of managerial ability on firm decision-making in the context of a developing economy – India. This study has implications for practice, because by using publicly available accounting data, users will now be able to estimate the managerial ability.

Although managerial ability is highly correlated with firm performance, there may be instances where they vary. As an illustration, consider the case of Reliance Industries Ltd. (RIL), one of the largest firms in India. Clearly, the company is highly efficient, as it has maintained a firm efficiency score of 1 during the majority of the sample period. However, high efficiency levels are largely explained by firm-specific characteristics, resulting in a managerial ability score that is average at best. The calculated MA Score for RIL is positive but close to zero, indicating that a significant portion of efficiency can be attributed to external factors that are beyond the control of the management. Therefore, this indicator of managerial ability differs from firm efficiency in that it distinguishes management from the exogenous factors in leading to firm efficiency. Financial analysts may be able to use this metric to forecast corporate performance and to generate investment advice. The credit rating agencies also look to the management for additional support for their credit considerations and willingness to pay.

This measure of managerial ability will, thus, aid credit agencies in assessing the creditworthiness of the company.

The study's finding that high-ability managers maintain larger cash reserves for precautionary reasons has important implications for policy makers. To delve deeper into this topic, let's start at the beginning: the institutional theory. The institutional theory posits that "*organizations are technical instruments, designed as means to definite goals. They are judged on engineering premises; they are expendable. Institutions, whether conceived as groups or practices, may be partly engineered, but they also have a "natural" dimension. They are products of interaction and adaptation; they become the receptacles of group idealism; they are less readily expendable*" (Selznick, 1957, pp.21-22). Since organizations are the result of their external environment, organizational actors are able to adapt to the design requirements deemed necessary for efficient operations (DiMaggio and Powell, 1983). The institutional theory also asserts that the interests of the organizations are largely defined by the structure of institutions and this encourages agents to act in accordance with the predetermined goals (Scott, 1987). The institutional theory, therefore, suggests that agents act in consonance with the institutional system in which they operate.

In consonance with the institutional theory, it has been confirmed that the level of cash holdings in firms also depend on the overall level of shareholder protection in the country, or the strength of the institutional framework (Dittmar et al., 2003; Kalcheva and Lins, 2007). Weak shareholder protection and institutions limit external financing opportunities (La Porta et al., 1997), leading to capital constraints (Claessens and Laeven, 2003). The institutional theory predicts that, in this case, high cash levels reduce the underinvestment problems in profitable projects. When considering agency conflicts, associated agency costs may be higher than benefits of reduced underinvestment (Kalcheva and Lins, 2007). Indian firms are majorly

family firms, and the agency costs are minimized to the extent that leadership is rarely separated from the family. Therefore, absent agency costs, the high cash holdings are actually beneficial to the firms.

As a symptom of inadequate shareholder protection due to weak institutional framework, the finding that high-ability managers maintain high cash levels has significant ramifications for policy formation. The study further reveals that Indian managers hold large cash reserves for precautionary purposes, and the excess cash exceeds the optimum levels of cash according to the model proposed by Opler et al., (1999). In addition, the higher cash levels are warranted because they are rewarded by the market participants, the shareholders. For instance, the high cash levels of Infosys and other technology firms contribute to the high market valuations that they afford. Alternatively, for policy considerations, large amounts of cash reserves are undesirable, as it may be used or economic development. Policymakers can take this into consideration and take steps to improve the institutional architecture to encourage firms to lower their cash stockpiles.

Additional References

Banker, R., Park, H. U., & Sahoo, B. (2022). A statistical foundation for the measurement of managerial ability. Working Paper.

Bertrand, M., & Schoar, A. (2003). Managing with style: The effect of managers on firm policies. *The Quarterly journal of economics*, *118*(4), 1169-1208.

Claessens, S., & Laeven, L. (2003). Financial development, property rights, and growth. *the Journal of Finance*, *58*(6), 2401-2436.

Demerjian, P., Lev, B., & McVay, S. (2012). Quantifying managerial ability: A new measure and validity tests. *Management science*, *58*(7), 1229-1248.

DiMaggio, P. J. (1983). State expansion and organization fields.‖ In Organization Theory and Public Policy, 147-61, Richard H. Hall and Robert E. Quinn, ed. Beverly Hills.

Dittmar, A., Mahrt-Smith, J., & Servaes, H. (2003). International corporate governance and corporate cash holdings. *Journal of Financial and Quantitative analysis*, *38*(1), 111-133.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of management review*, *9*(2), 193-206.

Kalcheva, I., & Lins, K. V. (2007). International evidence on cash holdings and expected managerial agency problems. *The review of financial studies*, *20*(4), 1087-1112.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1997). Legal determinants of external finance. *The journal of finance*, *52*(3), 1131-1150.

Martin, S. (1993). Endogenous firm efficiency in a Cournot principal-agent model. *Journal of Economic Theory*, *59*(2), 445-450.

Opler, T., Pinkowitz, L., Stulz, R., & Williamson, R. (1999). The determinants and implications of corporate cash holdings. *Journal of financial economics*, *52*(1), 3-46.

Scott, W. R. (1987). The adolescence of institutional theory. *Administrative science quarterly*, 493-511.

Selznick, P. (1957). Leadership in administration. New York: Harper & Row.

Tone, K. (2001). A slacks-based measure of efficiency in data envelopment analysis. *European journal of operational research*, *130*(3), 498-509.

List of Abbreviations

COGS	Cost of Goods Sold
SG&A	Selling, General and Administrative Expenses
PPE	Property, Plant and Equipment
CMIE	Centre for Monitoring Indian Economy
MMTPA	Million Metric Tonnes Per Annum
RIL	Reliance Industries Limited
IOCL	Indian Oil Corporation Limited
BPCL	Bharat Petroleum Corporation Limited
FF48	Fama-French-48
FCF	Free Cash Flow
RE/TA	Retained Earnings to Total Assets
INR	Indian Rupee
NPV	Net Present Value
EPU	Economic Policy Uncertainty
WACC	Weighted Average Cost of Capital
TA	Total Assets
FFE	Firm Fixed Effects
RE	Random Effects
MTB	Market to Book Ratio
ROA	Return on Assets
SBM	Slacks Based Model
CCR	Charnes Cooper Rhodes
DEA	Data Envelopment Analysis
CRS	Constant Returns to Scale

VRS	Variable Returns to Scale
FRM	Fractional Regression Model
OLS	Ordinary Least Squares
IV	Instrumental Variable
MV	Market Value
EBIT	Earnings Before Interest and Taxes
2SLS	Two Stage Least Squares
BG	Business Group
PSU	Public Sector Undertaking
GFC	Global Financial Crisis
MA	Managerial Ability
CEO	Chief Executive Officer
DMU	Decision Making Unit
NIC	National Industrial Classification
QML	Quasi Maximum Likelihood
R&D	Research and Development
BCC	Banker Charnes Cooper
ROI	Return on Investment
NWC	Net Working Capital