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Disentangling Risk and Change: Internal and External Social Comparison in the Mutual Fund Industry

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Abstract

Using data on 3,225 actively managed U.S. mutual funds from 1980 to 2006, we test hypotheses designed to disentangle risk and change as outcomes of behavioral performance feedback routines. We theorize that managers make decisions involving risk and decisions involving change under different conditions and motivated by different concerns. Our results show internal social comparison across units within a firm will motivate risk, whereas external social comparison across firms will motivate change. When a fund experiences a performance shortfall relative to internal social comparison, the manager is likely to make decisions that involve risk because the social and spatial proximity of internal comparisons trigger individual concern and fear of negative individual consequences, such as job loss. In contrast, when a fund experiences a performance shortfall in comparison with external benchmarks, the manager is more likely to consider the shortfall an organizational concern and make changes that do not necessarily involve risk. Although we might assume that negative performance in comparison with both internal and external benchmarks would spur risky change, our results indicate that risky change occurs most often when a decision maker receives unfavorable internal social performance feedback and favorable external social performance feedback. By questioning assumptions about why and when organizational change involves risk, this study begins to separate change and risk outcomes of the decision-making process.

Keywords: performance feedback, risk taking, organizational change, social comparison, behavioral theory of the firm

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When and how managers make the decision to engage in organizational change is both theoretically and practically important inasmuch as change (or the lack thereof) is studied across a diverse set of organizational theories and is argued to be the source of adaptation, learning, evolution, and inertia (Cyert and March, 1963; March, 1981; Hannan and Freeman, 1989; Tushman and Rosenkopf, 1992; Greenwood and Hinings, 1996). Some changes are accompanied by risk, which we define as variation in the distribution of possible outcomes and uncertainty associated with gains and losses (e.g., Pratt, 1964; Arrow, 1965; Lindley, 1971; March and Shapira, 1987, 1992). Variability in outcomes is one of the key elements of risk (Sanders and Hambrick, 2007). For example, new product innovations may lead to risk for the firm (Greve, 2003a, 2007), whereas other changes might have little bearing on risk because they involve the imitation of well-established practices and strategies or incremental and routine adaptations (Ketchen and Palmer, 1999; Massini, Lewin, and Greve, 2005; Schwab, 2007). For example, switching from one commodity supplier to another in an arm's-length contract is unlikely to expose firms to significant risk. More generally, change—whether or not associated with risk—is likely to be consequential for organizations because all such decisions may have performance implications. Scholars debate what types of changes, and what levels of risk, enhance firm performance (Gavetti, 2012; Winter, 2012), which is why it is crucial to examine when managers make these different decisions.

The behavioral theory of the firm theorizes about change decisions and their antecedents (Cyert and March, 1963), positing that change is driven in part by the feedback that firms receive from comparisons made either with the firm's prior performance or with the performance of others (Greve, 2003c). Simply put, organizations make changes when they receive unfavorable performance feedback. Cyert and March's (1963) seminal propositions about organizational change were made without any reference to risk per se (Argote and Greve, 2007), yet most subsequent scholarship in this domain has assumed that risk and change occur together, implying that change is always associated with risk. For example, risk taking has been assumed in a number of decisions to make organizational changes, including acquisitions (Iyer and Miller, 2008) and strategic alliances with non-local partners (Baum et al., 2005). As a result, many studies have suggested that the same conditions give rise to risk and change, with performance feedback considered a single antecedent of both outcomes.

The integration of risk into these arguments is a result of behavioral scholars drawing on prospect theory (Kahneman and Tversky, 1979), implicitly invoking this theory's notion of loss aversion in the domain of failure as a mechanism that is conceptually equivalent to behavioral theory's performance feedback below a set reference point (Singh, 1986; Bromiley, 1991; Greve, 1998). Yet these seminal theories operate at different levels of analysis—organizational and individual, respectively (see Shimizu, 2007)—and individual-level determinants of risk are not clearly comparable to organizational-level determinants of organizational change. This raises questions about whether performance feedback results in risk, change, or both. Thus the impact of performance feedback on risk and the causal processes behind it need to be considered more fully.

Because of the lack of analytic precision in the literature, we relax the assumption that risk and change necessarily operate in concert and propose that the two may arise under different conditions and reflect distinct causal

processes. Change and risk may therefore reflect different concerns: organizational and individual, respectively. Managers are likely to undertake change when performance feedback indicates an organizational problem. The focal mechanism here is problemistic search, which Cyert and March (1963) described as an organizational response to a performance shortfall. In contrast, risk is a response to performance feedback indicating an individual concern. The focal mechanism is one of loss aversion: as described in prospect theory (Kahneman and Tversky, 1979), individuals respond to their aversion to loss by taking greater risks, so we would expect to find risk as a response to performance feedback that triggers individual concerns for the manager. But though loss aversion is distinct from problemistic search, the two mechanisms may occur simultaneously. When both organizational and individual concerns are identified, the two mechanisms are likely to work in concert, resulting in ''risky organizational change,'' such as has been seen in the literature (Greve, 1998: 58).

Further, individual and organizational concerns may relate to different sources of performance feedback. Individual concerns can emanate from a relatively unexamined source of performance feedback: social comparisons made to units inside the firm, such as when a decision maker compares the unit for which he or she has responsibility with other units within the firm. Such internal social performance comparisons are likely to be the primary driver of individual concerns because they are socially and physically proximate (i.e., Festinger, 1954) and are consequential for determining rewards and termination threat (i.e., Lazear and Rosen, 1981). By contrast, comparisons with actors external to the focal organization may indicate organizational problems, because negative performance relative to an external comparison group indicates poor performance relative to competitors or similar organizations in the market.

We take advantage of the numerous empirical benefits of the U.S. mutual fund industry. In this context, risk can be quantified ex ante by decision makers and is clearly distinguishable from change. In addition, because mutual fund performance is closely monitored and publicly disclosed, a fund manager has a well-defined set of both internal and external funds for social performance comparison.

CHANGE AND RISK IN THE BEHAVIORAL THEORY OF THE FIRM

Cyert and March (1963) advocated a process-oriented view to understand how events and experiences shape organizational decision making. A central premise in this perspective is that an organizational performance shortfall triggers decisions that lead to organizational adaptation (Greve, 2003c). In table 1, we distinguish between organizational change and risk as the central outcomes examined in this feedback/adaptation process, also known as performance feedback theory, using examples from selected studies (for a comprehensive review, see Shinkle, 2012).

A number of studies have focused on change outcomes and have sometimes confounded those changes with risk either theoretically or empirically (see the first column in table 1). Many changes analyzed are routine or incremental, often having little or a negative impact on risk levels (e.g., Massini, Lewin, and Greve, 2005). Other changes have been theorized as either high- or low-risk changes. For example, some scholars consider R&D intensity to

Table 1. Selected Research on Change, Risk, and Risky Change Outcomes

Change	Risk	Risky change
Acquisition probability *Iyer & Miller, 2008* Adopting a satellite radio format *Greve, 1998* Capacity expansion/investment *Audia & Greve, 2006* *Desai, 2008* Change in routines *Massini, Lewin, & Greve, 2005* Change in services *Ketchen & Palmer, 1999* Change in status of network ties *Shipilov, Li, & Greve, 2011* Choice of non-local network ties *Baum et al., 2005* Join R&D consortia *Bolton, 1993* New product introduction *Greve, 2007* *Gaba & Joseph, 2013* R&D investment *Greve, 2003a* *Chen & Miller, 2007* *Vissa, Greve, & Chen, 2010* *Lim & McCann, 2014*	Attempting a 4th down conversion *Lehman & Hahn, 2013* Financial misrepresentation *Harris & Bromiley, 2007* Size of bet *Boyle & Shapira, 2012* Variance in analysts' forecasts *Bromiley, 1991* *Wiseman & Bromiley, 1996* Variance in firm ROA *Palmer & Wiseman, 1999* *Miller & Chen, 2004* Variance in firm ROE *Gooding, Goel, and Wiseman, 1996* *Fiegenbaum & Thomas, 1988*	Adoption of new innovative radio format *Greve, 1998* Launch innovation *Greve, 2003a* Planned radical vs. incremental change *Labianca et al., 2009*

indicate uncertain and risky investments (Vissa, Greve, and Chen, 2010; Lim and McCann, 2014), while others note that R&D may not be risky when those expenditures are targeted at existing projects (Greve, 2003a). In other instances, and in the absence of directly measuring risk, scholars have measured only change but theorized that all such changes are risky (e.g., Baum et al., 2005; Audia and Greve, 2006; Desai, 2008). For example, Baum et al. (2005) theorized that forming ties with non-local partners is risky, even though it is plausible that such ties might reduce uncertainty and variability by bringing critical new knowledge. We included many studies evoking ''risky change'' in the first column of table 1 for ''change'' because scholars have not directly measured the risk associated with those changes. Although some of those changes may indeed be risky, it is not clear that all such changes are risky and result in increased uncertainty of potential outcomes. For example, an acquisition of a target when the focal firm already owns a significant stake may not be a risky decision (Iyer and Miller, 2008). We also omitted from table 1 studies that do not clearly examine change or risk outcomes, such as those studies predicting growth or accident costs (Baum and Dahlin, 2007; Greve, 2007; Kim and Tsai, 2012).

A smaller set of studies, listed in the second column of table 1, has focused on risk per se, measured as the variance in firm-level outcomes, including security analysts' forecasts (Bromiley, 1991), or in firms' return on assets (ROA) (Palmer and Wiseman, 1999). Conceptualized in this way, the decision to take on greater risk need not be concurrent with the decision to make change; risk

may increase even in the absence of change. For example, in high-velocity markets, the failure to make changes might lead to greater risk for the firm (e.g., Brown and Eisenhardt, 1997). Yet within the subset of studies focusing on risk, the question of whether risk involves change has been left unaddressed.

Finally, a number of studies, listed in the third column of table 1, have explicitly examined risky change, generally by considering multiple change decisions accompanied by varying levels of risk (i.e., Greve, 1998, 2003a; Labianca et al., 2009). Greve's study of changes in radio station formats (1998) offers an excellent demonstration of risky change by clearly articulating levels of risk inherent in the different change decisions. Similarly, Greve (2003a) separated the decision to engage in change from the decision to take on risk in the innovation context: problemistic search increases R&D intensity change (see the first column in table 1), while managerial propensity to take on risk predicts the decision to launch product innovations (see the third column in table 1). Despite the vast literature examining performance feedback, there has been little consistency in distinguishing among risk, change, or risky change outcomes. Risk and change have been generally assumed to occur simultaneously, and often the terms are used interchangeably.

Performance Feedback: Organizational and Individual Concerns

Change, risk, and risky change are all outcomes that have been examined within the behavioral theory tradition, but researchers have not assessed the possibility that distinct theoretical mechanisms might trigger risk and change. The seminal theories exploring these two outcomes, behavioral theory and prospect theory, were developed to explain decision making at different levels of analysis: behavioral theory at the organizational level and prospect theory at the individual level. By incorporating prospect theory into behavioral theory, scholars have assumed that the associations and mechanisms predicted by prospect theory will occur at both the individual and organizational levels of analysis. Following multilevel theory (Kozlowski and Klein, 2000), this is an assumption of isomorphism (Rousseau, 1985). The implicit claim that the individual-level determinants of risk are isomorphic with organizational-level determinants of change has not been tested, however, and should not be assumed a priori. Rather, according to the seminal theories, change is likely to arise in response to organizational problems, as in behavioral theory, and risk is likely to arise in response to individual concerns, as in prospect theory.

According to behavioral theory, which is concerned with organizational decision making, change is conceptualized as any adaptation in organizational routines and processes (e.g., March, 1981). In this seminal conceptualization, change is not associated with risk. Change decisions are made when feedback about organizational performance indicates an organizational problem. Broadly speaking, performance feedback is evaluated in reference to preset aspirations (March and Simon, 1958; Cyert and March, 1963): it derives from assessing the difference between achieved performance and the aspiration point (Lant, 1992). Past studies have identified two distinct performance aspirations: the firm's own prior performance (historical aspirations) and performance of a meaningful referent group (social aspirations). The general model suggests that when performance falls short of aspirations derived from either or both historical and social comparison, organizations engage in ''problemistic search'' and

make subsequent change in an attempt to improve their performance (Cyert and March, 1963: 169). Search is typically ''simpleminded,'' triggering relatively simple, short-run, and incremental reactions, with search often taking place in the neighborhood of the problem (Cyert and March, 1963: 121–122).

Though behavioral theory leverages an organizational argument, subsequent research suggested that managerial risk taking (Singh, 1986; Bromiley, 1991) and managerial risk preferences (March and Shapira, 1987, 1992) were also associated with performance feedback. But in its initial conceptualization, risk generally arises in response to individual rather than organizational concerns. In fact, the individual mechanism of loss aversion was developed as a theoretical component in prospect theory, which posits that alternatives are framed as either gains or losses relative to a reference point, and individuals are more sensitive to losses than to commensurate gains (Kahneman and Tversky, 1979; Tversky and Kahneman, 1991; Barberis, Huang, and Santos, 2001). In a series of laboratory experiments, Tversky and Kahneman examined alternatives with pre-assigned gains and losses and observed that individuals were more likely to take risks when decisions were framed as losses rather than as gains. In the language of behavioral theory, negative performance feedback can be equated with a loss. Individual aversion to loss has been further validated in a number of contexts, ranging from individuals' decisions on tax evasion (Chang, Nichols, and Schultz, 1987) to gambling (Kameda and Davis, 1990). These studies collectively imply that risk results from loss aversion when individuals frame a situation as one in which they are likely to experience significant losses.

Scholars have merged these ideas from prospect theory into behavioral theory and have assumed that the individual-level associations and mechanisms predicted by prospect theory will occur isomorphically at the organizational level of analysis. In contrast, we theorize distinct mechanisms at different decision-making levels and suggest that risk and change are likely to be driven by two different sources of performance feedback: one that identifies organizational performance problems and one that identifies individual performance concerns.

Performance Feedback: External and Internal Social Comparisons

The distinction between individual and organizational concerns is particularly salient in the context of social performance feedback because social comparisons can trigger individual concerns when made to referents inside the firm and organizational concerns when made to referents outside the firm. It has been well established that social referents external to the firm are the central source of feedback about organizational problems (Cyert and March, 1963; Greve, 2003c; but see Mezias, Chen, and Murphy, 2002). Organizational problems are identified when managers assess organizational performance by making comparisons with similar organizations or competitors in the market. Through these external comparisons, organizational decision makers recognize the firm's poor relative position. The external referent group often consists of all industry incumbents (e.g., Greve, 1998; Miller and Chen, 2004; Audia and Greve, 2006) or other organizations similar in certain dimensions, including geographic location or the level of innovation (Greve, 2003a; Massini, Lewin, and Greve, 2005; Baum and Dahlin, 2007; Moliterno et al., 2014). For example, Ketchen and Palmer (1999) found that managers changed hospital services and

technologies in response to poor performance relative to other firms within their strategic group.

Consistent with this view, a number of studies have documented significant associations between change and performance relative to external social aspirations (e.g., Labianca et al., 2009; Shipilov, Li, and Greve, 2011). Other studies have found no effects of such external social comparisons on risk (Wiseman and Bromiley, 1996), and still others have found partial or no effects on change outcomes (here, change and risk have been confounded because risk has been asserted but not measured; Greve, 2003b; Audia and Greve, 2006; Desai, 2008; Iyer and Miller, 2008; Lim and McCann, 2014). This assessment is further complicated by the fact that many studies have modeled social and historical aspirations together, making it difficult to determine the relative importance of social aspirations (e.g., Palmer and Wiseman, 1999; Gaba and Joseph, 2013). But together, these studies provide some support for the notion that external performance comparisons are the key driver of change decisions and cast doubt on the notion that such comparisons may have an effect on risk decisions.

By contrast, we expect unfavorable performance comparisons relative to units inside the firm to be a central source of feedback indicating individual concerns (see also Mezias, Chen, and Murphy, 2002; Gaba and Joseph, 2013), for at least two reasons. First, such comparisons are salient due to the physical and social proximity of the social referents. The notion that proximity facilitates the formation of a reference group and that individuals consider socially comparable and physically proximate others as relevant referents has been well established by scholars (Festinger, Schachter, and Back, 1950; Festinger, 1954; Burt, 1982; McPherson, Smith-Lovin, and Cook, 2001; Nickerson and Zenger, 2008). These similar others provide information and identity signals for managers, and individuals are concerned with comparisons within this group and are motivated to avoid a negative identity (Blanton and Christie, 2003). Further, individual feelings of deprivation or entitlement are based on social comparisons across structurally equivalent ''neighbors'' or ''near peers'' (Stouffer et al., 1949; Burt, 1982; Burt, 2010: 256). When unfavorable comparisons are prevalent within the firm, for example, a low-productivity worker comparing him- or herself to a high-productivity worker, relative deprivation is likely triggered, leading to risky conduct (Stark and Hyll, 2011).

Organizational structures enhance social and physical proximity in multiple ways. Units and actors within a single firm are often co-located (Alcacer and Delgado, 2013), and such internal agglomerations enhance individuals' ability to make meaningful comparisons across different actors or units. In addition, firms organized by business unit, division, or market often have directly comparable, unit-specific performance outcomes (e.g., Greve, 1998; Birkinshaw and Lingblad, 2005; Labianca et al., 2009; Gaba and Joseph, 2013) and use consultants to aid in cross-unit performance comparisons (e.g., KPMG, SAP, PricewaterhouseCoopers, and the Hackett Group). For example, Kaiser Associates provides expertise in internal benchmarking to facilitate ''apples to apples'' comparisons across units (http://www.kaiserassociates.com/capabilities/benchmarking/benchmarking-services/). More generally, research suggests that knowledge of relative performance within an organization increases the likelihood of social comparison between workers, as well as the incidence of disreputable behavior (Blanes i Vidal and Nossol, 2011; Charness, Masclet, and

Villeval, 2014). Finally, forced distribution rating systems are often used in which supervisors are required to rank employees relative to each other according to a bell-curve distribution—for example, 10 percent of all employees are ranked as poor performers. In fact, the spread of winners-take-all organizations, in which work is allocated by employees' performance, makes social comparisons salient (Netessine and Yakubovich, 2012).

Second, unfavorable internal social comparisons are an individual concern because they are consequential for people's careers. Multiple organizational and economic studies of labor markets have concluded that individuals are fundamentally concerned about their advancement prospects within a firm (e.g., Baron and Bielby, 1980; Barnett, Baron, and Stuart, 2000), with potential for termination, promotion chances, and rewards being of central importance (e.g., Oldham et al., 1986; Chevalier and Ellison, 1997). Studies on internal tournaments, for example, have generally linked relative internal performance ranking to variation in wages, promotions, or division-level resources (Lazear and Rosen, 1981; Kempf and Ruenzi, 2008). Accordingly, these studies have observed that a performance shortfall relative to others in the firm has often resulted in job termination or reduction in compensation, leading to significant losses for individual workers (Hambrick and Cannella, 1993; Chevalier and Ellison, 1999; Nyberg, 2010; Hu, Kale, and Pagani, 2011).

In short, internal social performance comparisons are a basis for individual concerns and lead to loss aversion and risk, while external social performance comparisons are the basis for organizational problems that lead to problemistic search and organizational change. Despite this logic, it is worthwhile to consider the alternative relationships. It is unlikely that unfavorable internal social comparisons will trigger problemistic search and organizational change because one unit's poor performance relative to another does not necessarily indicate an organizational problem. Though problematic for the individual manager of the poorly performing unit, such underperformance might not be consequential to the organization. For example, external stakeholders such as stockholders are likely to evaluate the organization only in reference to other similar organizations in the marketplace and not in reference to other units in the firm.

Similarly, negative external social comparisons are unlikely to trigger loss aversion and risk because this type of underperformance does not indicate individual concerns. Though such comparisons may have individual consequences in some markets, such as the market for high-level executives or CEOs (Kulik and Ambrose, 1992; DiPrete, Eirich, and Pittinsky, 2010), our core arguments for individual concerns—salience, proximity, and future rewards—are more often determined by relative performance standing in the firm. And poor internal performance might result in termination even when performance relative to the external aspirations is high. For example, in academia, assistant professors underperforming relative to their own department face a termination threat even if they are outperforming peers at other universities.

Together, these arguments suggest that unfavorable external social performance comparisons lead to change outcomes; by contrast, unfavorable internal social performance comparisons lead to risk outcomes. This argument further suggests that risky changes should arise when problemistic search and loss aversion operate jointly, as illustrated by the right-hand column in table 1, and managers perceive both individual and organizational concerns. Hence we expect that decisions to engage in risky change are a function of both external

social performance feedback and internal social performance feedback. We thus derive the following hypotheses:

Hypothesis 1 (H1): When performance relative to external social aspirations increases, decision makers will make less change.

Hypothesis 2 (H2): When performance relative to internal social aspirations increases, decision makers will take less risk.

Hypothesis 3 (H3): When performance relative to internal and external social aspirations increases, decision makers will make less risky change.

METHODS

Empirical Context and Data

Our limited understanding of the conditions under which decision makers focus on change versus risk might reflect, in part, methodological challenges. Separating risk and change is difficult because in many contexts decision makers cannot estimate risk ex ante. We take advantage of a context in which it is possible to separate risk and change: the mutual fund industry, which is composed of professionally managed collective investments that pool money from multiple investors and invest in securities such as stocks or bonds. In this setting, financial risk can be measured with precision because standard estimations of risk are widely known. Fund managers, charged with buying and selling securities, are able to estimate risk prior to deciding which stocks or bonds to buy or sell.

Moreover, mutual funds offer a rare opportunity to model internal and external social performance comparisons, which are otherwise difficult to observe. Asset management firms often include multiple business units or funds (Drazin and Rao, 1999; Kacperczyk, 2012, 2013) that are bound together by a brand name, shared distribution channels, research, and common traditions (e.g., Fidelity, Vanguard, American Funds, T. Rowe Price, and Janus). Funds have directly comparable performance, a distinct competitive strategy, a governance structure, and a legal identity through registration with the U.S. Securities and Exchange Commission (SEC). Scholars have shown that fund managers routinely benchmark their returns against the returns of other funds (e.g., Jain and Wu, 2000; Gallaher, Kaniel, and Starks, 2006; Gaspar, Massa, and Matos, 2006; Kempf and Ruenzi, 2008).

We conducted semi-structured interviews with fund managers and found that social performance comparisons were salient. One manager stated, ''The top management decides about promotions, advertising, and compensation. If you want a higher salary or more resources for your fund, you need to be better than others in the firm.'' Numerous managers suggested that underperformance relative to others in the firm triggered the threat of termination (see also Chevalier and Ellison, 1999; Hu, Kale, and Pagani, 2011). One manager noted, ''It's a cut-throat competition. You are evaluated based on how well your fund did. It matters how well others in your firm did, too. You are always being compared with peers in your firm. If you are at the bottom, then you better prepare to move.'' Finally, a number of managers indicated that internal social comparisons were more salient and more consequential for careers than external social comparisons. One manager suggested, ''Even if your fund did fine in the

market, you may still be worried that [the executives] will be inclined to terminate you or take away your bonus if others in the firm did better.'' Another fund manager mentioned, ''You constantly watch how well you do in the market. But what really matters is whether you are better or worse than other guys in the firm. That's what makes the difference.''

We obtained data on mutual funds from the Center for Research in Security Prices (CRSP) Survivorship-Bias-Free U.S. Mutual Fund Database on all live and defunct funds in the United States. This database provides rich monthly information on mutual funds, including equity, bond, money market, and international funds. Moreover, we obtained data on U.S. holdings by merging the CRSP database with the stockholdings database published by CDA Investments Technologies, which provides stockholdings of U.S. mutual funds and is collected both from reports filed by mutual funds with the SEC and from voluntary reports generated by the funds. We linked each reported stockholding to the CRSP stock database. The vast majority of funds have holdings of companies listed on the NYSE, NASDAQ, or AMEX stock exchanges. We eliminated balanced, bond, index, international, and sector funds and concentrated our analysis on actively managed diversified equity funds because equity fund managers are most likely to make strategic decisions regarding their investment styles. Finally, given our focus on internal social performance comparisons, we excluded single-fund firms from our sample. Our final sample comprised 3,225 actively managed diversified equity funds that spanned the period between 1980 and 2006.

Dependent Variables

Change measures. We considered three measures of change: fund turnover, concentration change, and load change. We measured *fund turnover* as the frequency with which funds trade their stocks, indicating the percentage of a fund's holdings that have changed over the past year, bought and sold by the manager. Because managers trade stocks with different risk, turnover may reflect changes associated with higher, lower, or constant risk levels. In general, managers trade low-risk stocks at a higher frequency than high-risk stocks (e.g., Chen, Jegadeesh, and Wermers, 2000). Correlations of fund turnover and risk were not statistically significant, suggesting that increases in fund turnover are unlikely to reflect risk. Fund turnover was derived from the CRSP database and calculated annually as a ratio of the fund's total sales or purchases (excluding cash) and the fund's average monthly assets during the year, with higher values indicating greater change to a fund's portfolio. The CRSP measure was logged to eliminate outliers, and the independent variables were lagged by one year to mitigate simultaneity problems.

Concentration change. To measure changes in stock concentration, we computed the Herfindahl Index of security concentration, following the methodology used by Kacperczyk, Sialm, and Zheng (2005). The Herfindahl Index of a fund's stock portfolio at time t is defined as the sum of the squared weights of each stock i in the fund's portfolio. The index equals 100 if a fund owns only one common stock, and an equally weighted portfolio of N securities has a Herfindahl Index of $1/N$. To the extent that increasing concentration may indicate risk, we considered concentration increases and decreases by calculating

an absolute value of those changes. A three-month window was used to compute such changes. The final measure was not positively correlated with risk.

Load change. Finally, we considered absolute changes in a fund's sales fees. Fund managers decide about a fund's expense structures, sales commissions, and dollar investment levels (Santini and Aber, 1993), often altering a fund's cost in response to competitive pressures. For example, BlackRock, the biggest provider of exchange-traded funds (ETFs) in the United States, decided to reduce fees and commissions on its iShares ETFs as a response to the rival Vanguard Group, ''whose low-cost ETFs have eaten into BlackRock's market share'' (Grind, 2012: C1). We focused on sales loads, primary one-time fees paid directly by investors. Because the SEC does not limit the sales load charged by the fund, managers hold considerable discretion over setting the load percentage. We considered the absolute value of fund-load changes (increases and decreases), using a three-month window to compute the changes. The final measure was not significantly correlated with risk.

Risk measures. We measured risk by focusing on fund returns, the most common financial-risk measures (e.g., Brown, Harlow, and Starks, 1996; Koski and Pontiff, 1999; Hu, Kale, and Pagani, 2011). We considered three standard measures: systematic risk, or uncertainty associated with the entire market movement; non-systematic risk, or uncertainty associated with a specific asset or the firm; and total risk, or the sum of systematic and non-systematic risk.

Systematic risk. Systematic risk indicates uncertainty associated with the entire market or economy and is generally measured with market beta, a standard indicator of a fund's portfolio systematic risk in relation to the market (e.g., Kraus and Litzenberger, 1976; Mankiw and Shapiro, 1986). Though beta captures return variability, it is calculated relative to the market benchmark: it takes into account market volatility and reflects the tendency of a security's returns to respond to swings in the market. A beta of 1 indicates that the security's price will move with the market, a beta of less than 1 indicates that the security will be less volatile than the market, and a beta greater than 1 indicates that the security's price will be more volatile than the market. Within their equity holdings, managers can shift risk by switching between low-beta stocks and high-beta stocks. We derived beta by estimating the linear regression of the capital asset pricing model (CAPM) of Sharpe (1964) and Lintner (1965); we used time series of returns on a given fund and the returns on the market portfolio, typically represented by the return on the S&P 500 (Carhart, 1997). We estimated these regressions using rolling windows of the past 12 months of data. We calculated changes in market beta over a moving three-month window.

Non-systematic risk. Non-systematic risk represents financial risk specific to individual securities held in the fund portfolio and not correlated with the overall market risk (e.g., Campbell et al., 2001). We measured non-systematic risk as the standard deviation of return residuals from the market regression we used to estimate market beta. We estimated the regressions using rolling windows of the past 12 months of data. We used three-month time spans to account for changes in the standard deviation of residuals.

Total risk. We used monthly volatility of historical fund returns, a standard measure, to measure total risk. Fund volatility is the standard deviation of returns calculated over the 12 months preceding a given month, and higher values indicate greater total risk of the fund's portfolio (e.g., Brown, Harlow, and Starks, 1996; Koski and Pontiff, 1999; Elton, Gruber, and Blake, 2003; Hu, Kale, and Pagani, 2011). Because returns may reflect the overall market volatility, we calculated risk-adjusted returns by taking the difference between the fund's return and market return, the latter represented by the return on the S&P 500. Finally, we calculated changes in the standard deviation of risk-adjusted returns in three-month time spans to reflect the fact that the SEC discloses information about fund performance and portfolio investment on a quarterly basis. To test the robustness of this time span, we modeled six-month time spans for all analyses and found similar results (available from the authors upon request).

Risky change measures. Finally, we considered risky change, defined as the types of decisions that involve change in stock composition and concurrent risk taking. To do this, we leveraged data on mutual fund holdings, following prior research on fund managers' intended changes in stock composition (e.g., Chevalier and Ellison, 1997; Kempf, Ruenzi, and Thiele, 2009). We considered shifts from higher to lower book-to-market ratio as well as from larger-cap to smaller-cap stocks. Stocks with low book-to-market ratios (i.e., growth stocks) are generally more risky than those with higher book-to-market ratios because they have a high expectation of future growth and reveal a higher positive correlation with market beta (Harris and Marston, 1994). Similarly, small-cap stocks have been associated with higher risk than large-cap stocks (Banz, 1981; Kempf, Ruenzi, and Thiele, 2009).

We followed the methodology in past research (Daniel et al., 1997) to measure shifts in portfolio composition from high to low book-to-market ratio stocks and from large-cap to small-cap stocks. We grouped each stock listed on the U.S. stock exchanges (NYSE, NASDAQ, and AMEX) into respective quintiles according to its size and book-to-market ratio. For both measures, depending on the quintile to which a stock belongs, the stock received a score between 1 and 5. For size, stocks with the highest market capitalization (i.e., those in the top quintile) received a score of 1, and stocks with the lowest market capitalization (i.e., those in the bottom quintile) received a score of 5. For growth, stocks with the highest book-to-market ratio (i.e., those in the top quintile) received a score of 1, and stocks with the lowest book-to-market ratio (i.e., those in the bottom quintile) received a score of 5. We calculated changes to the average portfolio stock size and stock growth quintiles over a moving three-month window. Overall, higher values of our measures indicate greater amounts of risky change taken by fund managers.

Explanatory and Control Variables

Internal social performance feedback. To measure internal social performance feedback, we calculated the difference between the fund's achieved risk-adjusted performance and an internal social performance aspiration, which we constructed based on the risk-adjusted performance of other funds inside the firm and within the same fund category. Fund categories represent broad

classifications of funds' investment styles and objectives. Because fund returns may partly be driven by fund investment category, with some categories associated with more risk than others, any two funds are comparable only within the same category. We constructed categories using the Morningstar fund classification scheme based on fund size (small cap, mid cap, or large cap) and the investment type (growth or value funds). For example, the performance of a T. Rowe Price mid-cap growth fund is benchmarked against the performance of other mid-cap growth funds within T. Rowe Price. We set the performance aspiration to the mean monthly risk-adjusted performance of the internal reference group of funds. Hence the internal social aspiration was measured as $(\Sigma P_{jt})/N$, where P indicates fund risk-adjusted returns, j indicates another fund within the firm in the same category, and N is the total number of such funds in the internal reference group. We modeled internal social performance feedback as a single continuous variable, defined as the fund's risk-adjusted returns minus the relevant social performance aspiration. We lagged the measure by four months to alleviate simultaneity with the three-month window used for the dependent variables. To test the robustness of this lag, we also modeled internal performance aspirations as the mean fund performance in the six months and twelve months prior to the measurement of the dependent variable. We found similar results with these alternate specifications.

External social performance feedback. We measured external social performance feedback as the difference between a fund's achieved risk-adjusted performance and the external social performance aspiration, which is based on the risk-adjusted performance of other funds outside the firm and within the same fund category. For example, the performance of a T. Rowe Price large-cap value fund is compared with the performance of large-cap value funds in the United States housed in firms other than T. Rowe Price. The aspiration was set to the mean risk-adjusted returns of the external referent group. Hence the external social performance aspiration was measured as $(\Sigma P_{kt})/N$ where k is another fund in the external referent group and N is the total number of funds in that referent group. We modeled external social performance feedback as a single continuous variable, defined as the value of a fund's risk-adjusted returns minus its external social aspiration. To alleviate simultaneity, we lagged the measure by four months.

Control Variables

Historical performance feedback. We controlled for performance relative to historical aspirations, shown to be a significant source of performance feedback (e.g., Greve, 2003c). We specified the historical aspiration level for a fund's performance as an exponentially weighted moving average of its past performance (Levinthal and March, 1981; Lant, 1992), with performance measured as a fund's risk-adjusted return. Thus we constructed the following measure:

$$\textit{Historical Aspiration}_{it} = \alpha P_{it-1} + (1-\alpha)A_{it-1}$$

where P is risk-adjusted return, i is the focal fund, t is the time period, and α is a weighting coefficient indicating the rate at which the historical aspiration variable updates as a function of past performance. At high values of α, the

aspiration level is sensitive to recent performance. In the models we report below, we used the specification of historical aspirations with $\alpha = 0.25$ and conducted robustness checks for additional values.[1] To measure historical performance feedback, we then subtracted the value derived for the aspiration level at time *t* from performance at time *t* and lagged the variable by four months. The resulting value is positive if a fund's current period performance is above the historical aspiration point and negative if it is below.

Other controls. We controlled for numerous fund characteristics. Because risk decreases with a fund's size and age (Chevalier and Ellison, 1997), we controlled for both. We measured *fund age* as a natural logarithm of the number of years since the fund's inception and *fund size* as a natural logarithm of assets under fund management. We also controlled for *fund flow* by calculating the net of the fund's cash inflows and outflows on a monthly basis. Net inflows generate excess cash for managers to invest, increasing the probability of change. We controlled for the *number of managers* supervising each fund, because solo managers are likely to have more discretion to make changes to the fund.

We also controlled for firm-level attributes (e.g., Vanguard, T. Rowe Price, etc.), such as size and performance. We measured *firm size* as the aggregate assets of all individual funds within a firm. *Firm performance* was measured as the average return of the firm's funds in any given month using a value-weighted approach, which multiplies each fund's risk-adjusted return by its relative size in the investment firm and takes the sum across all weighted fund returns in the firm. All control variables were lagged by four months to alleviate simultaneity problems with the dependent variables.

Model Specification

We first estimated the linear regression models of change and risk. Because the two are likely to overlap, estimating separate equations might lead to inefficient estimates of the coefficients and standard errors, with disturbances contemporaneously correlated across equations. To alleviate this concern, we estimated those models simultaneously using seemingly unrelated regressions (SUR) (Zellner, 1962), an empirical technique that estimates error covariances among the estimated equations and results in more efficient estimates of the coefficients and standard errors (Zellner, 1962; Parker and Dolich, 1986). Given our goal to assess the predictors of risk and change, we jointly estimated three pairs of equations, with risk and change as dependent variables in each pair.[2] Subsequently, we assessed the predictors of risky change by estimating a series of linear regression models with risky change as the dependent variable.

We implemented a highly conservative analytical strategy to account for different sources of unobserved heterogeneity. The models were estimated with month-fixed effects to control for exogenous shifts in the opportunity structure.

[1] Consistent with past research, we estimated our models with calculated values of the historical aspiration point constructed using values of $\alpha = 0.25$, 0.50, and 0.75 and selected the model with the best overall fit. The coefficient results were robust to the other two specifications of α.

[2] For robustness, we reestimated jointly all equations, as well as different combinations of dependent variables, and obtained similar results. In addition, we estimated models in which we controlled for total risk in the models predicting change and controlled for change in the models predicting risk. Our results (available upon request) are robust to this alternative specification.

We augmented our specification with a fund-category-fixed estimator to alleviate the possibility that our results may be contaminated by unobserved attributes of fund categories. An important concern might be that fund categories with systematically higher tolerance for risk (e.g., small-cap growth funds) may encourage risk taking. Finally, we focused on fund-month as the unit of analysis and clustered error terms by the fund.

RESULTS

Table 2 reports descriptive statistics and correlations for the main variables. Table 3 presents the results for risk and change estimated with the SUR method. These results test our first two hypotheses. First, when we accounted for external social performance feedback alone, as is typical in the literature, our findings provided support for hypothesis 1: negative external social performance feedback leads to greater change, and the results are robust across all change measures (i.e., models 2, 6, and 10). We reestimated the same models with internal social performance feedback, and the results in table 3 report statistically insignificant coefficients of internal social performance feedback in the

Table 2. Descriptive Statistics for the Analysis of Social Performance Feedback, Risk, and Change, 1980–2006*

Variable	Mean	S.D.	1	2	3	4	5	6	7	8
1. Total risk (volatility)	.001	.014								
2. Systematic risk (market beta)	.001	.002	.871							
3. Non-systematic risk	.000	1.335	.277	−.024						
4. Fund turnover (log)	−.464	.955	−.001	.000	.000					
5. Concentration change (abs.)	2.349	3.648	−.004	−.007	.003	−.045				
6. Load change (abs.)	.049	.058	−.001	−.002	−.001	−.011	−.023			
7. Risky change (stock growth)	.000	.464	.050	.045	.003	.000	−.003	.000		
8. Risky change (stock size)	.000	.215	.008	.006	.001	.000	.008	−.001	.142	
9. External performance feedback	.000	.025	.016	.008	.009	.006	.001	−.005	.004	−.016
10. Internal performance feedback	.008	.055	.020	.007	.020	.010	.004	.002	.002	−.014
11. Historical performance feedback	.000	.022	.014	.005	.016	.002	−.014	.003	.016	−.022
12. Fund age (log)	2.221	.900	.002	.001	.000	−.102	.014	.042	.001	.000
13. Fund size (log)	5.296	1.741	−.001	.000	−.002	−.093	−.146	.069	.000	.000
14. Fund flow	.012	.192	−.007	−.003	−.009	.011	−.013	.005	.000	.001
15. Number of managers per fund	1.627	.934	.000	.000	.000	.069	−.135	.088	.000	.000
16. Firm size	.571	.519	−.016	−.003	−.008	−.016	−.014	−.011	.000	−.015
17. Firm performance	−.001	.012	.000	.000	.001	.012	−.037	−.009	.008	.001

Variable	9	10	11	12	13	14	15	16
10. Internal performance feedback	.643							
11. Historical performance feedback	.449	.327						
12. Fund age (log)	−.002	−.010	−.001					
13. Fund size (log)	.011	−.005	−.006	.475				
14. Fund flow	.023	.023	−.021	−.079	−.007			
15. Number of managers per fund	−.002	.000	.002	−.040	.266	.003		
16. Firm size	.209	.000	.364	−.004	.001	−.004	−.007	
17. Firm performance	−.002	−.003	−.001	.046	.113	−.003	−.005	−.006

* Correlation coefficients greater than .005 are significant at the 5-percent level.

Table 3. Seemingly Unrelated Regressions of Social Performance Feedback, Risk, and Change*

Variable	(1) Total risk	(2) Fund turnover	(3) Total risk	(4) Fund turnover	(5) Non-systematic risk	(6) Load change
Historical performance feedback	−0.555••	0.362••	−0.301•	0.368••	−0.463••	−0.028••
	(0.126)	(0.123)	(0.129)	(0.123)	(0.147)	(0.007)
Fund age	−0.045	−4.165••	−0.052	−4.164••	−0.330•	0.038••
	(0.295)	(0.312)	(0.294)	(0.312)	(0.159)	(0.008)
Fund size	0.017	−4.367••	0.015	−4.368••	−0.078	0.159••
	(0.156)	(0.165)	(0.156)	(0.165)	(0.393)	(0.018)
Fund flows	−0.216	−0.813	0.003	−0.799	−0.012	0.088••
	(1.257)	(1.331)	(1.257)	(1.331)	(0.206)	(0.010)
Firm size	0.001	0.162••	0.001	0.162••	1.125	0.160•
	(0.005)	(0.005)	(0.005)	(0.005)	(1.605)	(0.075)
Firm performance	−0.028	−0.012••	−0.816••	−0.012••	0.001	0.008••
	(0.223)	(0.004)	(0.236)	(0.004)	(0.006)	(0.000)
Number of managers per fund	−0.000	0.020••	−0.000	0.020••	−0.004	−0.061••
	(0.002)	(0.002)	(0.002)	(0.002)	(0.006)	(0.014)
External performance feedback	−0.808••	−0.692••	0.034	−0.632••	0.001	−0.001••
	(0.108)	(0.114)	(0.136)	(0.138)	(0.003)	(0.000)
Internal performance feedback	–	–	−0.998••	−0.075	–	–
	–	–	(0.098)	(0.098)	–	–
Observations	159,576	159,576	159,576	159,576	188,812	188,812
R-squared	0.644	0.076	0.644	0.076	0.140	0.026
Log likelihood	−407703	−407703	−407652	−407652	−36921	−36921

Variable	(7) Non-systematic risk	(8) Load change	(9) Systematic risk	(10) Concentration change	(11) Systematic risk	(12) Concentration change
Historical performance feedback	0.246	−0.036••	−0.066••	0.184	−0.057••	0.075
	(0.179)	(0.009)	(0.013)	(0.351)	(0.013)	(0.358)
Fund age	−0.259	0.036••	0.001	9.597••	0.001	9.601••
	(0.159)	(0.008)	(0.030)	(0.796)	(0.030)	(0.796)
Fund size	−0.071	0.159••	0.002	−19.324••	0.002	−19.323••
	(0.393)	(0.018)	(0.016)	(0.419)	(0.016)	(0.419)
Fund flows	−0.023	0.088••	0.086	−1.191	0.093	−1.267
	(0.206)	(0.010)	(0.123)	(3.265)	(0.123)	(3.265)
Firm size	1.254	0.158•	0.000	−0.456••	0.000	−0.456••
	(1.604)	(0.075)	(0.000)	(0.012)	(0.000)	(0.012)
Firm performance	0.001	0.008••	0.087••	2.239••	0.060•	2.574••
	(0.006)	(0.000)	(0.023)	(0.617)	(0.025)	(0.654)
Number of managers per fund	−0.004	−0.053••	−0.000	−0.041••	−0.000	−0.041••
	(0.006)	(0.015)	(0.000)	(0.006)	(0.000)	(0.006)
External performance feedback	0.001	−0.001••	−0.004	−1.210••	0.026	−1.567••
	(0.003)	(0.000)	(0.011)	(0.301)	(0.014)	(0.380)
Internal performance feedback	−0.891••	0.009	–	–	−0.035••	0.425
	(0.128)	(0.006)	–	–	(0.010)	(0.277)
Observations	188,812	188,812	189,607	189,607	189,607	189,607
R-squared	0.140	0.026	0.643	0.218	0.643	0.218
Log likelihood	−36896	−36896	−266494	−266494	−266487	−266487

• $p < .05$; •• $p < .01$.

* Standard errors are in parentheses. All models include month and category fixed effects.

models of change.[3] As shown in models 4, 8, and 12, the results are similar, indicating that external social performance feedback is a significant driver of change, even when controlling for internal social performance feedback. Together, these results indicate that managers tend to engage in change in response to performance shortfalls relative to external social referents.

Second, the results shed light on the influence of internal social performance feedback on risk. Lending support to hypothesis 2, the analyses reported in models 3, 7, and 11 show that an increase in performance relative to internal social performance aspiration reduces risk, as indicated by the negative coefficient of internal social performance feedback.[4] As reported in models 1, 5, and 9, external social performance feedback is negatively associated with total risk but has no significant association with systematic and non-systematic risk. As shown in model 3, however, the coefficient of external social performance feedback is no longer significant when controlling for internal social performance feedback. Overall, these findings suggest that although a shortfall in external social performance feedback leads to greater change, a shortfall in internal social performance feedback leads to greater risk.

Table 3 reports further on the impact of fund-level characteristics on risk and change. Historical performance feedback is negatively associated with all measures of risk and one measure of change, fund load. Surprisingly, historical performance feedback has a positive association with stock turnover, suggesting that the amount of change increases as performance relative to the prior performance period improves. In addition, fund size is negatively correlated with turnover and change in stock concentration, but it has a positive association with changes in load. Fund age has a significant positive association with stock concentration and fund load, and it has a significant negative association with fund turnover. Fund flow has a positive impact on fund load. Firm size and performance are significantly correlated with all measures of change, and firm performance additionally predicts systematic risk. Finally, the number of managers per fund has a significant association with all change outcomes but no impact on risk.

Table 4 shows estimates for the effects of internal and external social performance feedback on risky change for two measures of risky change. Models 1 and 2 estimate the effects of internal and external social performance feedback on risky change, and models 3 and 4 add an interaction term to test whether these sources of performance feedback are complements or substitutes. The main effect of internal social performance feedback is significant in models of stock size change (to smaller stocks) and stock growth change (to lower book-to-market ratio). The results for external social performance feedback are mixed: it is a significant predictor of change in stock growth but not in stock size. We thus find that a shortfall in internal social performance feedback is the most important source of feedback predicting risky change. This might suggest that the loss aversion mechanism dominates the problem search mechanism

[3] In additional analyses, we entered internal social performance feedback into the change models without external social performance feedback. The results (available upon request) show a significant and negative coefficient for internal social performance feedback when predicting turnover ($p < .01$) but an insignificant coefficient for the remaining measures of change.

[4] In additional analyses, we entered internal social performance feedback into the risk models without external social performance feedback. The results (available upon request) confirm a significant negative relationship with risk across all the risk-dependent variables.

Table 4. OLS Regressions of Social Performance Feedback and Risky Change*

Variable	(1) Stock size change	(2) Stock growth change	(3) Stock size change	(4) Stock growth change
Historical performance feedback	0.107••	0.022	0.107••	0.021
	(0.036)	(0.069)	(0.029)	(0.069)
Fund age	0.004	0.014	0.001	0.005
	(0.012)	(0.024)	(0.063)	(0.025)
Fund size	0.010	−0.006	0.008	−0.010
	(0.005)	(0.011)	(0.033)	(0.011)
Fund flows	0.169	0.594	0.178	0.616
	(0.372)	(0.573)	(0.251)	(0.578)
Firm size	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.001)	(0.000)
Firm performance	−0.054	−0.013	−0.054	−0.014
	(0.063)	(0.122)	(0.053)	(0.122)
Number of managers per fund	−0.000	0.000	−0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
External performance feedback	−0.008	−0.166•	−0.006	−0.161•
	(0.032)	(0.072)	(0.030)	(0.072)
Internal performance feedback	−0.047•	−0.171••	−0.048•	−0.173••
	(0.023)	(0.048)	(0.022)	(0.048)
Internal performance feedback × External performance feedback	–	–	−0.980•	−2.279•
	–	–	(0.416)	(1.121)
Observations	193,615	193,615	193,615	193,615
R-squared	0.097	0.054	0.097	0.054
Log likelihood	33912	−119731	33915	−119728

• $p < .05$; •• $p < .01$.

* Robust standard errors are in parentheses. All models include month and category fixed effects.

for risky change outcomes. Moreover, the interaction between internal and external social performance feedback is negative and significant. The association between internal social performance feedback and risky change becomes stronger as external social performance feedback improves. Although this is generally consistent with hypothesis 3, graphing the interaction terms reveals that the predicted amount of risky change is highest with negative internal social performance feedback and positive external social performance feedback. Thus hypothesis 3 holds only when both sources of performance feedback are high, suggesting a more complex theoretical argument than we hypothesized.

Supplemental Analyses

Examining individual concerns. We conducted supplemental analyses to probe the causal processes behind these observed relationships and test the robustness of our results. We interacted social performance feedback with variables consistent with our hypothesized mechanisms. These estimates test for the heterogeneous effects of social performance feedback on risk and change depending on spatial and social proximity and on career concerns. We first considered the proximity of same-firm funds and expected the influence of internal

social comparisons on risk to be stronger for similar funds hosted within a single firm. We focused on similarity in funds' reported investment objectives and calculated an annual proportion of same-firm funds that share investment objectives with the focal fund. For fund categorization, we relied on a fine-grained investment objective classification developed by CRSP, which includes 23 investment categories. Second, we examined the spatial proximity of same-firm funds. If spatial proximity highlights individual concerns, the impact of internal social comparisons on risk should be stronger when funds in a single firm are also geographically co-located. We used the CRSP data on funds' locations, and for each focal fund we calculated an annual proportion of same-firm funds co-located in the same city as the focal fund. Finally, we considered career concerns and expected the relation between internal performance feedback and risk to be stronger when career concerns are likely to be salient. We used recessionary periods to proxy for career concerns: underperforming managers are more likely to lose their jobs and fewer new funds are started during recessions (Zhao, 2005), making it more difficult for a terminated fund manager to find a new job. We used the definition of the National Bureau of Economic Research (NBER) business cycle dating committee and operationalized *recession* as an indicator variable equal to 1 if the economy in month t was in recession, as defined by the NBER, and 0 otherwise. During our sample period, there were 39 recessionary periods.

The SUR estimates reported in table 5 provide general support for the theorized individual mechanisms. First, the association of negative internal performance feedback and risk is stronger when a focal fund is more proximate to other funds in the firm in that it shares the same investment objective with a higher proportion of other funds in the firm (for two of the risk-dependent variables, in model 1 and model 3) and is co-located with a higher proportion of other funds in the firm (for two of the risk-dependent variables, model 1 and model 5). Similarly, risk increases with negative internal performance feedback during recessionary periods for all three risk-dependent variables, as indicated by the negative interaction between recession and internal performance feedback. Additional findings merit attention. The results generally show a weaker association of these moderators and the negative effect of external social performance feedback on change. The interaction terms in the change models are mostly insignificant, with two exceptions (model 2 and model 4). The general lack of statistical significance is consistent with the claim that the negative impact of external social performance feedback on change is not driven by individual concerns. This provides additional evidence that the influence of internal and external social performance feedback is unlikely to reflect the same mechanisms. Overall, the results are consistent with the notion that decision makers take greater risk as they underperform relative to internal social performance aspirations, which are salient because of social and spatial proximity as well as career concerns.

Selection effects. One inferential challenge pertains to the fact that individuals with traits correlated with propensity for risk may sort differentially across funds, self-selecting into funds that perform lower relative to internal social aspirations. Although there is no direct evidence to support the notion that the managerial traits that predict propensity to undertake risk should also be

Table 5. Seemingly Unrelated Regressions of Social Performance Feedback, Risk, and Change (Interaction Effects)*

Variable	(1) Total risk	(2) Fund turnover	(3) Non-systematic risk	(4) Load change	(5) Systematic risk	(6) Concentration change
Historical performance feedback	−0.140	0.416••	−0.181	0.032••	−0.051••	0.683•
	(0.131)	(0.125)	(0.162)	(0.008)	(0.014)	(0.328)
Fund age	−0.063	−3.712••	−0.058	0.193••	0.003	9.723••
	(0.298)	(0.316)	(0.401)	(0.019)	(0.031)	(0.810)
Fund size	0.008	−4.973••	−0.038	0.100••	0.002	−17.019••
	(0.163)	(0.173)	(0.217)	(0.010)	(0.017)	(0.440)
Fund flows	0.644	−2.099	1.222	0.213••	0.201	−0.060
	(1.320)	(1.400)	(1.681)	(0.079)	(0.129)	(3.411)
Firm size	0.004	0.038••	−0.000	0.009••	0.000	−0.673••
	(0.007)	(0.008)	(0.010)	(0.000)	(0.001)	(0.019)
Firm performance	−0.795••	−0.013••	−0.000	−0.053••	0.058•	0.020
	(0.238)	(0.005)	(0.006)	(0.015)	(0.025)	(0.013)
Number of managers per fund	−0.000	0.018••	0.001	−0.001••	−0.000	−0.045••
	(0.002)	(0.002)	(0.003)	(0.000)	(0.000)	(0.006)
External performance feedback	0.109	−0.595••	0.243	0.007	0.027	−0.321
	(0.139)	(0.210)	(0.183)	(0.013)	(0.015)	(0.551)
Internal performance feedback	−0.621••	−0.108	−0.414•	0.009	−0.050••	0.091
	(0.140)	(0.099)	(0.190)	(0.006)	(0.015)	(0.262)
Fund similarity	−0.001	0.043••	0.000	−0.000••	−0.000	0.042••
	(0.001)	(0.002)	(0.002)	(0.000)	(0.000)	(0.004)
Recession	2.935••	0.040	0.012	0.011	0.104••	3.315••
	(0.156)	(0.165)	(0.199)	(0.009)	(0.015)	(0.401)
Spatial proximity	−0.000	−0.003••	−0.000	0.000••	0.000	0.005••
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Internal performance feedback × Fund similarity	−0.116••	–	−0.127••	–	0.002	–
	(0.032)	–	(0.043)	–	(0.003)	–
Internal performance feedback × Proximity	−0.029••	–	−0.008	–	−0.003••	–
	(0.007)	–	(0.009)	–	(0.001)	–
Internal performance feedback × Recession	−2.805••	–	−1.187••	–	−0.108••	–
	(0.234)	–	(0.320)	–	(0.024)	–
External performance feedback × Fund similarity	–	0.014	–	−0.010••	–	−0.125
	–	(0.043)	–	(0.003)	–	(0.114)
External performance feedback × Proximity	–	0.010	–	−0.000	–	−0.040
	–	(0.010)	–	(0.001)	–	(0.024)
External performance feedback × Recession	–	−1.469••	–	−0.021	–	−0.145
	–	(0.326)	–	(0.019)	–	(0.846)
Observations	155,167	155,167	183,026	183,026	183,724	183,724
R-squared	0.644	0.082	0.142	0.028	0.642	0.213
Log likelihood	−394879	−394879	−34769	−34769	−255916	−255916

• $p < .05$; •• $p < .01$.

* Standard errors are in parentheses. All models include month and category fixed effects.

responsible for differential sorting of managers across funds, such self-selection is conceivable. Sorting processes could spuriously generate an association between internal social performance feedback and the propensity to take on risk.

To rule out this explanation, our identification strategy exploited changes in fund performance relative to the internal social aspirations that arise

exogenously to managers' risk preferences. We took advantage of mutual fund firms' mergers and used them as a quasi-natural experiment. Mergers are relatively exogenous to unobserved individual traits that might be potentially correlated with selection into a fund and the decision to take on risk. Moreover, a merger between two firms represents a change in internal social performance feedback. Using the CRSP data from 1980 to 2006, we identified 206 mergers of mutual fund firms that affected 102 firms as bidders. We constructed an indicator variable equal to 1 for the period a firm is post-merger and 0 for the period a firm is pre-merger. We used a six-month event window that includes three months before the merger and three months after the merger. The advantage of this analytical approach is that it helps examine changes in fund performance relative to internal social aspirations between treatment firms, which are affected by the merger, and control firms, which are unaffected by the merger.

We used the difference-in-differences (DID) methodology, a highly conservative approach that divides the sample of firms into treatment and control groups. A simplified analysis would involve examining the amounts of risk taken before and after the merger to isolate the effect of mergers on risk, but an important concern with this approach is that the observed correlation between merger events and risk may be driven by an unobserved time trend. For example, suppose we wished to estimate the effect of mergers that occurred in 1989 on risk in the firms affected by these mergers. We would subtract the amount of risk after 1989 from the amount before 1989 for firms affected by mergers. But other forces in 1989, such as recession, may have affected the merged firms, leading to higher levels of the outcome variables, making it difficult to identify whether the amount of risk is increased due to a time trend or due to mergers. Although this concern is somewhat mitigated because mergers are staggered over time, this does not eliminate the possibility that the amount of risk may still change over time due to non-merger-induced events.

The DID method alleviates this concern by allowing us to choose a control sample of firms that did not experience mergers but would potentially be subject to the same time trends. Using the control sample as a benchmark differentiates any non-merger-related trends from the data. Operationally, we captured the effect of strategic change due to a merger by estimating the following model:

$$C_i = u + \beta_1 Merger_i + \beta_2 Treatment_i + \beta_3 Merger_i \times Treatment_i + \beta_4 Controls + \varepsilon_i$$

where C is the outcome variable that may be subject to merger, *Merger* is an indicator variable equal to 1 for observations three months after the merger and 0 for three months before the event, *Treatment* is an indicator variable equal to 1 if the fund company i was affected by the merger and 0 to indicate firms in the control group, and *Controls* is a vector of fund-specific covariates affecting the outcome variable C. In this specification, the coefficient of primary interest is the interaction of *Merger* and *Treatment*, which captures the differential effect of the two types of firms around mergers.

Our estimation strategy included two stages. In the first stage, we estimated a DID model to verify that firms affected by mergers did experience

Table 6. Seemingly Unrelated Regressions of Social Performance Feedback, Risk, and Change (Mergers)*

Variable	(1) Internal performance feedback	(2) Total risk	(3) Fund turnover	(4) Non-systematic risk	(5) Load change	(6) Systematic risk	(7) Concentration change
Mergers × Treatment	0.002•	−0.104•	0.028	−0.176••	−0.000	−0.012•	−0.004
	(0.001)	(0.053)	(0.041)	(0.064)	(0.000)	(0.005)	(0.009)
Mergers	−0.001	0.022	−0.081••	0.054	0.000	0.010••	0.001
	(0.001)	(0.039)	(0.031)	(0.049)	(0.000)	(0.004)	(0.007)
Treatment	−0.000	0.037	−0.115••	0.127••	0.000••	0.015••	−0.011
	(0.001)	(0.039)	(0.029)	(0.046)	(0.000)	(0.004)	(0.007)
Observations	8,769	6,041	6,041	7,682	7,682	7,776	7,776
R-squared	0.476	0.003	0.113	0.002	0.023	0.461	0.020
Log likelihood	21609	−15272	−15272	20775	20775	8671	8671

• $p < .05$; •• $p < .01$.

* Standard errors are in parentheses; all models include control variables, as reported in other models, and month and category fixed effects.

change in internal social performance feedback relative to firms unaffected by mergers. A positive and significant coefficient of *Merger* × *Treatment* indicates that mergers lead to substantial improvement in a fund's relative internal performance. In the second stage, we estimated a linear regression model in the same DID framework to examine whether funds in firms affected by mergers were less likely to experience risk relative to funds in firms unaffected by mergers. One concern with our identification strategy is that treatment and control groups might differ in a way that correlates with risk or change. We ruled out this concern by examining whether there were significant differences between treatment and control groups. Firms involved in mergers and those not involved in mergers do not differ with respect to risk, change, or fund and firm controls, with the exception of the control group having higher levels of fund turnover. Finally, we found that risk or change did not significantly influence the probability of mergers.

Results presented in table 6 suggest two important conclusions. First, model 1 uses internal social performance feedback as the dependent variable. Results estimated in model 1 show a positive coefficient on the interaction term between *Merger* and *Treatment* indicators. This suggests that mergers act as a positive shock to internal social performance feedback in that funds in firms that experience mergers, on average, improve their performance relative to other funds in the same category and in the same firm. Thus mergers increase a fund's relative internal positioning. Second, our results are consistent with the main analyses: negative coefficients of *Merger* × *Treatment* reported in models 2, 4, and 6 indicate that an exogenous increase in internal social performance feedback reduces the propensity to take risk for all of the three risk-dependent variables. Moreover, models 3, 5, and 7 report the estimates for change. Consistent with our main analyses, the results indicate a non-significant coefficient of *Merger* × *Treatment*. We interpret this finding as indicating that an exogenous increase in internal performance feedback does not have an impact on change. We do not report results for our risky change

dependent variables, which were not significant. Together, these findings provide additional confidence that internal social performance feedback is causally related to managerial propensity for risk and that this effect does not arise due to selection along unobserved traits of managers, with the possible exception of managerial decisions to engage in risky change.

Robustness checks. We performed several robustness checks. Our theoretical argument suggests that low levels of relative performance motivate loss aversion and problem search, so that performance below aspiration should be the primary driver of our results. To assess this claim empirically, we created spline functions for our performance feedback variables, above and below the social aspiration point, to allow for different slopes for values above and below aspirations. The results showed coefficients of the spline variables to be negative and statistically significant for performance below internal aspirations across all models of risk, one measure of risky change (stock performance), and two models of change (fund turnover and concentration change). Overall, our results predicting change were less consistent than those for risk, but they nevertheless suggested increased change and risk as performance falls relative to external and internal aspirations, respectively.

Another concern was that our results reflected unobserved heterogeneity at the firm or fund level. We ruled out this concern by augmenting our specification with firm and fund fixed effects (see Online Appendix tables A1 and A2 at http://asq.sagepub.com/supplemental). The results were generally robust to the inclusion of these fixed-effects estimators. Internal and external social performance feedback both predicted fund turnover, but the effect of the latter was greater in magnitude than the effect of the former (table A1; chi-squared = 23.83; $p < .01$). We further ruled out the possibility that our results reflected turnover in fund management, if underperforming managers tend to be replaced by peers with stronger risk-seeking preferences. Though we had no reason to expect this empirical regularity, we investigated that possibility by reestimating all models for the subsample of funds that experienced no managerial turnover within a four-month time span following the fund's underperformance. Restricting our sample in this way had no influence on the results. In additional analyses, we also controlled for change in the models predicting risk, and vice versa, as an alternative to the SUR regressions to deal with the relationship between change and risk outcomes—e.g., some risky decisions may involve change, and some change decisions may involve risk. Our results were robust to the inclusion of these controls.

Finally, in unreported models, we considered additional tests of the hypothesized individual-level mechanism for risk. The impact of internal social performance feedback on risk should be stronger when managers are socially proximate. We considered two individual attributes, managers' age and prior university affiliation, and conducted individual-level analyses. We focused on a subsample of solo fund managers—approximately 40 percent of the sample—to enhance statistical precision of social similarity. We used Nelson's *Directory of Investment Managers* and the public search engines ZoomInfo and Zabasearch to collect data on managers' age and prior-university-affiliation proximity. We calculated the annual proportion of internal peers in the same age group as the focal manager and the annual proportion of internal peers who

obtained a degree from the same university as the focal manager.[5] Findings provided general support for our predictions, indicating that a focal manager was more likely to seek risk in response to underperformance relative to internal referents when those referents were similar in age to the focal manager. We also found partial support for the notion that a focal manager was more likely to seek risk in response to underperformance relative to internal referents when those referents shared prior university affiliation with the focal manager. Finally, the theorized mechanisms received no support in change models: neither proximity in age nor in prior university affiliation systematically amplified a manager's tendency to engage in change in response to either external or internal social performance feedback.

DISCUSSION

The analyses we present here make a number of contributions. To date, research has largely considered risk and change as concurrent outcomes associated with the same performance feedback antecedents. Our study challenges this common assumption, suggesting that risk and change tend to arise under different conditions and are motivated by individual and organizational concerns, respectively. Empirically, we confirmed the well-established notion that organizational change arises in response to performance shortfalls relative to external performance aspirations. Moreover, though past studies have often inferred risk from change alone, our results do not support a relationship between external social performance feedback and risk. Instead, we found that decision makers take on greater risk in response to individual concerns, which become salient when performance falls short of internal social performance aspirations. Finally, our analyses probed deeper into the instances when risk and change might overlap; we found that risky change is most likely to occur as a result of individual concerns triggered by negative internal social comparisons and not as a result of organizational problems triggered by negative external social comparisons. In fact, we see the highest level of risky change with unfavorable internal social performance feedback and favorable external social performance feedback.

By measuring risk directly, we were able to probe for the mechanisms behind the individual concerns associated with risk. We found that career concerns, as well as social and spatial proximity, account in part for the observed impact of internal social performance feedback on risk. This finding is conceptually consistent with the notion of loss aversion, because those managers most at risk of termination or loss—those with the most to lose—are also the most likely to take risks. Importantly, loss aversion operates as an individual rather than an organizational mechanism predicting risk, and it does not appear to be isomorphic across all levels of analysis.

Yet more research on risk and individual concerns is needed. We have theorized that individual concerns trigger managerial risk and have focused on those concerns that arise in response to internal social comparisons. But other comparisons may trigger concerns that lead to individual risk. In industries in which external labor markets are strong and internal comparisons are not salient,

[5] Median age was used as a cut-off point to measure *age proximity*. For robustness, we used terciles and quartiles as cut-off points and found consistent results.

decision makers are likely to rely on external comparisons to a greater extent to assess individual performance. In particular, external social comparisons may trigger individual concerns and risk in high-level labor markets, such as the market for CEOs. Consistent with this argument, Burt (1982: 244) suggested that ''network fear'' is less relevant in those labor markets in which network peers are not clear, as with a CEO. Focusing on the market for CEOs is promising, as there is some research on risk taking and evidence that narcissistic CEOs may take risky actions because they overestimate their own abilities and thus underestimate the actual riskiness of a given course of action (Chatterjee and Hambrick, 2011). Future research could profitably address other sources of social comparison that are proximate to the decision maker in different ways and that may trigger different types of risk, as well as the organizational structures that encourage or discourage internal social comparisons.

In contrast, internal social comparisons may be more prevalent in firms with franchises, such as banks, and less prevalent in contexts in which inter-unit comparisons are difficult or discouraged, including unrelated diversified companies, firms with heterogeneous product divisions (e.g., Tata), or functional organizations. Our findings may also be less clear when the metrics used for comparison are more contested and when units propose metrics that reflect more favorably on themselves, e.g., for self-enhancement (Audia and Brion, 2007; Jordan and Audia, 2012). Finally, other sources of individual concerns beyond social comparison that trigger risk may be usefully expanded.

Our results also shed light on organizational decision makers' propensity to engage in organizational change. Though we confirmed the well-established argument that poor performance relative to external social performance aspirations predicts change, our findings suggest that the subset of non-risky change is most likely to be triggered by negative external social performance feedback. This implies that risky change might be a relatively small subset of the changes predicted by external social performance feedback. Though it is plausible that other mechanisms might trigger risky change, our results provide strong support that problemistic search alone does not suffice; we find that change driven by problemistic search does not need to imply risk. Future research should explicitly examine whether biased and local search, which generally start in the neighborhood of the problem, are less risky (Cyert and March, 1963). These distinctions should encourage scholars to explicitly measure risky change associated with distant search and probe for new mechanisms associated with risky change (Gavetti, 2012; Winter, 2012).

Our study relates to the behavioral theory notion that organizations are composed of individuals and units (Gavetti, Levinthal, and Ocasio, 2007). We examine the effects on risk and change in organizations with multiple units, each with its own distinct and easily comparable performance. Our approach contrasts with the literature on performance feedback that has commonly conceptualized the organization as a monolithic entity. In fact, although Cyert and March (1963) noted that the organization comprises subdivisions with different goals, research has only recently begun to consider multiple performance benchmarks (Labianca et al., 2009; Giachetti and Lampel, 2010; Gaba and Joseph, 2013; Moliterno et al., 2014; Joseph and Gaba, 2015). Our research suggests that different benchmarks may activate different mechanisms and acknowledges that decisions about risk are motivated by multiple interests and individual concerns. In short, internal social comparisons across units represent

an important source of performance feedback that should be more carefully considered in future research.

Although many unresolved theoretical questions in the performance feedback literature concern performance below the aspiration point (e.g., Audia and Greve, 2006), future research should also give greater consideration to the effects on risk and change when performance is above the internal and external social aspirations. Performance that exceeds external aspirations may trigger a different mechanism than we have discussed here, such as slack search (Baum et al., 2005), and a different mechanism may be at work when performance exceeds the internal social aspirations. Anecdotal evidence suggests that high-performing employees may take oversized risks; traders at J.P. Morgan and UBS who recently took excessive risks are one example. But we found no evidence that risk increases for performance above the internal performance aspirations, and in fact risk taking decreases for total risk and nonsystematic risk. Our findings do not support the idea that high relative internal social performance leads to more risk, but future research should consider this question in further detail. And future research can usefully extend Baum et al. (2005) and further examine the relative impact of different types of inconsistent feedback (see also Joseph and Gaba, 2015). Our findings for risky change, when positive external feedback and negative internal feedback together result in the highest levels of risky change, may suggest the primacy of internal social performance feedback. This possibility is best examined, however, after reconsidering whether the median performance represents an appropriate aspiration point when assessing the organizational effects of social performance feedback (see Moliterno et al., 2014).

Finally, and following researchers who have leveraged multilevel theory to examine and extend core management theories (e.g., Cappelli and Sherer, 1991; Ostroff and Bowen, 2000; Moliterno and Mahony, 2011; Ployhart and Moliterno, 2011), we see an opportunity to leverage a multilevel framing to examine the core propositions in the extant research. The behavioral theory of the firm is an organization-level theory conceptualized to explain organizational behaviors and phenomena, such as learning, routines, change, and decision making. But it has long been a premise of organizational scholarship that organizations are multilevel systems (Kozlowski and Klein, 2000; Hitt et al., 2007), and misspecification ''occurs when we attribute an observed relationship to a level other than the actual behavioral or responsive unit'' (Rousseau, 1985: 5). In this study, we make small but important first steps in exploring this issue in the context of behavioral theory. Notably, we have argued that organizational change is driven by organizational problems, whereas risk is driven by individual concerns. Future conceptual and empirical research should explore more explicitly where and how theoretical associations are isomorphic across levels in behavioral theory and should engage in a full examination of cross-level effects. For example, threat-rigidity effects are theorized to be isomorphic across the individual, group, and organizational levels (Staw, Sandelands, and Dutton, 1981). Thus, although our efforts here are preliminary, they should be encouraging to scholars who wish to examine behavioral theory in general, and performance feedback theory in particular, through a multilevel lens. Scholars might also consider how individual threat rigidity, triggered by stress, anxiety, and physiological arousal, and risk, triggered by loss aversion, can be reconciled.

Methodologically, the mutual fund setting offered key advantages with respect to examining risk. Our definition of risk—variation in the distribution of possible outcomes—does not differentiate between managerial perceptions of uncertainty and the actual actions that increase uncertainty. The finance setting offers the advantage of quantifying risk more precisely because ex ante estimations of risk are widely known. As a result, our study is better able to separate risk taking from change and to investigate their respective drivers. Though our focus was on financial risk, it generalizes beyond the finance context to other types of risk, such as strategic or operational risk. But our findings may be less applicable to contexts in which decision makers are unable to estimate risk ex ante. In those contexts, actual risk is more likely to be an incidental rather than an intended consequence of managers' decisions. Our theorizing suggests that individual concerns may trigger actions that are perceived to be risky, even if ex post it is clear that the action did not result in variability in outcomes. Additional research on the relationship between perceived and actual risk is warranted to identify individual concerns.

This study revisits the common assumption that organizational change necessarily involves greater risk, and we demonstrate different antecedents to risk and change outcomes. We find that risk often arises when decision makers have individual concerns that trigger loss aversion, in this case caused by unfavorable internal social performance comparisons. This mechanism is distinct from problemistic search, an organizational mechanism typically linked to unfavorable external social performance comparisons. Together, these insights indicate that although the broader environment is important to understanding decision making, so too are the internal dynamics of a firm.

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