Progenitors of Firm's Search Behaviour: A Country Comparison of Australia vs. India

Ranjan Dasgupta[1] and Monika Dhochak[2]

Abstract

The determinants and consequences of firm-risk are widely studied in regard to the US and other developed markets. However, little attention is paid to these issues in emerging markets or in cross-country contexts. The empirical literature is also mostly silent about the progenitors of firms' search behaviour in an organisational risk context. To fill these research gaps, we investigate the progenitors of a firm's search behaviour (i.e. risk-taking) in a bi-country context of Australia vs. India with 395 firms across 2003-2017. We use four distinctive risk measures - return on asset SD, capital expenditure ratio, accounting beta and R&D intensity, as dependent variables representing the overall search behaviour of firms and thirteen variables under four independent constructs. We use factor analysis to eliminate redundant variables and then multiple regressions to fulfil our research objectives. Results show that fundamental valuation, psychological, corporate governance and performance drivers all influence firms' overall search behaviour. Specifically, firm size, market size, growth opportunities, board busyness, expectation, and operating and cash performance are the most critical sub-progenitors driving firm's risk-taking. Our results are consistent across time, country-heterogeneity and industry contexts. Our study results would be of immense help to firm-managers, investors, policy-makers, and other stakeholders to assess a firm in the risk-return context from both emerging and developed country perspectives. Thereby, these would help these stakeholders in strategic policy decisions and portfolio rebalancing decisions objectively and in a timely manner.

Keywords: Firm-risk, Managerial risk-taking, Search behavior, Corporate governance, Progenitors of risk

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[1] Indian Institute of Management Raipur, India. Dasguptaranjan75@gmail.com
[2] Indian Institute of Management Nagpur, India.

Introduction

While the determinants and consequences of firm-risk (or managerial risk-taking [as used interchangeably here]) are recently examined in the US and other developed markets worldwide (see e.g., John et al., 2008; Bargeron et al., 2010; Faccio et al., 2011; Li et al., 2013; etc.), little attention is paid to these issues in emerging markets or in cross-country contexts. Also, scholarly research in strategy, finance and other organisation disciplines have generally focused on identifying factors that explain firm-performance without serious note of drivers (i.e. progenitors) of firm-risk except in relation to systematic risk. In this paper, we try to fill these research gaps by finding out the progenitors of firm-risk (i.e. firm's overall search behaviour) in a bi-country context of Australia vs. India by using unsystematic accounting based measures.

We begin by providing working definitions of risk, firm-risk and managerial risk-taking. It is critical to draw a distinction first between how managers perceive risk (i.e. risk-taking) and how external stakeholders measure risk (i.e. firm-risk), as the two have most often been confused. Strategy and finance literature defines risk in two ways. For some authors (e.g. Feigenbaum and Thomas, 1988), it represents the degree of uncertainty and is thus measured as variability in income. This definition corresponds to the notions of firm-risk generally held by the investors/shareholders who wish to price the future income streams and thus determine the value of that future income. A critical influence on the pricing of a firm's future income (i.e., through profitability measures and/or stock returns) is the uncertainty of that income. Firms, which report returns varying disproportionately (volatile or downside firms) relative to its own past returns or the overall market's returns, are subject to higher risk. Therefore, here we have taken both *income stream uncertainty* and *market-adjusted accounting beta* (under robustness tests) to proxy firm-risk.

On the other hand, the term '*managerial risk-taking*' refers to choosing the option with the higher outcome variability, i.e., within the wider range of possible outcomes (i.e. innovative searches). However, Shapira (1995) and Miller and Leiblein (1996) argue that managers view risk more in terms of downside losses (i.e. problemistic searches). They are more likely to focus on the potential losses of an investment, i.e., actions that increase firm's exposure to loss are risky considerations. Therefore, according to us, '*managerial risk-taking*' seeks to reduce firm-risk by limiting downside exposure even if this sacrifices upside potential in the process. That is why many prior studies use firm-risk to proxy managerial risk-taking because managerial risk-taking assumes to modify firm-performance (Palmer and Wiseman, 1999). In other words, managers undertaking risky projects also create scope of wider fluctuations in operating income, which makes the firm risky in the eyes of external stakeholders including shareholders.

Generally managers make strategic choices in pursuing problemistic (say capital investment in new projects or technology) and/or innovative (say research & development expenditures) searches on demand and/or at regular intervals out of probable differential risk-return characteristics' investment proposals on behalf of the firm. Then, one combines the risk-return characteristics of the selected investments to create a portfolio of risk and return that reflects overall firm-risk in the form of variability of income stream and market return which investors look at. Therefore, in this study we have used *CAPEX ratio* and *R&D intensity* (under robustness tests) to proxy managerial risk-taking also in the organisational context. So, overall we subscribe that both firm-risk and managerial risk-taking are inclined to firm's overall search behaviour.

However, existing empirical literature is mostly silent about the drivers (i.e. progenitors) of firm-risk (or managerial risk-taking) concerning problemistic or innovative searches by organisations and their managers. Only a few studies like Xiadong et al. (2014) try to investigate its determinants from the theoretical application viewpoint. We fill these gaps in the literature by studying the influence of firm's performance drivers, psychological inputs, corporate governance framework and mechanisms, and fundamental valuation drivers as progenitors of firm's overall search behaviour (i.e. firm-risk or managerial risk-taking) in a single study. We also use the most advanced Confirmatory Factor Analysis (CFA) approach and multiple regression approach in a bi-country context consisting of one emerging (India) and one developed (Australia) country. Our results will also put some light on whether the same progenitors are driving both firm-risk or managerial risk-taking behaviour or not.

We contribute to the existing literature in two ways. Firstly, we frame firm-risk (or managerial risk-taking) in two different contexts under a single study to examine and find out the most influential drivers of them in a bi-country (India and Australia) context which has never done before. Under each of these measures, we have also taken two dependent variables each of distinct nature to make our study more robust. We accept all four of our hypotheses that imply that fundamental valuation, psychological, corporate governance and performance drivers all are driving firm-risk or managerial risk-taking, i.e., overall search behaviour unanimously. More specifically, we observe that firm-size, market size and growth opportunities of the firm within fundamental valuation drivers, board busyness under CG drivers, expectation among the psychological determinants, and firm's operating and cash performance are the most critical sub-progenitors as taken in our study. However, board independence and P/BV has no role to play in influencing risk or risk behaviour. In addition, it is evident from our results that country-specific regulatory and/or cultural characteristics have no role to play in influencing firm's overall search behaviour in Australia and India.Secondly, we use a mixed methodology by combining PCA, CFA (to eliminate redundant variables) and multiple regression model with the main dependent variables (*ROASD* and *CAPEX ratio*) and with two additional dependent variables (i.e. *accounting beta* and *R&D intensity*) under robustness tests for the first time in literature. This finds out progenitors for sample firms which influence both firm-risk or managerial risk-taking i.e. overall search behaviour simultaneously. Limited earlier studies are weak in their methodology.

The remaining portion of this paper is organized as follows – section 2 talks about the relevant literature and develop hypotheses, section 3 presents data and methodology, section 4 presents the results and section 5 concludes the discussion, followed by references.

Materials and methods

Literature review and hypotheses development

Performance drivers and firm-risk or managerial risk-taking

The direct impact of firm-performance on firm-risk or managerial risk-taking is central to work of Fisher and Hall (1969) and Hurdle (1974) [positive], and Bowman (1980; 1984) and Fiegenbaum and Thomas (1985) [negative], and is significant in Singh's (1986) research. However, most of these studies see the impact of performance on firm-risk or managerial risk-taking from a troubled firm context (i.e. problemistic searches) and not on an overall top-down basis. In addition, empirical works mostly study the *income stream uncertainty* by either taking the return on assets (ROA) or return on equity (ROE) measures. To fill these gaps in the existing literature, here we have taken the actual firm performance, actual market return performance of the firms, and also the cash performance to examine the impact of performance as a whole on firm-risk or managerial risk-taking (i.e. overall search behaviour) (see table 1).

More specifically, in the model developed here, we hypothesize that poor performance drives risk in both variability of income and problemistic search behaviour by managers. The underline of our hypothesis is the concept of satisficing levels of firm performance (March and Simon, 1958; and Simon, 1976) and problem-motivated search. In addition, performance above satisficing levels creates slack resources, which motivate managers to innovative searches when opportunities arise (see e.g. Weinzimmer, 2000).

Therefore, our ***first hypothesis*** is:

H1: Performance drivers (operating, stock market and cash) influence firm-risk or managerial risk-taking (i.e. overall search behaviour).

Psychological drivers and firm-risk or managerial risk-taking

Firm's managers take decisions based on two different measures - the performance level they aspire to (aspirations) and the performance level they expect (expectations).

This aspirations-expectancy gap for below performing firms would induce them to undertake risky decisions (problematic searches) in capital expenditure front or (innovative searches) in R&D front, which in turn reduces organisational predictability and creates *income stream uncertainty* and investors' suspicions. Although all earlier studies use only actual performance to predict risk, we follow the behavioural theory (Cyert and March, 1963) of the firm and use expected performance along with actual performance here. It allows us to differentiate between the direct effects of performance on firm-risk and/or managerial risk-taking and the psychological impact of the aspirations-expectations process on these.

As both aspirations and expectations are manager and firm-centric reference or target points we also incorporate an industry performance psychological driver (see table 1) in line with most earlier empirical studies (Lehner, 2000; and Miller and Bromiley, 1990) which adopt the industry mean or median as the reference point. We modify our measure to incorporate the country impact (economic, cultural, regulatory, etc. [see Bargeron et al., 2010; Giordani and Zamparelli, 2011; Hofstede, 2001; etc.) by calculating firm's reference points in this regard in relation to industry averages specifically for India and Australia (i.e. industry-country performance measure [see table 1]). This will cater not only the firm's, but industry-heterogeneity also (see Lehner, 2000; and Miller and Bromiley, 1991) within the country. This is also used here as a complementary measure to firm's actual performance impact on firm-risk or managerial risk-taking (i.e. overall search behaviour). Therefore, our ***second hypothesis*** is:

H2: Psychological drivers (aspirations-expectancy gap in terms of firm's actual performance, market performance and industry-country performance) influence firm-risk or managerial risk-taking (i.e. overall search behaviour).

Corporate governance drivers and firm-risk or managerial risk-taking

Agency theory asserts that managers are reluctant to undertake risky (especially innovative ones) projects out of concern for their personal welfare (Fama, 1980;Holmstrom, 1999). Agency and corporate governance researchers (see e.g., Andres and Vallelado, 2008; Belghitar and Clark, 2015; Pathan, 2009;etc.) address this declining risk-preferences of firm-managers by prescribing various control mechanisms. These can affect managerial risk-taking behaviour positively, such as, board size, board independence, women directors' presence, busy directors, firm's equity ownership and ownership structure, etc.

In line with the assumptions of the agency theory, the number of directors serving a corporate board (i.e. board size) is relevant to the outcome of the board decisions. Although there is no optimal board-size for heterogeneous firms in a country context, board size affects firm's policy choices, and thereby firm-risk or managerial risk-taking (see Coles et al., 2008; and Guest, 2009).

In addition to board-size, board-diversity (i.e. percentage of independent and women directors) is also associated with better firm performance, quality of earnings and/or lower risk-taking propensity by managers. One of the most influential arguments emphasises the role of the incentives that independent directors have to protect their reputation (see Fama, 1980) in the market for independent directorships. Under this so-called *reputation hypothesis*, non-executive directors would support investments in less risky projects, which will help firms in avoiding losses and would thus protect the image of their firms (Pathan, 2009). In addition, based on the *monitoring hypothesis*, we assume that the presence of non-executive directors on corporate boards tends to reduce firms' risk-taking by putting a hold on value-destroying investments. This would encourage them to restrict firms and its managers to take innovative searches and thereby lower firm-risk or managerial risk-taking (Aebi et al., 2012; Ellul and Yerramilli,2013; Pathan, 2009).

Farrell and Hersch (2005) find an inverse link between firm-risk and female directors, However, Adams and Funk (2012) show that female directors are more prone to take risks than men are. Levi et al. (2014) also show that boards with female directors pursue less aggressive acquisition strategies. All these imply that boards with higher women directors' presence are mostly risk-averse in terms of innovative searches due to excessive monitoring or conflicts and thereby *income stream uncertainty* is lower in those firms.

One aspect of resource dependency theory linked with corporate governance and performance (and thereby firm-risk) is the intensity of board activity, as measured by the frequency of board meetings. In line with the '*monitoring hypothesis*' (see Berger et al., 2014) we argue that a board (mostly the independent directors) with more meetings might monitor its executives more strictly. Stricter monitoring would limit executive discretion and decrease opportunities for excess risk-taking, which might ultimately lead to a negative relationship between number of board meetings and risk-taking. However, it is clear from above discussion that all of the corporate governance drivers would have some influence on firm-risk or managerial risk-taking (i.e. overall search behaviour). Therefore, our ***third hypothesis*** is:

Corporate governance drivers (board size, board independence, women directors' presence and number of meetings) influence firm-risk or managerial risk-taking (i.e. overall search behaviour).

Fundamental valuation drivers and firm-risk or managerial risk-taking

Firms typically have heterogeneous investment opportunity sets. Hence, there is no reason to believe that the corporate governance's and other antecedents' (taken here) influence on firm-risk and/or managerial risk-taking would be the same for a firm with plenty of attractive investments and another one with few investment opportunities available. In fact, we argue that the negative effect of a large board should be weaker for high-growth firms but more severe for low-growth firms (see Nakano and Nguyen, 2012). As a result, a high-growth firm would exhibit a higher market value (so price-to-book value would also be higher) together with a high-risk profile. In addition, a high-growth firm typically enjoys higher market share, size and mostly satisfies investors by higher dividend payouts.

Field studies using survey data (see Brav et al., 2004) provide compelling evidence that firm-risk can shape dividend policy. Venkatesh(1989) also argue that higher level of firm-risk causes a reduction in firm's willingness to discharge cash through dividend payments. Therefore, in choosing dividend levels, managers strategize based on sustained future earnings with a high degree of certainty. This suggests that dividend payments should be inversely related to firm-risk or managerial risk-taking. Myers and Majluf(1984) also contend that managers might also have to choose between dividend payments and capital expenditures (investments) which is also used here as a proxy of managerial risk-taking. Therefore, our ***fourth hypothesis*** is:

Fundamental valuation drivers (high-growth, increasing size & market-size, low dividend-pay-outs and increasing P/BV) influence firm-risk or managerial risk-taking (i.e. overall search behaviour).

Control variables and firm-risk or managerial risk-taking

In many of the above-mentioned papers (see Fisher and Hall, 1969; Lant and Montgomery, 1987; Lehner, 2000; Coles et al., 2008; Guest, 2009; John et al., 2008; Aebi et al., 2012; Nakano and Nguyen, 2012; Ellul and Yerramilli, 2013; etc.) results show that firm's characteristics act as catalysts to the main conclusions drawn. Hermalin and Weisbach(2003) also argue that risky external environment can shape firm's risk-taking based on its heterogeneous characteristics. Therefore, here we have incorporated industry-country performance variable and fundamental valuation drivers, which would surely proxy the impact of external environment on studied firms.

In this study we also incorporate age, leverage and liquidity to proxy individual firm's heterogeneous characteristics' impact on firm-risk and managerial risk-taking as control variables. Age is the basic firm-characteristics which impacts firm-risk or managerial risk-taking through the indirect route of '*market power*'. If '*market power*' is assumed to have an impact on firm-risk or managerial risk-taking,[3] and as it is only logical to assume older firms which has survived for some length of time and cash-rich firms which has liquidity to rule with, do have higher '*market power*', then older and liquid firms would exhibit evidence of lower risk (see Venkatesh, 1989). Firms also can use borrowing as a substitute for holding cash (i.e. liquidity) because leverage can act as a proxy for the ability of firms to issue debt (John, 1993). This implies higher risk-taking by firms and managers. Firms with more resources (i.e. slack)

[3] It is assumed here as we have taken market size as an important driver of firm-risk or managerial risk-taking under fundamental valuation drivers.

tend to have more leeway to indulge in exploratory activities (Cyert and March, 1963), allowing their CEOs more discretion (Hambrick and Finkelstein, 1987).

Therefore, we have incorporated firm's age, leverage and liquidity as control variables to moderate the effect of our antecedents on firm-risk or managerial risk-taking (i.e. overall search behaviour).

Data

We start with all firms' data of S&P/ASX 300 and CNX NIFTY 500 collected from *Centre for Monitoring Indian Economy's* (CMIE) prowess database and Bloomberg database. However, during the sorting process, we exclude financial services companies (including banks and NBFCs) and utility companies. Thus, we use data of 395 firms across study years starting from 2003 to 2017 of Australia and India. This results in 5,925 firm-years for all these 17 variables. We undertake only India and Australia here because of their rising trade associations and most importantly, we think that distinctive cultural characteristics of these two countries can provide interesting and conflicting results in our case.

Variables descriptions

Table 1: Description of variables

This table explains the dependent and independent variables (under different constructs) undertaken in this study. The firm-risk is proxied by income stream risk and managerial risk-taking is represented by CAPEX ratio. These two are dependent variables in this study. The 15 independent variables (drivers/antecedents) as constructed here are classified into 4 broad heads (constructs) in accordance with their nature. The heads are shown in parentheses after each variable.

Variables	Description
Income stream risk	*Ex-post* standard deviation (σ) of individual firm's actual return on assets (ROA) for preceding 5 years in year t
CAPEX risk	[(Capital expenditure/Sales)*100] in year t
Operating performance (PD)	Actual ROA [(PAT/Average total assets)*100] in year t
Market performance (PD)	Annualised monthly market return {[((1 + R)^12) - 1] x 100} of a firm in year t
Cash performance (PD)	[(OCF/Average total assets)*100] in year t [average total assets = (total assets in year t-1 + total assets in year t)/2]
Aspiration (PSYD)	$ASP_t = ([ROA_{t-1} – ASP_{t-1}$ (i.e. ROA_{t-2})] + ROA_{t-1})
Expectation (PSYD)	$EXP_t = ([PE_{t-1} – EXP_{t-1}$ (i.e. PE_{t-2})] + PE_{t-1})
Industry-country performance (PSYD)	[Firm's actual ROA in year t (ROA_t) - Mean ROA for all firms in a similar industry in the country in year t-1 ($IndROA_{t-1}$)]
Board size (CGV)	Number of directors in the board in year t
Board independence (CGD)	% of independent directors to total number of directors in the board in year t
Women presence in board (CGD)	% of women directors in the firm-board in year t
Board busyness (CGD)	Number of board meetings in year t
Market size (FVD)	Net sales amount in year t
Growth opportunities (FVD)	% change in investment in total assets in year t from year t-1 (i.e.ΔTA_t = [{(TA_t -TA_{t-1})/TA_{t-1}}*100])
Dividend payout	[(Equity dividend/PAT)*100] in year t

(FVD)	
P/BV (FVD)	Market capitalisation in year t/Book value of assets in year t (scaled in average)
Size (FVD)	Average total assets in year t [average total assets = (total assets in year t-1 + total assets in year t)/2]

Note 1: All market return calculations are undertaken on adjusted closing price basis.
Note 2: All absolute amount figures have been log normalised.
Note 3: PD – Performance drivers; PSYD – Psychological drivers; CGD – Corporate governance drivers; and FVD – Fundamental valuation drivers.
Note 3: PAT – Profit after tax; OCF – Operating cash flow; ASP_t - Aspiration in year t; EXPt - Expectation in year t; PE - Price-earnings ratio; TA – Total assets; P/BV – Price-to-book value.

Table 1 explains the variables (under different constructs) undertaken in this study.

The unpredictability in a firm's income stream is the result of its inherent risk and the managerial risk-taking behaviour (Bromiley, 1991; and Wright et al., 1995). Therefore, we measure firm's risk from the income stream variability and the managerial problemistic and innovative searches (risk-taking) by *CAPEX risk* proxies.

In the first case, firm-risk (henceforth σ) is measured as *ex-post* standard deviation of individual firm's actual return on assets (i.e. ROA) for preceding 5 years on a rolling basis, i.e.,

$$\sigma(ROA)_t = \sqrt{\sum_{j=t-5}^{t-1} \frac{(ROA_j - \overline{ROA})^2}{n - 1}} \qquad (1)$$

Where, t = 2003, 2005,……., 2016

We also measure managerial risk-taking by incorporating *CAPEX ratio* (see table 1). *CAPEX ratio* increases managerial risk-taking in two ways (see Brealey and Myers, 1984; and Shapiro and Titman,1986). In the first case, if firm opts to be capital-intensive and demand fluctuates, there would be wider variations in income streams. Secondly, managers using large amount of capital for innovative searches (measured by *R&D intensity*) runs a high risk of capital obsolescence. In this study, we calculate *CAPEX ratio* in line with Coles et al. (2006).

We discuss the independent constructs (see table 1) in detail while formulating hypotheses in the previous section.

Methods – Exploratory and Confirmatory factor analysis

We employ factor analysis (exploratory and confirmatory) (most appropriate for testing a newfound theory and model [as it is here] (see Gefen et al., 2011; and Bingol et al., 2018) and multiple regression to test the unidimensionality of the constructs (variables) and to analyze the drivers (i.e. progenitors) of firm-risk or managerial risk-taking (i.e. overall search behaviour).

It is also extremely essential to purify the measuring instruments of variables that do not correlate to the constructs (Churchill et al., 1979) before we undertake any type of factor analysis (i.e. exploratory or confirmatory). Therefore, we check the convergent validity of each construct by examining the average variance extracted (AVE) values. Constructs, which have AVE values greater than 0.5 and composite reliability greater than 0.70, are said to have a good convergent validity or unidimensionality (see Chin, 1998; and Chin et al., 2003). We ascertain the discriminant validity of constructs by comparing the AVE scores of the two constructs, with the square of the correlation between the two constructs. If both the AVE values are larger than the square of the correlation, we consider the constructs to show discriminant validity (Fornell and Larcker, 1981).

Methods - Multiple regression model

Next, we use multiple regression analysis (see Gujarati, 2005) to test the hypotheses about the existence of causal effects, to estimate the strength of those effects, and to compare the strength of effects across groups (Stolzenberg, 2004). We estimate multiple regression equations using the set of four independent variables, i.e., fundamental, corporate governance (CG), psychological and performance drivers to examine their influence on firm-risk (i.e. *ROASD*) or managerial risk-taking (i.e. *CAPEX ratio*). In these two regression models, we also incorporate leverage, liquidity and firm-age as control variables. We check for the assumptions of normality, multi-collinearity and auto-correlation before running the regression models. The goodness-of-fit test of Kolmogorov-Smirnov (K-S) shows that the data set does not violet the normality assumption. The Durbin-Watson values prove that there is no presence of auto-correlation. In addition, the correlation matrix and the value of VIF (Variance Inflation Factor) VIF ($\beta_i < 10$) show that multi-collinearity is not an issue for the variables used in this study (in line with Khan et al., 2016).

We thereby use the following two regression models in this study.

Model I: *ROASD* $= \beta_0 + \beta_1$Fundamental $+ \beta_2$CG $+ \beta_3$Psychological $+ \beta_4$Performance $+ \beta_5$Leverage $+ \beta_6$Liquidity $+ \beta_7$Firm-age $+ \varepsilon$ (2)

Model II: *CAPEX ratio* $= \beta_0 + \beta_1$Fundamental $+ \beta_2$CG $+ \beta_3$Psychological $+ \beta_4$Performance $+ \beta_5$Leverage $+ \beta_6$Liquidity $+ \beta_7$Firm-age $+ \varepsilon$ (3)

Results

Descriptive statistics results

Table 2 provides descriptive statistics results of the variables undertaken in this study. Results show that cash performance and market performance are highly volatile in comparison to operating performance of the studied firms. The wide variability of growth opportunities arises out of internal cash flow (fluctuating C&CE) and is evidenced by size, market size and dividend pay-out proxies. This makes the innovative searches uncertain for the firms, but points out that there is enough scope for problemistic searches. However, the psychological and corporate governance variables represent a stable situation in organisation contexts. Overall, this substantiates the investigation of firm-risk or managerial risk-taking (i.e. overall search behaviour) from different constructs' influential role as done here.

Table 2: Descriptive statistics results

This table provides mean, standard deviation, maximum and minimum values of 395Australian and Indian firms studied here (see table 1 for description of these variables).

Variables (measures)	Minimum	Maximum	Mean	Std. Deviation
ROA SD (in %)	.00	145.91	5.12	9.39
CAPEX ratio (in %)	.07	171.75	141.69	113.98
Market size (in Sales US$)	.00	3544433.11	84062.36	319.75
Size (in TA US$)	6.41	19693438.67	207132.20	1141.28
Growth opportunities (in %)	-10.00	584.71	88.67	456.17
Dividend payout (in %)	.00	625.04	241.68	314.71
P/BV (in times)	.51	163.21	4.23	9.17
Aspiration (in %)	-31.99	88.85	5.18	9.89
Expectation (in %)	-2.98	160.53	3.68	8.96
Industry-country performance (in %)	-31.98	60.35	5.36	9.37
Board independence (in %)	17.78	91.87	62.92	15.49
Women directors presence (in %)	.00	63.00	12.46	9.75
Board size (number of directors)	3.22	16.78	7.71	2.62
Busyness (Number of board meetings)	3.75	27.50	10.53	3.65
Operating performance (ROA in %)	-34.47	57.86	5.83	9.23
Market performance (Return in %)	-9.99	1154.77	25.18	86.82
Cash performance (Cashflow in %)	-86.97	1362.06	15.34	78.24
Leverage (TD/TA %)	.00	89.20	22.39	16.91
Cash and cash equivalents (in US$)	2.06	1099123.30	11890.97	654.39
Age (in years)	15.00	212.00	36.73	30.47

Correlations results

Table 3 indicates the co-relationships among the studied variables.It is evident thatgrowth opportunities, aspiration and busy boards significantly positively influence firm-risk. On the other hand, managerial risk-taking has significant positive association with market returns and growth opportunities of the sample firms.Market size, women directors, board size and operating performance influence both firm-risk or managerial risk-taking significantly negatively. In addition, size, industry-country performance, leverage and liquidity have a significant negative influence on firm-risk. Results also prove interrelationships in between variables, which formulate different constructs here. All these results further substantiate our investigation objectives under this study.

Analysis of the results

Our hypothesized model estimates the influence of fundamental, psychological, corporate governance and performance antecedents (i.e. variables) on firm-risk (i.e. *ROASD*) or managerial risk-taking (i.e. *CAPEX ratio*). For testing the hypothesized model, we attempt to gather information about latent factors through observable variables, and thereafter employed factor analysis (exploratory and confirmatory) by examining the covariation among observed variables. Then, we run multiple regression analysis to analyse the influence of these observed variables on firm-risk or managerial risk-taking (i.e. overall search behaviour).

Table 3: Correlations results

This table presents the correlations results among the studied variables. Here, ROASD stands for income stream risk, CAPEX implies CAPEX ratio/risk, MS indicates market size, SIZE implies size of the firm, GRO stands for growth opportunities, DPR represents dividend pay-outs, P/BV implies price-to-book value, ASP stands for aspiration, EXP implies expectation, ICPER indicates industry-country performance, BI stands for board independence, WD implies % women directors in the board, BS represents board size, BM indicates number of board meetings, ROA means return on assets, MR implies market return, CPER denotes cash performance, LEV represents leverage of the firm, C&CE (cash & cash equivalents) stands for liquidity of the firm and AGE indicates age of the firm.

Variables	ROASD	CAPEX	MS	SIZE	GRO	DPR	P/BV	ASP	EXP	ICPER	BI	WD	BS	BM	ROA	MR	CPER	LEV	C&CE	AGE
ROASD	1																			
CAPEX	.091	1																		
MS	-.241**	-.138**	1																	
SIZE	-.212**	-.098	.932**	1																
GRO	.352**	.139**	-.106*	-.086	1															
DPR	.007	-.008	-.033	-.027	-.013	1														
P/BV	.051	-.023	.042	-.021	.001	-.014	1													
ASP	.179**	-.086	.217**	.118*	.045	-.082	.166**	1												
EXP	.071	-.014	.086	.046	.016	-.013	.977**	.177**	1											
ICPER	-.170**	-.076	-.254**	-.364**	-.089	-.069	.134**	.665**	.086	1										
BI	-.034	-.008	-.198**	-.142**	-.012	.046	.002	-.104*	.001	.128*	1									
WD	-.189**	-.122*	-.046	-.053	-.163**	-.015	-.025	.002	-.060	.231**	.431**	1								
BS	-.195**	-.106*	.819**	.830**	-.077	-.040	.046	.149**	.092	-.233**	-.187**	.022	1							
BM	.123*	.029	-.423**	-.383**	.085	.051	-.164**	-.224**	-.186**	.078	.292**	.187**	-.391**	1						
ROA	-.266**	-.114*	.212**	.081	-.119*	-.092	.186**	.810**	.156**	.841**	-.099	.088	.146**	-.258**	1					
MR	.090	.120*	.040	.002	.248**	-.022	.096	.092	.110*	.026	-.028	-.151**	-.052	-.133**	.109*	1				
CPER	-.031	-.017	.169**	.149**	-.008	-.003	.012	.120*	.010	.027	-.064	-.010	.110*	-.060	.113*	.001	1			
LEV	-.207**	-.096	.124*	.200**	-.084	.082	-.126*	-.173**	-.116*	-.192**	.067	.062	.116*	.037	-.175**	-.089	-.081	1		
C&CE	-.170**	-.070	.904**	.936**	-.076	-.049	.031	.140**	.079	-.328**	-.195**	-.069	.798**	-.408**	.126*	.042	.201**	.074	1	
AGE	-.050	-.080	.367**	.309**	-.081	-.031	.173**	.077	.187**	-.095	-.004	.026	.322**	-.230**	.082	.010	.081	.008	.313**	1

**** Accepted at 1% level of significance; * Accepted at 5% level of significance.**

The Exploratory factor analysis results

Table 4: KMO and Bartlett's tests results

This table provides the KMO and Bartlett's testsvalues, whichproves the sample adequacy and factorability of the data.

Kaiser-Meyer-Olkinmeasure of sampling adequacy		0.750
Bartlett's Test of Sphericity	Approx. Chi-Square	4845.966
	df	105
	Sig.	.000

The first step to analyse the hypothesized model is to identify and validate the latent variables. Before extracting the factors, we use Kaiser–Meyer–Olkin (KMO) (Kaiser, 1974) measure and Bartlett's (1950) test of sphericity, to ensure the inherent sufficient correlation in the sample-data. Kaiser (1974) observes that KMO values lying between 0.5 and 0.7 are mediocre, values between 0.7 and 0.8 are good, and values between 0.8 and 0.9 are great for factor analysis. KMO value for our sample data is 0.750 as reported in table 4, greater than 0.50 and thereby acceptable.

Table 5: Rotated component matrix[a]results

This table provides the construct used to describe the variables and values 1,2,3,4 explain the underlining structure in the variables and thereby extract the factors from the structure.

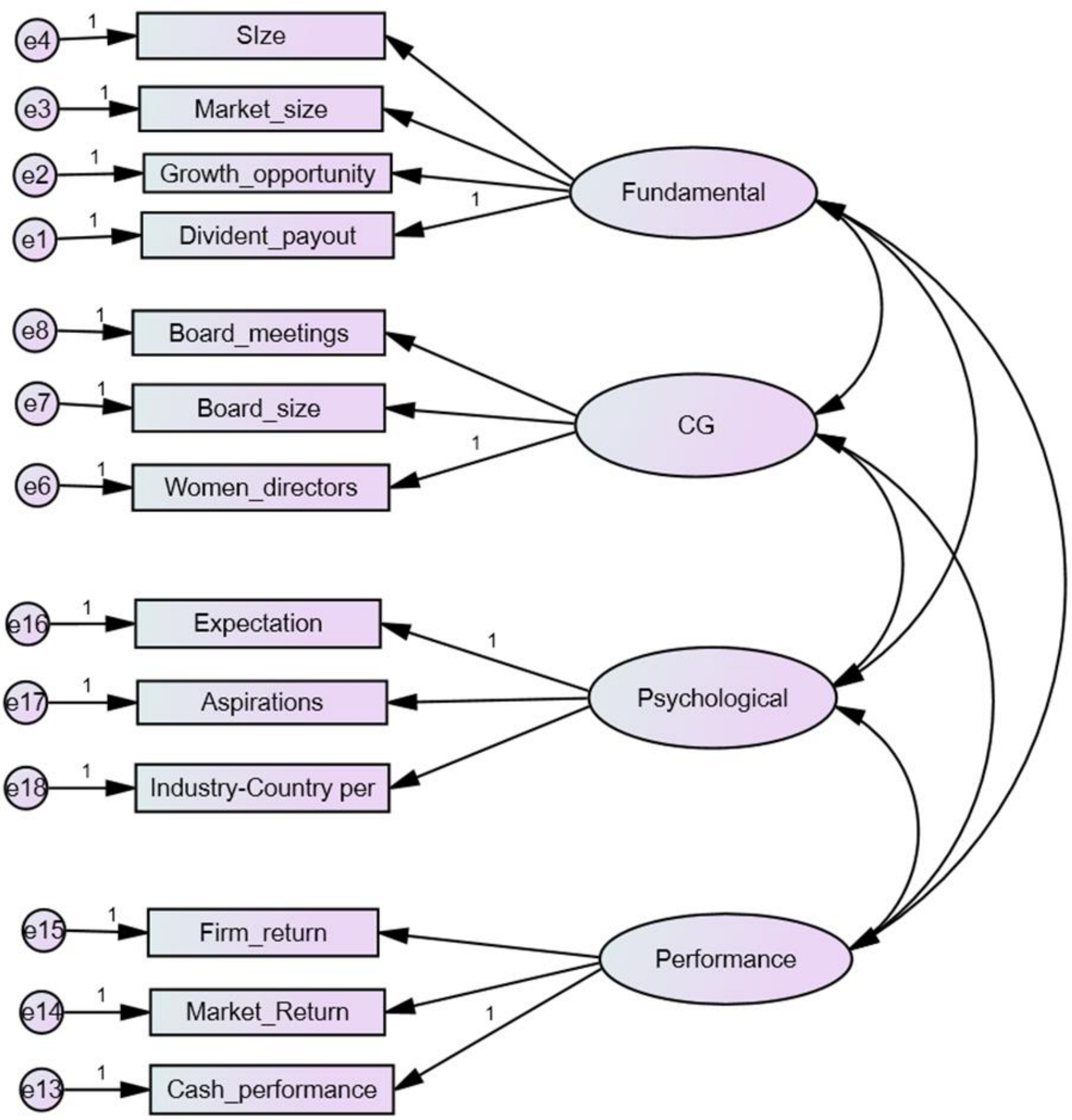
Construct	1	2	3	4
Size	.960			
Market size	.936			
Growth opportunity	.924			
Dividend pay-out	.898			
Board meetings		.895		
Board size		.892		
Women directors		.862		
Independent directors		.782		
Expectation			.846	
Industry-Country performance			.834	
Aspirations			.833	
P/BV			.807	
Firm return				.947
Cash performance				.946
Market return				.933

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

The objective of the exploratory model is to explore and find out the structural relationship between variables and reduce the number of variables into unobserved unrelated variables from correlated variables. We perform the principal component analysis (PCA) to extract the factors and simplify the factor structure of a set of items (Costello and Osborne, 2005). We use the Eigen-value criteria (eigenvalue > 1) to extract the factors. As a result, four factors are extracted explaining 79.57% variance in our data set. Rotated component matrix is drawn using Orthogonal Varimax factor rotation method as shown in Table 5; factor-loading ≥ 0.50 is acceptable as a significant cut-off value.

The confirmatory factor analysis results



The results of the exploratory factor analysis, in a given domain, fundamentally provides a small number of latent constructs (also known as factors), which influence the potentially vast array of observed variables (Nusair and Hua, 2010). We present the hypothesized factor model in figure 1. In this model, we measure four latent variables (i.e. fundamental, psychological, corporate governance and performance drivers) with thirteen observed variables. The purpose of confirmatory factor analysis (CFA) is to test statistically the ability of the hypothesized factors, which are correlated and observed variables, and measuring each factor (Schumacker and Lomax, 2004). Based on the low loading cut-off (i.e. less than 0.40) in variance-covariance matrix, we drop two variables i.e. board independence (under corporate governance drivers) and P/BV (under fundamental valuation drivers) for further analysis. Following redefined and retested model, we specify the parameter estimates and evaluate the overall model fit by examining the extent to which our data set supports the hypothesized model. Several measures of goodness-of-fit indices are estimated such as chi-square/df ratio, Normed fit index (NFI), relative fit index (RFI), comparative fit index (CFI), incremental fit index (IFI), root mean-square error of approximation (RMSEA) as propagated by Joreskog and Sorbom, 1993; Hair et al., 1998; and Schumacker and Lomax,2004). Thereafter, we evaluate the measurement constructs for reliability and validity (both convergent and discriminant).

Table 6: Model fit indices of the CFA model

This table reports the goodness-of-fit indices for measurement structural model. Chi-square statistic ($\chi2$/CMIN) and root mean square error of approximation (RMSEA) shows the absolute fit indices; adjusted goodness-of-fit index (AGFI), comparative fit index (CFI) is used to measure the incremental fit indices; normed chi-square ($\chi2$/df) measures the parsimonious fit.

Model	CMIN	DF	χ^2/df	RMSEA	AGFI	CFI
CFA	108.53	59	1.840	0.046	0.94	0.98

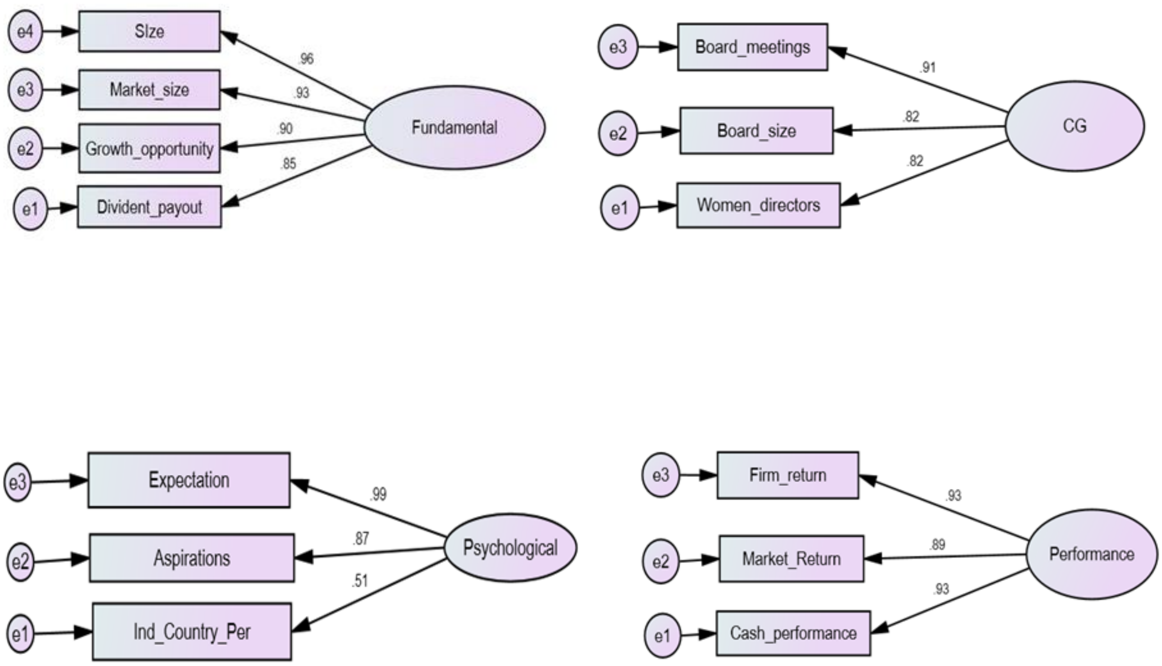


Figure 2. Results of confirmatory factor analysis

The maximum likelihood method of estimation is then employed, as the data set does not violet the multivariate normality assumption (Schumacker and Lomax, 2004). The application of multiple fit measures ensures the acceptability and fitness of the overall model. As shown in table 6, the overall fit indices are acceptable for the proposed model with χ^2/df = 1.840, AGFI = 0.940, NFI = 0.974, RFI = 0.965, IFI = 0.988, CFI = 0.98, and RMSEA = 0.046. All the above indices are acceptable and fit the measurement model (Hair et al., 1998). This is evident through our figure 2 depicts.

Reliability and validity measures results

After attaining acceptable fit indices, the next step is to evaluate the reliability, convergent and discriminant validity of the measurement model. Before performing the validity analysis, we check each specified construct for the statistical reliability. The reliability of the construct refers to the "extent to which it yields consistent results when the characteristic being measured has not changed" (Leedy and Ormrod, 2005). Zikmund et al. (2010) state that reliability is an indicator of that measure's internal consistency. We consider *Cronbach alpha coefficient* as the most appropriate method for testing the internal consistency of a scale (Hair et al., 1998; Pallant, 2007). The value of Cronbach's alpha ranges from 0 to 1 and 0.6 is considered as the minimum value for checking the internal reliability (Hair et al., 1998).

Table 7: Reliability and validity results of the measurement model

This table presents the reliability and validity results of the measurement model. Here, constructs describes the latent variables and variable defines a set of observed variables in the structured model. Standard loadings measures the relationship between latent and observed variables. Item reliability and construct reliability are used to test the reliability of the observed constructs used in the model, and Average variance extracted (AVE) is used to measure the discriminant and convergent validity of the constructs.

Fundamental valuation drivers	Size	0.96	0.92	0.97	0.83
	Market size	0.92	0.86		
	Growth opportunity	0.90	0.81		
	Dividend payout	0.85	0.72		
Psychological drivers	Expectation	0.99	0.98	0.89	0.66
	Aspiration	0.87	0.75		
	Industry-Country performance	0.51	0.27		
Corporate Governance drivers	Board meetings	0.91	0.83	0.93	0.85
	Board size	0.82	0.67		
	Women directors	0.82	0.67		
Performance drivers	Firm return	0.93	0.86	0.96	0.83
	Market return	0.88	0.78		
	Cash performance	0.93	0.85		

*All factor loadings are significant at $p = 0.05$.

[a]Construct reliability = $(\sum \text{Standardized loadings})^2/[(\sum \text{Standardized loadings})^2 + \sum ej]$.

[b]Average variance extracted (AVE) = $\sum(\text{Standardized loadings}^2)/[\sum(\text{standardized loadings}^2)/ \sum ej]$, where ej is the measurement error.

Table 7 shows the results of item reliability and construct reliability, representing the different measures in the model ranging from 0.67 to 0.97 expect one item. The composite reliability of all the constructs are above 0.70 (ranging from 0.89 to 0.91), indicating a very good reliability of the constructs.

We use the convergent and discriminant validity to test the capability of constructs to measure what it is intended to measure (Ibrahim et al., 2007; Zikmund et al., 2013). Table 7 shows that the AVE values ranged from 0.66 to 0.83, exceeding the threshold value of 0.50 (Hair et al., 1998), which implies sound convergent validity (Fornell and Larker, 1981; and Gerbingand Anderson, 1988). Therefore, we claim that our indicators are truly representative of latent construct. Additionally, we evaluate the discriminant validity when the value of AVE of each latent variable is greater than its squared correlation coefficient. Henceforth, the convergent and discriminant validity of the measurement model confirm its reliability and validity.

Multiple regression results

Table 8: Multi-collinearity and correlations results

This table reports the correlations among the constructs used in the regression model and Variance inflation factor (VIF) which checks the existence of multi-collinearity in the independent variables. Here, CG implies corporate governance.

Constructs	Fundamental	CG	Psychological	Performance	Leverage	Liquidity	Firm age	VIF
Fundamental	1.000							3.686
CG	0.794**	1.000						3.184
Psychological	0.785**	0.741**	1.000					3.081
Performance	0.684**	0.680**	0.671**	1.000				2.189
Leverage	0.046	0.026	-.011	0.029	1.000			1.013
Liquidity	0.022	0.030	0.056	0.000	0.063	1.000		1.134
Firm age	-.006	.005	.049	-.002	.021	0.334**	1.000	1.131

**Correlation is significant at the 0.01 level (2-tailed).

Before running our multiple regression model, we further check the multi-collinearity among the constructs as developed through CFA through Variance inflation factor (VIF). Results show (see table 8) that there is no multi-collinearity issues in our model.

Table 9 presents Model I and II multiple regression results. It presents the R^2 (Coefficient of determination), Adj. R^2, F-ratio, D-W test, standardized beta coefficients of the model and summarizes the multiple regression results which statistically explains the relationship between dependent variables (*ROASD* and *CAPEX ratio*), and firm-specific independent variables and control ones. Our results indicate the model fit (Model I: R^2 = 0.622; Model II, R^2 = 0.683 [overall]). It implies that a very good percentage (62.2% and 68.3% respectively) of the variation in *ROASD* and *CAPEX ratio* can be explained with the whole set of independent variables (Adj R^2 = 0.620 and 0.681, respectively). Individual country results also document good model fit.Our findings suggest that control variables such as leverage, liquidity and firm-age do not significantly affect firm-risk and/or managerial risk-taking (i.e. overall search behaviour). Therefore, our multiple regression and confirmatory factor analysis results are consistent and significant at the 0.05 level of significance.

We accept hypothesis 1 that fundamental valuation drivers positively and significantly influence the firm-risk (coefficient value of 0.128 at 5% significance level [t value – 2.883]) or managerial risk-taking (with 0.166 [t value 4.207]). Furthermore, earlier factor analysis results corroborate that size (0.96) and market size (0.92) through indirect route of market power also influence firm-risk or managerial risk-taking significantly. However, in individual country context, fundamental valuation drivers influence managerial risk-taking in both Indian and Australian firms, although they only influence income stream uncertainty of Australian firms.The significant and positive coefficient values of 0.139 (t value – 3.386) and 0.070 (t value – 1.877) respectively support hypothesis 2 that corporate governance (CG) drivers also affect the firm-risk or managerial risk-taking. However, this is not true distinctly about managerial risk-taking for Indian and Australian firms.In addition, our findings also reveal that number of board meeting (0.91) i.e. busy boards is the most dominant progenitor to drive firm-risk or managerial risk-taking. Our third hypothesis that managers take risky decisions based on their psychological drivers gets support as our results show 0.166 (t value 4.184) and 0.224 (t value 6.028) coefficient values at 5% significance level. This is also evident when we examine Indian and Australian firms separately.But, the role of such psychological drivers in the variability in income for Indian firms is not evident.Our findings also suggest that while considering psychological drivers, aspiration and expectations strongly influences managerial decision-making and thereby *income stream uncertainty*. Our results also prove hypothesis 4 i.e. performance drivers (firm, market and cash) significantly and positively influence firm-risk (0.448 and t value – 13.279) or managerial risk-taking (0.461 and t value – 14.942). The findings (concerning magnitude of coefficients) report that firm-performance progenitors including firm-return, market-return and cash performance are the most influential drivers those explains firm-risk or managerial risk-taking (i.e. overall search behaviour) decisions. We further substantiate our results by examining Indian and Australian firms distinctly.

Robustness tests results

We undertake *two robustness tests* here. *Firstly*, we use *accounting beta* to proxy firm-risk and *R&D intensity* to proxy managerial risk-taking along with our two main dependent variables. Accounting beta is a non-market measure of systematic risk and the economy-wide factors directly influences it, as opposed to unsystematic component that relates to other firm-specific factors. We calculate this in line with Bowman (1979). Therefore, by taking market-adjusted accounting beta along with firm-specific *income stream risk*, we make our study more robust. *R&D intensity* (i.e. R&D expenditures/Sales) is a much volatile and unique proposition to proxy managerial risk-taking, as not all firms are prone to it. We use *R&D intensity* only as a secondary managerial risk-taking measure because R&D expenditures are high-risk investments compared to capital expenditures on property, plant and equipment (see Bhagat and Welch, 1995; and Kothari et al., 2001).

Secondly, we run the same regression models by taking nationalculture, investor protection rights, and developed/emerging (as country regulatory and economic proxies) as instrumental variablesboth for Australia and India. This is because the institutional and economic environments prevailing in a country do affect firm's risk-taking decisions. We rate the extent of investor's protection in India and Australia following arguments of company law about minority shareholders rights across countries as argued by La Porta et al. (2008 & 1998). We assess such rights based on six important parameters related to voting rights, also referred as anti-directors rights, where existence of such parameters in the company laws of countries would earn a score of one. Therefore, a total score of six would be for countries offering best investors protection and vice-versa for score of one or zero. We define strong rights if the overall score is above three.We follow Hofstede's(2001) national culture scores for India and Australia as given on six dimensions. Based on that, we assume that Indian managers would be more risk seeking than their Australian counterparts would. The developed economic status of Australia also may be the cause of more balanced and prudent approach by their firms and managers, which bring transparency and stability concerning firm's overall search behaviour. According to us, all these can also provide some insights why in case of Indian firms the antecedents of firm's overall search behaviour is not so overwhelming unlike Australian firms. However, our results do not documentthe country-specific impact on the firm-risk or managerial risk-taking. Henceforth, we can conclude that country dynamics does not play a significant role in firm's risk-taking or search decisions.[4]

[4]We do not report the robustness tests results for brevity purpose.

Table 9: Multiple regression results

This table depicts the multiple regression results. Model I explains the relationship of the independent variables with firm-risk (i.e. ROASD as proxy for dependent variable), while Model II defines the relationship of independent variables with managerial risk-taking (i.e. CAPEX ratio as dependent). We also incorporate leverage (TD/TA), liquidity (C&CE) and firm age (current year – year of incorporation) as control variables here. βvalue shows the standardized beta coefficients and in parentheses we display standard errors.

Independent variables	Model I (ROASD) β (Std. Error)			Model II (CAPEX ratio) β (Std. Error)		
	Overall	**India**	**Australia**	**Overall**	**India**	**Australia**
Constant	.394** (.088)	.336 (.352)	.387** (.147)	.180** (.083)	.276 (.270)	.273** (.144)
Fundamental	.128** (.041)	.104 (.113)	.133** (.044)	.166** (.039)	.317** (.087)	.140** (.043)
CG	.139** (.040)	.147* (.107)	.136** (.043)	.070** (.037)	.049 (.082)	.066 (.042)
Psychological	.166** (.043)	.124 (.104)	.175** (.048)	.224** (.040)	.095* (.080)	.249** (.047)
Performance	.448** (0.032)	.470** (.089)	.444** (.035)	.461** (.031)	.505** (.068)	.456** (.034)
Leverage	.009 (.681)	.025 (.070)	.006 (.028)	-.025 (.231)	-.025 (.053)	-.025 (.028)
Liquidity	.022 (.360)	.017 (.072)	.022 (.028)	.007 (.750)	.059 (.055)	-.002 (.027)
Firmage	-.018 (.455)	.031 (.078)	-.028 (.029)	-.008 (.724)	-.039 (.060)	-.001 (.029)
R Square (R^2)	**.622**	**.587**	**.633**	**.684**	**.773**	**.666**
Adj. R^2	**.619**	**.563**	**.628**	**.681**	**.761**	**.662**
F-test	p < .001	p < .001	p < .001	p < .001	p < .001	p < .001
Durbin-Watson (D-W)	1.972	2.018	1.969	1.859	1.995	1.850
K-S test	0.000	0.000	0.000	0.000	0.000	0.000

** Significance values at 5% level (p<0.05)
* Significance values at 10% level (p<0.10)

Discussion

Our hypothesized model estimates the influence of fundamental, psychological, corporate governance and performance antecedents on firm-risk (i.e. *ROASD*) or managerial risk-taking (i.e. *CAPEX ratio*). Therefore, first, we perform the PCA to extract the factors and then we measure four above stated latent variables with thirteen observed variables (after excluding board independence and P/BV). Multiple model-fit measures ensure the acceptability and fitness of the overall model. The convergent and discriminant validity of the measurement model also confirm its reliability and validity. Our results also indicate a very good model fit for the multiple regressions. It shows that a very good percentage (62.2% and 68.3% respectively) of the variation in *ROASD* and *CAPEX ratio* can be explained with the whole set of independent variables (Adj $R^2 = 0.620$ and 0.681, respectively).

We accept all four of our hypotheses overall and for Australian firmsthat imply that fundamental valuation, psychological, corporate governance and performance drivers all are driving firm-risk and/or managerial decision-making (i.e. overall search behaviour) unanimously. However, for Indian firms only the performance drivers influence firm's overall search behaviour whereas fundamental and psychological drivers affect managerial risk-taking only.More specifically, we observe that firm-size, market size and growth opportunities of the firm within fundamental valuation drivers, board busyness under CG drivers, expectation among the psychological determinants, and firm's operating and cash performance are the most critical sub-progenitors as taken in our study.

The significant influence of growth opportunities on risk and risk-taking are validating Andres et al., 2005; Guest, 2009; and Nakano and Nguyen, 2012, whereas we support Myers and Majluf (1984) and Venkatesh (1989) that firms choose between capital expenditure and dividend payout. We find no relation in between risk and risk-taking with board independence unlike Aebi et al. (2012); Ellul and Yerramilli (2013); and Pathan (2009), rather PCA deletes it. Surprisingly, contradicting '*monitoring hypothesis*' (Berger et al.,2014), we put our strong implication that busy boards undertake searches to move up the pecking order i.e. superior performance (Lipton and Lorsch, 1992), and thereby creating *income stream uncertainty*. Our results also authenticate the positive influence of board size and women directors' presence in firm-boards in line with Adams and Funk (2012); Coles et al. (2008); Guest (2009); and Nakano and Nguyen (2012); however disagree with Farrell and Hersch(2005) and Levi et al. (2014). The psychological influence of firm-managers on firm-risk and/or risk-taking is significantly evident as their expectation is driving their risk-preferences (problemistic or innovative) more than the aspiration, which resembles the behavioural theory (Cyert and March, 1963) implications. However, we do not find any notable impact of industry heterogeneity of the specific country or as such any country-specific regulatory and/or culturalimpact. We also observe overwhelming influence of firm's own operating, market and cash performance on its risk and managerial risk-taking (in line with Fisher and Hall, 1969; Hurdle, 1974; and Weinzimmer, 2000). Therefore, we prove the hypothesis that the satisficing level of firm performance first motivates problemistic searches to reach it, and thereafter creates slack and thereby motivates innovative search behaviour (March and Simon, 1958; Simon, 1976; and Weinzimmer, 2000)

Overall, our multiple regression and confirmatory factor analysis results are consistent and significant at the 5% level of significance. We also undertake two robustness tests with two additional proxies and with country-specific instrumental variables in the regression models, which further substantiates our main research findings.

However, our results do not find any influence of the control variables i.e. leverage, liquidity and firm age on firm-risk and/or managerial risk-taking (i.e. overall search behaviour). Rather it is interesting to note a negative coefficient value of firm-age in relation to risk and risk-taking. These results substantiate findings of Cyert and March (1963); Hambrick and Finkelstein (1987); and Lavie and Rosenkopf (2006), however contradict John (1993); and Venkatesh (1989).

We prove that though firm-risk and/or managerial risk-taking can be two distinct measures, but similar set of progenitors influence them. Our results also show that these determinants remain influential irrespective of time, country or industry contexts. Therefore, study results would be of immense help for firm-managers, investors, policy-makers, and other stakeholders to assess a firm in risk-return context in both emerging and developed country perspectives. These would help these stakeholders in strategic policy decisions and portfolio rebalancing decisions objectively and timely.However, our study is not free from limitations. Future researchers can examine the role of external factors such as economic, political, regulatory, institutional, etc. in detailsin driving firm-risk and/or managerial risk-taking (i.e. overall search behaviour) along with the progenitors studied here.

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