

Peer effects in investment: Evidence from early-tenure CEOs

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Abstract: This study examines whether CEOs' incentives to rely on peers' investment change over time. Newly appointed CEOs (hereinafter "early-tenure CEOs") lack firm-specific information about growth opportunities and are subject to intense evaluation. Therefore, in making investment decisions, they seek more efficient and easily accessible external information, such as peer firms' investment decisions in the same industry. Using Standard & Poor's 1500 firms, we find that the positive association between the focal firm's and peers' investments is stronger when early-tenure CEOs run the focal firm. This peer effect is stronger when managers have more incentives to rely on peers (i.e., lower ability and stronger monitoring) or firms' investment information quality is poorer (i.e., firms in the early stage of their life cycle, greater investment volatility and uncertainty), supporting our expectation that peers' investments are a useful input for early-tenure CEOs. We also find that sharing common board members or auditors can be a possible mechanism that facilitates the investment peer effects. Lastly, we document better future performance for early-tenure CEOs who follow peers' investments. Taken together, this study contributes to the literature by showing that manager-level characteristics influence heterogeneity in peer effects and that peer effects can be beneficial to firm value, too.

KEYWORDS: peer effects; learning from peers; investment; CEO tenure; early-tenure CEO.

JEL CLASSIFICATION: G31; M12; M41

DATA AVAILABILITY: All data are publicly available from sources identified in the text.

1. INTRODUCTION

Managers with imperfect knowledge of new investments should seek additional information, which can be obtained internally (e.g., firms' growth opportunities) or externally (e.g., industry competition or stock prices) (Beatty, Liao, and Yu 2013; Chen, Goldstein, and Jiang 2007). In this regard, peer firms, defined as firms operating in the same industry, are important external information sources for focal firms' investment opportunities (Badertscher, Shroff, and White 2013; Bustamante and Fresard 2021; Foucault and Fresard 2014). In particular, firms can obtain valuable information by looking at peer firms' investment decisions because they are subject to similar business environments and industry shocks.¹ Bustamante and Fresard (2021) demonstrate the peer effects in investment decisions and attribute them to firms' imperfect information about investment opportunities. While they provide a stepping stone to understanding the peer effects in corporate investments, they are silent on manager-level characteristics which are also important determinants of investment decisions (Malmendier and Tate 2005). We thus extend the literature by examining whether and how manager-level characteristics are associated with peer effects in investments.

Understanding managers' characteristics is important in explaining firms' investment decisions for two reasons. First, the upper echelons theory by Hambrick and Mason (1984) argues that organizational behaviors and outcomes are partially explained by the characteristics of the top management team, including Chief Executive Officers (CEOs). Given that CEOs are ultimately responsible for investment decisions, which are essential for firms' growth, it is necessary to understand whether and how CEO characteristics affect investment decisions. Second, CEOs are regularly evaluated by the board and shareholders to determine whether they maximize firm value

¹ Several studies suggest the existence of a peer effect in various corporate policies such as capital structure, earnings management, tax avoidance, disclosure, or dividends (Adhikari and Agrawal 2018; Bird, Edwards, and Ruchti 2018; Kedia, Koh, and Rajgopal 2015; Leary and Roberts 2014; Seo 2021).

or shareholders' wealth (Holmstrom 1999; Holmstrom and Ricart i Costa 1986; Scharfstein and Stein 1990). As long as the successful investment is vital to improve the firm's value or shareholder's wealth, CEOs are concerned about the choice and consequences of their investment decisions (McConnell and Muscarella 1985). That is, CEOs' investment decisions can be a critical input in the evaluation of their ability (Shi, Connelly, Mackey, and Gupta 2019). Thus, to obtain a good assessment of the labor market, CEOs exert efforts to make sound investment decisions and consequently improve firm performance.

To shed light on the role of CEO-level characteristics on peer effects in investment, we investigate whether newly appointed CEOs (early-tenure CEOs) employ peer firms' investments in their investment decisions.² There could be conflicting expectations on whether early-tenure CEOs rely on peers' investments. On the one hand, early-tenure CEOs are expected to be sensitive to peers' investments because they are new to the firm and, thus, do not have enough accumulated firm-specific idiosyncratic knowledge to make efficient and effective investment decisions. Furthermore, because they must spend much time adjusting to a new environment, they do not have enough time to learn and analyze information about investment opportunities by themselves. In this case, peer firms' behaviors could serve as an efficient and easily accessible information source for early-tenure CEOs in navigating their own firms' investment opportunities (Bustamante and Fresard 2021). Therefore, early-tenure CEOs have the incentive to rely on peers' investment decisions to compensate for their lack of firm knowledge. On the other hand, early-tenure CEOs may have incentives to make bold decisions rather than to look similar to competitors (Bebchuk and Stole 1993; Li, Low, and Makhija 2017; Prendergast and Stole 1996; Yim 2013). The labor

² In this paper, we use 'early-tenure CEO' to refer CEO who has been appointed recently at the firm. Please note that 'early-tenure CEO' does not indicate CEOs who work for a recently founded firm. Later, we use the 'early-stage' firm to refer the firm which is supposed to be at the beginning phase of firm life cycle.

market evaluates earlier-tenure CEOs more actively, particularly about whether they fit well with the company (Graffin, Boivie, and Carpenter 2013). Following peers' behavior would be safe but does not help show off their abilities. This motivates early-tenure CEOs to differentiate themselves, hoping to raise the possibility of outperforming other CEOs. Collectively, whether early-tenure CEOs rely on peer firms' investment in their investment decisions remains an empirical question.

As various studies on peer effects point out, identifying the response to peers' behaviors is challenging because of the reflection problem (Adhikari and Agrawal 2018; Angrist 2014; Bustamante and Fresard 2021; Leary and Roberts 2014; Seo 2021). As Manski (1993) articulates, the reflection problem refers to the empirical difficulty in examining whether peers' behaviors influence a focal firm's behaviors because the focal firm's response to peers can be a component of peers' behaviors. In our context, a positive association between a focal firm's investment and peers' investment occurs as a result of a firm's response to peers' investment (i.e., peer effects), or because two firms make simultaneous investment decisions based on common information.³ Since our main focus only lies on the first case, an inference from ordinary least squares (OLS) regression does not provide sound empirical peer effects evidence. To address these concerns, we employ two-stage least squares (2SLS) regressions using instrumental variables (IVs), where IVs are correlated with the peer's information but orthogonal to the focal firm's information. Following Adhikari and Agrawal (2018) and Seo (2021), we use peers' idiosyncratic returns and idiosyncratic volatilities as IVs.

We test how CEO tenure is related to peer effects in investment using Standard & Poor's (S&P) 1500 firms from 1992 to 2017. We find that the investment decisions by the CEOs in the early years of their tenure are more likely to be associated with peers' investments, demonstrating

³ For example, changes in growth opportunities or regulatory policies may affect the investment decisions of all firms in the same industry at the same time.

salient peer effects in investment. To gain further support for the main finding, we examine whether our results vary with managerial incentives or the firm's own information quality. In the absence of sufficient information for investment decisions, the lower the CEO's ability is, the less confident the CEO is in their information set. Also, CEOs under stronger monitoring are more likely to choose a safer strategy by relying on peers' information. Thus, CEOs with inferior abilities and under stronger monitoring by the boards are expected to rely more on peers' investment decisions. Our empirical results confirm this prediction. We also show that peer effects among early-tenure CEOs are stronger when the quality of the company's information on growth opportunities is poor (i.e., firms in the early stage of their life cycle, high investment volatility, or high growth uncertainty) These results indicate that a lack of information on investment opportunities by early-tenure CEOs is one reason for the existence of peer effects in investment.

To figure out possible mechanisms of documented peer effects among early-tenure CEOs, we explore the shared link between focal firms and peer firms in the industry. Following prior studies (e.g., Bizjak, Lemmon, and Whitby 2009; Dhaliwal, Lamoreaux, Litov, and Neyland 2016), we focus on firms that share board members or auditors with their peer firms. We find that investment peer effects among early-tenure CEOs are stronger when the firm share board members or auditors with peer firms because the information flow between the two firms becomes faster.

Lastly, we investigate the economic consequences of peer effects on early-tenure CEOs. If early-tenure CEOs rely on peers' investments because of a lack of sufficient information for investment decisions, their investment decisions will result in better performance. As expected, we find that investments that are highly correlated with peer firms' investments result in greater profitability (return on assets and operating cash flows) and higher stock returns, supporting that following peers for investment decisions is an effective choice for early-tenure CEOs.

We acknowledge several limitations in this paper. First, even after controlling for factors that are known to affect investment decisions in our regression model, omitted variables could affect our results. Second, our method to mitigate the reflection problem may not be perfect. Third, although we try to measure the economic significance of peer effects, it is not easy to accurately measure how much the peer effects are greater than the economic shock, and how large the economic significance of peer effects is in reality. Fourth, peer effects do not mean that the focal firm invests in the same investment opportunities (i.e., the same technology or innovations) as the peer firms do. Instead, peer effects in this paper imply that the focal firm's investment is associated with peer firms' investment. Fourth, although we tried to show in various ways when and how peer effects exist, other explanations are still possible.

Despite the limitations, this study contributes to the literature in several ways. First, by focusing on the manager-level characteristics, our findings expand the literature on peer effects. Prior studies have empirically examined peer effects on various corporate decisions, including investments, disclosures, and financing (Badertscher et al. 2013; Bustamante and Fresard 2021; Foucault and Fresard 2014; Leary and Roberts 2014; Ozoguz and Rebello 2013; Seo 2021). Relatedly, Chen and Ma (2017) suggest several mechanisms (e.g., information advantages, information quality, and product market competition) of investment peer effects. We note that those prior studies on peer effects are silent on manager-level characteristics (Foucault and Fresard 2014). Thus, this study fills the void in the literature by empirically showing that investment peer effects are closely related to manager-level characteristics (i.e., a CEO tenure).

Second, our study contributes to the literature on the relationship between executive characteristics and corporate investment decisions. Several studies have focused on the relationship between CEO tenure and investment levels (Li et al. 2017; Pan, Wang, and Weisbach

2016; Yim 2013). This study provides evidence that CEOs are more likely to rely on peers when they lack information because of a shorter period of accumulated knowledge in their investment decisions. These results underscore the importance of considering CEO tenure in explaining corporate investment decisions.

Third, this study documents the economic consequences of peer effects. We show that reliance on peers' investments by early-tenure CEOs improves firm performance. In addition, we provide evidence that CEOs with the low ability or CEOs in firms with poor information quality complement their lack of ability or knowledge by learning from peers. These results indicate that early-tenure CEOs' responses to peers' investments are not a mimicking behavior but imply learning from peers to efficiently obtain more relevant information, highlighting a positive externality of peer firms' behaviors (Bustamante and Fresard 2021; Leary and Roberts 2014; Seo 2021).

The next section reviews the literature and develops the hypotheses. Section 3 describes the research design and the sample selection process. Section 4 presents the empirical findings, and Section 5 concludes the study.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Peer effects in corporate investment

Peer effects, referring to the contagion or learnings from firms in relevant industries, are observed with respect to capital structure, stock splits, and disclosures (Badertscher et al. 2013; Bustamante and Fresard 2021; Foucault and Fresard 2014; Leary and Roberts 2014; Ozoguz and Rebello 2013; Seo 2021; Xu et al. 2006). The investment decision is not an exception. Foucault and Fresard (2014) show that peer market valuations matter for a focal firm's corporate investment

because managers obtain information from their peers' valuations. They also suggest that learning from peers is more pronounced when peers' stock prices are more informative and when demands for a firm's products and those of its peers are highly correlated. Similarly, Ozoguz and Rebello (2013) show that investment sensitivity to peer firms' stock prices is stronger when a firm is subject to a rapidly changing operating environment. Badertscher et al. (2013) find that private firms rely on public firms' disclosures when making their own investment decisions. Bustamante and Fresard (2021) argue that firms follow investments of peers in the same product market and this investment peer effects vary with the product market concentration, firm size, and the precision of information.

Although prior studies provide evidence that firms respond to peer firms' investment decisions on their own investment decisions, they largely attribute peer effects to firm-specific factors or the macro-level environment, being silent on manager-level characteristics. Given that the CEO is the ultimate decision-maker in corporate investment (McConnell and Muscarella 1985) and the CEO characteristics are one of the important drivers in investment decisions, analyzing the role of CEO characteristics in explaining investment peer effects contributes to a comprehensive view of peer effects.⁴ We aim to fill this void by investigating the relationship between early-tenure CEOs and their reliance on peers in their investment decisions.

2.2. CEO tenure and peer effects in investment

We have a specific interest in CEO tenure in explaining the peer effects in investment. We expect two distinct predictions of the relationship between CEO tenure and peer effects in investment. CEO tenure, especially early-tenure CEOs, can have two opposite effects on peer effects in investments. First, early-tenure CEOs are less likely to have sufficient information and/or

⁴ For example, Pan et al. (2016) show that CEO tenure is related to a cyclical pattern of investment. Cen and Doukas (2017) and Malmendier and Tate (2005) link CEO risk preference and overconfidence to investment. In addition, Kang and Kim (2020) show that founder CEOs invest more in employee relations.

experience to predict future demand, and thus, assess investment opportunities. According to classical economic theory, a CEO, as a rational agent, uses all available signals efficiently to make an investment decision (Scharfstein and Stein 1990). CEOs, in the early period of their service period, however, do not have enough firm-specific information to make efficient investment decisions because of the shorter service period. Additionally, they are required to spend much time adjusting to a new environment, resulting in a lower accumulation of investment knowledge (Hambrick and Fukutomi 1991; Luo, Kanuri, and Andrews 2014).

Therefore, early-tenure CEOs must rely on various external information to make optimal investment decisions. Among possible external information sources, peers' investment behavior could be a cost-efficient information source that is easily accessible and efficient because peer firms have a similar business area and investment environment as focal firms. Based on these arguments, we hypothesize that CEOs' reliance on peer firms in their investment decisions is stronger in the early tenure, as follows:

Hypothesis(a): CEOs' reliance on peers' information in their investment decisions is stronger in the early years of their tenure than in other years.

However, it is also plausible that CEOs in their early period can make investment decisions that do not rely on peer information. The labor market for CEOs matches the supply of CEOs with companies' demand by collecting all available information on CEOs and continuously evaluating their abilities (Gibbons and Murphy 1990, 1992; Hermalin and Weisbach 1998). This evaluation process is more active in the early years of CEO tenure because the labor market lacks sufficient information on CEOs' abilities or their match to companies (e.g., Dikolli, Mayhewm, and Nanda 2014). Additionally, since CEOs who are labeled as having the low ability at the beginning of their

tenure can suffer from this labeling throughout their careers (Axelson and Bond 2009; Oyer 2008), the pressure on early-tenure CEOs from labor market evaluation is considerable.

When the labor market actively evaluates CEO abilities, CEOs would have incentives to distinguish themselves from others by taking bold actions because referring to peers' information and, thereby, making similar investment decisions do not make CEOs stand out from others (Bebchuk and Stole 1993; Li et al. 2017; Prendergast and Stole 1996; Yim 2013; Yin and Zhang 2014). We can thus expect early-tenured CEOs to rely less on peer firms' investments to boldly signal their ability and differentiate themselves from other CEOs. If the CEOs' incentive to differentiate themselves is stronger than the incentive to safely rely on peer firms, investment peer effects will be weaker for firms with early-tenure CEOs. Thus, the hypothesis is as follows:

Hypothesis(b): CEOs' reliance on peers' information in their investment decisions is weaker in the early years of their tenure than in other years.

3. RESEARCH DESIGN, IDENTIFICATION PROBLEM, AND DATA

3.1. Research design

To test whether CEOs rely on peers' behavior in their investment decisions during the early years of their service period, we estimate the following regression model (Ali and Zhang 2015; Biddle, Hilary, and Verdi 2009; Foucault and Fresard 2014; Shroff 2017):

$$Investment_{i,t} = \beta_0 + \beta_1 IV(P_Investment)_{i,t} + \beta_2 IV(P_Investment * Early)_{i,t} + \beta_3 Early_{i,t} + \sum \beta_i P_Controls_{i,t-1} + \sum \beta_i Controls_{i,t-1} + \varepsilon_{i,t}, \quad (1)$$

where *Investment* is a firm *i*'s net investments, defined as the sum of capital expenditures, research and development expenses (R&D), and acquisitions less sales of property, plant, and equipment (PP&E), scaled by lagged total assets. *P_Investment* is the average peer firms' investments

(excluding firm i), where peer firms are primarily defined as firms sharing the same three digits of the Standard Industrial Classification (SIC) code. The prefix IV denotes that the variable is based on the estimation results of the first-stage regression, which we explain later. Following Ali and Zhang (2015), $Early$ is an indicator variable that equals one for firm-years that correspond to the first three years of the CEO's tenure and zero otherwise. We expect β_2 to be positive (negative) if early-tenure CEOs are more (less) likely to make investment decisions based on peer firms' investment decisions.

The variable $P_Controls$ refers to the control variables for peer firms' characteristics (i.e., the average value of peer firms, excluding firm i), and $Controls$ refer to the focal firm's characteristics. Following prior studies, we include several variables that capture the firm-level characteristics of peer firms and the focal firm: firm size ($Size$), investment opportunities ($TobinQ$), leverage (Lev), cash flow from operations (CFO), cash holdings ($Cash$), return on assets (ROA), the standard deviation of past sales (Std_Sale), the standard deviation of past operating cash flows (Std_CFO), the standard deviation of past investments ($Std_Investment$), number of analyst followings ($Coverage$), and the percentage of shares held by institutional owners ($Instown$). We also include firm age ($FirmAge$) and firm life cycle stage ($FirmStage$) because the stage in which a firm is in the life cycle influences the CEO's investment decisions (Arikan and Stulz 2016).

As for focal firms' CEO-level variables, we include CEOs' age ($CEOAge$), CEO duality ($CEOChair$), and the percentage of CEOs' stock ownership ($CEOOwn$) (Kim and Lu 2011; Yim 2013).⁵ We also control for the focal firm's idiosyncratic stock returns ($EquityShock$), the standard deviation of idiosyncratic stock returns ($EquityRisk$), and their interaction terms with $Early$

⁵ To be consistent with an indicator variable for early-tenure CEOs ($Early$), we include the CEO's age, CEO duality, and the percentage of a CEO's stock ownership in year t .

(Adhikari and Agrawal 2018; Ali and Zhang 2015).⁶ In the regression model, we include year- and firm-fixed effects to control for time- and firm-invariant characteristics, respectively. Standard errors are clustered at the firm-level to control for the within-firm correlation of the error term (Peterson 2009).⁷ All continuous variables are winsorized at the 1st and 99th percentile of the sample distribution. Detailed definitions of the variables are provided in Appendix A.

3.2. Identification problem

In studying peer effects, one potential concern in research design using OLS is the reflection problem. The reflection problem arises when the average peer firm behavior influences the focal firm's behavior and *vice versa* (Angrist 2014; Manski 1993). Even if the estimation of a simple regression model yields a significant relationship between the focal firm's and peer firms' behaviors, there can be three different reasons for such a result: (1) change in the focal firm's behavior in response to changes in peers' behaviors, (2) change in the focal firm's behavior in response to changes in peers' behaviors through the focal firm's characteristics, and (3) uncontrolled omitted factors that drive changes in the behaviors of both the focal firm and peer firms. However, the examination of the peer effect should focus on (1) rather than (2) or (3), and the OLS estimation does not yield the prevailing effect.

To address this identification problem, we conduct analyses using the 2SLS method.⁸ To correctly capture changes in the focal firm's investments in response to changes in peers'

⁶ For the construction of the focal firms' idiosyncratic returns (*EquityShock*) and the standard deviation of these returns (*EquityRisk*), See Section 3.2 and Appendix A.

⁷ Since we focus on peers' effects on a focal firm's decision, one could argue that standard errors should be clustered at the group level (i.e., the SIC3 industry level). Our results are robust to the group-level clustering (untabulated).

⁸ It would have been better if we find exogenous peer firm characteristics, or exogenous events that are only relevant to peer firms but not to the focal firm. However, it is not easy to find them. Thus, we take an alternative approach using idiosyncratic shocks. This approach has advantages in that stock information is available for broader firms and it is less subject to manipulation. Additionally, prior studies developed the link between information in stock returns and investment decisions well (Chen et al. 2007; Foucault and Fresard 2014).

investments, peers' investments should not be endogenously determined. Thus, in the first stage, we identify instrumental variables that capture idiosyncratic shocks to peer firms' investments only and not to the focal firm's investments. Following Adhikari and Agrawal (2018) and Seo (2021), we use peers' idiosyncratic returns ($P_EquityShock$) and idiosyncratic volatilities ($P_EquityRisk$) as instrumental variables for peers' investments ($P_Investment$). In the first stage, we regress peers' investments on the instrumental and control variables in Equation (1). In the second stage, we test whether the predicted value of the first-stage regression ($IV(P_Investment)$) influences the investment decision of the focal firm ($Investment$). If $P_Investment$ is endogenous, then $P_Investment*Early$ is also endogenous, because it is an interaction term with the endogenous variable (Wooldridge 2002). Thus, we also model $P_Investment*Early$ in the first stage and obtain instrumented interaction terms $IV(P_Investment*Early)$.

To be good instruments, the instrumental variables should be highly correlated with the endogenous variable in the first stage but not directly correlated with the dependent variable of the second stage. In our setting, $P_EquityShock$ and $P_EquityRisk$ should be highly correlated with $P_Investment$, but not correlated with $investment$. Prior studies show that stock prices provide valuable information on investment opportunities and future status; therefore, managers make investment decisions by referring to firm stock prices (Chen et al. 2007; Grossman and Stiglitz 1980; Roll 1984). Thus, peer firms' stock prices contain relevant information on peers' investment decisions. Since the idiosyncratic return is estimated by removing common economy- and industry-wide shocks from firm-level stock returns, it should contain only firm-specific information. Thus, there is no theoretical reason for peers' idiosyncratic stock returns to be related to the focal firm's investment decisions. Collectively, our instrument variables, $P_EquityShock$ and

$P_EquityRisk$, contain value implications for peer firms' investment opportunities, while we expect them not to have a significant relationship with the focal firm investment.

The idiosyncratic stock returns ($EquityShock$) and idiosyncratic volatilities ($EquityRisk$) are estimated from the following regression of monthly stock returns over a year with estimated loadings on market returns and industry average excess returns (excluding firm i):

$$R_{ijt} = \alpha_{ijt} + \beta_{ijt}^M \times MKT_t + \beta_{ijt}^{IND} \times (\bar{R}_{-ijt} - RF_t) + \eta_{ijt}, \quad (2)$$

where R_{ijt} is the total stock return for firm i in industry j over month t , MKT_t is the excess market returns, and $(\bar{R}_{-ijt} - RF_t)$ is the excess industry returns calculated as an equal-weighted portfolio of peer firms sharing the same three-digit SIC industry code as firm i minus the one-month treasury bill rate. The regression is estimated for each firm on a rolling annual basis using the preceding 60 months of data, with a minimum of 24 monthly observations required. Expected returns for year t were computed using estimated factor loadings. We define the idiosyncratic return ($EquityShock$) as the residual obtained from the regression, the difference between the raw return and expected return, and the idiosyncratic volatilities ($EquityRisk$) as the standard deviation of the residuals. We then calculate the averages of the annual idiosyncratic stock returns and idiosyncratic volatilities for firm i 's peers, denoted by the peers' idiosyncratic returns, $P_EquityShock$, and idiosyncratic volatilities, $P_EquityRisk$, respectively. The estimated factor parameters and descriptive statistics for the return decomposition are presented in Appendix B.

3.3. Sample and data

Our sample starts from the S&P 1500 firms. We retrieve financial data from Compustat, CEO-related data from ExecuComp, and stock return and price information from the Center for Research in Security Prices (CRSP). We first obtain 46,349 firm-year observations from all S&P

1500 firms with identifiable CEO information for the 1992–2017 period. We exclude regulated industries (SIC codes 4900–4999) and financial industries (SIC codes 6000–6999), reducing the sample size to 35,846 firm-year observations. We then delete 6,364 observations that are missing data required in Equation (1), resulting in a final sample of 29,482 firm-year observations.

Table 1 shows the descriptive statistics of the variables used in the analysis. The first part shows the descriptive statistics of focal firms. The mean value of the investment is 0.140, indicating that our sample firms spend 14.0 percent of their total assets on investments, on average. The average firm size (*Size*) is 7.081, and the average leverage ratio (*Lev*) is 20.3 percent. The average proportion of cash and cash equivalents holdings out of total assets (*Cash*) is 15.8%, and the average return on assets (*ROA*) is 5.5 percent. Consistent with prior studies, the mean (median) value of the number of years CEOs stay in the office (*Tenure*) is 8.14 years (6 years) (Ali and Zhang 2015; Gibbons and Murphy 1992). In our analysis, we use an indicator variable for early-tenure CEOs (*Early*) with a mean value of 0.311, indicating that 31.1 percent of the CEOs in our sample are in the first three years of their tenure. The average age of the CEOs in our sample is about 55 years, and, on average, they own 2.4 percent of the outstanding shares.

[Insert Table 1 here]

Table 1 also presents the descriptive statistics for average peer characteristics. Compared to focal firms, peer firms are, on average, smaller (*P_Size*), have higher growth opportunities (*P_TobinQ*), are more levered (*P_Lev*), accumulate more cash (*P_Cash*), are less profitable (*P_ROA*), exhibit more volatility (*P_Std_Sale*, *P_Std_CFO*, *P_Std_Investment*), and receive less attention in the capital market (*P_Coverage*, *P_Instown*). These differences arise because the dataset we used to calculate the peer firm variables is broader than the final dataset. When calculating the average values of peer firms' variables, we use as many observations within the

same industry as possible. Therefore, we include all observations unless peer firm characteristics are missing. However, the final sample additionally requires non-missing CEO information of the focal firm (i.e., CEO tenure, age, chair, ownership), further reducing the sample size.

4. EMPIRICAL RESULTS

4.1. Early-tenure CEOs and the peer effect in investment decisions

Table 2 presents the estimation results for the investment peer effects among early-tenure CEOs. Columns (1) and (2) show the results for the first stage, where the dependent variables are $P_Investment_{i,t}$ and $P_Investment_{i,t} * Early_{i,t}$, respectively. In each column, the dependent variable is regressed on $Early_{i,t}$ and control variables, along with instrumental variables. The coefficients of the instrumental variables were consistent with our expectations. In both columns, the coefficients on $P_Equityshock$ are positive and significant at the 1 percent level, while those on $P_EquityRisk$ are significantly negative. These results indicate that peer firms invest more when their idiosyncratic stock returns are higher and their idiosyncratic returns are less volatile. The statistically significant coefficients suggest that these are the relevant instrumental variables.⁹

Column (3) of Table 2 shows the results for the second stage, where the focal firm's investment is regressed on instrumented peer investments and the instrumented interaction term. The positive coefficient on $IV(P_Investment)$ indicates that a focal firm's CEO increases investments as peer firms increase their investments. This result provides evidence of investment peer effects in general and is consistent with the findings of prior studies (Bustamante and Fresard

⁹ Following Larcker and Rusticus (2010), we assess the appropriateness of our instrumental variables and reported the test statistics at the bottom of Column (3). A weak identification test based on the Cragg–Donald Wald F -statistic rejects the null hypothesis that the instrument variables are weakly identified. Over-identification test using Hansen J -statistics do not reject the null hypothesis that all IVs are exogenous. Taken together, the test statistics suggest that our IVs satisfied both relevant and exclusion criteria.

2021; Foucault and Fresard 2014). More importantly, the coefficient of $IV(P_Investment*Early)$ is significantly positive. This finding suggests that CEOs in the early years of their tenure, compared to those in the later years of their tenure, rely more on their peer firms in investment decisions, consistent with *Hypothesis(a)*. That is, early-tenure CEOs who have not accumulated firm-specific knowledge are more responsive to peer investments.

Although it is not easy to pinpoint peer effects and measure their economic significance, we tried to measure peer effects from an economic perspective as much as possible. The coefficient on $IV(P_Investment*Early)$, 0.122, captures how much early-tenure CEOs, compared to other CEOs, are more likely to rely on their peers' investment. Considering that the standard deviation of $IV(P_Investment)$ is 0.092, a one standard deviation increases in the average peer firm investment is associated with $0.092 * 0.122 = 0.011$ increases in the focal firm's investment. This corresponds to a 7.9 percentage point increase in the average investment of focal firms. The results for the control variables in Column (3) are largely consistent with those of prior studies. The coefficient of *Early* is negative, indicating that the investment level is lower during the early years of CEO tenure (Pan et al. 2016). The negative coefficient of *Size* indicates that larger firms have smaller investments. The results also show that firms with more growth opportunities, that is, a higher *TobinQ* value, are more likely to invest. Firms with higher leverage (*Lev*) spend less money on investments, which could be due to difficulties in accessing external investment capital. The positive coefficients on *Cash* and *CFO* are similar to those in the literature on investment-cash flow sensitivity, arguing that firms are more likely to undertake investments when they have a large amount of internal cash or operating cash flows (Kaplan and Zingales 1997). The positive coefficient on *ROA* indicates that firms with profitable operations invest more.

[Insert Table 2 here]

4.2. Dynamics of reliance on peers

We also examine in detail how investment peer effects among early-tenure CEOs differ for each year of their tenure. As previously defined, *Early* captures the first three years of a CEO's tenure, calculated as half of the median CEO tenure in our sample, consistent with Ali and Zhang (2015). Since early-tenure CEOs would gain more firm-specific information as they gain more experience, peer effects in investment decisions may weaken as CEO tenure increases. Thus, following Ali and Zhang (2015), we replace the early-tenure tenure indicator (*Early*) in our baseline model with three or six indicator variables indicating each year of CEO tenure. The coefficients on the interactions between peers' investment ($P_Investment$) and yearly indicators measure the incremental reliance on peers' investment in each year of CEO tenure compared to the peer effects during the latter period of CEO tenure.

Table 3 shows the results. Column (1) includes the indicators of the first three years of CEO tenure in the model. The coefficients on $IV(P_Investment*Year1)$ and $(P_Investment*Year2)$ are positive and significant, and their magnitudes are similar. Conversely, the coefficient on $(P_Investment*Year3)$ is still positive, but its magnitude is slightly smaller than previous ones and it is statistically insignificant at the conventional level. In Column (2), we include additional indicators for the fourth, fifth, and sixth years of CEO tenure in the model and interact with $IV(P_Investment)$. In this specification, we cannot find any significant incremental peer effects after the third year. Furthermore, the coefficients of the interaction terms of peer investment and indicator variables for later years become smaller in magnitude.

Overall, the results in Table 3 suggest that the reliance on peers' investment is salient in the early years of CEO tenure and decreases as the years CEOs stay in the firm increases. These findings support our argument that as the CEO accumulates firm-specific information about

investment opportunities, CEOs rely less on peers' behavior and, thus, the peer effect in investments becomes weaker.

[Insert Table 3 here]

4.3. The effect of CEO incentives

We examine cross-sectional variations of investment peer effects among early-tenure CEOs. First, we consider CEO incentives to rely on peer information. According to Gan (2019), managers with different ability levels have different levels of obtaining and understanding investment information, leading to different investment opportunity assessments. More able CEOs with perceived better knowledge and judgment than peers can make more efficient investment decisions and, thus, report better investment performance (Gan 2019; Jian and Lee 2011). In this case, the best strategy for CEOs with better ability is not to rely on peers, but to follow their judgment when making investment decisions.¹⁰ Thus, we expect peer effects in investment to be weaker if the CEO is more able.

Investment peer effects among early-tenure CEOs can also vary with the strength of corporate governance. Governance mechanisms can affect managerial decisions. For example, CEOs in firms with strong corporate governance will make the optimal decisions for firm value and these CEOs will rely more on peer firm's information if it is value-increasing (Fairhurst and Nam 2020). A strong board keeps the CEO from deviating from the consensus when executing the capital budget (Hilary et al. 2019). Furthermore, the board exerts greater monitoring on CEOs in their early tenure, further stimulating CEO career concerns (Graffin et al. 2013). Thus, we expect

¹⁰ Although not directly related to corporate investment, Hong, Kubik, and Solomon (2000) examine a similar topic among security analysts. They compare experienced (i.e., considered as more able) analysts with inexperienced (i.e., considered as less able) analysts and show that inexperienced analysts deviate less from consensus forecasts. The result indicates that more experienced analysts of higher ability do not rely on forecasts issued by other analysts.

that early-tenure CEOs in strong corporate governance have a stronger incentive to rely on peers' decisions.

We measure CEO ability according to Demerjian, Lev, and McVay (2012).¹¹ The strength of corporate governance is measured as board independence because greater board independence leads to more rigorous CEO monitoring and discipline (Guo and Masulis 2015). We then divide the sample into two subsamples based on the yearly sample median of managerial ability or board independence and estimate Equation (1).

Table 4 presents the results using these subsamples.¹² Column (1) reports the results for high-ability CEOs, while Column (2) reports the results for low-ability CEOs. In Column (1), the coefficient of $IV(P_Investment*Early)$ is insignificant, whereas the same coefficient in Column (2) is significantly positive.¹³ These results indicate that early-tenure CEOs with superior ability rely less on peers' investment because it is better to make decisions based on their private and superior information, resulting in higher productivity. Columns (3) and (4) report the results for high and low board independence. The results show that peer effects by early-tenure CEOs are significantly stronger if CEOs are under strong board monitoring. It indicates that how the CEOs are monitored is also an important factor in determining the investment peer effects.¹⁴

¹¹ We thank Peter Demerjian for sharing the managerial ability data on his website.

¹² Due to the missing values on managerial ability, the sample size reduces to 29,046 in this analysis.

¹³ Our focus is to examine whether the distinct peer effects only hold for certain circumstances. That is, we are interested in whether the peer effects become stronger in the early years of the CEOs' tenure for managers with high ability and under the stricter monitoring. Hence, our analyses are not focused on whether the coefficients on $IV(P_Investment*Early)_it$ are statistically different between two subsamples. Nonetheless, we test the difference between subsamples using the bootstrapping approach following Shroff et al. (2014) and Amberger et al. (2021).

¹⁴ Goyal and Park (2002) show that strong leadership (i.e., CEO also holds the chairman position or CEO duality) makes it difficult for board members to monitor or discipline CEOs. Thus, we expect that peer effects become weaker in firms with CEO duality. Empirical results show that the coefficient on $IV(P_Investment*Early)$ is insignificant in firms with CEO duality, but it is positively significant in firms without CEO duality (untabulated).

[Insert Table 4 here]

4.4. The effect of the availability of investment information

We then turn to the availability of information related to investments as a determinant of investment peer effects among early-tenure CEOs. We consider three cases in which CEOs find it difficult to obtain firm-specific information. First, we consider what stage the firm is in its life cycle (*FirmStage*). Newly appointed CEOs of young firms and mature firms will face different circumstances. If the firm is not yet sufficiently mature, the quality of information that can be used as a reference for the investment may not be good. In this case, it will be difficult for CEOs in early-stage firms to make investment decisions using only their own information set. Two more cases where it is difficult to obtain firm-specific information are considered: volatility of the firm's investments over the past five years (*Std_Investment*), and *ex-ante* uncertainty in investment (*GrowthUncertainty*) which is measured as idiosyncratic return volatility over the past five years, is high (Arif, Marshall, and Yohn 2016; Eisdorfer 2008). It is more difficult for CEOs to decide which information to use in their investment decisions when past investments are highly volatile or there are greater uncertainties in their investment. Therefore, we expect stronger peer effects in these cases.

To test the prediction, we divide the sample into two groups for each case. To consider the firm stage, we separate firms into the 'introduction/growth' versus 'mature' stage following Dickinson (2011) which classified the firm life cycle according to its cash flow pattern. We also divide the sample into two subsamples based on the yearly median values of *Std_Investment* or *GrowthUncertainty*. For each subsample, we estimate Equation (1) separately and report the results in Table 5.

Columns (1) and (2) show the peer effects in the investment decisions of early-tenure CEOs for the introduction/growth stage and mature stage, respectively. The coefficient on $IV(P_Investment*Early)$ in the introduction/growth group is significant, but that in the mature group is insignificant, indicating that early-tenure CEOs in early-stage firms, compared to those in mature-stage firms, refer more to peers' information. Columns (3) and (4) show the peer effects in the investment decisions of early-tenure CEOs for high and low volatility levels in investment. The coefficient on $IV(P_Investment*Early)$ in the high investment volatility subsample is positive and significant, while that in the low investment volatility subgroup is insignificant. This result indicates that early-tenure CEOs rely on peer firms' investments when they find it hard to learn from their information in making investment decisions because of volatile investment history. Columns (5) and (6) show the results for *GrowthUncertainty*. As expected, we find that peer effects in investments are only observed in firms with greater *ex-ante* uncertainties in growth opportunities. Taken together, our findings in Table 5 suggest that early-tenure CEOs rely more on peer firms in their investment decisions when the information on their own firm's investment is less useful.¹⁵

[Insert Table 5 here]

4.5. Underlying mechanism of investment peer effects

In this section, we investigate the underlying mechanism through which the focal firm obtains and utilizes peers' information. Prior studies argue that information is more likely to be transmitted among firms sharing the same board members (i.e., board interlocks) or auditors (Bizjak et al. 2009; Brown and Drake 2014; Cai, Dhaliwal, Kim, and Pan 2014; Cai, Zheng, and Zhu 2019; Chiu, Teoh, and Tian 2013; Dhaliwal et al. 2016; Foroughi, Marcus, Nguyen, and

¹⁵ Foucault and Fresard (2014) show that investment sensitivity to peers' stock price is higher when peers' stock price is more informative. Thus, we test the cross-sectional effects of information quality of peers and find that peer effects in investments are stronger when peers' stock price is more informative. The results are available upon request.

Tehrani 2022; Reppenhagen 2010). Firms with board interlock have direct access to another firm's decision-making process, facilitating the two firms' behaviors to be similar. Auditors can also promote the information flow among firms because they understand clients' business activities and are required to communicate with managers and audit committees. In this process, thus, there is a possibility that information from one client can flow to other clients.¹⁶ If shared board members or auditors play roles in facilitating information flow between the focal firm and peer firms, we expect peer effects in investment to be stronger in firms with shared board members or common auditors.

To test the prediction, we measure the proportion of board members who are also appointed as named executive directors of another firm (*BoardInterlock*) and the proportion of peer firms that are audited by the same auditor as the focal firm (*SharedAuditor*).¹⁷ We then divide the sample into two groups based on the yearly median values of *BoardInterlock* or *SharedAuditor*. Table 6 reports the results for feedback mechanisms. The results show that peer effects by early-tenure CEOs are stronger in firms with high board interlocks and high shared auditors. These results indicate that information flows through interlocked board members or shared auditors can be a mechanism that causes peer effects in investment.

[Insert Table 6 here]

4.6. Consequences of peer effects in investment

Next, we examine the consequences of early-tenure CEOs' investment peer effects. If early-tenure CEOs rely more on peers to supplement insufficient information, their investments

¹⁶ In addition to this, peer firm information can be shared through other routes. For example, geographical proximity (Chen and Ma 2017; Chiu et al. 2013), common institutional investors (Jung 2013), or common law firms (Dechow and Tan 2021) can also be feedback mechanisms that increase dependencies among firms.

¹⁷ We obtain data on board directorship from BoardEx database. Li (2021) report that most board interlock (5.273 out of 6.614) are within the sector.

will lead to better performance. To test this prediction, we estimate the peer effects in investment (*PeerEffect*) as follows. We first regress a focal firm's investment in peer firms' investments each year and obtain residuals from the regression. The residual captures the focal firm's investments that are unrelated to their peers. Then, we multiply the absolute value of the residual by a negative one and define it as *PeerEffect*, so that the higher the *PeerEffect* value, the more the firm's investment is explained by the peers' investments. Next, we regress future performance by *PeerEffect* and its interaction term with *Early*. We gauge future performance using return on assets (*ROA*), cash flow from operations (*CFO*), and stock return (*RET*) in year $t+1$.¹⁸

Table 7 shows the results for the consequences of peer effects. In each Column, we find that the coefficient on *PeerEffect*Early* is positive and significant. These results indicate that early-tenure CEOs' investments that rely on peers generate greater profitability, operating cash flows, and stock returns in the future. In summary, the results in Table 7 show that early-tenure CEOs' reliance on peers in their investment decisions is an effort to find efficient information to invest in better opportunities where sufficient information has not yet been obtained.

[Insert Table 7 here]

4.7. Robustness tests

We explain several robustness tests here. First, to check whether our construction of idiosyncratic returns (*EquityShock*) is not affected by unobservable risk factors related to stock returns, we include additional factors in estimating idiosyncratic returns in Equation (2). Following Fama and French (1993) and Carhart (1997), we include size (*SMB*), book-to-market (*HML*), and

¹⁸ Because of the missing values on future performance measures, the sample size slightly reduces in Table 7.

momentum (*MOM*) factors in our model.¹⁹ Panel A of Table 8 presents the results. Column (1) includes *SMB* and *HML* factors in the model. In Column (2), we include the momentum factor (*MOM*). Our results remain intact. Second, to examine whether our inference does not change with the definition of peers, we change peer firms as firms that share the same two-digit SIC codes (*SIC2*), four-digit North American Industry Classification System codes (*NAICS4*), or text-based network industry classifications (TNIC). The results are reported in Columns (1) to (3) in Panel B of Table 8. In all columns, we find significant and positive coefficients for $IV(P_Investment*Early)$. This finding indicates that our results are robust regardless of the definition of peers. Third, we measure investment in alternative ways. We replace *Investment* with changes in assets (*AssetGrowth*) or selling, general, and administrative expenditures (*SG&A Expenditure*) and confirm the robust peer effects by early-tenure CEOs in alternative investment variables.

[Insert Table 8 here]

5. CONCLUSION

We examine early-tenure CEOs' reliance on peer firms in their investment decisions. Using data on S&P 1500 firms, we find that early-tenure CEOs are more likely to rely on peer firms' investments in their investment decisions (i.e., peer effects). We also show that early-tenure CEOs' reliance on peers' investments is more pronounced when the CEOs have a strong incentive to rely on peers and when their firm's investment information quality is poor. Board interlock and shared auditors can work as mechanisms that facilitate the peer effects. Consistent with the view on learning from peers' behavior, we find that peer effects in investment improve future firm

¹⁹ The monthly size factor (*SMB*) and the book-to-market factor (*HML*) are downloaded from Kenneth R. French's online data library at https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html, and the *MOM* factor is constructed according to Carhart (1997). We thank Kenneth. R. French for sharing this data.

performance. In sum, these results show that CEOs in their early tenure have not yet accumulated sufficient knowledge of investment opportunities and thereby rely on peers to obtain information more efficiently and effectively.

This study contributes to the literature in several ways. It provides a more comprehensive view of peer effects and echelon theory by showing that reliance on peer firms concerning investment decisions is closely related to CEO characteristics. Additionally, the results of cross-sectional tests, mechanisms analyses, and the consequences of peer effects help to deeply understand the peer effect.

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APPENDIX A
VARIABLE DEFINITION

Variable	Definition
<i>Variables used in the main analyses: Focal firm</i>	
<i>Investment</i>	= The sum of capital expenditure, R&D expenses, and acquisition minus sales of PP&E scaled by lagged total assets.
<i>Tenure</i>	= The number of years a CEO stays in the firm.
<i>Early</i>	= Indicator variable that equals one for firm-years that correspond to the first three years of CEO tenure and zero otherwise.
<i>Size</i>	= The natural logarithm of total assets.
<i>TobinQ</i>	= The Tobin's q of firm <i>i</i> , where Tobin's q is defined as the market value of equity plus the book value of total assets minus the book value of equity, scaled by the book value of total assets.
<i>Lev</i>	= The sum of short-term debt and long-term debt divided by total assets.
<i>CFO</i>	= Cash flow from operations divided by lagged total assets.
<i>Cash</i>	= The sum of cash and cash equivalents scaled by total assets.
<i>ROA</i>	= Income before extraordinary items divided by lagged total assets.
<i>Std_Sale</i>	= The standard deviation of sales (scaled by lagged total assets) from year <i>t-4</i> to year <i>t</i> .
<i>Std_CFO</i>	= The standard deviation of <i>CFO</i> from year <i>t-4</i> to year <i>t</i> .
<i>Std_Investment</i>	= The standard deviation of <i>Investment</i> from year <i>t-4</i> to year <i>t</i> .
<i>Coverage</i>	= The natural log of one plus the number of analysts following.
<i>Instown</i>	= The percentage of shares held by institutional investors.
<i>FirmAge</i>	= The natural logarithm of the number of years since a firm <i>i</i> first appeared in Compustat plus one.
<i>FirmStage</i>	= Firm life cycle state based on cash flow patterns following Dickinson (2011). If a firm reports negative investing cash flows and positive financing cash flows, it is classified as the 'introduction/growth' stage. If a firm reports positive operating cash flows, negative investing cash flows, and negative financing cash flows, it is classified as the 'mature' stage.
<i>CEOAge</i>	= The CEO's age of firm <i>i</i> .
<i>CEODuality</i>	= Indicator variable that equals one if a CEO is also the chairman of the board.
<i>CEOOwn</i>	= The proportion of stock ownership held by the CEO.
<i>EquityShock</i>	= Residuals obtained from regressions of monthly stock returns over a year on estimated loadings on market returns and industry average excess returns, compounded each year.

<i>EquityRisk</i>	= Log of the standard deviation of residuals obtained from regressions of monthly stock returns over a year on estimated loadings on market returns and industry average excess returns during the year.
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Variables used in the main analyses: Peer firm average

<i>P_Investment</i>	= Average of <i>Investment</i> within SIC3 industry after excluding firm <i>i</i> .
<i>P_Size</i>	= Average of <i>Size</i> within SIC3 industry after excluding firm <i>i</i> .
<i>P_TobinQ</i>	= Average of <i>TobinQ</i> within SIC3 industry after excluding firm <i>i</i> .
<i>P_Lev</i>	= Average of <i>Lev</i> within SIC3 industry after excluding firm <i>i</i> .
<i>P_CFO</i>	= Average of <i>CFO</i> within SIC3 industry after excluding firm <i>i</i> .
<i>P_Cash</i>	= Average of <i>Cash</i> within SIC3 industry after excluding firm <i>i</i> .
<i>P_ROA</i>	= Average of <i>Profitability</i> within SIC3 industry after excluding firm <i>i</i> .
<i>P_Std_Sale</i>	= Average of <i>Std_Sale</i> within SIC3 industry after excluding firm <i>i</i> .
<i>P_Std_CFO</i>	= Average of <i>Std_CFO</i> within SIC3 industry after excluding firm <i>i</i> .
<i>P_Std_Investment</i>	= Average of <i>Std_Investment</i> within SIC3 industry after excluding firm <i>i</i> .
<i>P_Coverage</i>	= Average of <i>Coverage</i> within SIC3 industry after excluding firm <i>i</i> .
<i>P_Instown</i>	= Average of <i>Instown</i> within SIC3 industry after excluding firm <i>i</i> .
<i>P_FirmAge</i>	= Average of <i>FirmAge</i> within SIC3 industry after excluding firm <i>i</i> .
<i>P_FirmStage</i>	= Average of <i>FirmStage</i> within SIC3 industry after excluding firm <i>i</i> .
<i>P_EquityShock</i>	= Average of <i>EquityShock</i> within SIC3 industry after excluding firm <i>i</i> .
<i>P_EquityRisk</i>	= Average of <i>EquityRisk</i> within SIC3 industry after excluding firm <i>i</i> .

Variables used in other tests

<i>ManagerialAbility</i>	= Managerial ability score from Demerjian et al. (2012), computed using data envelopment analysis (DEA) where total sales are optimized using the vector of inputs including net PP&E, operating leases, R&D, purchased goodwill and intangibles, cost of goods sold, and SG&A. The DEA is optimized at the industry and year levels, and a firm efficiency score is computed. The firm efficiency score is then regressed on firm characteristics (size, market share, positive free cash flow, age, business segment concentration, a foreign currency indicator, and year indicators), and the residual from this regression is the managerial ability score. See Demerjian et al. (2012) for additional details.
<i>BoardIndependence</i>	= The percentage of independent directors in the board.
<i>GrowthUncertainty</i>	= A one-month-ahead expected idiosyncratic return volatility as of beginning-of-the fiscal year, estimated by best-fitted EGARCH models using at least 60 previous monthly returns.
<i>BoardInterlock</i>	= The proportion of interlocked board members. If a board member serves as a named executive director of another firm, he/she is classified as an interlocked board member.

<i>SharedAuditor</i>	= The proportion of peer firms that are audited by the same auditor as the focal firm
<i>RET</i>	= Stock returns for firm <i>i</i> during the fiscal year based on monthly stock returns.
<i>PeerEffect</i>	= The extent of dependence on the peers in investment. A focal firm's investment is regressed on peer firms' investment excluding firm <i>i</i> at the industry and year levels. The absolute value of residual from this regression multiplied by (-1) is defined as peer effect score.
<i>AssetGrowth</i>	= Change in total assets from year <i>t-1</i> to year <i>t</i> , scaled by lagged total assets.
<i>SG&A</i>	= Selling, General, and Administrative (SG&A) expenses, scaled by lagged total assets.

Variables used in the return shock construction

<i>Total Return</i>	= Monthly stock returns from CRSP.
<i>Idiosyncratic Return</i>	= Difference between <i>Total Return</i> and <i>Expected Returns</i> .
<i>Expected Return</i>	= Expected returns are computed using the estimated factor loadings on market returns and industry average excess returns in month <i>t</i> .
<i>MKT</i>	= Excess market return.
$(\bar{R}_{-ijt} - RF_t)$	= The excess return on an equal-weighted portfolio of other firms in firm <i>i</i> 's three-digit SIC industry classification.

Notes: This table presents the variable definitions used in our paper.

APPENDIX B
IDIOSYNCRATIC SHOCK CONSTRUCTION

Variables	Mean	Std	Q1	Median	Q3
<i>Regression summary</i>					
<i>Intercept</i> (α_{ijt})	0.005	0.409	-0.006	0.004	0.015
<i>MKT</i> (β_{ijt}^M)	0.343	19.536	-0.179	0.309	0.896
$(\bar{R}_{-ijt} - RF_t)$ (β_{ijt}^{IND})	0.679	10.737	0.188	0.577	1.068
<i>Adjusted R²</i>	0.191	0.206	0.050	0.160	0.308
<i>Observation per regression</i>	48.09	18.29	38.00	60.00	60.00
<i>Monthly return decomposition</i>					
<i>Total Return</i>	0.011	0.180	-0.065	0.000	0.070
<i>Expected Return</i>	0.013	0.151	-0.025	0.012	0.005
<i>Idiosyncratic Return</i>	-0.002	0.199	-0.064	-0.006	0.048

Notes: This table reports the regression summary of estimating idiosyncratic returns in Equation (2).

TABLE 1 Descriptive statistics

Variables	N	Mean	Std	Q1	Median	Q3
<i>Variables used in the main analyses: Focal firm</i>						
<i>Investment</i>	29,482	0.140	0.141	0.051	0.098	0.178
<i>Tenure</i>	29,482	8.139	7.319	3.000	6.000	11.000
<i>Early</i>	29,482	0.311	0.463	0.000	0.000	1.000
<i>Size</i>	29,482	7.081	1.593	5.921	6.933	8.111
<i>TobinQ</i>	29,482	2.065	1.320	1.248	1.644	2.367
<i>Lev</i>	29,482	0.203	0.168	0.041	0.192	0.318
<i>CFO</i>	29,482	0.116	0.103	0.063	0.111	0.167
<i>Cash</i>	29,482	0.158	0.174	0.027	0.089	0.231
<i>ROA</i>	29,482	0.055	0.105	0.021	0.059	0.104
<i>Std_Sale</i>	29,482	0.246	0.262	0.089	0.162	0.296
<i>Std_CFO</i>	29,482	0.064	0.062	0.027	0.045	0.076
<i>Std_Investment</i>	29,482	0.095	0.120	0.026	0.054	0.112
<i>Coverage</i>	29,482	2.137	0.803	1.609	2.197	2.773
<i>Instown</i>	29,482	0.371	0.355	0.000	0.316	0.726
<i>FirmAge</i>	29,482	3.081	0.659	2.565	3.135	3.664
<i>FirmStage</i>	29,482	2.929	1.307	2.000	3.000	3.000
<i>CEOAge</i>	29,482	4.008	0.133	3.932	4.007	4.094
<i>CEOChair</i>	29,482	0.482	0.500	0.000	0.000	1.000
<i>CEOOwn</i>	29,482	0.024	0.056	0.001	0.004	0.014
<i>EquityShock</i>	29,482	-0.036	0.351	-0.246	-0.072	0.115
<i>EquityRisk</i>	29,482	0.095	0.051	0.059	0.083	0.117
<i>Variables used in the main analyses: Peer firm average</i>						
<i>P_Investment</i>	29,482	0.190	0.125	0.092	0.168	0.257
<i>P_Size</i>	29,482	5.067	1.207	4.101	4.952	5.807
<i>P_TobinQ</i>	29,482	3.610	2.502	1.752	2.692	4.803
<i>P_Lev</i>	29,482	0.336	0.141	0.233	0.312	0.416
<i>P_CFO</i>	29,482	-0.086	0.215	-0.180	-0.018	0.065
<i>P_Cash</i>	29,482	0.189	0.126	0.092	0.149	0.284
<i>P_ROA</i>	29,482	-0.269	0.363	-0.466	-0.143	0.002
<i>P_Std_Sale</i>	29,482	0.420	0.229	0.263	0.361	0.525
<i>P_Std_CFO</i>	29,482	0.320	0.324	0.082	0.194	0.478
<i>P_Std_Investment</i>	29,482	0.188	0.137	0.084	0.151	0.249
<i>P_Coverage</i>	29,482	0.992	0.407	0.718	0.924	1.212
<i>P_Instown</i>	29,482	0.190	0.114	0.107	0.176	0.255
<i>P_FirmAge</i>	29,482	2.508	0.375	2.248	2.483	2.759
<i>P_FirmStage</i>	29,482	2.982	0.484	2.667	2.952	3.263
<i>P_EquityShock</i>	29,482	-0.034	0.120	-0.096	-0.041	0.010
<i>P_EquityRisk</i>	29,482	0.127	0.043	0.097	0.119	0.153
<i>Variables used in the cross-sectional tests</i>						
<i>ManagerialAbility</i>	29,046	0.011	0.141	-0.076	-0.023	0.059

<i>BoardIndependence</i>	17,704	0.719	0.159	0.625	0.750	0.857
<i>GrowthUncertainty</i>	29,476	0.093	0.048	0.060	0.082	0.115
<i>BoardInterlock</i>	18,648	0.463	0.717	0.000	0.000	1.000
<i>SharedAuditor</i>	26,170	0.175	0.106	0.106	0.152	0.214
<i>RET</i>	28,308	0.155	0.511	-0.146	0.092	0.355
<i>PeerEffects</i>	29,482	-0.110	0.106	-0.148	-0.079	-0.037
<i>AssetGrowth</i>	29,482	0.127	0.288	-0.012	0.066	0.178
<i>SG&A</i>	27,649	0.295	0.223	0.126	0.241	0.407

Notes: This table reports the descriptive statistics for all the variables used in our analyses. All variables are defined in Appendix A.

TABLE 2 Peer effects in investment

Dep. Variable =	First Stage		Second Stage
	$P_Investment_{it}$	$P_Investment_{it} * Early_{it}$	$Investment_{it}$
	(1)	(2)	(3)
$IV(P_Investment)_{it}$			0.483** (2.19)
$IV(P_Investmen_i * Early)_{it}$			0.122*** (2.66)
$Early_{it}$	-0.001 (-0.36)	0.082*** (15.63)	-0.028*** (-3.29)
P_Size_{it-1}	-0.025*** (-10.35)	-0.010*** (-5.68)	0.012** (2.08)
P_TobinQ_{it-1}	0.007*** (12.50)	0.002*** (7.06)	-0.002 (-0.92)
P_Lev_{it-1}	-0.049*** (-6.57)	-0.020*** (-3.45)	0.016 (1.05)
P_CFO_{it-1}	-0.037*** (-4.85)	-0.017*** (-2.74)	0.013 (0.83)
P_Cash_{it-1}	0.178*** (9.35)	0.062*** (4.31)	-0.066 (-1.40)
P_ROA_{it-1}	0.018*** (3.98)	0.009*** (2.61)	0.003 (0.38)
$P_Std_Sale_{it-1}$	-0.000 (-0.07)	-0.001 (-0.19)	0.001 (0.16)
$P_Std_CFO_{it-1}$	-0.022*** (-5.11)	-0.009*** (-2.99)	0.007 (1.08)
$P_Std_Investment_{it-1}$	0.038*** (3.53)	0.008 (1.01)	-0.001 (-0.05)
$P_Coverage_{it-1}$	0.009** (2.25)	0.003 (1.00)	-0.002 (-0.42)
$P_Instown_{it-1}$	0.005 (0.42)	0.011 (1.25)	-0.007 (-0.38)
$P_FirmAge_{it-1}$	-0.039*** (-8.93)	-0.012*** (-3.75)	0.021** (2.11)
$P_FirmStage_{it-1}$	-0.010*** (-7.17)	-0.003*** (-3.06)	0.002 (0.58)
$Size_{it-1}$	-0.000 (-0.27)	-0.000 (-0.19)	-0.047*** (-17.00)
$TobinQ_{it-1}$	0.003*** (5.63)	0.000 (0.43)	0.013*** (7.59)
Lev_{it-1}	-0.000 (-0.02)	0.005 (0.90)	-0.113*** (-10.90)
CFO_{it-1}	0.012* (1.94)	0.004 (0.57)	0.034** (2.43)
$Cash_{it-1}$	-0.019*** (-3.34)	-0.010 (-1.61)	0.074*** (5.17)

<i>ROA_{it-1}</i>	0.034*** (5.98)	0.007 (0.99)	0.053*** (3.32)
<i>Std_Sale_{it-1}</i>	0.009*** (2.99)	0.003 (1.08)	-0.014** (-2.18)
<i>Std_CFO_{it-1}</i>	-0.048*** (-3.81)	-0.015 (-1.02)	-0.013 (-0.43)
<i>Std_Investment_{it-1}</i>	0.002 (0.33)	-0.001 (-0.20)	-0.047*** (-3.58)
<i>Coverage_{it-1}</i>	-0.003** (-2.06)	-0.001 (-1.05)	0.012*** (4.39)
<i>Instown_{it-1}</i>	-0.004 (-1.53)	0.000 (0.03)	-0.006 (-1.29)
<i>FirmAge_{it-1}</i>	-0.011*** (-2.60)	-0.005 (-1.44)	-0.001 (-0.08)
<i>FirmStage_{it-1}</i>	0.001** (2.32)	0.001* (1.66)	-0.002*** (-3.34)
<i>CEOAge_{it}</i>	-0.006 (-1.09)	0.000 (0.01)	-0.018* (-1.82)
<i>CEOChair_{it}</i>	0.002 (1.53)	0.004*** (2.96)	0.004 (1.52)
<i>CEOOwn_{it}</i>	-0.012 (-0.92)	-0.023 (-1.48)	-0.029 (-1.03)
<i>EquityShock_{it-1}</i>	-0.001 (-0.40)	0.000 (0.49)	0.009*** (3.16)
<i>EquityShock_{it-1}*Early_{it}</i>	0.001 (0.39)	-0.001 (-0.38)	-0.006 (-1.21)
<i>EquityRisk_{it-1}</i>	-0.019 (-1.43)	-0.005 (-0.31)	-0.072*** (-2.64)
<i>EquityRisk_{it-1}*Early_{it}</i>	0.012 (0.63)	-0.072* (-1.74)	-0.038 (-1.08)
<i>P_EquityShock_{it-1}</i>	0.027*** (5.18)	0.014*** (6.16)	
<i>P_EquityShock_{it-1}*Early_{it}</i>	-0.008 (-0.97)	-0.021** (-2.18)	
<i>P_EquityRisk_{it-1}</i>	-0.051** (-2.05)	-0.291*** (-12.69)	
<i>P_EquityRisk_{it-1}*Early_{it}</i>	-0.003 (-0.12)	0.891*** (15.91)	

Weak identification test

Cragg-Donald Wald F statistic

17.05

Over identification test

Hansen's J-statistic

4.43
(0.11)

Year/Firm-Fixed Effects	Yes	Yes	Yes
Observations	29,482	29,482	29,482
Adjusted R-squared	0.749	0.753	0.050

Notes: This table reports the regression results of Equation (1). Columns (1) and (2) present the first-stage regression when the dependent variable is $P_Investment_{it}$ and $P_Investment_{it} * Early_{it}$, respectively. Column (3) reports the main results of this study. Standard errors are clustered by firm. Year- and firm-fixed effects are included. Detailed variable definitions are provided in Appendix A. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 3 Dynamics of reliance on peers

Dep. Variable =	<i>Investment_{it}</i>	
	<i>Year1 to Year3</i>	<i>Year1 to Year6</i>
	(1)	(2)
<i>IV(P_Investment)_{it}</i>	0.462**	0.456**
	(2.11)	(2.18)
<i>IV(P_Investment*Year1)_{it}</i>	0.134**	0.157**
	(2.28)	(2.36)
<i>IV(P_Investment*Year2)_{it}</i>	0.126**	0.151**
	(2.06)	(2.11)
<i>IV(P_Investment*Year3)_{it}</i>	0.094	0.120
	(1.38)	(1.54)
<i>IV(P_Investment*Year4)_{it}</i>		0.049
		(0.58)
<i>IV(P_Investment*Year5)_{it}</i>		0.090
		(1.09)
<i>IV(P_Investment*Year6)_{it}</i>		0.020
		(0.20)
<u>Weak identification test</u>		
Cragg-Donald Wald F statistic	8.67	5.20
<u>Over identification test</u>		
Hansen's J-statistic	5.28	6.04
	(0.26)	(0.53)
Control Variables	Yes	Yes
Year/Firm-Fixed Effects	Yes	Yes
Observations	29,482	29,482
Adjusted R-squared	0.056	0.052

Notes: This table reports the estimation results of Equation (1) after including dummy variables that indicate each year of a CEO's tenure and their interaction with peers' investments. Standard errors are clustered by the firm. Year- and firm-fixed effects are included. Detailed variable definitions are provided in Appendix A. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 4 The effect of CEO incentives

Dep. Variable =	<i>Investment_{it}</i>			
	<i>ManagerialAbility</i>		<i>BoardIndependence</i>	
Sample =	<i>High</i>	<i>Low</i>	<i>High</i>	<i>Low</i>
	(1)	(2)	(5)	(6)
<i>IV(P_Investment)_{it}</i>	0.504 (1.26)	0.339 (1.31)	0.552 (1.41)	0.348 (0.90)
<i>IV(P_Investment*Early)_{it}</i>	0.074 (1.44)	0.245** (2.20)	0.144** (2.21)	-0.010 (-0.12)
<i>Difference test for IV(P_Investment*Early)_{it}</i> (p-value)		(0.02)		(0.04)
Control Variables	Yes	Yes	Yes	Yes
Year/Firm-Fixed Effects	Yes	Yes	Yes	Yes
Observations	14,530	14,516	8,305	9,399
Adjusted R-squared	0.043	0.061	0.007	0.102

Notes: This table reports the estimation results of Equation (1) after partitioning the sample based on the yearly sample median of managerial ability (*ManagerialAbility*) in Columns (1) and (2) and board independence (*BoardIndependence*) in Columns (3) and (4). Standard errors are clustered by firm. Year- and firm-fixed effects are included. Detailed variable definitions are provided in Appendix A. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 5 The effect of availability of investment information

Dep. Variable =	<i>Investment_{it}</i>					
	<i>FirmStage</i>		<i>Std_Investment</i>		<i>GrowthUncertainty</i>	
Sample =	<i>Introduction /Growth</i>	<i>Mature</i>	<i>High</i>	<i>Low</i>	<i>High</i>	<i>Low</i>
	(1)	(2)	(3)	(4)	(5)	(6)
<i>IV(P_Investment)_{it}</i>	0.730*	0.281	0.858***	-0.250	0.493*	0.035
	(1.86)	(1.31)	(2.70)	(-0.93)	(1.90)	(0.10)
<i>IV(P_Investment*Early)_{it}</i>	0.196*	0.015	0.161**	-0.004	0.156**	0.064
	(1.89)	(0.45)	(2.02)	(-0.06)	(2.12)	(1.13)
<i>Difference test for IV(P_Investment*Early)_{it}</i>						
(p-value)		(0.08)		(0.04)		(0.18)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year/Firm-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,612	15,451	14,749	14,733	14,746	14,730
Adjusted R-squared	0.023	0.045	0.005	0.015	0.083	0.092

Notes: This table reports the results of Equation (1) after partitioning the sample based on firm stage (*FirmStage*) in Columns (1) and (2). Column (1) shows the results for firms in the introduction or growth stage, while Column (2) shows the results for firms in the mature stage. We also divided the sample based on the yearly sample median of the volatility of past investment (*Std_Investment*) in Columns (3) and (4) and the growth uncertainties (*GrowthUncertainty*) in Columns (5) and (6). Standard errors are clustered by firm. Year- and firm-fixed effects are included. Detailed variable definitions are provided in Appendix A. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 6 Underlying mechanism tests

Dep. Variable =	<i>Investment_{it}</i>			
	<i>BoardInterlock</i>		<i>SharedAuditor</i>	
Sample =	<i>High</i>	<i>Low</i>	<i>High</i>	<i>Low</i>
	(1)	(2)	(3)	(4)
<i>IV(P_Investment)_{it}</i>	2.091 (1.58)	1.052** (2.27)	0.146 (0.59)	0.798 (1.49)
<i>IV(P_Investment*Early)_{it}</i>	0.365* (1.75)	0.114 (1.09)	0.125* (1.74)	0.068 (0.98)
<i>Difference test for IV(P_Investment*Early)_{it}</i> (p-value)		(0.08)		(0.28)
Control Variables	Yes	Yes	Yes	Yes
Year/Firm-Fixed Effects	Yes	Yes	Yes	Yes
Observations	8,259	10,389	15,660	10,510
Adjusted R-squared	0.160	0.088	0.118	0.016

Notes: This table reports the estimation results of Equation (1) after partitioning the sample based on the yearly sample median of board interlocks (*BoardInterlock*) in Columns (1) and (2), and the on the yearly sample median of shares common auditor (*SharedAuditor*) in Columns (3) and (4). Standard errors are clustered by firm. Year- and firm-fixed effects are included. Detailed variable definitions are provided in Appendix A. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 7 Consequences of peer effects in investment

Dep. Variable =	<i>ROA</i>_{it+1}	<i>CFO</i>_{it+1}	<i>RET</i>_{it+1}
	(1)	(2)	(3)
<i>PeerEffect</i> _{it}	-0.010 (-0.81)	-0.009 (-0.83)	-0.142** (-2.35)
<i>PeerEffect</i> _{it} * <i>Early</i> _{it}	0.025* (1.72)	0.036*** (2.73)	0.141* (1.85)
<i>Early</i> _{it}	-0.002 (-0.72)	0.000 (0.11)	0.007 (0.73)
<i>Investment</i> _{it}	0.008 (0.86)	-0.011 (-1.40)	-0.194*** (-4.44)
<i>Size</i> _{it}	-0.023*** (-7.18)	-0.012*** (-4.58)	-0.174*** (-17.61)
<i>TobinQ</i> _{it}	0.009*** (17.11)	0.006*** (13.32)	-0.017*** (-11.76)
<i>Lev</i> _{it}	-0.139*** (-13.28)	-0.107*** (-11.91)	0.411*** (11.41)
<i>Cash</i> _{it-1}	-0.063*** (-4.03)	-0.079*** (-6.20)	-0.216*** (-5.28)
<i>Std_Sale</i> _{it-1}	0.001 (0.12)	0.005 (0.76)	0.049** (2.07)
<i>Std_CFO</i> _{it-1}	-0.009 (-0.25)	0.039 (1.31)	-0.259** (-2.31)
<i>Std_Investment</i> _{it-1}	-0.018 (-1.55)	-0.041*** (-4.13)	-0.016 (-0.38)
<i>Coverage</i> _{it-1}	0.017*** (6.72)	0.013*** (6.15)	-0.107*** (-11.53)
<i>Instown</i> _{it-1}	0.027*** (3.83)	0.030*** (4.84)	-0.048*** (-3.59)
<i>FirmAge</i> _{it-1}	-0.015* (-1.82)	-0.002 (-0.23)	-0.071*** (-2.68)
<i>FirmStage</i> _{it-1}	-0.003*** (-4.84)	-0.003*** (-4.68)	0.007** (2.20)
<i>CEOAge</i> _{it}	0.010 (0.99)	0.012 (1.34)	0.008 (0.22)
<i>CEOChair</i> _{it}	-0.001 (-0.57)	-0.001 (-0.44)	-0.008 (-1.05)
<i>CEOOwn</i> _{it}	0.016 (0.55)	-0.011 (-0.46)	0.016 (0.16)
Year/Firm-Fixed Effects	Yes	Yes	Yes
Observations	28,416	28,461	28,308
Adjusted R-squared	0.584	0.514	0.244

Notes: This table reports the effect of reliance on peers' investment on future performance. Columns (1), (2), and (3) show the consequence of peer effects on one-year ahead return on assets (*ROA*), operating cash flows (*CFO*), and stock return (*RET*). Standard errors are clustered by firm.

Year- and firm-fixed effects are included. Detailed variable definitions are provided in Appendix A. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 8 Robustness tests

Panel A. Controlling for additional factors in calculating idiosyncratic returns			
Dep. Variable =	<i>Investment_{it}</i>		
Alternative factor model =	(1)	(2)	
	<i>Incl. SMB, HML</i>	<i>Incl. SMB, HML, MOM</i>	
<i>IV(P_Investment)_{it}</i>	0.539** (2.31)	0.485** (2.54)	
<i>IV(P_Investment*Early)_{it}</i>	0.117*** (2.65)	0.107** (2.57)	
Control Variables	Yes	Yes	
Year/Firm-Fixed Effects	Yes	Yes	
Observations	29,482	29,482	
Adjusted R-squared	0.036	0.052	
Panel B. Alternative industry classification			
Dep. Variable =	<i>Investment_{it}</i>		
Peer definition	(1)	(2)	(3)
	<i>SIC2</i>	<i>NAICS4</i>	<i>TNIC</i>
<i>IV(P_Investment)_{it}</i>	0.616*** (3.17)	0.263*** (3.77)	0.889*** (3.00)
<i>IV(P_Investment*Early)_{it}</i>	0.131*** (2.87)	0.119*** (2.62)	0.106** (1.99)
Control Variables	Yes	Yes	Yes
Year/Firm-Fixed Effects	Yes	Yes	Yes
Observations	29,482	29,060	21,181
Adjusted R-squared	0.078	0.093	0.096
Panel C. Alternative investment variables			
Dep. Variable =	(1)	(2)	
	<i>AssetGrowth_{it}</i>	<i>SG&A Expenditure_{it}</i>	
<i>IV(P_Investment)_{it}</i>	0.180 (1.50)	-0.396* (-1.66)	
<i>IV(P_Investment*Early)_{it}</i>	0.104* (1.79)	0.031* (1.68)	
Control Variables	Yes	Yes	
Year/Firm-Fixed Effects	Yes	Yes	
Observations	29,482	27,632	
Adjusted R-squared	0.168	0.273	

Notes: This table reports the regression results of Equation (1) using the alternative factor model to calculate idiosyncratic return in Panel A, and alternative industry classification in Panel B. Panel C presents the results using alternative investment variables as dependent variables. Detailed variable definitions are provided in Appendix A. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.