From performance to the horizon: Management's horizon and firms' investment efficiency

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Abstract

Purpose

We propose a novel measure for management's horizon (short-termism or myopia *vs* long-termism or hyperopia) derived from easily obtainable firm-level accounting and stock market performance data. We use the measure to explore the impact of management's horizon on firms' investment efficiency.

Design/methodology/approach

We rely on two commonly used but uncorrelated measures of management performance; accounting performance (return on capital employed, ROCE) and stock market performance (average abnormal return, AAR). We combine these measures to develop a multi-dimensional framework for performance, which classifies firms into four groups; efficient (high accounting and high market performance), poor (low accounting and low market performance), myopic (high accounting and low market performance) and hyperopic (low accounting and high market performance). We validate this framework and deploy it to explore the relationship between horizon and firms' investment efficiency.

Findings

In validation tests, we show that management myopia (hyperopia) explains firms' decision to cut (grow) research and development investments. Further, as expected, myopic (hyperopic) firms are associated with significantly more (less) accrual and real earnings management. Our empirical tests on the link between horizon and investment efficiency suggest that myopic managers cut new investments while their hyperopic counterparts grow the same. Ultimately, we find that myopia (hyperopia) exacerbates(mitigates) the over-investment of free cash flow problem.

Originality/value

We introduce a framework for assessing management horizon using easily obtainable measures of performance. Our framework explains inconsistencies in prior empirical research using different measures of performance (accounting versus market). We demonstrate its utility by showing that our measure explains decisions around R&D investment, earnings management and firm investments.

Keywords: Firm performance, management horizon, Myopia, Hyperopia, Investment efficiency, Cartesian plane.

1 Introduction

Management horizon captures the time over which managers plan, set goals and make decisions for their firms (Kalyta, 2009). It can range from short-term (myopia) to long-term (hyperopia) and influences firms' strategies (Chen et al., 2015b; Kim et al., 2019). Despite its importance to researchers, investors and practitioners (Chen et al., 2015b; Kim et al., 2019), easy-to-derive yet compelling proxies are scarce. Existing studies widely use CEO option vesting behaviour (Cadman et al., 2013; Edmans et al., 2017; Kolasinski and Yang, 2018; Ladika and Sautner, 2020), management's alteration of the research & development (R&D) expenditures (Alessandri and Pattit, 2014; Faleye, 2007; Holden and Lundstrum, 2009; Meulbroek et al., 1990), management's decision to reduce capital expenditure and earnings management behaviour (Boubaker et al., 2017; Wahal and McConnell, 2000) as proxies for myopia. While these extant measures have been criticised (Bushee, 1998; Cadman et al., 2013; Osma and Young, 2009; Tunyi et al., 2019), the literature does not provide alternative robust frameworks for measuring management's horizon. Further, our understanding of how horizon influences several management decisions (e.g., investment decisions) is still in its infancy (Tunyi et al., 2019). Our study fills this gap.

We propose an alternative framework for measuring management's horizon. Our framework leverages the fact that accounting measures of performance (e.g., return on capital employed and return on assets) provide information about firms' "past performance" while stock market measures of performance (e.g., abnormal returns, Tobin's Q and market to book) capture investors' beliefs about firms' "future prospects" (Lambert and Larcker, 1987; Rappaport, 1986; Tunyi et al., 2019).[1] We categorise each firm's accounting and market performance into "high" and "low", depending on whether the firm's measure of performance is greater (i.e., high) or less than (i.e., low) the industry-year median. Drawing from combination theory, we generate a two-dimensional matrix in which firms can either achieve (i) high accounting and high stock market performance, (ii) high accounting and low stock market performance, (iii) low accounting and high stock market performance, or (iv) low accounting and low stock market performance. Firms in the first (fourth) category are clearly well-

[1] Indeed, in our sample (US firms between 1984 and 2018), the correlation between accounting and stock market measures of performance (rho) is 0.001 consistent with the view that they measure different constructs.

performing (poorly performing) as they outperform (underperform) their peers across the two measures.

Over 50% of firms in our US sample are categorised in the mismatch dimensions (i.e., ii and iii), where the correlation between the two measures of performance is low. Ordinarily, the performance of these firms is ambiguous as they can neither be classified as well-performing nor underperforming firms. We argue that these mismatches are informative about management's horizon. Specifically, high accounting (i.e., high past performance) but low stock market performance (i.e., low future prospects) is plausibly consistent with short-termism or myopia as these firms overly focus on current profitability at the expense of future growth. Similarly, a combination of low accounting and high stock market performance is broadly consistent with long-term or hyperopia, as characteristic firms appear to sacrifice current profitability for long-term growth. We empirically validate this framework by showing that firms classified under each dimension share expected characteristics; myopic firms cut R&D investments and engage in upward real and accrual earnings management in the year following classification, while hyperopic firms grow R&D investments and report significantly lower levels of real and accrual earnings management over the same period.

The grouping of firms into four categories (see Table 1) limits the informativeness of the framework by suggesting that all firms within each of the dimensions are homogeneous. By depicting each of the dimensions as a quadrant on the Cartesian plane (see Figure 1), we can extend the framework beyond a simple binary classification scheme by taking into consideration the spatial location of each firm within each quadrant—i.e., its distance from the origin (median firm). This extension improves the informativeness of the framework by allowing for heterogeneity within each dimension. In our empirical tests, we show that the measure of spatial location—"distance from the median"—is informative, captures the extent of a firm's belonging within each dimension and can, hence, allow us to compare firms within the same dimension.

To demonstrate the usefulness of the framework, we use our derived measures to explore how management's horizon shapes firm-level investment decisions. Firstly, we explore the impact of management's horizon on firms' new investments. We find that levels of new investment decline (increase) with firms' membership in the myopia (hyperopia) dimension, and this relationship is moderated by firms' spatial location within each dimension. Secondly, we explore the impact of management's horizon on the over-investment of free cash flow problem (Richardson, 2006). Richardson (2006) finds that free cash flow induces over-investment in the firm, and the presence of activist investors partly addresses this problem. We extend Richardson (2006) by showing that myopia exacerbates while hyperopia potentially attenuates the over-investment of free cash flow problem.

Consequently, our study makes two important contributions to the accounting and finance literature. Firstly, we add to existing studies on management horizon (Baldenius et al., 2014; Boubaker et al., 2017; Holden and Lundstrum, 2009; Kolasinski and Yang, 2018) by developing a framework to capture management horizon. Our framework reconciles mixed findings and inconsistencies relating to the use of different measures of performance (accounting versus stock market) in prior research. Our framework and the derived measures are based on stock market returns (abnormal returns) and the performance of other firms in the industry, which are both exogenously determined and independent of managerial choices. Alternative measures of management's horizon (or myopia) used across prior studies (Bushee, 1998; Cadman et al., 2013; Edmans et al., 2017) are endogenous to firms, hence limiting their use in empirical research. Further, CEO option vesting behaviour captures the horizon of the CEO *only* and thereby undermines the role of other executives. Our measures of myopia and hyperopia capture the horizon of the entire decision-making unit and, hence, can potentially support more powerful empirical tests.

Secondly, we contribute to the burgeoning literature explaining firms' investment decisions (Faleye, 2007; Graham et al., 2006) and the over-investment of free cash flow problem (Deng et al., 2017; Richardson, 2006). Here, we show that management's horizon explains investment decisions. Specifically, myopic firms cut new investments and over-investment while hyperopic firms grow the same. Importantly, we extend (Richardson, 2006) by showing that management horizon moderates the tendency for managers to over-invest free cash flows.

The rest of our paper is organised as follows. Section 2 presents the framework and develops hypotheses. Section 3 describes the methodology. Section 4 reports the results. Section 5 summarises the findings and presents concluding remarks.

2 Literature review, hypotheses development and horizon framework

2.1 Theoretical background and empirical evidence

Agency theory conceptualises the relationship between principals (shareholders) and their agents (managers) and the conflicts that result when the agent is a rational utility maximiser (Eisenhardt, 1989; Jensen, 1986; Jensen and Meckling, 1976). From a neoclassical perspective, the agent's primary responsibility is to maximise the firm's long-term value by taking appropriate actions. However, because the agent's incentives are set and performance judged on temporal outcomes (such as annual profitability or stock return), she may prioritise short-term goals, thus creating a horizon problem.

The consequences of management myopia on investment decision-making have been explored in extant research (Graham et al., 2006; Stein, 1989). Firstly, Graham et al. (2006) find that managers would reduce discretionary spending and long-term investments in order to meet analysts' forecasts and other short-term earnings targets. Secondly, Stein (1989) argues that when managers hold stocks in their firms, stock price concerns will motivate them to overweight short-term cash flows at the expense of value-increasing long-term investments. Thirdly, the literature suggests that firm investment in R&D declines when firms adopt antitakeover amendments (Meulbroek et al., 1990) and classified boards (Faleye, 2007), suggesting that managers pursue short-term objectives in the absence of market discipline. Finally, Edmans et al. (2017) find that the CEO's option vesting decision (as a proxy for managerial myopia) is associated with reductions in the growth rates of R&D and capital expenditure, suggesting that myopia induces managers to reduce long-term investment in pursuit of short-term earnings.

Perhaps the lack of suitable exogenous measures of myopia has limited further research on the issue (Edmans et al., 2017). Much of the literature using equity or option vesting is prone to endogeneity. Specifically, the decision to exercise options or sell equity might be correlated with several omitted variables that drive investment decisions. For example, Ladika and Sautner (2020) contends that weak corporate governance may lead to an acceleration in equity and option vesting and may also lead to a reduction in long-term investments. Similarly, Edmans et al. (2017) note that negative private information on a firm's prospects may cause a CEO to sell equity and also cut long-term investment.

2.2 The management horizon framework

There is a lack of consensus on the measurement of management performance in prior studies. Broadly speaking, there are two categories of performance measures; accounting measures and stock market measures. Accounting measures[2] use profitability as the basis of performance measurement (Hussain and Shams, 2022; Tunyi et al., 2023, 2020; Tunyi and Ntim, 2016). These measures capture historical performance over the accounting period and, hence, mainly assess management's success in using the firm's assets to generate revenues net of expenses and taxes (Lambert and Larcker, 1987; Rappaport, 1986). Stock market measures such as abnormal returns (Bhagat and Bolton, 2008; Danbolt et al., 2016; Tunyi et al., 2019), on the other hand, use share price information as the basis for performance measurement. Unlike accounting measures, stock market measures capture investors' perceptions of future cash flows that will accrue to the firm as a result of management's actions (Lambert and Larcker, 1987; Rappaport, 1986).

The use of accounting and stock market measures of performance across research has been indiscriminate. Prior studies do not generally provide a rationale for choosing one set of measures over the other. Indeed, some studies use a combination of both measures (Bhagat and Bolton, 2008; Danbolt et al., 2016; Espahbodi and Espahbodi, 2003) without due consideration of what these measures capture. As we will discuss later, the correlation between these two measures is extremely low, i.e., a rho of 0.001 in our sample. Bhagat and Bolton (2008), similarly, reports moderate to low correlation (i.e., a rho of 0.321) between accounting and market measures of performance for an earlier period (1990-2004). Unsurprisingly, some of the studies using multiple performance measures record conflicting results from the different measures (see, for example, Bhagat and Bolton, 2008; Danbolt et al., 2016; Espahbodi and Espahbodi, 2003). Sometimes, studies use alternative measures of performance as part of their battery of additional or robustness checks (Huang and Hilary, 2018). Clearly, there is potential for these measures to act as complements rather than substitutes when comprehensively assessing management performance. Indeed, studies such as Tang et al. (2018), amongst others, use factor analysis to aggregate several measures

[2] such as return on assets (ROA), return on equity (ROE), return on capital employed (ROCE) and operating profit margin (OPM).

of performance (i.e., sales volume, market share, return on investment, firm image and customer satisfaction) to derive a single comprehensive measure. Nonetheless, these studies do not consider the implications of mismatches or inconsistencies between alternative measures.

We argue that a mismatch between accounting and stock market measures of performance is informative about management's horizon—short-termism or myopia *vs* long-termism or hyperopia. This contention, which we discuss later in our study, forms the basis of our framework. A mismatch occurs when a firm reports a high (or low) accounting performance *but*, at the same time, a low (or high stock market performance. To develop our framework, we first create a binary measure of performance (accounting and market), which takes two values: "high" *vs* "low". To establish whether a firm's performance is high or low, we compare its measure to its industry-year median. Secondly, we combine the binary measures of accounting and market performance to arrive at dimensions in our framework. Drawing from combination theory, by combining these binary measures, we should obtain the two-by-two matrix shown in Table 1.

[Insert Table 1 here]

The multidimensional framework (Table 1) captures standard attributes of performance (i.e., well-performing or efficient and underperforming or poor) but also explains ambiguities or discrepancies between market and accounting measures of performance (i.e., myopia and hyperopia). Specifically, firms can achieve one of four alternatives: (i) high accounting and high stock market performance, (ii) a high accounting and low stock market performance, (iii) a low accounting and high stock market performance, and (iv) a low accounting and low stock market performance.

Firms that outperform their peers both in terms of historical (i.e., accounting) performance and future prospects (i.e., stock market performance) are clearly well-performing and presumably led by an efficient management team, and vice versa for poorly performing firms. The challenge is interpreting results when firms outperform their peers in one dimension but underperform in the other. Indeed, over 50.5% of firm-year observations in our sample report a mismatch (see Table 3), perhaps making this an important sub-sample to study. Given that management has control over their firm's prospects, the framework posits that managers that seek to optimise profitability (i.e., "high" accounting performance) while ignoring future growth opportunities ((i.e., "low" market performance)) are myopic. Similarly, managers who overly focus on enhancing firm prospects (i.e., market performance) even at the expense of current profitability (i.e., accounting performance) are hyperopic. Clearly, efficient and poor represent the most and least optimal outcomes, respectively. From a shareholder value maximisation perspective, hyperopia is, perhaps, more optimal than myopia.

The framework classifies firms into four broad dimensions (see Table 1) and therefore assumes that all firms belonging to the same dimension are homogeneous. We can, perhaps, improve the informativeness of the framework by modelling each firm's degree of belonging within each dimension. We do so by mapping the framework onto the Cartesian plane as in Figure 1. In Figure 1, AAR and ROCE represent measures of abnormal returns (market performance) and profitability (accounting performance), respectively. The solid lines represent the y-axis and x-axis of the plane (i.e., where ROCE and AAR are, respectively, equal to zero) while the dotted lines represent the median values of ROCE and AAR (i.e., $ROCE_m$ and AAR_m). Different firm-year observations can be plotted on the plane using their ROCE and AAR as coordinates (i.e., $(ROCE_i, AAR_i)$). Their location (i.e., quadrant) on the plane provides primary information about the dimension to which they belong.

[Insert Figure 1 here]

As in Figure 1, even within the same dimension, some firms could be much closer to the median firm than others. Presumably, firms that are further away from the median firm could be perceived as those with stronger membership within each dimension. For example, myopic firms that are further away from the median in Figure 1 are presumably more myopic than their counterparts that are closer to the median. Therefore, besides identifying the dimension in which firms are selected into, we can measure the Euclidean distance from each observation to the median, i.e., the spatial location of each firm within each dimension.

Considering a Cartesian plane with y values given by estimates of AAR and x values given by estimates of ROCE, the Euclidean distance or simple straight-line distance from the median ($ROCE_m$, AAR_m) to each point ($ROCE_i$, AAR_i) can be computed as follows[3];

$$Distance\,from\,median = \sqrt{(ROCE_i - ROCE_m)^2 + (AAR_i - AAR_m)^2} \tag{1}$$

The Euclidean distance—"distance from the median"—provides secondary information about each firm's belonging within each dimension.

In our empirical analysis, we validate this framework and also show how it can be used to test hypotheses in accounting and finance research. In this study, we focus on the relationship between management's horizon and firm investment decisions—an issue which, perhaps, requires more research attention but also allows us to evidence the framework's usefulness. We briefly develop our hypotheses on the relationship between management's horizon and investment decisions in the next section.

2.3 Hypotheses development

Drawing on agency theory, we explore how myopia impacts on the level of new investment taken on by firms. Amongst others, Healy and Wahlen (1999) argue that myopic managers reduce investments in long-term projects by, for example, freezing hiring, closing underperforming units and delaying critical maintenance projects in order to beat short-term earnings targets. Similarly, in a survey of 401 senior financial executives of US companies, Graham et al. (2006) find that over 80% of managers interviewed will defer or decrease investments in maintenance, R&D and advertising in order to achieve targets set by analysts. Following the literature Edmans et al. (2017); Faleye (2007); Graham et al. (2006); Ladika and Sautner (2020); Meulbroek et al. (1990); Stein (1989), we expect that managers, identified as myopic by the framework, should cut while their hyperopic counterparts grow new investments. Empirically, we test the following hypothesis;

Hypothesis 1 (H1): *The level of new investments increases (decreases) with management hyperopia (myopia).*

While the pursuit of value-increasing investments is consistent with neoclassical motives

[3] We use the formula for the distance between two points on the Cartesian plane;

$$Distance = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

where the first point has coordinates; (x_1, y_1), and the second point has coordinates; (x_2, y_2).

of firms and objectives of financial management, research has suggested that managers may sometimes over-invest, particularly when they hold large amounts of free cash flow (Bates, 2005; Blanchard et al., 1994; Jensen, 1986; Richardson, 2006). Hence, what matters is not just firms' level of (new) investments as tested in H_1, but also their investment efficiency. Indeed, using new accounting-based measures of over-investment and free cash flow, Richardson (2006) finds evidence to support the view that free cash flow induces over-investment, although the presence of activist investors partly addresses this problem. Further, a recent study by Deng et al. (2017) supports this finding by showing that Chinese firms receiving government support during the 2008 global financial crisis (beneficiaries of the Economic Stimulus Package) tended to over-invest after receiving the stimulus. We add to this literature by exploring whether managerial horizon also moderates the over-investment of free cash flow problem.

Measures of myopia and hyperopia are developed by noting that hyperopic managers focus on maximising shareholder value, ignoring current profitability in the process, while their myopic counterparts focus on current profitability at the expense of future cash flows. In this sense, relative to other managers, hyperopic managers are less likely to over-invest as over-investment negatively impacts on future cash flows. Besides, prior research (see, for example, Bates, 2005; Blanchard et al., 1994; Jensen, 1986; Richardson, 2006) generally attribute over-investment to agency problems. Such agency problems are likely to be more pronounced in myopic firms. Specifically, research suggests that myopic managers pursue short-term objectives such as meeting earnings targets in order to access performance-related rewards and bonuses (Duru et al., 2012; Lambert and Larcker, 1987). We thus expect the relationship between the availability of free cash flow and the tendency to over-invest to be stronger for myopic firms when compared to their hyperopic counterparts. Specifically, we hypothesise that;

Hypothesis 2 (H2): *Management hyperopia (myopia) mitigates (exacerbates) the over-investment of free cash flows.*

3 Data and Methodology

3.1 Data and estimation of management's horizon

Our starting point is to assess the validity of the framework. We use a panel dataset of all US firms listed on the NYSE, NASDAQ and AMEX between 1984 and 2018. We collect firm-level data from Compustat. We exclude financial firms (sic code 6000-6999) and utilities (sic code 4910-4939) because firms from these industries have different regulations and accounting information. We also exclude firms without sufficient financial data for key variables (e.g., total assets and share prices) required for our analyses. Our final sample, after excluding all firm-year observations without sufficient data, is 29,053 firm-year observations.

The framework relies on two variables: a measure of firms' accounting performance and a measure of firms' stock market return. In our main analysis, we use the return on capital employed (ROCE) and average abnormal return (AAR) as proxies for accounting and market performance, respectively. ROCE is computed as the ratio of earnings before interest and tax (EBIT) to total invested capital.[4] We compute AAR using the OLS market model (Tunyi, 2019, 2021). Consistent with prior research (Danbolt et al., 2016; Tunyi, 2021; Tunyi et al., 2019), AAR is defined as the average daily abnormal return over the event window, starting 260 trading days before the fiscal year-end date and ending at the fiscal year-end date. Market model parameters are estimated using the preceding 260 trading days but leaving a gap of 40 trading days. The computation requires a minimum of 70 valid observations.[5]

Next, we compute the industry-year median ROCE and AAR. Industries are defined based on the Fama and French 48 industry classification system. All firms in the panel dataset are then classified into 1 of 4 dimensions. Specifically, firms are classified as (i) efficient if their ROCE and AAR are both equal to or greater than the industry-year medians, (ii) hyperopic if their AAR is equal to or greater but their ROCE is less than the industry-year median, (iii) myopic if their ROCE is equal to or greater but their AAR is less than the industry-year median, and (iv) poor if their ROCE and AAR are both less than the industry-year medians.

[4] In robustness tests, we also used net income in place of EBIT, and the results are qualitatively unchanged in unreported tables. We have used alternative profitability measures such as ROA (EBIT to total assets) and ROS (EBIT to total sales), and our results are qualitatively robust. We do not report these for brevity.

[5] The analysis is facilitated by Eventus software accessed through Wharton Research Data Services (WRDS). In robustness tests, we have altered these conditions, i.e., length of estimation period, length of gap and minimum required observations, and the results remain qualitatively similar.

This classification system is summarised in Table 1. Following classification, we estimate each firm's degree of belonging within each dimension using our "distance from the median" measure from Equation (1).

3.2 Validation of the multidimensional framework

3.2.1 Management's horizon, R&D and other discretionary expenses

The validation tests focus on the myopia and hyperopia dimensions which presumably capture management's horizon. Prior research suggests that myopic managers cut R&D and other discretionary expenses in order to meet earnings targets (Graham et al., 2006) and, hence, several studies use R&D investments as a proxy for management myopia (Bushee, 1998; Chen et al., 2015a). To validate our measure of myopia, we explore whether US firms that are classified as myopic (hyperopic) by the framework cut (grow) R&D in the next period. We measure R&D intensity as the ratio of R&D to total assets. Our baseline validation model is shown in Equation (2).

$$R\&D_{it} = \beta_0 + \beta_1 Horizon_{it-1} + \sum \beta_k Controls_{it-1} + v_j + v_t + \epsilon_{it} \tag{2}$$

In Equation (2), $R\&D$ is the ratio of R&D expenditure to total assets, and $Horizon$ captures the two dimensions of performance which we focus on i.e., myopia and hyperopia. In our empirical analysis, Myopia (Hyperopia) takes a value of one if a firm belongs in the Myopia (Hyperopia) dimension and a value of zero otherwise.[6] Prior research (Alessandri and Pattit, 2014; Edmans et al., 2017; Faleye, 2007; Tunyi et al., 2019) suggests that R&D is a function of Tobin's Q, firm size, leverage, liquidity, sales growth, tangible assets, and market share so we include these control variables in our regression analyses.[7] We also control for industry (v_j) and year (v_t) fixed effects. Full variable definitions are provided in Appendix A.

[6]Later in our robustness checks, we redefine Myopia as a dummy variable which takes a value of one if a firm belongs in the Myopia dimension and a value of zero if it belongs in Hyperopia dimension, thereby excluding the Efficient and Poor dimensions from our sample. Our results are qualitatively similar.

[7]We control for Tobin's Q as more valuable firms are likely to engage in research activities that will sustain future growth. Similarly, relatively larger firms with significant resources (low leverage and high liquidity), higher growth prospects (growth) and larger market shares are more likely to invest in R&D due to the availability of liquid resources and the likelihood of achieving significant returns from R&D innovation. Tangible assets capture firms' asset structure; firms with significant tangible assets within their asset portfolio historically have low investments in intangibles such as R&D.

To address selection bias arising from the unavailability of R&D data, we use the Heckman two-stage approach (Heckman, 1979) with one instrument for R&D—industry-year median R&D. In the first stage, we predict a firm's likelihood of investing in R&D using a probit model specification. Next, we include the associated Inverse Mills ratio (selection hazard derived from the first stage regression) as an additional control variable in Equation (2). Besides focusing on R&D investments, we also consider how management's horizon impacts on total discretionary expenses (R&D plus selling, general and administrative expenses) modelled following Roychowdhury (2006) and Cohen and Zarowin (2010).

3.2.2 Management's horizon, accrual and real earnings management

Our second validation test explores the extent to which myopic and hyperopic manage earnings using accrual and real earnings management strategies. Following the literature (Bushee, 1998; Gerged et al., 2021; Graham et al., 2006; Healy and Wahlen, 1999; Zhao et al., 2012), we can validate our framework by showing that in the year following classification, firms classified as myopic by the framework manage earnings upward using accrual and real earnings management techniques. Our measure of accrual earnings management is discretionary accruals (*REM1*) estimated using the modified-Jones model (Dechow et al., 1995). We measure real earnings management (*REM1* and *REM2*) following prior work by Zang (2012) and Roychowdhury (2006). Full variable definitions are provided in Appendix A. To test whether myopic firms manage earnings upwards, we re-estimate Equation (2) using our measures of accrual (*DACC*) and real (*REM1* and *REM2*) earnings management as the dependent variables.

3.3 Empirical tests of hypotheses

We conduct two main empirical tests to explore the relationship between horizon, new investments, over-investment and free cash flows as per our hypotheses. We follow Richardson (2006) and Zhang (2016) to derive accounting proxies for new investments, over-investment and free cash flows. Specifically, free cash flow is computed as cash flow above that required to service existing debt obligations, maintain assets in place, and finance expected new investments (Zhang, 2016). Free cash flow is estimated as follows:

$$FCF_{it} = CFO_{it} - DA_{it} + RD_{it} - I^{*}_{NEW,it} \tag{3}$$

where CFO_{it}, DA_{it} and RD_{it} are cash flow from operations, depreciation and amortization expense and R&D expense for firm i in year t (all deflated by total assets), respectively. $I^{*}_{NEW,it}$, the expected level of new capital expenditure, is estimated as the predicted value of $I_{NEW,it}$ in Equation (4).

$$\begin{aligned} I_{NEW,it} =& \beta_0 + \beta_1 V/P_{it-1} + \beta_2 Leverage_{it-1} + \beta_3 Cash_{it-1} + \beta_4 Age_{it-1} \\ & + \beta_5 Size_{it-1} + \beta_6 \acute{} MVE_{it-1} + \beta_7 I_{NEW,it-1} + v_t + v_j + \epsilon_{it} \end{aligned} \tag{4}$$

where $I_{NEW,it}$ is a measure of new capital investment computed as the difference between total capital investment and the investment required to maintain firm i's assets in year t, scaled by total assets (see Equation (5)). As in Equation (6), total capital investment ($I_{TOTAL,it}$) is estimated as the sum of R&D expenditure ($R\&D_{it}$), capital expenditure ($CAPEX_{it}$) and acquisition expenditure ($Acquisition_{it}$) less cash receipts from property, plant and equipment disposal ($SalePPE_{it}$).

$$I_{NEW,it} = I_{TOTAL,it} - I_{MAINT,it} \tag{5}$$

$$I_{TOTAL,it} = R\&D_{it} + CAPEX_{it} + Acquisition_{it} - SalePPE_{it} \tag{6}$$

$$I_{NEW,it} = R\&D_{it} + CAPEX_{it} + Acquisition_{it} - SalePPE_{it} - I_{MAINT,it} \tag{7}$$

The independent variables in Equation (4) are defined as in Richardson (2006). Specifically, V/P is a measure of growth opportunities, computed as the ratio of firm value absent growth opportunities to the market value of the firm. Consistent with Richardson (2006), we estimate firm value absent growth opportunities as in Equation (8).

$$V_{AIP} = (1 - \alpha r)BV + \alpha(1 + r)X - \alpha r d \tag{8}$$

where, $\alpha = (\omega/(1 + r - \omega))$, $r = 12\%$ and $\omega = 0.62$. Consistent with Richardson (2006), in

Equation (8), r is the discount rate (12%), ω is the abnormal earnings persistence parameter (0.62), BV is the book value of common equity, X is operating income after depreciation and d is the annual dividend.

Leverage in Equation (4) is measured as the sum of current and long-term debt deflated by total assets. *Cash* is the ratio of cash and short-term investments to total assets. *Age* is the log of the total number of years since listing on CRSP. *Size* is the log of total assets. ´MVE is the change in the market value of the firm from the prior year. Additionally, the model (Equation (4)) controls for year (v_t) and industry (v_j) fixed effects. We run cross-sectional regressions for industry-year groups and use predicted values of $I_{NEW,it}$ as the estimate of $I^*_{NEW,it}$ in Equation (3). Consistent with Zang (2012), we generate the residuals from Equation (4) and use these as our measure of over-investment ($I_{OVER,it}$).

Our first hypothesis (H_1) suggests that the level of new investments increases (decreases) with management hyperopia (myopia). To test this hypothesis, we estimate the following model;

$$I_{NEW,it} = \beta_0 + \beta_1 Horizon_{it} + \sum \beta_k Controls_{it} + v_j + v_t + \epsilon_{it} \tag{9}$$

Here, $I_{NEW,it}$ is a measure of new capital investment and $Horizon$ captures the different dimensions of performance (i.e., myopia and hyperopia).[8] The model controls for firm characteristics (including valuation (Tobin's Q), firm size, cash resources (cash & equiv), leverage, quick assets, sales growth, tangible assets and market share) as well as industry (v_j) and year (v_t) fixed effects.

Our second hypothesis (H_2) extends Richardson (2006) by exploring whether management's horizon moderates the over-investment of free cash flow problem. Specifically, we hypothesise that management hyperopia (myopia) mitigates (exacerbates) the over-investment of free cash flows. We test this hypothesis by estimating Equation (10).

$$\begin{aligned} I_{OVER,it} = &\beta_0 + \beta_1 Horizon_{it} + \beta_2 FCF_{it} + \beta_3 Horizon_{it} * FCF_{it} \\ &+ \sum \beta_k Controls_{it} + v_j + v_t + \epsilon_{it} \end{aligned} \tag{10}$$

[8]For completeness, we also run analyses for the Efficient and Poor dimensions.

In Equation (10), $I_{OVER,it}$ is a measure of over-investment estimated as the residual in Equation (4), $Horizon$ captures the different dimensions of performance (i.e., myopia and hyperopia) and FCF is a measure of firm free cash flow estimated from Equation (3). We explore moderation by adding an interacting or measures of dimension with the free cash flow measure. As in previous cases, the model controls for firm characteristics, as well as industry (v_j) and year (v_t) fixed effects.

4 Results and discussions

4.1 Descriptive Statistics

Table 2 presents descriptive statistics of key variables in the study. Specifically, we present summary statistics including the number of observations, the mean, the standard deviation (Std Dev) and the 25th (p25), 50th or median (p50) and 75th (p75) percentiles. The variables are fully defined in Appendix A. The mean ROCE for firms in the sample is -35.0%, while the median is 10.7%. This suggests that this variable, which we later use to derive the dimensions of the framework, is negatively skewed.[9] The mean and median AAR in the sample are both 0.0%.

We use ROCE and AAR to generate our dimensions using the procedure illustrated in Table 1. In Table 3, we present details on the number of observations under each of the four dimensions. We find that distribution is fairly even with about 25% of firms classified under each Dimension.[10]

[Insert Table 2 here]

[Insert Table 3 here]

In Appendix B, we explore basic descriptive statistics (mean and median) for different firms across the four dimensions. By design, the mean and median ROCE for efficient and myopic firms (i.e., about 20% in both cases) are positive and significantly greater than the mean and median ROCE for hyperopic and poor firms.[11] Similarly, by design, the mean and

[9] To account for the skewness, we therefore use median values of ROCE and AAR in each year as the cut-offs when classifying each firm's ROCE and AAR as high or low.

[10] We expect such results by construction as we have used the industry-year median values of ROCE and AAR as the cut-off point to classify firms into different dimensions.

[11] Given that we are interested in the distribution of this variable, we have not winsorised it to eliminate extreme observations. To mitigate this problem, we have used the median values rather than mean values to arrive at our cutoffs. Our results do not change if we winsorise ROCE at the 1st and 99th percentile.

median values of AAR for efficient and hyperopic firms are greater than those of myopic and poor firms. There are no notable differences in the distribution of Tobin's Q, Size, Leverage, Liquidity, Growth, Tangible assets and Market share across the four dimensions. Our descriptive statistics reveal some important differences in the distribution of R&D investment and discretionary expenses across the groups. Specifically, we find that hyperopic firms report substantially higher R&D investments and discretionary expenses when compared to efficient and myopic firms. Additionally, hyperopic firms report slightly high levels of new investment but also higher values of over-investment when compared to their myopic counterparts. Finally, the descriptive statistics suggest myopic firms hold high levels of free cash flows when compared to their hyperopic counterparts.

Our main analysis is based on multiple regression models involving several independent variables. In Appendix C, we explore the correlations between the main variables in our study. The results show that there are no significant issues of multicollinearity to contend with. Importantly, we find that the correlation coefficient between the measure of accounting performance (ROCE) and the measure of stock market performance (AAR) is close to 0 (i.e., 0.001) and insignificant at the 1% level. This suggests that the two variables do not capture the same underlying construct. This supports our view that the two variables should be used as complements rather than substitutes when assessing management performance.

4.2 Results from validation tests

We begin our validation tests by exploring whether myopic (hyperopic) firms cut (grow) discretionary expenses (including R&D, as well as SG&A expenses) using Equation (2). The results are presented in Table 4. Columns (1)-(3) present Heckman two-stage regression (Heckman, 1979) results with R&D as the dependent variable, while Columns (4)-(6) present OLS results with abnormal discretionary expenses (R&D and SG&A expenses) as the dependent variable. First-stage results for the Heckman two-stage regression are presented in Column (1). Here, we find a significant positive relationship between the instrument (industry-year median R&D intensity) and firm R&D intensity (p-value of 0.000), suggesting that this exogenous instrument is a good predictor of firm-level R&D intensity. In the second stage, we exclude the instrument and use the inverse mills ratio estimated from the first stage regression as an additional control variable in Columns (2)-(3).

[Insert Table 4 here]

In Column (2) of Table 4, consistent with expectations, firms classified as myopic in one period is associated with a decline in R&D investments in the next period. Specifically, membership in the myopic dimension (relative to any dimension) leads to a 1.8% decline in R&D intensity in the next period. On the contrary, as shown in Column (3), relative to other firms, hyperopic firms increase R&D investments by 2.0% in the next period. These results are significant at the 1% level (p-value of 0.000).[12] Using an alternative measure of discretionary expenses — abnormal discretionary expenses — in Columns (4)-(5), we find that relative to other firms, firms classified as myopic reduce discretionary expenses. These results are consistent with other studies documenting that myopic managers cut R&D investments (Alessandri and Pattit, 2014; Faleye, 2007; Meulbroek et al., 1990) or discretionary expenses (Bushee, 1998; Chen et al., 2015a; Faleye, 2007; Holden and Lundstrum, 2009).

[Insert Table 5 here]

In Table 5, we explore the relationship between the different dimensions of management performance and firms' earnings management behaviour. We expect that firms classified as myopic manage earnings upwards and, perhaps, those classified as hyperopic either do not manage earnings or report comparatively lower levels of earnings management. We explore accrual earnings management behaviour in Columns (1)-(2) and real earnings management in Columns (3)-(6). We find that firms classified as myopic in one period increase discretionary accruals in the next period (Column 1), while their hyperopic counterparts report lower discretionary expenses in the next period (Column 2). Specifically, myopic firms report discretionary accruals which are 0.4 percentage points higher than those reported by other firms (significant at the 1% level), while hyperopic firms report discretionary accruals which are 0.3 percentage points lower than those reported by other firms (significant at the 10% level). Myopic firms also appear to engage in upward real earnings management. In Column (3), we find that firms classified as myopic are associated with a 1.7% increase in REM1 in the following period, while their hyperopic counterparts are associated with a 2.1%

[12] While we have no explicit expectations for our efficient and poor sub-groups (untabulated), we find that firms classified as efficient (poor) cut (grow) R&D investments relative to other firms.

decline in REM1. These results are significant at the 1% level and robust to the choice of real earnings management proxy (REM1 or REM2). Overall, the results suggest that earnings management (real and accrual) increases with our measures of management myopia but declines with management hyperopia.

4.3 The informativeness of the distance from the median

We explore the informativeness of the distance from the median measure by testing whether our estimate of "distance" (see Figure 1 and Equation (1)) moderates the relationship between management's horizon and decisions to alter discretionary expenses, as well as manage earnings. The models we estimate are specified as follows:

$$\begin{aligned} DE_{it} or EM_{it} =& \beta_0 + \beta_1 Horizon_{it-1} + \beta_2 Distance_{it-1} \\ &+ \beta_3 Horizon_{it-1} * Distance_{it-1} + \sum \beta_k Controls_{it-1} + v_j + v_t + \epsilon_{it} \end{aligned} \quad (11)$$

All variables are defined as in previous equations. If the distance from the median is informative, the coefficient of the interaction terms in Equation (11) should be significant, suggesting that the distance from the median or a firm's spatial location within each dimension amplifies or attenuates the impact of group membership on earnings management behaviour. In order words, a significant interaction term will suggest that the further away a firm is from the median firm, the more likely it is to increase or decrease its discretionary expenses or its level of earnings management. Our results are presented in Table 6.

[Insert Table 6 here]

In Column (1), we find a negative interaction effect, i.e., distance moderates the relationship between myopia and R&D intensity (p-value of 0.000). Recall that distance is a scalar quantity and that a negative relationship between myopia and R&D intensity had been established in Table 4. The result here, therefore, suggests that firms that are relatively more myopic (i.e., further away from the median) report lower R&D investment compared to their less myopic counterparts. In Column 3 of Table 6, we find that distance also moderates the positive relationship between hyperopia and R&D intensity reported in Table 4. The interaction effect is significant at the 1% level (p-value of 0.000). This result suggests that as firms become more hyperopic, their investment in R&D increases. In order words, hyperopic firms that are further away from the median firm tend to grow R&D investment by a larger amount. The results in Columns (3) and (4) are consistent with those from the latter two Columns. Specifically, myopic firms that are further away from the median report comparatively lower abnormal discretionary expenses (Column 3), while their hyperopic counterparts that are further away from the median report higher abnormal discretionary expenses. The latter two results are significant at the 1% level.

In Columns (5)-(8), we also explore whether the cross-sectional differences in earnings management behaviour for firms within the same dimension are explained by their spatial location, captured as the distance from the median. We find that the distance from the median moderates the relationship between horizon and earnings management. As shown in Columns (5) and (7) of Table 6, distance attenuates the positive impact of myopia on earnings management documented in Table 5.[13] Specifically, myopic firms that are further away from the median report comparatively lower levels of accrual (Column 5) and real (Column 7) earnings management compared to their counterparts that are closer to the median. Our results for accrual earnings management (Column 5) are not significant at the 10% level but the results for real earnings management are significant at the 1% level (p-value of 0.001). Similarly, our results in Columns (6) and (8) of Table 6 suggest that distance also attenuates the negative relationship between hyperopia and earnings management, which we documented in Table 5. The findings on the impact of the distance from the median on the relationship between horizon, discretionary expenses and earnings management support our view that the distance from the median is informative and, perhaps, broadly captures the level or extent of myopia or hyperopia.

4.4 Investment, free cash flow and horizon

The preceding section established the empirical validity of our proposed framework for management's horizon estimation. We use this framework to explore a classic issue—the relationship between management's horizon and investment decision-making —which has received little attention due to the lack of exogenous measures of management's horizon (Edmans et al., 2017; Ladika and Sautner, 2020). In Table 7, we examine the contemporaneous

[13]Notice that in Table 5, we documented a positive (negative) relationship between myopia (hyperopia) and earnings management.

relationship between management's horizon and firms' level of new investment. Consistent with our first hypothesis (H_1), we find that the level of new investments in a firm declines with management myopia (Column 2) but increases with management hyperopia (Column 1). Indeed, myopic firms report new investments, which are 1.0 percentage points lower than those reported by other firms.

On the other hand, hyperopic firms report new investments, which are 0.9 percentage points higher than the level reported by other firms. These results are significant at the 1% level (p-value of 0.000). Our results are consistent with the view that myopic firms restrict long-term investments (Edmans et al., 2017; Graham et al., 2006; Meulbroek et al., 1990; Stein, 1989). The results are also intuitive as we find a positive relationship between hyperopia and firm-level new investments, suggesting that hyperopic managers are more likely to grow new investments.

[Insert Table 7 here]

The question of the value of this new investment remains as managers may engage in new investments simply to avoid returning free cash flow to their investors (Jensen, 1986; Richardson, 2006). Following Richardson (2006), we also explore firms' over-investment of free cash flow in Columns (3)-(5) of Table 7. Here, we test firms' investment decisions in the presence of free cash flow. In Column (3), we explore the contemporaneous relationship between free cash flow and the level of over-investment. Consistent with findings from Richardson (2006), the level of over-investment increases with free cash flow. A unit increase in free cash flow leads to a 5.6% increase in firm-level over-investment. These results are significant at the 1% level (p-value of 0.000).

Richardson (2006) argues that the relationship between free cash flow and the tendency to over-investment is moderated by corporate governance. Specifically, the presence of activist investors mitigates the over-investment of free cash flows. Building on the Richardson (2006) model, our study considers how this relationship is moderated by management's horizon. In Columns (4) and (5), we explore whether, consistent with our second hypothesis (H_2), the free cash flow–over-investment relationship is moderated by management's horizon. In Column (4) of Table 7, we see that management myopia exacerbates the free cash flow–

over-investment problem. Specifically, we find that the coefficient of the interaction term is positive (0.048) and statistically significant (p-value of 0.000). On the contrary, hyperopia appears to attenuate the problem or, at least, does not amplify it. The coefficient of the interaction term in Column (5) is negative, relatively smaller (-0.009) and not significant at the 1% level (p-value of 0.300).

Overall, the results from Table 7 suggest that myopic managers cut down on new investments while their hyperopic counterparts grow new investments. Importantly, myopia exacerbates the over-investment of free cash flow problem, while management hyperopia potentially mitigates this problem. These results extend Richardson (2006) by suggesting that besides governance factors, management characteristics, particularly management's horizon, potentially shape the free cash flow–over-investment nexus.

4.5 Distance, free cash flow and investment decisions

In Table 8, we explore firm investment decisions as a function of free cash flow, management's horizon and the distance from the median while controlling for firm characteristics, as well as industry and year fixed effects. In Columns (1) and (2), we conduct sub-sample tests to explore whether, within sub-samples of hyperopic and myopic firms, the distance from the median influences new investments. We find this to be the case for myopic firms. Specifically, the distance from the median moderates (amplifies) the negative impact of myopia on new investments. Our results in Column (2) suggest that the moderating effect of distance on the hyperopia–new investments relationship is weak. These results broadly qualify our findings in Table 7 by showing that even within sub-samples of firms classified as myopic, the spatial location of firms within the dimension (or their distance from the median value) matters. Here, we show that firms that are comparatively more myopic than their counterparts report comparatively lower levels of new investments. These results are significant at the 1% level (p-value of 0.000).

[Insert Table 8 here]

In Columns (3)-(6) of Table 8, we test whether distance also moderates the over-investment of free cash flow problem across different dimensions (documented in Table 7). In Columns (3) and (4), we explore three-way interactions between horizon, distance and free cash flow. In both Columns, we document statistically significant three-way interaction effects (p-values of 0.070 and 0.060, respectively). The results broadly suggest that both horizon and distance moderate the relationship between free cash flow and over-investment. To shed light on the nature of the three-way interaction, we explore two-way interactions within sub-sample analyses (as in Columns 5 and 6). Recall that in Column (3) of Table 7, we documented a positive relationship between free cash flow and over-investment. In Columns (5)-(6) of Table 8, we find that the negative relationship between free cash flow and over-investment attenuates with distance. Taken together, the results from Tables 7 and 8 suggest that myopic (hyperopic) firms reduce (grow) new investments, with the extent of growth or decline being a function of the firm's spatial location within the dimension. Secondly, the results suggest that the over-investment of free cash flow problem documented by Richardson (2006) is exacerbated by management myopia.

4.6 Additional robustness checks

We conduct several robustness checks to ensure that our results are not driven by modelling choices. First, we use alternative measures of accounting (e.g., ROA) and market performance (e.g., abnormal returns computed from mean and market-adjusted return models) and all our results remain qualitatively unchanged. For conciseness, we do not present these results. Secondly, we have used the mean in place of the median when defining high and low performance—comparing firms to their peers—in the derivation of the four dimensions of performance. To mitigate the impact of extreme values when computing the industry-year means, we winsorise ROCE and AAR at the 1st and 99th percentile. After addressing the problem of extreme values, we find that our conclusions remain robust when we use the mean in place of the median. Again, for conciseness, we do not present these results. Thirdly, in all models where R&D is used to compute the dependent variable (see Tables 4 and 6), we recognise that not all firms are predisposed to reporting R&D. Hence we present results which correct for selection bias using the Heckman two-stage approach.

Importantly, all our regression models control for industry and year-fixed effects. In untabulated analysis, we have also used panel regression models with fixed effects, and all our results remain qualitatively similar. Notice that in our main regression analyses (see Tables 4 to 6), we are simply comparing firms in one dimension to firms in the other three dimensions. For example, in Column 4, Panel A of Table 4, we are simply assessing whether myopic firms report less R&D investment when compared to efficient, hyperopic and poor firms. In untabulated results, we exclude all observations in the Efficient and Poor dimensions before re-estimating our main results. By excluding these observations, we are directly comparing myopic firms to their hyperopic counterparts. All our conclusions remain robust.

5 Conclusions

5.1 Summary of findings

While management performance is frequently discussed in empirical business, finance and accounting research, standard measures of performance may inadequately capture the underlying construct. We propose a framework for measuring management's horizon (myopia and hyperopia) and use standard measures of accounting and stock market performance to capture this construct.

Our validation tests show that, as expected, myopic firms report significantly lower R&D and discretionary expenses and engage in upward accrual and real earnings management relative to their hyperopic counterparts. The effects are large and economically significant. For example, myopic firms report 2% (and 4%) lower R&D investments (discretionary expenses; R&D and selling, general and administrative expenses) relative to other firms.[14] Consistent with this finding, myopic firms are associated with lower long-term investment relative to their myopic counterparts. Importantly, myopia exacerbates the over-investment of free cash flow problem (Richardson, 2006) while hyperopia attenuates it. Our findings are consistent with agency perspectives (Eisenhardt, 1989; Graham et al., 2006; Jensen, 1986; Jensen and Meckling, 1976; Stein, 1989), suggesting that some managers may pursue short-term value-decreasing strategies at the expense of their shareholders to meet their own short-term goals. Here, we show that myopia influences managers' investment decisions. Our work extends prior studies by developing and validating a new measure of management horizon.

[14]The effects are even more significant (7.5%) when we compare myopic firms directly with their hyperopic counterparts.

5.2 Implications

Our results and the framework have some salient implications for current research and for investors. Besides creating opportunities to revisit the findings of prior studies, our measure for management horizon opens up new areas for research. For example, studies can directly explore how horizon influence other firm outcomes. We demonstrate this by exploring the link between management horizon and investment decisions.

Our measures also allow investors and other stakeholders to assess managers' time horizons and use this information to inform their decisions. For example, our work suggests that poor accounting performance might be acceptable when it is accompanied by high market performance, as this indicates that managers are likely to be focusing on long-term value creation even at the expense of short-term profitability.

Our results show that management myopia limits long-term investment and exacerbates the over-investment of free cash flow problem (Richardson, 2006). This is likely to have an adverse impact on shareholders (investors) as myopic managers sacrifice long-term value creation and do not return free cash flow to their investors. This has important governance implications. Myopia arises because managers overly focus on achieving short-term goals set by investors. Our findings suggest a perverse cycle where efforts to align the interests of the principal and the agent (by setting short-term targets) exacerbate agency problems. This may suggest that governance strategies such as pay-for-performance may benefit from additional clauses around the use of free cash flow and long-term value creation. Frequently used indicators, including short-term profitability, may incentivise myopic behaviour.

5.3 Limitations and areas for future research

Our study has some limitations and opportunities for extension, which are worth highlighting. First, we assume market efficiency in pricing firms' prospects and, hence, use market measures of performance as an indicator for future value creation. The evidence suggest that some markets frequently fall short (as evidenced by over and under-reaction to information) and are sometimes influenced by investors' biases. Future studies can explore the framework's usefulness in less advanced stock markets or in periods of high market volatility.

Secondly, we rely on accounting information (a measure of profit) from US-listed firms.

Reported profits are influenced by accounting regulations and other managerial choices, which we do not account for in our analysis. Our results might not directly apply to firms that do not employ US accounting regulations (GAAP). Our framework will not apply to non-listed firms as it requires stock market performance. It will, therefore, be interesting for future studies to explore the applicability of the framework in different settings.

Importantly, our framework is two-dimensional — simplistic. It implicitly assumes that we can glean information about management horizon by looking only at two factors. The framework ignores other managerial and governance characteristics which might influence management's horizon. Future studies can explore how other qualitative and quantitative indicators of management horizon (such as sustainability performance and employee engagement) can be integrated into the framework.

Finally, our work does not address the fundamental issue of whether management horizon is innate (or permanent or a managerial fixed effect) or an attribute that changes over time. This will be an interesting issue to explore in future studies.

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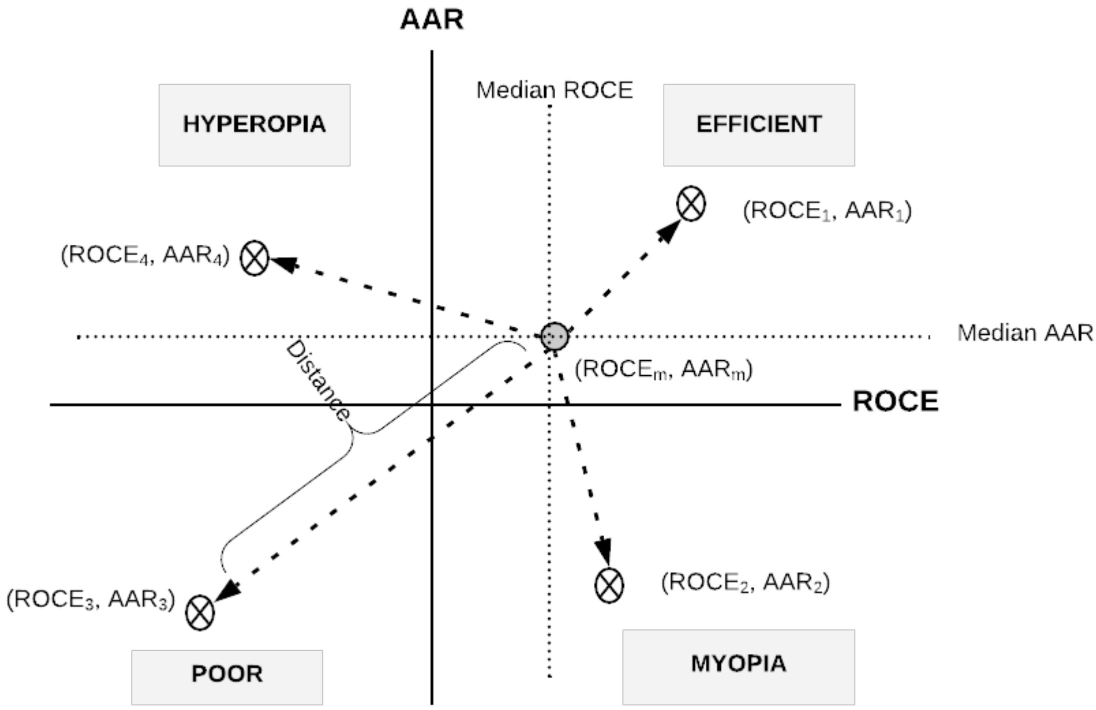

Figure 1 Illustration of spatial location: distance from the median

Table 1 Derivation of dimensions

The table summarises the development of the management horizon framework. The framework uses measures of accounting performance (proxied by return on capital employed, ROCE) and stock market performance (proxied by average abnormal returns, AAR) to arrive at 4 distinct dimensions of performance. AAR is estimated using the market model.

		Accounting	
		High: $ROCE_{it} > Median_{jt}$	**Low:** $ROCE_{it} < Median_{jt}$
Market	**High:** $AAR_{it} > Median_{jt}$	**Efficient**	**Hyperopia**
	Low: $AAR_{it} < Median_{jt}$	**Myopia**	**Poor**

Table 2 Descriptive Statistics
The table presents descriptive statistics for key variables used in the study. Full variable definitions are available in Appendix A.

Variable	Observations	Mean	Std Dev	p25	p50	p75
ROCE	29,053	-0.350	67.390	0.034	0.107	0.180
AAR	29,053	0.000	0.003	-0.001	0.000	0.001
Tobin's Q	29,053	1.949	1.437	1.116	1.508	2.250
Size	29,053	6.395	2.021	4.919	6.280	7.739
Leverage	29,053	0.171	0.173	0.002	0.134	0.283
Liquidity	29,053	2.276	2.306	1.010	1.547	2.591
Growth	29,053	0.045	0.238	-0.023	0.064	0.153
Tangible assets	29,053	0.260	0.229	0.084	0.182	0.373
Market share	29,053	0.019	0.056	0.000	0.002	0.011
DACC	28,990	0.000	0.084	-0.035	0.001	0.036
R&D	29,053	0.047	0.095	0.000	0.005	0.059
DISX	29,052	-0.003	0.221	-0.114	-0.018	0.074
REM1	21,697	0.006	0.353	-0.139	0.024	0.188
REM2	29,010	0.001	0.229	-0.089	0.016	0.119
New investment	29,053	0.069	0.104	0.002	0.040	0.106
Over-investment	20,723	0.000	0.067	-0.035	-0.006	0.022
Free cash flow	20,696	0.016	0.115	-0.030	0.025	0.075

Table 3 Distribution of observations across dimensions

The table shows the distribution of sample observations across the four dimensions of the framework. Efficient firms are those with high accounting and high stock market performance. Hyperopic firms are those with low accounting but high stock market performance. Myopic firms are those with high accounting but low stock market performance. Poor firms are those with low accounting and low stock market performance. High (low) performance refers to accounting and stock market performance above (below) that of the median firm in that year.

Dimension	**Definition**	**Observations**	**Proportion of sample**
Efficient	High Accounting & High Market	7,575	26.07%
Hyperopic	Low Accounting & High Market	6,899	23.75%
Myopic	High Accounting & Low market	7,532	25.93%
Poor	Low Accounting & Low Market	7,047	24.26%
Total	Full sample	29,053	100.0%

Table 4 Management's horizon and R&D investment

The table explores the relationship between measures of performance in one period and the level of R&D (Columns 1-3) and other discretionary expenses (Columns 4-5) incurred in the next period. Columns (1)-(3) present results from Heckman two-stage selection models. The first stage (Column 1) is a probit regression that predicts firm-level R&D using the industry-year median R&D as an exogenous instrument. The Inverse Mills ratio computed from the first stage regression is used as an additional control in the OLS regressions in Columns (2)-(3). All models control for firm characteristics, as well as, industry- and year-fixed effects. Full variable definitions are provided in Appendix A. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

	First stage DV: R&D	**Second stage** DV: R&D		**OLS** DV: DISX	
Variables	(1)	(2)	(3)	(4)	(5)
Myopic		-0.018***		-0.040***	
		(0.000)		(0.000)	
Hyperopic			0.020***		0.046***
			(0.000)		(0.000)
Median R&D	5.699***				
	(0.000)				
Inverse Mills		0.025***	0.024***		
		(0.000)	(0.000)		
Tobin's Q	0.110***	0.010***	0.010***	0.043***	0.043***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size	0.069***	-0.003***	-0.003***	-0.011***	-0.010***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-0.940***	-0.030***	-0.030***	-0.099***	-0.099***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Liquidity	0.005	0.002***	0.001***	-0.013***	-0.013***
	(0.440)	(0.000)	(0.000)	(0.000)	(0.000)
Growth	0.000	-0.020***	-0.019***	-0.015**	-0.014**
	(0.998)	(0.000)	(0.000)	(0.028)	(0.041)
Tangible assets	-1.060***	-0.055***	-0.054***	-0.195***	-0.196***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Market share	1.250***	0.066***	0.063***	-0.059**	-0.064**
	(0.000)	(0.000)	(0.000)	(0.038)	(0.024)
Constant	-0.838	0.005	-0.000	0.161**	0.144**
	(0.129)	(0.819)	(0.988)	(0.019)	(0.035)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	19,685	19,685	19,685	19,766	19,766
χ^2	8,510				
Prob (χ^2)	0.000				
Pseudo R^2	0.341				
R-squared		0.374	0.376	0.120	0.121
Adj.R^2		0.372	0.374	0.117	0.118
F-stat		167.8	168.7	37.73	38.20
$Prob > F$		0.000	0.000	0.000	0.000

Table 5 Management's horizon and earnings management

The table explores the relationship between measures of performance in one period and earnings management the next period. We use discretionary accruals as the dependent variable in Columns (1)-(2), the sum of abnormal discretionary expenses (multiplied by -1) and abnormal production as the dependent variable in Columns (3)-(4) and the sum of abnormal cash flows from operations and abnormal discretionary expenses, all multiplied by negative 1, as the dependent variable in Columns (4)-(5). The model controls for firm-level characteristics, as well as industry and year fixed effects. All variables are fully defined in Appendix A. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

	DACC		**REM1**		**REM2**	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Myopic	0.004***		0.017***		0.007**	
	(0.004)		(0.001)		(0.032)	
Hyperopic		-0.003*		-0.021***		-0.010***
		(0.063)		(0.000)		(0.004)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.009	-0.008	-0.213*	-0.205*	-0.043	-0.040
	(0.787)	(0.813)	(0.065)	(0.076)	(0.539)	(0.574)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,741	19,741	19,766	19,766	19,743	19,743
R-squared	0.024	0.023	0.105	0.105	0.132	0.132
Adj.R^2	0.020	0.020	0.101	0.102	0.129	0.129
F-stat	6.689	6.619	32.44	32.50	42.04	42.10
$Prob > F$	0.000	0.000	0.000	0.000	0.000	0.000

Table 6 Informativeness of the distance from the median value

The table explores the informativeness of the distance from the median value. The dependent variables in the models include R&D investments (Columns 1-2), abnormal discretionary expenses (Columns 3-4), abnormal discretionary accruals (Columns 5-6), real earnings management (Columns 7-8). Independent variables are lagged by one year. All models control for firm characteristics, as well as industry- and year-fixed effects. Coefficients are suppressed to save space. Full variable definitions are provided in Appendix A. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

	R&D		**DISX**		**DACC**		**REM1**	
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Myopic # Distance	-0.080***		-0.128***		-0.012		-0.139***	
	(0.000)		(0.000)		(0.277)		(0.001)	
Hyperopic # Distance		-0.000		-0.002***		0.001*		0.004***
		(0.182)		(0.007)		(0.081)		(0.004)
Distance	-0.000	0.000	0.000	0.002***	0.000	-0.001*	0.000	-0.004***
	(0.881)	(0.185)	(0.546)	(0.007)	(0.171)	(0.087)	(0.931)	(0.004)
Myopic	-0.009***		-0.027***		0.006***		0.032***	
	(0.000)		(0.000)		(0.003)		(0.000)	
Hyperopic		0.020***		0.046***		-0.003*		-0.022***
		(0.000)		(0.000)		(0.053)		(0.000)
Inverse Mills	0.024***	0.024***						
	(0.000)	(0.000)						
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.007	-0.000	0.161**	0.143**	-0.009	-0.007	-0.213*	-0.204*
	(0.767)	(0.986)	(0.019)	(0.036)	(0.788)	(0.818)	(0.065)	(0.077)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,685	19,685	19,766	19,766	19,741	19,741	19,766	19,766
Adj.R^2	0.376	0.374	0.118	0.118	0.020	0.020	0.102	0.102
F-stat	165.5	164.1	37.13	37.27	6.548	6.507	31.72	31.73
$Prob > F$	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 7 Management's horizon and investment behaviour

The table explores the relationship between management's horizon and investment decision-making, focusing on new investments (Columns 1 and 2) and the tendency to over-invest free cash flows (Columns 3 to 5). The model controls for firm-level characteristics, as well as industry- and year-fixed effects. Coefficients are suppressed to save space. FCF refers to free cash flows. All variables are fully defined in Appendix A. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

	New investment		Over-Investment		
	(1)	(2)	(3)	(4)	(5)
Myopic	-0.010***			-0.010***	
	(0.000)			(0.000)	
Hyperopic		0.009***			0.005***
		(0.000)			(0.000)
Free cash flow (FCF)			0.056***	0.053***	0.063***
			(0.000)	(0.000)	(0.000)
Myopic # FCF				0.048***	
				(0.000)	
Hyperopic # FCF					-0.009
					(0.300)
Controls	Yes	Yes	Yes	Yes	Yes
Constant	0.057**	0.053*	0.051	0.052	0.051
	(0.041)	(0.054)	(0.111)	(0.103)	(0.111)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	29,053	29,053	20,696	20,696	20,696
R-squared	0.234	0.234	0.040	0.043	0.041
Adj.R^2	0.232	0.232	0.037	0.040	0.038
F-stat	123.2	122.8	12.73	13.38	12.73
$Prob > F$	0.000	0.000	0.000	0.000	0.000

Table 8 Horizon and Investment behaviour: The effect of distance

The table reports the OLS regression coefficient estimates of new investments (Columns 1 and 2) and over-investments (Columns 3 to 6) as a function of distance, management's horizon and free cash flow. All models control for firm characteristics, as well as industry- and year-fixed effects. Coefficients are suppressed to save space. FCF refers to free cash flows. Full variable definitions are provided in Appendix A. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

	New investment		Over-investment			
Sample	All (1)	All (2)	All (3)	All (4)	Myopic (5)	Hyperopic (6)
Myopic # Distance # FCF			-0.079* (0.070)			
Hyperopic # Distance # FCF				0.010* (0.060)		
Myopic # Distance	-0.125*** (0.000)		-0.077*** (0.000)			
Hyperopic # Distance		-0.000 (0.297)		-0.004*** (0.000)		
Distance # FCF			-0.003** (0.018)	-0.026*** (0.000)	-0.082** (0.047)	-0.016*** (0.000)
Distance	0.000 (0.109)	0.000 (0.280)	-0.000** (0.020)	0.003*** (0.000)	-0.072*** (0.000)	-0.002*** (0.000)
Free cash flow (FCF)			0.056*** (0.000)	0.075*** (0.000)	0.174*** (0.000)	0.086*** (0.000)
Myopic	0.003** (0.036)		-0.004*** (0.008)			
Hyperopic		0.009*** (0.000)		0.006*** (0.000)		
Myopic # FCF			0.107*** (0.000)			
Hyperopic # FCF				-0.011 (0.236)		
Controls	Yes	Yes	Yes	Yes	Yes	yes
Constant	0.057** (0.040)	0.053* (0.055)	0.055* (0.084)	0.042 (0.184)	0.058 (0.371)	0.012 (0.705)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	29,053	29,053	20,696	20,696	5,505	4,855
R-squared	0.240	0.234	0.049	0.045	0.085	0.065
Adj.R^2	0.238	0.232	0.045	0.041	0.073	0.052
F-stat	123.4	119.5	14.24	13.04	7.211	4.839
$Prob > F$	0.000	0.000	0.000	0.000	0.000	0.000

Appendix A Variable descriptions

Variable	Description
Industry	Fama and French 48 industry classification scheme.
ROCE	Ratio of earnings before interest and tax to total capital employed.
AAR	Average daily Market model abnormal returns over the event window starting 260 days before the fiscal year-end date and ending on the fiscal year-end date.
Efficient	Indicator variable which takes a value of 1 when a firm's ROCE and AAR are both greater than the industry-year median, and a value of zero, otherwise.
Hyperopia	Indicator variable which takes a value of 1 when a firm's AAR is greater than the industry-year median but its ROCE is less than the industry-year median, and a value of zero, otherwise.
Myopia	Indicator variable which takes a value of 1 when a firm's AAR is less than the industry-year median but its ROCE is greater than the industry-year median, and a value of zero, otherwise.
Poor	Indicator variable which takes a value of 1 when a firm's ROCE and AAR are both less than the industry-year median, and a value of zero, otherwise.
Tobin's Q	The sum of the book value of debt and the market value of equity, scaled by the book value of assets.
Firm size	Natural log of total assets.
Liquidity	Ratio of current assets less inventory to current liabilities.
Leverage	Ratio of total debt to total assets.
Sales growth	Percentage change in total sales.
Tangible assets	The ratio of property, plant and equipment to total assets.
Market share	The ratio of a firm's revenue to industry revenue in each year.
Free cash flow	Cash flow above that required to service existing debt obligations, maintain assets in place and finance expected new investments (Richardson, 2006; Zhang, 2016).
R&D	The ratio of R&D expenditure to total assets.
DISX	The residual obtained from industry-year regressions of total discretionary expenses i.e., the sum of R&D and selling, general and administrative (SG&A) expenses on sales and a constant. All variables in the model are deflated by the previous year's total assets. See Roychowdhury (2006) for details.
DACC	The residual of the modified Jones model (Dechow et al., 1995). The residual captures the portion of total accruals (the change in current assets minus cash minus the change in current liabilities minus depreciation) which is not explained by the level of property, plants and equipment and the change in revenues and receivables. All variables in the model are deflated by previous year total assets.
REM1	Computed as the sum of over-production and negative abnormal discretionary expenses.
REM2	Computed as the sum of abnormal cash flows from operations and abnormal discretionary expenses multiplied by negative 1.
New investment	Computed as the difference between total capital investment and the investment required to maintain firm i's assets in year t, scaled by total assets. See Equations 5 and 7.
Over-investment	Investment beyond that required to fund all positive net present value projects. Following Richardson (2006), over-investment is estimated as the residual from regressing new investments on lagged values estimates of growth opportunities, leverage, cash, age, size, change in market value of equity and new investments, while controlling for industry and year fixed effects. See Equation (4).

Appendix B Descriptive statistics by Dimension

The table presents descriptive statistics (mean and median) for variables in this study by dimensions of management performance. Full variable definitions are presented in Appendix A. Efficient firms are those with high accounting and high stock market performance. Hyperopic firms are those with low accounting but high stock market performance. Myopic firms those with high accounting but low stock market performance. Poor firms those with low accounting and low stock market performance. High (low) performance refers to accounting and stock market performance above (below) that of the median firm in that year.

Dimension	**Efficient**		**Hyperopic**		**Myopic**		**Poor**	
Variable	Mean	Median	Mean	Median	Mean	Median	Mean	Median
ROCE	0.199	0.176	-1.788	0.035	0.197	0.175	-0.119	0.034
AAR	0.001	0.001	0.002	0.001	-0.002	-0.001	-0.002	-0.002
Tobin's Q	2.289	1.854	1.765	1.291	2.153	1.762	1.547	1.203
Size	6.799	6.733	5.857	5.705	6.899	6.819	5.947	5.792
Leverage	0.161	0.135	0.174	0.123	0.168	0.140	0.183	0.139
Liquidity	2.062	1.489	2.490	1.638	2.105	1.503	2.479	1.581
Growth	0.089	0.085	0.007	0.039	0.075	0.074	0.003	0.034
Tangible assets	0.253	0.182	0.266	0.180	0.257	0.186	0.265	0.179
Market share	0.025	0.004	0.012	0.001	0.026	0.004	0.012	0.001
DACC	0.003	0.003	-0.003	0.000	0.003	0.003	-0.004	0.000
R&D	0.033	0.005	0.064	0.007	0.031	0.005	0.061	0.004
DISX	-0.013	-0.022	0.020	-0.011	-0.028	-0.030	0.014	-0.011
REAL	-0.025	0.000	0.022	0.046	0.002	0.008	0.028	0.047
New investment	0.061	0.039	0.072	0.034	0.065	0.044	0.080	0.041
Over-investment	-0.001	-0.006	0.001	-0.005	-0.003	-0.007	0.003	-0.005
Free cash flow	0.058	0.056	-0.024	-0.002	0.051	0.049	-0.033	-0.013

Appendix C Correlation matrix

The table reports mean and median values for acquirers and non-acquirers across several variables. Full variable definitions are provided in Appendix A. Differentials are based on *t*-tests and Mann Whitney U tests for difference in median. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) ROCE	1.000											
(2) AAR	0.001	1.000										
(3) Efficient	0.005	0.313*	1.000									
(4) Hyperopia	-0.010*	0.418*	-0.334*	1.000								
(5) Myopia	0.005	-0.313*	-0.337*	-0.329*	1.000							
(6) Poor	0.000	-0.417*	-0.337*	-0.330*	-0.333*	1.000						
(7) Tobin's Q	0.001	0.075*	0.120*	-0.074*	0.093*	-0.139*	1.000					
(8) Size	-0.005	-0.026*	0.103*	-0.124*	0.128*	-0.108*	-0.062*	1.000				
(9) Leverage	-0.001	-0.007	-0.026*	0.009	-0.012	0.028*	-0.206*	0.367*	1.000			
(10) Liquidity	0.003	0.004	-0.064*	0.062*	-0.050*	0.053*	0.238*	-0.253*	-0.291*	1.000		
(11) Growth	-0.005	0.003	0.117*	-0.094*	0.080*	-0.109*	0.199*	0.006	0.010	-0.035*	1.000	
(12) Tangible assets	0.001	-0.004	-0.008	0.006	-0.004	0.006	-0.206*	0.172*	0.344*	-0.283*	-0.031*	1.000
(13) Market share	0.000	-0.006	0.066*	-0.067*	0.071*	-0.071*	-0.040*	0.411*	0.122*	-0.147*	0.001	0.085*