The Effect of Managers on Systematic Risk*

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ABSTRACT

Existing studies in the asset pricing literature assume that managers are interchangeable. We examine whether managers' idiosyncrasies explain differences in firms' systematic risk. To identify manager fixed effects, we construct a data set that tracks managers across different firms over time. Our results suggest that manager fixed effects are an important determinant of systematic risk and that managers exert greater influence on systematic risk in smaller firms. Managers' preferences for internal growth (financial conservatism) are positively (negatively) related to manager fixed effects on systematic risk, but these preferences explain only a small fraction of the variation in manager fixed effects on systematic risk.

Keywords: Manager Fixed Effects; Systematic Risk.

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1 Introduction

A fundamental principle in asset pricing theory is that investors are compensated only for bearing systematic risk (Cochrane 2005). Drawing on this insight, empirical asset pricing models commonly decompose stock return variability into systematic and firm-specific components (e.g., Fama and French 1993, 2015, 2018). The systematic risk of a stock is determined by its sensitivity to common risk factors (e.g., the market factor) and this sensitivity is referred to as the beta coefficient. Precise estimates of beta are crucial in many applications of modern finance theory. For example, investors need precise estimates of beta to construct utility-maximizing portfolios and managers need precise estimates of beta to make value-enhancing capital budgeting decisions. Hence, a vast literature studies the determinants of beta.[1,2] The general conclusion that emerges from these studies is that a large amount of variation in systematic risk cannot be explained by firm-, industry- or market-level variables.[3] In this paper, we ask whether and to what extent managers' idiosyncrasies, as opposed to firm, industry, or market characteristics, account for these unexplained differences.

Prior research often assumes that managers' idiosyncrasies do not affect their firm's systematic risk. For example, Bushman, Dai, and Wang (2010) "posit that idiosyncratic volatility reflects information arrival related to the impact of CEO talent on firm performance, while systematic volatility captures aspects of return volatility unrelated to CEO talent and beyond the CEO's control" (p. 382). In contrast, we posit that managers' idiosyncrasies affect their firm's

[1] Fisher (1974) summarizes the research question in this literature as follows: "If I knew the economic environment, could I thereby make better estimates of beta? This is an important question. It should be pursued vigorously" (p. 489).
[2] See, for example, Beaver, Kettler, and Scholes (1970), Hamada (1972), Breen and Lerner (1973), Rosenberg and McKibben (1973), Lev and Kunitzky (1974), Melicher (1974), Robichek and Cohn (1974), Ben-Zion and Shalit (1975), Rosenberg and Guy (1976), and Karolyi (1992).
[3] Ben-Zion and Shalit (1975) conclude that "a search for the 'missing variable' seems to be a worthwhile undertaking for future research, not only because an important determinant of risk might thus be identified, but also because in the process we may gain a better understanding of the different aspects of risk" (p. 1025).

systematic risk through two channels. First, managers influence their firm's investment, financial, and organizational policies, which, in turn, may affect their firm's systematic risk.[4] For example, managers determine whether projects are financed with debt or equity and whether profits are retained in the company or distributed to shareholders. Managers also determine the amount of resources allocated to R&D and M&A. This channel is reflected in corporate policy variables such as leverage, dividend payout, R&D expenditures, and number of acquisitions. Second, managers influence dimensions of project selection which are not reflected in corporate policy variables. For example, managers can choose totally different types of projects (e.g., high systematic risk or low systematic risk) even if they invest the same amount of resources in R&D.

Using a single-index model, we decompose stock return variability into systematic and idiosyncratic components. Our measure of systematic risk (β_{MKT}) is the slope coefficient on the excess return of the market portfolio. While systematic risk is the focus of our study, we also examine total risk and idiosyncratic risk. Total risk (*TVOL*) is the standard deviation of a firm's daily stock returns within its fiscal year and idiosyncratic risk (*IVOL*) is the standard deviation of the residuals.

We begin by quantifying the *total* effect of managers on β_{MKT}. Following Bertrand and Schoar (2003), we construct a data set that tracks managers across different firms over time. To disentangle manager fixed effects from firm fixed effects, we must observe a manager at more than one firm. We cannot disentangle manager fixed effects from firm fixed effects if, for example, a manager never switches firms and advances only through internal promotions. In our base model, we regress each measure of risk on firm fixed effects and year fixed effects. Then, we add manager

[4] Bertrand and Schoar (2003) find that differences in managerial "style" explain a significant amount of variation in firms' investment, financial, and organizational policies. Bertrand and Schoar's results suggest that managerial style may matter for firms' systematic risk, but this is not a foregone conclusion. It is possible that managerial style matters only for firms' idiosyncratic risk. Furthermore, if managerial style matters, it is not clear to what extent.

fixed effects to our base model and examine whether the manager fixed effects have incremental explanatory power. The manager fixed effects approach measures persistent managerial style over time and across different jobs, a common definition of "style" adopted in the literature (Bertrand and Schoar 2003).[5] Intuitively, we test whether systematic risk is correlated across at least two firms when the same manager is present, controlling for time-invariant firm characteristics and year-specific cross-sectional effects. We do not control for time-varying firm characteristics (e.g., leverage) because our objective is to quantify the *total* effect of managers on systematic risk, which includes the effect of managers on systematic risk through time-varying firm characteristics. When we study the channels through which managers affect systematic risk, we examine whether time-varying firm controls attenuate manager fixed effects on β_{MKT}.

We observe a 7.16% increase in adjusted R^2 when we add manager fixed effects to the model with β_{MKT} as the dependent variable, which translates to a 16.67% increase relative to the base model. For comparison, we observe a 4.43% increase in adjusted R^2 when we use $IVOL$ as the dependent variable and we observe a 4.56% increase in adjusted R^2 when we use $TVOL$ as the dependent variable. Adjusted R^2 increases by 7.19% and 7.36% relative to the base model for $IVOL$ and $TVOL$, respectively. Furthermore, the frequency of significant manager fixed effects is far greater than would be expected under the null hypothesis that managerial style is not a determinant of systematic risk: 49.26% of the manager fixed effects are significant at the 10% level, 43.18% of the manager fixed effects are significant at the 5% level, and 35.01% of the manager fixed effects are significant at the 1% level.

[5] This approach does not rule out that managers may develop their style over time or the market may learn about managerial style over their tenure (e.g., Pan, Wang, and Weisbach 2015), but the manager fixed effects do not capture such a time-varying dimension of style.

Next, we track the evolution of β_{MKT} in event-time surrounding executive transitions. When a firm hires a manager with a beta-increasing style, we observe an immediate and persistent increase in β_{MKT}. In contrast, when a firm hires a manager with a beta-decreasing style, we observe an immediate and persistent decrease in β_{MKT}. In terms of economic magnitude, hiring a manager at the 25th percentile leads to a 0.201 decrease in β_{MKT} and hiring a manager at the 75th percentile leads to a 0.161 increase in β_{MKT}. Overall, our results suggest that manager-specific effects on systematic risk are economically significant.

We perform two tests to examine the channels through which managers affect systematic risk. First, we examine whether time-varying firm controls attenuate manager fixed effects on β_{MKT}. While time-varying firm characteristics partially explain manager fixed effects on β_{MKT}, this is not the dominant mechanism. When we include time-varying firm controls, adjusted R^2 increases by 6.86% (compared to 7.16% in the previous model). Second, we examine whether manager fixed effects on β_{MKT} are related to the management styles studied in Bertrand and Schoar (2003). Bertrand and Schoar (2003) find significant manager fixed effects for twelve corporate policy variables. Factor analysis suggests that these manager fixed effects vary along three dimensions: (1) internal growth, (2) financial conservatism, and (3) external growth. Manager fixed effects on β_{MKT} are positively (negatively) related to managers' preferences for internal growth (financial conservatism). Manager fixed effects on β_{MKT} are not related to managers' preferences for external growth. However, these three factors explain only a small fraction (4.1%) of the variation in manager fixed effects on β_{MKT}.

Our next analysis examines firm- and market-level determinants of signed and unsigned manager fixed effects on β_{MKT}. We examine unsigned manager fixed effects to determine whether certain firms and market conditions amplify the effects of managerial style, and whether other firms and market conditions dampen the effects of managerial style. The objective of this analysis is to understand how a manager's style interacts with her environment to jointly determine a firm's equity risk. We examine signed manager fixed effects to determine whether certain firm and market characteristics lead to a preference for beta-increasing managers, and whether other firm and market characteristics lead to a preference for beta-decreasing managers. The objective of this analysis is to study hiring preferences. For both tests, we examine institutional holdings, firm size, return on assets, leverage, Tobin's Q, and the value-weighted return to the market portfolio in the year before each executive transition. We find that large firms dampen the effects of managerial style and small firms amplify the effects of managerial style. We do not find evidence of hiring preferences.

In our final test, we examine the relation between manager fixed effects on β_{MKT} and observable manager characteristics. Manager fixed effects on β_{MKT} are related to managers' early-career experiences. On average, the signed effect on β_{MKT} is 0.240 smaller for managers who enter the labor market during recessions. We do not find evidence that age or gender is related to manager fixed effects on β_{MKT}. Overall, we find limited evidence that manager fixed effects on β_{MKT} are related to observable manager characteristics. The lack of strong association between manager fixed effects on β_{MKT} and observable manager characteristics suggests that there are unidentified manager characteristics that explain manager-specific effects on systematic risk.

We conduct a battery of sensitivity tests to ascertain the robustness of our results. First, estimates of systematic risk may be biased when a stock is infrequently traded (Dimson 1979). This concern is unlikely to confound our results since our sample tracks firms in the S&P 1500. Nevertheless, we ensure that our results hold when we estimate beta following Dimson (1979). Second, although we focus on the single-index model, we show that our results generalize to other empirical asset pricing models, such as the Fama-French (1993) three factor model. Third, we estimate each measure of risk using weekly returns in lieu of daily returns to ensure that microstructure frictions such as bid-ask bounce do not confound our results. Lastly, three notable events occurred during our sample period: the dotcom bubble, the Enron scandal, and the global financial crisis. Our identification strategy examines whether equity risk is correlated across at least two firms when the same manager is present. If the events thereof induce executive transitions and affect firms' risk exposures, these events could drive our results. This is not the case. Our results are qualitatively similar if we exclude managers who join or leave a firm in 2000 (dotcom bubble), 2001 (Enron scandal), or 2007-2008 (global financial crisis).

The rest of our paper is organized as follows. Section 2 reviews the related literature. Section 3 describes our sample. Section 4 describes our measures of risk and presents descriptive statistics. Section 5 presents the main results. Section 6 summarizes and offers some concluding remarks.

2 Related Literature

The contribution of our paper is to bridge two literatures: (1) the asset pricing literature and (2) the managerial style literature. In the following sections, we contextualize our study within each of these literatures.

2.1 Determinants of Systematic Risk

A strand of the asset pricing literature models beta as a function of firm characteristics. Gomes, Kogan, and Zhang (2003) construct a dynamic general equilibrium production economy that links beta with firm size and book-to-market. Size captures the importance of growth options relative to assets-in-place. Small firms derive most of their value from growth options, while large firms derive most of their value from assets-in-place. Since growth options are riskier than assets-in-place, there is an inverse relation between beta and firm size (i.e., small firms have higher beta). On the other hand, book-to-market is a measure of the risk associated with a firm's assets-in-place, leading to a positive relation between beta and book-to-market (i.e., high book-to-market firms have higher beta). Carlson, Fisher, and Giammarino (2004) elaborate on the mechanism underlying this relation. High book-to-market firms have higher operating leverage (i.e., more fixed costs), which increases their sensitivity to aggregate demand shocks. Livdan, Sapriza, and Zhang (2009) study the relation between beta and financial leverage. Levered firms are more risky because financial constraints hinder their ability to adjust capital investments in response to aggregate demand shocks. Empirical evidence is largely consistent with these predictions, but a significant amount of variation in beta cannot be explained by firm-level variables.[6] We examine whether managerial "style" explains some of this residual variation.

2.2 Managerial Style

The prior literature follows neoclassical economic theory and assumes that managers are rational optimizers. Under this view, managers are interchangeable. In contrast, Upper Echelons Theory argues that managers' unique experiences, values, and personalities influence how they respond to complex situations (Hambrick and Mason 1984). First, a manager's field of vision is limited. Managers are not omniscient – they do not (and cannot) monitor every aspect of the firm and its environment. Second, a manager selectively perceives only some of the information included in her (already limited) field of vision. Lastly, the information selected for processing is interpreted through a filter woven by the manager's cognitive frame. Therefore, "[if] we want to

[6] Beginning with Beaver, Kettler, and Scholes (1970), a vast empirical literature has studied firm-level determinants of beta (e.g., Hamada 1972; Breen and Lerner 1973; Rosenberg and McKibben 1973; Lev and Kunitzky 1974; Melicher 1974; Ben-Zion and Shalit 1975; Rosenberg and Guy 1976; Karolyi 1992; Cosemans, Frehen, Schotman, and Bauer 2015; Kelly, Pruitt, and Su 2019).

understand why organizations do the things they do, or why they perform the way they do, we must consider... their most powerful actors – their top executives" (Hambrick 2007, p. 334).

Bertrand and Schoar (2003) were the first to rigorously test Upper Echelons Theory. Their paper develops an identification strategy to disentangle manager fixed effects from firm fixed effects. Using this technique, Bertrand and Schoar (2003) find that manager fixed effects (i.e., differences in managerial "style") explain a significant amount of variation in firms' investment, financial, and organizational policies, after controlling for observable and latent firm covariates. More recently, studies have applied this technique to tax avoidance (Dyreng, Hanlon, and Maydew 2010), voluntary disclosure (Bamber, Jiang, and Wang 2010; Brochet, Faurel, and McVay 2011; Davis, Ge, Matsumoto, and Zhang 2015); financial reporting (Ge, Matsumoto, and Zhang 2011), and corporate social responsibility (Davidson, Dey, and Smith 2016). We are the first to examine managerial style in an asset pricing context.

Another strand of the literature examines the effect of individual manager characteristics. Recent studies have linked *idiosyncratic* risk to CEO overconfidence (Hirshleifer, Low, and Teoh 2012), marital status (Roussanov and Savor 2014), political affiliation (Hutton, Jiang, and Kumar 2014), pilot certification (Cain and McKeon 2016), early-life experiences (Bernile, Bhagwat, and Rau 2016), and early-career experiences (Schoar and Zuo 2017). There is no evidence in the prior literature that individual manager characteristics affect firms' *systematic* risk.

3 Sample

Our sample begins with all executives covered by Execucomp between 1992 and 2016. Within the Execucomp universe, we identify managers who work in two or more firms ("movers").[7] In doing so, we require that movers work at least three years in each firm, giving

[7] Beginning in 1994, Execucomp has tracked the top five highest paid executives in the S&P 1500. Execucomp includes both incumbent firms as well as firms that were once part of the S&P 1500, but were later removed from the

these managers an opportunity to "imprint their mark." If a firm employs a mover at any point during our sample period, we retain all of that firm's observations. Lastly, our sample excludes financial firms (SIC = 6) and utilities (SIC = 49).[8] The resulting sample includes 25,266 firm-year observations corresponding to 1,675 firms and 1,683 movers.

Table 1 summarizes the nature of executive transitions in our sample. We use three variables in Execucomp to code the position of a specific manager in a given firm: (1) *titleann*, (2) *ceoann*, and (3) *cfoann*. Following the prior literature (e.g., Jiang, Petroni, and Wang 2010; Engel, Gao, and Wang 2015), we use *ceoann* to identify CEOs.[9] For the sample period after and including 2006, we use *cfoann* to identify CFOs. For the sample period before 2006, we code a manager as CFO if *titleann* includes any of the following phrases: CFO, Chief Financial Officer, Treasurer, Controller, or Finance.[10]

A small subset of managers work at more than two firms: 131 (7.78%) managers work at three firms, 14 (0.83%) managers work at four firms, and 3 (0.18%) managers work at five firms. When a manager works at three or more firms (i.e., moves more than once), Table 1 reports the last move only. Therefore, the "to" positions in Table 1 can be interpreted as the last position held by each manager. Our sample contains 582 executives whose last position is CEO, 414 executives whose last position is CFO, and 687 executives whose last position is neither CEO nor CFO (i.e., Other). "Other" refers to miscellaneous job titles, such as Chief Operating Officer, Corporate

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index. Before 1994, Execucomp's coverage was limited to the S&P 500. Our sample selection procedure excludes managers who move from an Execucomp firm to a non-Execucomp firm and vice versa. However, we do not believe that this sample selection issue limits the generalizability of our results since the S&P 1500 covers approximately 90% of the U.S. market capitalization.

[8] Bertrand and Schoar (2003) exclude financial firms and utilities when examining manager fixed effects for various corporate policy variables. For consistency, we exclude these firms. However, our results are qualitatively similar if we include these firms.

[9] When a firm-year is not assigned a CEO (i.e., *ceoann* is missing), we assign a CEO using the variables *becameceo* and *leftofc*, if possible.

[10] The variables *ceoann* and *titleann* are available for the entire sample period; *cfoann* is not available before 2006.

Secretary, General Counsel, and various subdivision Presidents or Vice-Presidents (e.g., human resources, research and development, and marketing). In our main analysis, we use these three categories to group manager fixed effects.

Our sample contains 214 executives who leave a CEO position, 440 executives who leave a CFO position, and 1,029 executives who leave a non-CEO, non-CFO position. Among the set of executives who start as CEO, 132 become CEO at another firm and 82 move to a non-CEO, non-CFO position at another firm. Among the set of executives who start as CFO, 41 become CEO at another firm, 340 become CFO at another firm, and 59 move to a non-CEO, non-CFO position at another firm. Lastly, among the set of executives who start in a non-CEO, non-CFO position, 409 become CEO at another firm, 74 become CFO at another firm, and 546 move to a non-CEO, non-CFO position at another firm.

We merge the firm-year panel described above with annual accounting variables from Compustat, merger and acquisition data from SDC Platinum, institutional holdings data from CDA/Spectrum, and volatilities calculated using daily stock returns from the Center for Research in Security Prices (CRSP) and daily factor returns from Kenneth French's data library.[11]

4 Variable Definitions and Descriptive Statistics

4.1 Risk

If investors have homogenous expectations and hold mean-variance efficient portfolios (Markowitz 1959), the market portfolio will be a mean-variance efficient portfolio (Sharpe 1964; Lintner 1965). The efficiency of the market portfolio leads to the following equilibrium pricing relation (Campbell, Lo, and MacKinlay 1997):

$$E[R_i] = R_f + \beta_{im}\left(E[R_m] - R_f\right) \quad (1)$$

[11] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

where $E[R_i]$ is the expected return of asset i; R_f is the return of the risk-free asset; $E[R_m]$ is the expected return of the market portfolio; and $\beta_{im} = Cov(R_i, R_m)/Var(R_m)$.

Because the Sharpe-Lintner CAPM is a one-period model, early studies often assumed that beta was time-invariant. However, several studies challenge the veracity of this assumption (e.g., Bollerslev, Engle, and Wooldridge 1988; Harvey 1989; Jagannathan and Wang 1996). These studies advocate a dynamic or conditional CAPM in which beta is time-varying and depends on investors' information set at any given point in time. As noted by Liu, Stambaugh, and Yuan (2018), "[t]here are numerous approaches for estimating [time-varying] betas on individual stocks, and the literature does not really offer a consensus" (p. 3). However, several recent studies estimate beta using a one-year window with daily returns (e.g., Lewellen and Nagel 2006; Cederburg and O'Doherty 2016; Herskovic, Kelly, Lustig, and Van Nieuwerburgh 2016; Hong and Sraer 2016). Following these studies, we estimate the following time-series regression for each firm-year.[12]

$$R_{it\tau} - R_{ft\tau} = \alpha_{i\tau} + \beta_{i\tau}\left(R_{mt\tau} - R_{ft\tau}\right) + \varepsilon_{it\tau} \tag{2}$$

$R_{it\tau}$ is firm *i*'s stock return on day *t* in year τ; $R_{ft\tau}$ is the risk-free rate on day *t* in year τ; and $R_{mt\tau}$ is the return of the market portfolio on day t in year τ. Our measure of systematic risk, β_{MKT}, is the slope coefficient on the excess return of the market portfolio $\left(R_{mt\tau} - R_{ft\tau}\right)$. While systematic risk is the focus of our study, we also examine total risk and idiosyncratic risk. Total risk (*TVOL*) is the standard deviation of a firm's daily stock returns within its fiscal year and idiosyncratic risk ($IVOL$) is the standard deviation of the residuals $\varepsilon_{it\tau}$. Following Bali, Engle, and Murray (2016), we require at least 200 daily observations in year τ to estimate our measures of risk.

[12] Equation (2) allows a firm's risk exposures to change annually, but assumes that a firm's risk exposures are stable within its fiscal year.

4.2 Descriptive Statistics

Table 2 reports descriptive statistics for our measures of risk as well as the corporate policy variables and measures of firm performance studied in Bertrand and Schoar (2003). All variables are defined in Appendix 1. We winsorize all continuous variables at the 1st and 99th percentiles to reduce the influence of outliers. The mean (median) β_{MKT} in our sample is 1.082 (1.021). Although our sample focuses on the S&P 1500, we still observe considerable variation in firms' systematic risk. The standard deviation of β_{MKT} is 0.521 and the interquartile range of β_{MKT} is 0.644.

5 Main Results

5.1 Executive Effects on Risk

Prior research has studied various firm- and market-level determinants of systematic risk. To test whether managerial style is an important determinant, we adopt Bertrand and Schoar's (2003) identification strategy. First, we regress each measure of risk on firm fixed effects (γ_i) and year fixed effects (α_t). Firm fixed effects control for time-invariant firm characteristics. Year fixed effects control for cross-sectional changes in risk such as those documented by Campbell, Lettau, Malkiel, and Xu (2001). Then, we add manager fixed effects to our base model and examine whether the manager fixed effects have incremental explanatory power. Using the "to" positions in Table 1, we create three groups of manager fixed effects: λ_{CEO} are fixed effects for managers who are CEO in the last position we observe them in, λ_{CFO} are fixed effects for managers who are CFO in the last position we observe them in, and λ_{Other} are fixed effects for managers who are neither CEO nor CFO in the last position we observe them in. The manager fixed effects are indicator variables that equal one if manager *j* works at firm *i* during fiscal year τ. For each measure of risk, we estimate three models:

$$Risk_{i\tau} = \alpha_\tau + \gamma_i + \varepsilon_{i\tau} \quad (3)$$

$$Risk_{i\tau} = \alpha_\tau + \gamma_i + \lambda_{CEO} + \varepsilon_{i\tau} \tag{4}$$

$$Risk_{i\tau} = \alpha_\tau + \gamma_i + \lambda_{CEO} + \lambda_{CFO} + \lambda_{Other} + \varepsilon_{i\tau} \tag{5}$$

Note that none of these models include time-varying firm characteristics (e.g., leverage). Suppose that differences between managers lead to differences in their firms' capital structure, which affects systematic risk. If we controlled for leverage, we would ignore this effect. The goal of our first test is to quantify the *total* effect of managers on systematic risk, so we exclude time-varying firm controls. As Angrist and Pischke (2008) note, "[s]ome variables are bad controls and should not be included in a regression model... Bad controls are variables that are themselves outcome variables" (p. 64). When we look at the mechanisms through which managers affect systematic risk, we include time-varying firm controls and examine the extent to which these controls attenuate manager fixed effects on risk.

Table 3 reports the results from estimating equations (3), (4), and (5) using the sample of firm-years with non-missing data. For each measure of risk, the first row reports the adjusted R^2 of our base model that includes only firm fixed effects and year fixed effects. The second row reports adjusted R^2 when we include CEO fixed effects and the third row reports adjusted R^2 when we include fixed effects for all three groups of managers. The second and third rows also report F-statistics, which test the joint significance of the manager fixed effects.

The adjusted R^2 of our base model is 42.94% for β_{MKT}. Adding CEO fixed effects to our base model increases adjusted R^2 to 45.60% and adding manager fixed effects for all three groups of managers increases adjusted R^2 to 50.10%. Overall, adjusted R^2 increases by 7.16%, which translates to a 16.67% (7.16/42.94) increase relative to the base model. For comparison, we observe a 4.43% increase in adjusted R^2 when we use $IVOL$ as the dependent variable and we observe a 4.56% increase in adjusted R^2 when we use $TVOL$ as the dependent variable. Adjusted

R^2 increases by 7.19% (4.43/61.62) and 7.36% (4.56/61.99) relative to the base model for $IVOL$ and $TVOL$, respectively. In all specifications, the F-test strongly rejects the null hypothesis that the manager fixed effects are jointly equal to zero ($p < 0.0001$).[13]

The incremental adjusted R^2s reported in Table 3 are not large, but they are comparable in magnitude to those in prior studies. Bertrand and Schoar (2003) report large increases in adjusted R^2 for SG&A (37%), number of diversifying acquisitions (11%), and interest coverage (10%). However, Bertrand and Schoar (2003) report small increases in adjusted R^2 for other variables such as investment to cash flow sensitivity (1%), leverage (2%), and cash holdings (3%). More recently, Dyreng, Hanlon, and Maydew (2010) examine manager fixed effects for tax avoidance. Their adjusted R^2 increases by 6.4% when manager fixed effects and year fixed effects are added to their base model, which includes only firm fixed effects. Ge, Matsumoto, and Zhang (2011) examine manager fixed effects for several financial reporting variables: discretionary accruals, off-balance sheet accounting (e.g., operating leases), pension accounting, meeting and beating analysts' expectations, earnings smoothing, and the likelihood of misstatements. Their average incremental adjusted R^2 is 2%.

[13] These results suggest that systematic risk is correlated across at least two firms when the same manager is present. A limitation of our paper (and the managerial style literature in general) is that we cannot disentangle whether (1) managers impose their styles on the firms that they lead or (2) boards hire managers who match their firm's strategic needs. Finkelstein, Hambrick, and Cannella's (2009) fit-drift/shift-refit model expands on the second interpretation. They argue that the economic environment can gradually *drift* or radically *shift*, creating a mismatch between the incumbent CEO's style and the firm's strategic needs. CEO succession provides an opportunity for the board to realign the firm's leadership with its prevailing economic environment. While it is interesting to differentiate between these interpretations, doing so is not critical to our paper. Our results suggest that managerial style is relevant to asset pricing, regardless of whether managers impose their styles (against the will of the board) or whether boards actively seek managers with particular styles.

5.2 Robustness Tests

5.2.1 Infrequent Trading

When a stock is infrequently traded, estimates of systematic risk using equation (2) may be biased (Dimson 1979). This concern is unlikely to confound our results since Execucomp tracks firms in the S&P 1500 and we use a relatively recent sample period (1992 to 2016). Nevertheless, we ensure the robustness of our results using Dimson's (1979) procedure: that is, we include current and lagged market returns in equation (2), estimating $\beta_{MKT,DIMSON}$ as the sum of the slopes on all lags. Following Lewellen and Nagel (2006), we include four lags of market returns, but we do not impose the constraint that lags two to four have the same slope. More specifically, we estimate the following time-series regression for each firm-year.

$$R_{it\tau} - R_{ft\tau} = \alpha_{i\tau} + \beta_{i\tau}^{0}\left(R_{mt\tau} - R_{ft\tau}\right) + \sum_{k=1}^{4} \beta_{i\tau}^{k}\left(R_{mt-k\tau} - R_{ft-k\tau}\right) + \varepsilon_{it\tau} \tag{6}$$

$R_{it\tau}$ is firm *i*'s stock return on day *t* in year τ; $R_{ft\tau}$ is the risk-free rate on day *t* in year τ; and $R_{mt\tau}$ is the return of the market portfolio on day *t* in year τ. $\beta_{MKT,DIMSON}$ is the sum of the slopes on all lags (i.e., $\beta_{i\tau}^{0} + \beta_{i\tau}^{1} + \beta_{i\tau}^{2} + \beta_{i\tau}^{3} + \beta_{i\tau}^{4}$) and $IVOL_{DIMSON}$ is the standard deviation of the residuals $\varepsilon_{it\tau}$.

Panel A of Table 4 reports the results from estimating equations (3), (4), and (5) for $\beta_{MKT,DIMSON}$ and $IVOL_{DIMSON}$. When we include fixed effects for all three groups of managers, we observe a 4.69% increase in adjusted R^2 for $\beta_{MKT,DIMSON}$ and a 4.44% increase in adjusted R^2 for $IVOL_{DIMSON}$. Relative to the base model, adjusted R^2 increases by 14.44% (4.69/32.47) for $\beta_{MKT,DIMSON}$ and 7.20% (4.44/61.65) for $IVOL_{DIMSON}$.

5.2.2 Fama-French Three-Factor Model

While we focus on the Sharpe-Lintner CAPM in our paper, our results generalize to other asset pricing models. Drawing on Merton's (1973) Intertemporal Capital Asset Pricing Model and Ross' (1976) Arbitrage Pricing Theory, several multifactor models have been proposed (e.g., Chen, Roll, and Ross 1986; Fama and French 1993; Carhart 1997; Fama and French 2015; Hou, Xue, and Zhang 2015). We now turn our attention to the Fama-French Three Factor Model given its prominence in the asset pricing literature. More specifically, we estimate the following time-series regression for each firm-year.

$$R_{it\tau} - R_{ft\tau} = \alpha_{i\tau} + \beta_{i\tau}^{MKT} MKT_{t\tau} + \beta_{i\tau}^{SMB} SMB_{t\tau} + \beta_{i\tau}^{HML} HML_{t\tau} + \varepsilon_{it\tau} \quad (7)$$

$R_{it\tau}$ is firm *i*'s stock return on day *t* in year τ; $R_{ft\tau}$ is the risk-free rate on day *t* in year τ; MKT is the excess return of the market portfolio; SMB is the return to a portfolio that is long in small (low market capitalization) firms and short in big (high market capitalization) firms; and HML is the return to a portfolio that is long in high book-to-market (value) firms and short in low book-to-market (growth) firms. $\beta_{MKT,FF3}$ is the slope coefficient on the excess return of the market; $\beta_{SMB,FF3}$ is the slope coefficient on the mimicking portfolio for size; and $\beta_{HML,FF3}$ is the slope coefficient on the mimicking portfolio for book-to-market. We use $IVOL_{FF3}$ to denote the standard deviation of the residuals $\varepsilon_{it\tau}$.

Panel B of Table 4 reports the results from estimating equations (3), (4), and (5) for the Fama-French factor loadings and $IVOL_{FF3}$. We observe a 4.62%, 3.16%, and 3.36% increase in adjusted R^2 for $\beta_{MKT,FF3}$, $\beta_{SMB,FF3}$, and $\beta_{HML,FF3}$, respectively. This translates to a 14.51% (4.62/31.83), 6.96% (3.16/45.37), and 9.85% (3.36/34.10) increase in adjusted R^2 relative to each factor loading's base model. For comparison, we observe a 4.47% increase in adjusted R^2 when we use $IVOL_{FF3}$ as the dependent variable, which translates to a 7.29% (4.47/61.35) increase relative to the base model.

Note that there is a fundamental difference between characteristics and factor loadings (Daniel and Titman 1997; Chordia, Goyal, and Shanken 2015). There is a mechanical relation between characteristics and factor loadings at the portfolio level, but such a relation need not exist at the firm level. Consider market capitalization and SMB. The loading on SMB must be higher for small firms than for big firms, *on average*. However, a large firm can have a large loading on SMB and a small firm can have a small loading on SMB. For example, a small firm that sells most of its products to Apple may move more closely with the prices of large firms than with the prices of other small firms. Our analysis explores whether a small firm moves more closely with the prices of large firms when a small firm employs a manager who has a "large-firm" management style.

5.2.3 Other Robustness Tests

To ensure that microstructure frictions such as bid-ask bounce do not confound our results, we repeat our analysis for each measure of risk using weekly returns in lieu of daily returns. Following Hamm, Li, and Ng (2016), we require at least 26 weekly observations in year τ to estimate our measures of risk. Our results are qualitatively similar when we use these measures of risk.

Three notable events occurred during our sample period: the dotcom bubble, the Enron scandal, and the global financial crisis. Our identification strategy examines whether equity risk is correlated across at least two firms when the same manager is present. If the events thereof induce executive transitions and affect firms' risk exposures, these events could drive our results and our results may not generalize. This is not the case. Our results are qualitatively similar if we exclude managers who join or leave a firm in 2000 (dotcom bubble), 2001 (Enron scandal), or 2007-2008 (global financial crisis).

Lastly, the alternative hypothesis of the *F*-tests performed in Table 3 and Table 4 is that at least one of the manager fixed effects is not zero. Thus, a valid concern is that rejecting the null hypothesis does not necessarily mean that an economically significant number of manager fixed effects are different from zero. Furthermore, as Fee, Hadlock, and Pierce (2013) note, "Wooldridge (2002) cautions against using *F*-tests for testing significance of a large set of individual effects in the absence of very strong assumptions about the error term" (p. 593). To address these concerns, Figure 1 reports the actual and expected number of significant manager fixed effects (*t*-statistics). Because systematic risk is the focus of our study, we report the number of significant *t*-statistics only for β_{MKT}, $\beta_{MKT,DIMSON}$, $\beta_{MKT,FF3}$, $\beta_{SMB,FF3}$, and $\beta_{HML,FF3}$. The number of significant *t*-statistics is qualitatively similar for the other measures of risk.

Under the null hypothesis that managerial style is not a determinant of systematic risk, we would expect 16 (i.e., 1628×0.01) manager fixed effects to be significant at the 1% level, 81 (i.e., 1628×0.05) manager fixed effects to be significant at the 5% level, and 163 (i.e., 1628×0.10) manager fixed effects to be significant at the 10% level. When we use β_{MKT} as the dependent variable, 570 manager fixed effects are significant at the 1% level, 703 manager fixed effects are significant at the 5% level, and 802 manager fixed effects are significant at the 10% level. When we use $\beta_{MKT,DIMSON}$ as the dependent variable, 549 manager fixed effects are significant at the 1% level, 689 manager fixed effects are significant at the 5% level, and 788 manager fixed effects are significant at the 10% level. When we use $\beta_{MKT,FF3}$ as the dependent variable, 550 manager fixed effects are significant at the 1% level, 686 manager fixed effects are significant at the 5% level, and 785 manager fixed effects are significant at the 10% level. When we use $\beta_{SMB,FF3}$ as the dependent variable, 577 manager fixed effects are significant at the 1% level, 705 manager fixed effects are significant at the 5% level, and 793 manager fixed effects are significant at the 10% level. Lastly, when we use $\beta_{HML,FF3}$ as the dependent variable, 572 manager fixed effects are significant at the 1% level, 701 manager fixed effects are significant at the 5% level, and 807 manager fixed effects are significant at the 10% level. Ultimately, an economically significant number of manager fixed effects are statistically different from zero.

5.3 Graphical Analysis

Next, we plot the evolution of β_{MKT} in event-time surrounding executive transitions. We begin by classifying managers into four groups: beta-increasing (significant at the 5% level), beta-increasing (not significant at the 5% level), beta-decreasing (significant at the 5% level), and beta-decreasing (not significant at the 5% level). These categories are based on the sign and the significance of the fixed effects estimated in Table 3. If a firm employs one of these managers, we collect β_{MKT} for the period [–2, +2], where 0 denotes the hiring year. Then, we subtract the average value of β_{MKT} measured over the interval [-2, -1] from the raw value of β_{MKT} for each firm-year. Figure 2 plots these values for the full interval [–2, +2]. Thus, the value of beta over the interval [0, 3] represents the change in beta from the firm's average beta before the executive joined the firm. The evidence in Figure 2 suggests that beta-increasing (beta-decreasing) managers lead to an immediate and persistent increase (decrease) in β_{MKT}.

5.4 Distribution of Manager Fixed Effects

Our previous analyses show that manager fixed effects explain a significant amount of variation in firms' systematic risk. Now, we examine whether the differences between managers are economically large. In Table 5, we report the distribution of manager fixed effects for each regression in Table 3. When we compute these statistics, we weigh each manager fixed effect by the inverse of its standard error to account for estimation error. Table 5 suggests that hiring an executive at the 25th percentile of the distribution is expected to reduce β_{MKT} by 0.201, while hiring an executive at the 75th percentile of the distribution is expected to increase β_{MKT} by 0.161.[14]

5.5 Mechanisms

The previous sections of our paper show that manager fixed effects are a statistically and economically significant determinant of firms' (systematic) risk exposures. Now, we investigate how managers affect their firms' equity risk. We examine whether manager fixed effects on beta operate through (1) previously documented determinants of beta and (2) previously documented management styles.

5.5.1 Firm-Level Determinants of Beta

As discussed in Section 2.1, beta is related to size, book-to-market, and financial leverage. We adopt the standard definitions used in the prior literature. Size is the market value of equity. Book-to-market is book value of equity divided by market value of equity, where book value of equity equals common equity plus deferred taxes and investment tax credits minus the book value of preferred stock. Lastly, financial leverage is book value of assets divided by the market value of equity. We use the logarithmic transformation of these variables.

Without controlling for time-varying firm characteristics (Table 3), adjusted R^2 increases by 7.16% when we add manager fixed effects to the model with β_{MKT} as the dependent variable. After controlling for time-varying firm characteristics (Table 6), adjusted R^2 increases by 6.86% (51.51−44.65). Overall, it appears that manager fixed effects on beta operate through previously documented determinants of beta, but this is not the dominant mechanism.

[14] When a new CEO is hired, the average unsigned change in β_{MKT} is 0.374 (untabulated).

5.5.2 Other Manager Fixed Effects

Next, we examine whether manager fixed effects on beta operate through previously documented management styles. Bertrand and Schoar (2003) find significant manager fixed effects for twelve corporate policy variables. These variables are related to investment policy (capital expenditures, investment to *Q* sensitivity, investment to cash flow sensitivity, and number of acquisitions), financial policy (leverage, interest coverage, cash holdings, and dividend payout), and organizational strategy (number of diversifying acquisitions, R&D expenditures, advertising expenditures, and SG&A expenditures).[15]

Due to multicollinearity, we do not simply regress manager fixed effects on beta on the twelve manager fixed effects studied in Bertrand and Schoar (2003). Instead, we proceed in two steps. In the first step, we examine whether latent factors (i.e., unobservable management styles) explain the covariance structure among the manager fixed effects studied in Bertrand and Schoar (2003). In the second step, we examine whether the factors thereof explain manager fixed effects on beta.

To prepare our data for factor analysis, we follow the convention of standardizing our variables to have zero mean and unit variance. Using a Scree test (Cattell 1966), we determine that there are three factors. Panel A of Table 7 reports the factor loadings of the three factors; Panel B of Table 7 reports the eigenvalues and the proportion of variation explained by the three factors; and Panel C of Table 7 examines the relation between the three factors and manager fixed effects on risk.

[15] All variables are defined in Appendix 1. To reduce skewness, we use the natural logarithm of one plus the raw value for number of acquisitions, number of diversifying acquisitions, and interest coverage. Table 5 reports the distribution of manager fixed effects for each corporate policy variable. When we compute these statistics, we weigh each manager fixed effect by the inverse of its standard error to account for estimation error. For brevity, we do not report the estimation of these manager fixed effects. Please refer to Bertrand and Schoar (2003) for details on each specific regression.

The three factors identified in Table 7 have natural interpretations. The first factor loads positively on number of acquisitions and number of diversifying acquisitions. We interpret this factor as a preference for external growth. The second factor loads positively (negatively) on interest coverage (leverage). We interpret this factor as a preference for financial conservatism. The third factor loads positively on investment (i.e., capital expenditures), cash holdings and R&D. We interpret this factor as a preference for internal growth.

In Panel C of Table 7, we examine the relation between the three factors and manager fixed effects on risk. Factor 1 (external growth) is not significantly related to manager fixed effects on β_{MKT} or manager fixed effects on $IVOL$. Both of these findings are intuitive. Managers who have a proclivity to acquire other firms can acquire either high-beta or low-beta targets. Therefore, a preference for external growth can be beta-increasing, beta-decreasing, or beta-neutral. Our results suggest that a preference for external growth is beta-neutral, on average. Likewise, a manager who has a proclivity to acquire other firms can acquire targets within the parent's industry or outside of the parent's industry (i.e., not all acquisitions are "diversifying"). Therefore, a preference for external growth need not reduce idiosyncratic risk, on average.

There is some evidence that Factor 2 (financial conservatism) is related to manager fixed effects on β_{MKT}. The coefficient on Factor 2 is statistically significant (at the 10% level) and economically significant. The interquartile range for Factor 2 is 0.895 (untabulated), so we would expect the effect of a manager on β_{MKT} to be 0.062 smaller (i.e., 0.895×-0.069) for a manager at the 75th percentile of Factor 2 relative to a manager at the 25th percentile of Factor 2, holding the other covariates constant. On the other hand, Factor 3 (internal growth) is positively related to manager fixed effects on β_{MKT}. The coefficient on Factor 3 is statistically significant (at the 1% level) and (very) economically significant. The interquartile range for Factor 3 is 0.569

(untabulated), so we would expect the effect of a manager on β_{MKT} to be 0.147 larger (i.e., 0.569×0.259) for a manager at the 75th percentile of Factor 3 relative to a manager at the 25th percentile of Factor 3, holding the other covariates constant.

Manager fixed effects on ROA are not significantly related to manager fixed effects on β_{MKT}. However, manager fixed effects on ROA are negatively related to manager fixed effects on idiosyncratic risk. The coefficient on $F.E.(ROA)$ is negative and significant at the 1% level for $IVOL$. Managers who have larger performance fixed effects are associated with lower idiosyncratic risk, suggesting that these managers have superior ability, not greater risk tolerance.[16]

Ultimately, Table 7 provides some evidence that manager fixed effects on beta operate through previously documented management styles. However, the R^2s in Panel C are not large. The R^2 for manager fixed effects on β_{MKT} is only 4.1%, which suggests that previously documented management styles is not the dominant mechanism.

5.6 Executive Discretion

In Table 8, we examine firm- and market-level determinants of unsigned manager fixed effects on risk. The objective of this analysis is to determine whether certain environments amplify the effects of managerial style. This test is inspired by Finkelstein, Hambrick, and Cannella's (2009) influential book *Strategic Leadership*. They conclude that "considerable work is needed in understanding the determinants of [executive] discretion, and call for "examination of how organizational and individual characteristics affect the top executive's latitude of action" (p. 41).

We examine institutional holdings, firm size, return on assets, leverage, Tobin's Q, and the value-weighted return to the market portfolio. All variables are defined in Appendix 1. We acknowledge that the results in this table do not establish causality and are purely exploratory.

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[16] The Pearson product-moment correlation (Spearman rank-order correlation) between manager fixed effects on β_{MKT} and manager fixed effects on $IVOL$ is 0.438 (0.450).

However, to alleviate some concerns about reverse causality we measure all explanatory variables in the year before each executive transition. For example, for an executive transition in year τ, we measure institutional holdings in year τ–1.

Only firm size is significantly related to unsigned manager fixed effects on β_{MKT}. The coefficient on *Size* is statistically significant (at the 1% level) and economically significant. The interquartile range for *Size* in our sample (described in Section 3) is 2.239 (untabulated). Therefore, we would expect the unsigned effect of a manager on β_{MKT} to be 0.116 smaller (i.e., 2.239×-0.052) if the manager leads a firm at the 75th percentile of the *Size* distribution relative to a firm at the 25th percentile of the *Size* distribution, holding the other covariates constant. Given that Execucomp tracks managers in the S&P 1500 and our sample selection procedure further requires that a manager work at two or more Execucomp firms, the results documented hitherto likely represent a lower bound on the effects of managerial style on equity risk.[17]

5.7 Hiring Preferences

In Table 9, we ask whether certain firm and market characteristics lead to a preference for managers who have beta-increasing styles, and whether other firm and market characteristics lead to a preference for managers who have beta-decreasing styles. For example, if the market performed well in the previous year, do boards prefer beta-increasing managers? Again, we examine institutional holdings, firm size, return on assets, leverage, Tobin's Q, and the value-weighted return to the market portfolio in the year before each executive transition. While some

[17] In untabulated analysis, we also find that unsigned manager fixed effects on beta are larger in firms with high beta volatility. In particular, we perform two comparisons. First, we compare managers that worked at a high beta volatility firm with managers that never worked at a high beta volatility firm. Second, we compare managers that always worked at a high beta volatility firm with managers that did not always work at a high beta volatility firm. In both comparisons, unsigned manager fixed effects on beta are larger for the former group.

of the coefficients in Table 9 are statistically significant, we do not find robust evidence of hiring preferences.

5.8 Observable Manager Characteristics

Recent studies have linked *idiosyncratic* risk to observable manager characteristics such as CEO overconfidence (Hirshleifer, Low, and Teoh 2012), marital status (Roussanov and Savor 2014), political affiliation (Hutton, Jiang, and Kumar 2014), pilot certification (Cain and McKeon 2016), early-life experiences (Bernile, Bhagwat, and Rau 2016), and early-career experiences (Schoar and Zuo 2017). In this section, we examine the relation between *systematic* risk and observable manager characteristics.

Upper Echelons Theory (Hambrick and Mason 1984; Hambrick 2007) predicts that style is a function of managers' experiences, values, and personalities. Following this framework, we examine gender, early-career experiences (Schoar and Zuo 2017), and early-life experiences (birth year). Following Schoar and Zuo (2017), we examine the economic conditions at the beginning of a manager's career. To avoid endogenous selection of when an individual chooses to enter the labor market, we use the manager's birth year plus 24 as the beginning of the manager's career. *Recession* is an indicator variable that equals 1 if there is a recession in the calendar year when a manager turns 24 years old. Recession years are based on the business cycle dating database of the National Bureau of Economic Research (NBER). Recession years include the trough of the business cycle and all years leading to the trough (excluding the peak of the business cycle).

Table 10 presents descriptive statistics for the sample of managers for whom we were able to estimate fixed effects. The descriptive statistics are virtually identical for the Execucomp universe (untabulated). Not surprisingly, the majority of the executives in our sample are male

(93.7%). 23.7% of the executives in our sample entered the labor market during a recession. The mean birth year in our sample is 1953.

In Table 11, we examine the relation between the observable manager characteristics and manager fixed effects on risk. Only managers' early-career experiences are significantly related to manager fixed effects on β_{MKT}. The coefficient on *Recession* is statistically significant (at the 5% level) and (very) economically significant. On average, we would expect the signed effect of a manager on β_{MKT} to be 0.240 smaller if the manager entered the labor market during a recession, holding the other covariates constant. Gender is not associated with manager fixed effects on risk. This is surprising given that women are, on average, more risk averse than men (e.g., Byrnes, Miller, and Schafer 1999). However, as Hambrick and Mason (1984) note, it may take "a certain kind of person to rise to the top ranks of a firm" (p. 204); thus, women who rise to the top ranks of a firm may share many similarities with men (e.g., risk-aversion). Likewise, birth year is not associated with manager fixed effects on risk. This is also surprising given that older cohorts are, on average, more risk averse than younger cohorts. It should be noted, however, that our tests have low power. First, the dependent variables in Table 11 are regression coefficients which are noisy by definition. Second, demographic characteristics are "incomplete and imprecise proxies of executives' cognitive frames" (Hambrick 2007, p. 335).

6 Conclusion

This paper fills two gaps in the literature. First, there has been a proliferation of research on the effects of individual managers in both accounting and corporate finance, but the effects of individual managers has remained largely unexplored in asset pricing. We introduce a manager dimension to a strand of the asset pricing literature. Second, there is a dearth of research on the capital market consequences of managerial style. We examine the asset pricing implications of managerial style.

By tracking managers across different firms over time, we are able to identify manager-specific effects on systematic risk. We find that individual managers explain a significant amount of variation in their firms' systematic risk and that most of this variation cannot be explained by manager-specific effects on corporate policy variables. We also find that the effect of individual managers on systematic risk is decreasing in firm size. Since our sample focuses on firms in the S&P 1500, our results likely document a lower bound on the effects of managerial style on equity risk.

The objective of our paper is to bridge the asset pricing literature and the managerial style literature. We believe that questions at the intersection of these literatures is a promising area for future research. For example, we examine whether managerial style has explanatory power for firms' loadings on the excess return to the market portfolio and mimicking portfolios for size and book-to-market. However, it is conceivable that managerial style is itself a distinct risk factor. Testing this is beyond the scope of our paper, but we encourage future research to ask such questions. In addition, although we find limited evidence that manager fixed effects on beta are related to observable manager characteristics, it may be fruitful for future research to identify observable manager characteristics that have forecasting power for beta.

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APPENDIX 1

VARIABLE DEFINITIONS

Variable Name	Source	Description
$TVOL$	CRSP	Standard deviation of firm *i*'s daily stock returns during fiscal year τ.
β_{MKT} $IVOL$	CRSP, Fama-French factor data	For every firm *i*'s fiscal year τ, we estimate the following OLS regression using daily stock returns (*t* indexes days in year τ): $$R_{it\tau} - R_{ft\tau} = \alpha_{i\tau} + \beta_{i\tau}(R_{mt\tau} - R_{ft\tau}) + \varepsilon_{it\tau}$$ β_{MKT} is the slope coefficient on the excess return to the market ($\beta_{i\tau}$). $IVOL$ is the standard deviation of the residuals $\varepsilon_{it\tau}$. We allow a firm's sensitivity to the market to change annually, but we assume that a firm's sensitivity to the market is stable within its fiscal year.
$\beta_{MKT,DIMSON}$ $IVOL_{DIMSON}$	CRSP, Fama-French factor data	For every firm *i*'s fiscal year τ, we estimate the following OLS regression using daily stock returns (*t* indexes days in year τ): $$R_{it\tau} - R_{ft\tau} = \alpha_{i\tau} + \beta^0_{i\tau}(R_{mt\tau} - R_{ft\tau}) + \sum_{k=1}^{4} \beta^k_{i\tau}(R_{mt-k\tau} - R_{ft-k\tau}) + \varepsilon_{it\tau}$$ $\beta_{MKT,DIMSON}$ is the slope coefficient on the excess return to the market ($\beta^0_{i\tau}$) plus all of the slope coefficients on the lagged excess returns to the market ($\beta^1_{i\tau} + \beta^2_{i\tau} + \beta^3_{i\tau} + \beta^4_{i\tau}$). $IVOL_{DIMSON}$ is the standard deviation of the residuals $\varepsilon_{it\tau}$.
$\beta_{MKT,FF3}$ $\beta_{SMB,FF3}$ $\beta_{HML,FF3}$ $IVOL_{FF3}$	CRSP, Fama-French factor data	For every firm *i*'s fiscal year τ, we estimate the following OLS regression using daily stock returns (*t* indexes days in year τ): $$R_{it\tau} - R_{ft\tau} = \alpha_{i\tau} + \beta^{MKT}_{i\tau} MKT_{t\tau} + \beta^{SMB}_{i\tau} SMB_{t\tau} + \beta^{HML}_{i\tau} HML_{t\tau} + \varepsilon_{it\tau}$$ $\beta_{MKT,FF3}$ is the slope coefficient on the excess return to the market. $\beta_{SMB,FF3}$ is the slope coefficient on the mimicking portfolio for size. $\beta_{HML,FF3}$ is the slope coefficient on the mimicking portfolio for book-to-market. $IVOL_{FF3}$ is the standard deviation of the residuals $\varepsilon_{it\tau}$.

APPENDIX 1

VARIABLE DEFINITIONS

Variable Name	Source	Description
Investment	Compustat	Capital expenditures (*CAPX*) divided by net property, plant, and equipment at the beginning of the fiscal year (*PPENT*).
Tobin's *Q*	Compustat	Market value of assets divided by book value of assets (*AT*). Market value of assets equals book value of assets (*AT*) plus the market value of common equity (|*PCC_F*|×*CSHO*) less the sum of the book value of common equity and deferred taxes (*CEQ*+*TXDB*).
Cash flow	Compustat	The sum of earnings before extraordinary items and depreciation (*IB*+*DP*) divided by net property, plant, and equipment at the beginning of the fiscal year (*PPENT*).
Number of acquisitions	SDC Platinum	The total number of acquisitions in the fiscal year.
Leverage	Compustat	The sum of long-term debt and debt in current liabilities (*DLTT*+*DLC*) divided by the sum of long-term debt, debt in current liabilities, and the book value of common equity (*DLTT*+*DLC*+*CEQ*).
Interest coverage	Compustat	Earnings before depreciation, interest, and tax (*OIBDP*) divided by interest expense (*XINT*). We set interest coverage to zero for firms with negative *OIBDP* and positive *XINT*.
Cash holdings	Compustat	Cash and short-term investments (*CHE*) divided by lagged total assets (*AT*).
Dividends/earnings	Compustat	The sum of common dividends and preferred dividends (*DVC*+*DVP*) divided by earnings before depreciation, interest, and tax (*OIBDP*). We set this ratio to missing when it is negative.
Number of diversifying acquisitions	SDC Platinum	The total number of acquisitions in the fiscal year where the target's two-digit SIC differs from the acquirer's two-digit SIC.
R&D	Compustat	R&D expenditures (*XRD*) divided by lagged total assets (*AT*). Missing R&D is set to zero.

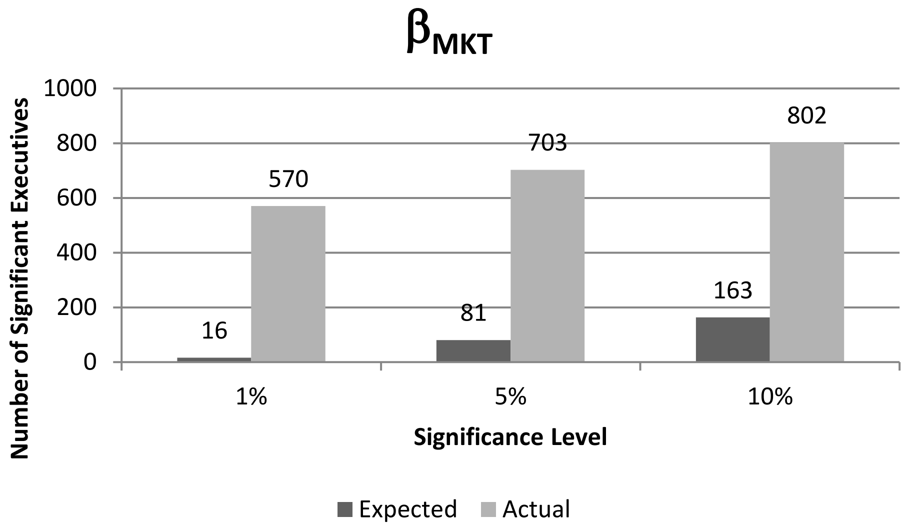
APPENDIX 1

VARIABLE DEFINITIONS

Variable Name	Source	Description
Advertising	Compustat	Advertising expenditures (*XAD*) divided by lagged total assets (*AT*). Missing advertising is set to zero.
SG&A	Compustat	Selling, general, and administrative expenditures (*XSGA*) divided by sales (*SALE*). Missing SG&A is set to zero.
Return on assets	Compustat	Earnings before depreciation, interest, and tax (*OIBDP*) divided by lagged total assets (*AT*).
Operating return on assets	Compustat	Operating cash flow (*OANCF*) divided by lagged total assets (*AT*).
Institutional holdings	CDA/Spectrum	Institutional holdings divided by the number of shares outstanding.
Size	Compustat	The natural logarithm of total assets (*AT*).
Value-weighted market return	CRSP	Value-weighted return to the market (*VWRETD*) cumulated over the past 12 months.
Male	Execucomp	An indicator variable that equals one if a manager is male.
Birth year	Execucomp	A manager's birth year.
Recession	Execucomp	An indicator variable that equals one if a manager's birth year plus 24 is a recession year (Schoar and Zuo 2017). Recession years are based on the business cycle dating database of the National Bureau of Economic Research (NBER). Recession years include the trough of the business cycle and all years leading to the trough (excluding the peak of the business cycle).

FIGURE 1

FREQUENCY OF SIGNIFICANT EXECUTIVE FIXED EFFECTS



Notes:

Figure 1 reports the actual number of significant manager fixed effects and the expected number of significant manager fixed effects. The significance of manager fixed effects is determined using heteroskedasticity-consistent standard errors clustered at the firm-level.

FIGURE 1 (CONTINUED)

FREQUENCY OF SIGNIFICANT EXECUTIVE FIXED EFFECTS

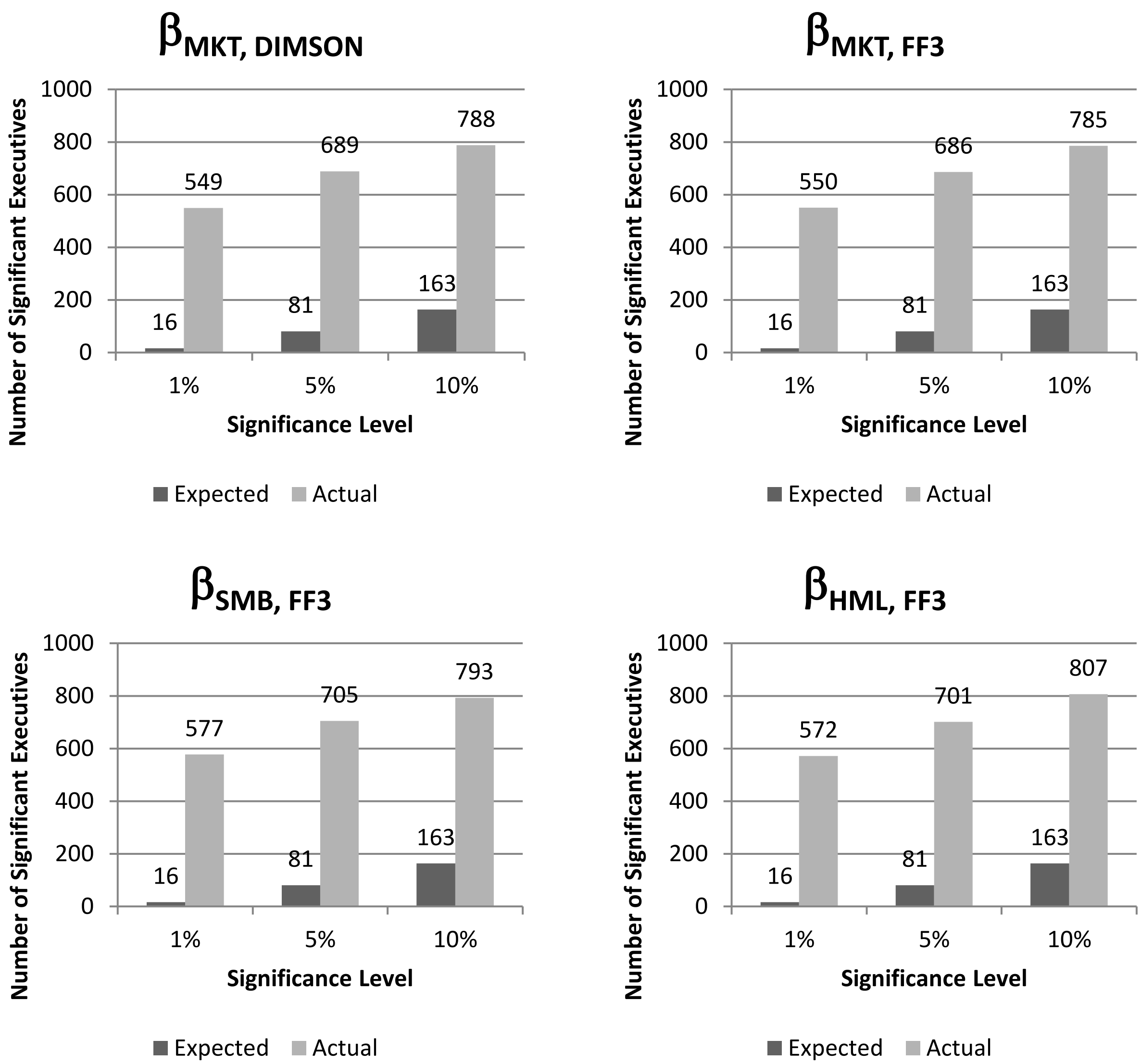
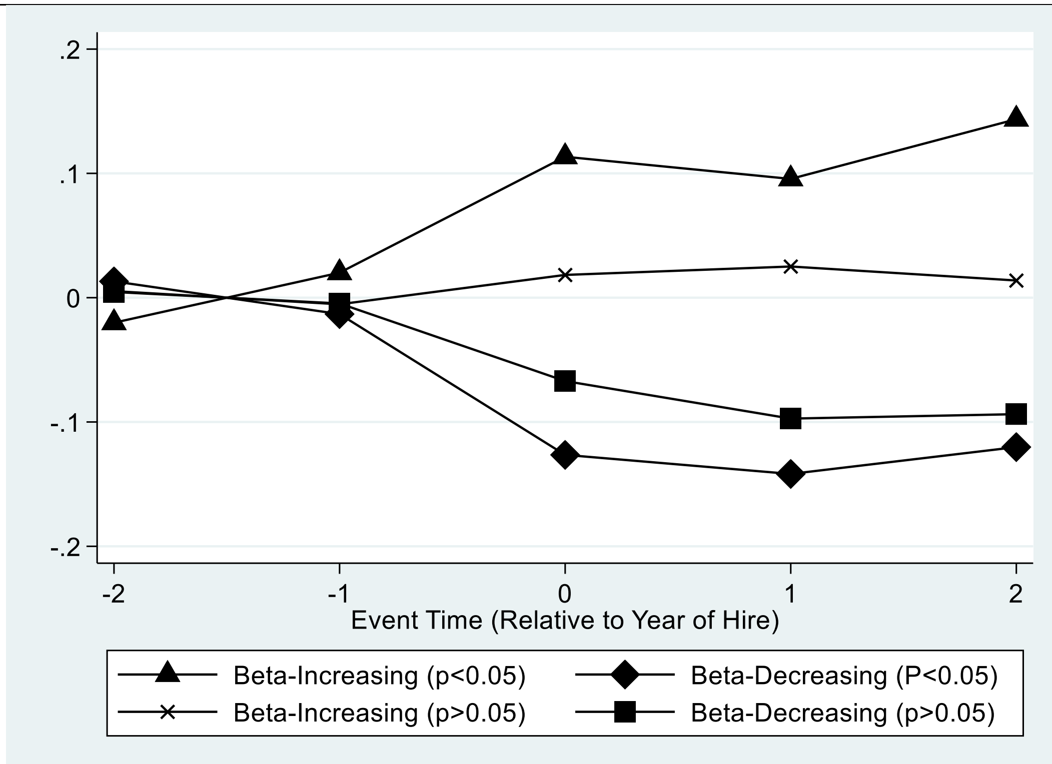


FIGURE 2

CHANGE IN BETA SURROUNDING EXECUTIVE TRANSITIONS



Notes:

Figure 2 plots the evolution of β_{MKT} for four groups: (1) firms that hire beta-increasing managers (significant at the 5% level), (2) firms that hire beta-increasing managers (not significant at the 5% level), (3) firms that hire beta-decreasing managers (significant at the 5% level), and (4) firms that hire beta-decreasing managers (not significant at the 5% level). Year 0 denotes the hiring year. To construct the figure, we subtract the average value of beta measured over the interval [-2, -1] from the raw value of beta for each firm-year. Thus, the value of beta over the interval [0, 3] represents the change in beta from the firm's average beta before the executive joined the firm.

TABLE 1

EXECUTIVE TRANSITIONS BETWEEN POSITIONS

To:	CEO	CFO	Other	Total
From:				
CEO	132	0	82	214
CFO	41	340	59	440
Other	409	74	546	1,029
Total	582	414	687	1,683

Notes:

This table summarizes executive transitions in our sample. Each manager in our sample works at least three years at two or more firms. When a manager works at three or more firms (i.e., moves more than once), we analyze the last move only. Each cell reports the number of transitions from the row position to the column position. "Other" refers to miscellaneous job titles, such as Chief Operating Officer, Corporate Secretary, General Counsel, and various subdivision Presidents or Vice-Presidents (e.g., human resources, research and development, and marketing).

TABLE 2

DESCRIPTIVE STATISTICS

	N	Mean	SD	p25	p50	p75
$TVOL$	23,762	0.027	0.014	0.018	0.024	0.033
β_{MKT}	23,762	1.082	0.521	0.722	1.021	1.366
$IVOL$	23,762	0.024	0.013	0.015	0.021	0.030
Investment	24,109	0.307	0.322	0.137	0.215	0.355
N of acquisitions	25,266	0.362	0.544	0.000	0.000	0.693
Leverage	24,415	0.353	0.313	0.103	0.326	0.500
Interest coverage	22,401	2.514	1.412	1.694	2.332	3.108
Cash holdings	24,327	0.180	0.269	0.028	0.089	0.233
Dividends/earnings	23,982	0.082	0.151	0.000	0.019	0.123
N of diversifying acquis.	25,266	0.170	0.382	0.000	0.000	0.000
R&D	24,346	0.039	0.072	0.000	0.004	0.047
Advertising	24,346	0.015	0.036	0.000	0.000	0.012
SG&A	24,482	0.239	0.181	0.106	0.209	0.333
Return on assets	24,275	0.164	0.122	0.098	0.153	0.221
Operating return on assets	24,297	0.115	0.105	0.061	0.109	0.166

Notes:

This table presents summary statistics for the sample of firms that employ a mover at some point during our sample period. All variables are defined in Appendix 1.

TABLE 3

EXECUTIVE EFFECTS ON RISK

	F-tests on fixed effects for				
	CEOs	*CFOs*	*Other executives*	*N*	*Adjusted* R^2
$TVOL$				23,762	.6199
$TVOL$	4.69 (<.0001, 563)			23,762	.6374
$TVOL$	3.86 (<.0001, 563)	4.53 (<.0001, 410)	8.72 (<.0001, 655)	23,762	.6655
β_{MKT}				23,762	.4294
β_{MKT}	5.00 (<.0001, 563)			23,762	.4560
β_{MKT}	4.50 (<.0001, 563)	6.14 (<.0001, 410)	4.60 (<.0001, 655)	23,762	.5010
$IVOL$				23,762	.6162
$IVOL$	4.21 (<.0001, 563)			23,762	.6330
$IVOL$	3.70 (<.0001, 563)	4.09 (<.0001, 410)	9.86 (<.0001, 655)	23,762	.6605

Notes:

Using the sample of firm-years with non-missing data, we estimate the following regression:

$$Risk_{i\tau} = \alpha_\tau + \gamma_i + \lambda_{CEO} + \lambda_{CFO} + \lambda_{Other} + \varepsilon_{i\tau}$$

α_τ are year fixed effects, γ_i are firm fixed effects, and λ are manager fixed effects. Because the objective of this test is to quantify the total effect of managers on risk, we exclude time-varying firm controls. The first row for each variable excludes manager fixed effects. The second row includes CEO fixed effects and the third row includes fixed effects for all three groups of managers (CEO, CFO, Other). The middle columns report the results from *F*-tests for the joint significance of the manager fixed effects. For each *F*-test, we report the *F*-statistic, *p*-value, and number of constraints.

TABLE 4

ROBUSTNESS: EXECUTIVE EFFECTS ON RISK

Panel A: Dimson (1979)

	F-tests on fixed effects for				
	CEOs	*CFOs*	*Other executives*	*N*	*Adjusted* R^2
$\beta_{MKT,DIMSON}$				23,762	.3247
$\beta_{MKT,DIMSON}$	2.91 (<.0001, 563)			23,762	.3406
$\beta_{MKT,DIMSON}$	3.09 (<.0001, 563)	3.40 (<.0001, 410)	4.98 (<.0001, 655)	23,762	.3716
$IVOL_{DIMSON}$				23,762	.6165
$IVOL_{DIMSON}$	4.19 (<.0001, 563)			23,762	.6333
$IVOL_{DIMSON}$	3.72 (<.0001, 563)	3.79 (<.0001, 410)	9.98 (<.0001, 655)	23,762	.6609

Notes:

Using the sample of firm-years with non-missing data, we estimate the following regression:

$$Risk_{i\tau} = \alpha_\tau + \gamma_i + \lambda_{CEO} + \lambda_{CFO} + \lambda_{Other} + \varepsilon_{i\tau}$$

α_τ are year fixed effects, γ_i are firm fixed effects, and λ are manager fixed effects. Because the objective of this test is to quantify the total effect of managers on risk, we exclude time-varying firm controls. The first row for each variable excludes manager fixed effects. The second row includes CEO fixed effects and the third row includes fixed effects for all three groups of managers (CEO, CFO, Other). The middle columns report the results from *F*-tests for the joint significance of the manager fixed effects. For each *F*-test, we report the *F*-statistic, *p*-value, and number of constraints.

TABLE 4

ROBUSTNESS: EXECUTIVE EFFECTS ON RISK

Panel B: Fama-French Three-Factor Model

	F-tests on fixed effects for				
	CEOs	*CFOs*	*Other executives*	*N*	*Adjusted R^2*
$\beta_{MKT,FF3}$				23,762	.3183
$\beta_{MKT,FF3}$	3.50 (<.0001, 563)			23,762	.3353
$\beta_{MKT,FF3}$	3.69 (<.0001, 563)	3.22 (<.0001, 410)	4.49 (<.0001, 655)	23,762	.3645
$\beta_{SMB,FF3}$				23,762	.4537
$\beta_{SMB,FF3}$	3.36 (<.0001, 563)			23,762	.4642
$\beta_{SMB,FF3}$	3.00 (<.0001, 563)	3.70 (<.0001, 410)	12.17 (<.0001, 655)	23,762	.4853
$\beta_{HML,FF3}$				23,762	.3410
$\beta_{HML,FF3}$	3.09 (<.0001, 563)			23,762	.3514
$\beta_{HML,FF3}$	2.89 (<.0001, 563)	6.37 (<.0001, 410)	8.07 (<.0001, 655)	23,762	.3746
$IVOL_{FF3}$				23,762	.6135
$IVOL_{FF3}$	4.77 (<.0001, 563)			23,762	.6307
$IVOL_{FF3}$	3.77 (<.0001, 563)	4.47 (<.0001, 410)	9.61 (<.0001, 655)	23,762	.6582

TABLE 5

DISTRIBUTION OF EXECUTIVE FIXED EFFECTS

	N	Mean	SD	p25	p50	p75
$TVOL$	1,628	-0.001	0.006	-0.004	0.000	0.003
β_{MKT}	1,628	-0.011	0.303	-0.201	-0.008	0.161
$IVOL$	1,628	-0.001	0.006	-0.004	-0.001	0.002
Investment	1,600	0.004	0.134	-0.046	0.009	0.057
Inv to Q sensitivity	1,621	-0.011	0.381	-0.093	-0.007	0.066
Inv to CF sensitivity	1,621	-0.017	0.820	-0.098	-0.016	0.060
N of acquisitions	1,640	-0.008	0.329	-0.139	-0.014	0.140
Leverage	1,638	0.002	0.140	-0.060	0.002	0.076
Interest coverage	1,615	-0.047	0.591	-0.282	-0.031	0.204
Cash holdings	1,639	-0.001	0.103	-0.044	0.000	0.043
Dividends/earnings	1,636	-0.002	0.133	-0.023	0.002	0.020
N of diversifying acquis.	1,639	0.003	0.201	-0.069	-0.007	0.062
R&D	1,639	0.001	0.019	-0.006	0.001	0.008
Advertising	1,639	0.000	0.008	-0.001	0.000	0.002
SG&A	1,639	-0.002	0.045	-0.017	-0.001	0.013
Return on assets	1,640	0.003	0.065	-0.027	0.002	0.034
Operating return on assets	1,640	0.003	0.058	-0.025	0.001	0.028

Notes:

This table presents the distribution of the manager fixed effects estimated in Table 3, as well as the distribution of the manager fixed effects studied in Bertrand and Schoar (2003). For brevity, we do not report the estimation of the latter. For details on each corporate policy regression, please refer to Bertrand and Schoar (2003). We weigh each manager fixed effect by the inverse of its standard error to account for estimation error.

TABLE 6

MECHANISM: FIRM-LEVEL DETERMINANTS OF BETA

	F-tests on fixed effects for				
	CEOs	*CFOs*	*Other executives*	*N*	*Adjusted R^2*
$TVOL$				22,382	.6685
$TVOL$	4.75 (<.0001, 556)			22,382	.6811
$TVOL$	4.19 (<.0001, 556)	6.08 (<.0001, 410)	10.65 (<.0001, 648)	22,382	.7056
β_{MKT}				22,382	.4465
β_{MKT}	4.99 (<.0001, 556)			22,382	.4726
β_{MKT}	4.45 (<.0001, 556)	5.92 (<.0001, 410)	4.71 (<.0001, 648)	22,382	.5151
$IVOL$				22,382	.6855
$IVOL$	4.26 (<.0001, 556)			22,382	.6960
$IVOL$	4.05 (<.0001, 556)	6.35 (<.0001, 410)	10.75 (<.0001, 648)	22,382	.7175

Notes:

Using the sample of firm-years with non-missing data, we estimate the following regression:

$$Risk_{i\tau} = \alpha_\tau + \gamma_i + \boldsymbol{\beta X}_{i\tau} + \lambda_{CEO} + \lambda_{CFO} + \lambda_{Other} + \varepsilon_{i\tau}$$

α_τ are year fixed effects, γ_i are firm fixed effects, λ are manager fixed effects, and $\boldsymbol{X}_{i\tau}$ is a vector of time-varying firm characteristics (size, book-to-market, and leverage). The first row for each variable excludes manager fixed effects. The second row includes CEO fixed effects and the third row includes fixed effects for all three groups of managers (CEO, CFO, Other). The middle columns report the results from *F*-tests for the joint significance of the manager fixed effects. For each *F*-test, we report the *F*-statistic, *p*-value, and number of constraints.

TABLE 7

MECHANISM: OTHER MANAGER FIXED EFFECTS

Panel A: Factor Loadings

	Factor 1	Factor 2	Factor 3
Investment	0.047	-0.052	0.326
Inv to Q sensitivity	-0.010	0.054	-0.048
Inv to CF sensitivity	-0.010	0.025	0.021
N of acquisitions	1.000	-0.002	0.000
Leverage	-0.063	-0.452	-0.117
Interest coverage	0.015	1.000	0.000
Cash holdings	0.022	0.082	0.755
Dividends/earnings	-0.048	0.020	0.058
N of diversifying acquis.	0.756	-0.012	0.021
R&D	0.030	0.032	0.591
Advertising	0.060	-0.004	0.133
SG&A	0.014	0.002	0.008

TABLE 7

MECHANISM: OTHER MANAGER FIXED EFFECTS

Panel B: Eigenvalues and Variance Explained

	Eigenvalue	Pct. Explained	Cumulative Pct.
Factor 1 (external growth)	1.585	0.132	0.132
Factor 2 (financial conservatism)	1.219	0.102	0.234
Factor 3 (internal growth)	1.063	0.089	0.322

Notes:

We perform factor analysis on the manager fixed effects studied in Bertrand and Schoar (2003). Our results are obtained using Stata's *factor* command with the *ml* and *altdivisor* options (Kaplan and Sorensen 2017). All factors are non-rotated; however, our results are not sensitive to factor rotation. Using a Scree test (Cattell 1966), we determine that there are three factors. Panel A reports the factor loadings of the three factors. Factor loadings greater than 0.15 in absolute value are highlighted. Panel B reports the eigenvalues and the proportion of variation explained by the three factors.

TABLE 7

MECHANISM: OTHER MANAGER FIXED EFFECTS

Panel C: Relation Between Factors and Manager Effects on Risk			
	$TVOL$	β_{MKT}	$IVOL$
Factor 1 (external growth)	-0.026	-0.021	-0.053
	(0.036)	(0.041)	(0.034)
Factor 2 (financial conservatism)	-0.133***	-0.069*	-0.125***
	(0.040)	(0.039)	(0.038)
Factor 3 (internal growth)	0.129**	0.259***	0.102
	(0.066)	(0.066)	(0.063)
$F.E.(ROA)$	-0.176***	-0.012	-0.168***
	(0.039)	(0.054)	(0.042)
N	1,548	1,548	1,548
R^2	0.074	0.041	0.070

Notes:

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

We standardize the fixed effects estimated in Table 3 to have zero mean and unit variance. Then, we estimate the following weighted least squares regression:

$$F.E.(Risk)_j = \alpha + \delta_1 Factor_{1j} + \delta_2 Factor_{2j} + \delta_3 Factor_{3j} + \delta_4 F.E.(ROA)_j + \varepsilon_j$$

where j indexes managers. We weigh each observation by the inverse of the standard error of the independent variable. Each column in Panel C of Table 7 reports the coefficients from a different multiple regression.

TABLE 8

EXECUTIVE DISCRETION

	Unsigned Manager Fixed Effects		
	$TVOL$	β_{MKT}	$IVOL$
Institutional holdings	-0.215	-0.123	-0.177
	(0.148)	(0.132)	(0.142)
Size	-0.058***	-0.052***	-0.062***
	(0.018)	(0.019)	(0.017)
Return on assets	0.049	-0.082	0.137
	(0.439)	(0.406)	(0.393)
Leverage	0.010	0.004	0.026
	(0.032)	(0.019)	(0.037)
Tobin's *Q*	-0.019	-0.001	-0.024
	(0.019)	(0.025)	(0.019)
Value-weighted market return	-0.101	0.179	-0.051
	(0.202)	(0.165)	(0.203)
N	1,159	1,159	1,159
R^2	0.033	0.023	0.033

Notes:

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

We standardize the fixed effects estimated in Table 3 to have zero mean and unit variance. Then, we estimate the following weighted least squares regression:

$$\left|F.E.(Risk)_j\right| = \alpha + \delta FIRM_{ij\tau-1} + \eta VWRET_{\tau-1} + \varepsilon_j$$

i, j, and τ index firms, managers, and years, respectively. We weigh each observation by the inverse of the standard error of the independent variable. Each column in Table 8 reports the coefficients from a different multiple regression. The dependent variable is the absolute value of the manager fixed effect on the column variable. *FIRM* is a vector of firm-level variables: institutional holdings, firm size, return on assets, leverage, and Tobin's *Q*. *VWRET* is the return on the CRSP value-weighted market portfolio. We measure *FIRM* in the last firm we observe each manager in, and we measure all independent variables (*FIRM* and *VWRET*) in the year before each executive transition.

TABLE 9

HIRING PREFERENCES

	Signed Manager Fixed Effects		
	$TVOL$	β_{MKT}	$IVOL$
Institutional holdings	0.284	0.076	0.230
	(0.199)	(0.203)	(0.189)
Size	0.041*	0.040	0.029
	(0.025)	(0.029)	(0.024)
Return on assets	-1.173**	-0.925*	-1.000**
	(0.490)	(0.525)	(0.483)
Leverage	0.038	0.027	0.038
	(0.050)	(0.052)	(0.043)
Tobin's *Q*	0.060**	0.065*	0.037
	(0.026)	(0.038)	(0.027)
Value-weighted market return	0.248	0.110	0.243
	(0.285)	(0.255)	(0.281)
N	1,159	1,159	1,159
R^2	0.044	0.022	0.032

Notes:

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

We standardize the fixed effects estimated in Table 3 to have zero mean and unit variance. Then, we estimate the following weighted least squares regression:

$$F.E.(Risk)_j = \alpha + \delta FIRM_{ij\tau-1} + \eta VWRET_{\tau-1} + \varepsilon_j$$

i, j, and τ index firms, managers, and years, respectively. We weigh each observation by the inverse of the standard error of the independent variable. Each column in Table 9 reports the coefficients from a different multiple regression. The dependent variable is the signed manager fixed effect on the column variable. *FIRM* is a vector of firm-level variables: institutional holdings, firm size, return on assets, leverage, and Tobin's *Q*. *VWRET* is the return on the CRSP value-weighted market portfolio. We measure *FIRM* in the last firm we observe each manager in, and we measure all independent variables (*FIRM* and *VWRET*) in the year before each executive transition.

TABLE 10

MANAGER CHARACTERISTICS

	N	Mean	SD	p25	p50	p75
Male	1,536	0.937	0.243	1.000	1.000	1.000
Recession	1,536	0.237	0.425	0.000	0.000	0.000
Birth Year	1,536	1953	8.268	1948	1954	1959

Notes:

This table presents summary statistics for the sample of managers for whom we were able to estimate manager fixed effects. All variables are defined in Appendix 1.

TABLE 11

MANAGER CHARACTERISTICS AND EXECUTIVE EFFECTS ON RISK

	Signed Manager Fixed Effects		
	$TVOL$	β_{MKT}	$IVOL$
Male	-0.160	0.008	-0.135
	(0.190)	(0.144)	(0.192)
Recession	-0.120	-0.240**	-0.037
	(0.100)	(0.100)	(0.099)
Birth Year	-0.005	0.007	-0.003
	(0.013)	(0.014)	(0.013)
Industry Fixed Effects	Yes	Yes	Yes
Decade Fixed Effects	Yes	Yes	Yes
N	1,536	1,536	1,536
R^2	0.081	0.099	0.069

Notes:

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

We standardize the fixed effects estimated in Table 3 to have zero mean and unit variance. Then, we estimate the following weighted least squares regression

$$F.E.(Risk)_j = \alpha + \delta Male_j + \eta Recession_j + \gamma Birth\,Year_j + \varepsilon_j$$

where j indexes managers. We weigh each observation by the inverse of the standard error of the independent variable. Decade fixed effects are based on the decade in which the manager was born. Industry fixed effects are based on the industry (two-digit SIC) of the last firm we observe each manager in. Each column in Table 11 reports the coefficients from a different multiple regression.