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Can Organizations Mitigate Individual Biases? Evidence from Mutual Fund Investment Decisions

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Abstract

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ABSTRACT

Can organizations mitigate the impact of individual biases on organizational decisions? This study investigates whether and how organizational structure and decision making process affect the quality of organizational decisions. Theoretical arguments about the impact of organizational structure and decision process on organizations' disposition effect - a decision bias that refers to actors' tendency to sell assets whose prices have increased since purchase, yet hold on to assets that have dropped in value since purchase - are evaluated empirically on a large sample of mutual fund portfolio decisions. The findings suggest that decision making process significantly affects the disposition effect bias in organizational decisions.

Keywords:

Decision Making; Organization Design; Heuristics & Biases; Mutual Funds

INTRODUCTION

Can organizations mitigate the impact of individual biases on organizational decisions? In the face of bounded individual rationality, organizations can improve decision making either by attempting to modify their members' cognitive processes (i.e. de-biasing individual judgment) or by architecting decision contexts which reduce the likelihood of particular decision errors. A substantial body of research on the psychology of human judgment has established that the former approach cannot reliably mitigate bias. Fischhoff's (1982) review of debiasing studies evaluated the performance of four strategies that had been proposed as solutions to biased individual decision making: (a) offering warnings about the possibility of bias; (b) describing the bias and its direction; (c) providing people with feedback on their bias; and (d) offering an extended program of training with feedback, coaching, and other interventions designed to improve judgment. The findings, which have withstood more than 25 years of subsequent scrutiny (Milkman et al. 2009), established that the first three strategies yielded minimal benefits and even extensive, personalized training and feedback were either ineffectual or produced only moderate improvements in decision making (Bazerman and Moore 2008).

Given that people exhibit persistent biases in their judgments, an alternative way to improve decision quality is to ask whether the organizational context in which decisions are made is likely to enhance or inhibit particular decision errors (Kahneman and Lovallo 1993). In other words, organizations could strive to architect contexts which reduce the likelihood that a particular individual bias will affect organizational decisions. Identifying such organizational means for controlling individual judgmental biases is an important challenge for organizational research.

This paper seeks to examine the impact of organizational context, in particular of structure and decision making process, on the bias in organizational decisions. The decision bias of interest is the "disposition effect" (Dhar and Zhu 2006; Feng and Seasholes 2005; Frazzini 2006; Grinblatt and Han 2005; Jin and Scherbina 2011; Odean 1998; Shapira and Venezia 2001; Shefrin and Statman 1985; Weber and Camerer 1998), which refers to the tendency of investors to realize gains by selling assets that have gained in value but to avoid realizing losses by holding on to assets that have lost value. This disposition of investors to "sell winners" and "ride losers" has been attributed to key features of prospect theory (Kahneman and Tversky 1979b), such as people's tendency to value gains and losses relative to a reference point (the purchase price) and to strongly prefer avoiding losses to acquiring gains (loss aversion), as well as to lack of self-control, mental accounting, and people's tendency to seek pride and avoid regret in their decisions (Shefrin and Statman 1985). Extensive evidence of disposition effects has been found by a number of empirical investigations of individual and organizational stock trading activity[1]. Evidence of disposition effects has also been uncovered in other settings, such as residential housing (Genesove and Mayer 2001), executive stock options (Heath et al. 1999) and prediction markets (Hartzmark and Solomon 2010). Moreover, a number of empirical studies have found the disposition effect to be associated with inferior performance outcomes (e.g. Frazzini 2006; Jin and Scherbina 2011; Odean 1998).

The present study empirically evaluates propositions about the impact of two key features of the organizational context – organizational structure and decision making process – on the disposition effect in organizational decisions, leveraging the mutual fund industry as its

[1] For example, Odean (1998), Grinblatt and Keloharju (2001), Shapira and Venezia (2001), and Feng and Seasholes (2005) document evidence of a disposition effect affecting both inexperienced and sophisticated individual equity investors in the United States, Finland, Israel, and China, respectively. Frazzini (2006) and Jin and Scherbina (2011) find a disposition effect in the trading of institutional investors such as U.S. equity mutual funds.

empirical setting. Mutual funds provide a particularly attractive setting as decision making is at the heart of fund management and extensive data exist on the structure and decision making processes funds use, the decisions they make, and their outcomes.

THEORY AND HYPOTHESES

Debiasing Organizational Decision Making: The Impact of Structure

The experimental economics literature on team decision making suggests that team decisions are less prone to bias than individual decisions (Sutter 2009). Teams have been found to be more "rational players" (Bornstein and Yaniv 1998) in a broad variety of experiments comparing team and individual decisions to the outcomes predicted by expected utility theory. For example, teams send and accept smaller transfers in the ultimatum game (Bornstein and Yaniv 1998), send or return smaller amounts in the trust game (Cox 2002; Kugler et al. 2007), violate the principles of Bayesian updating less often than individuals do (Charness et al. 2007), and are less likely to exhibit loss aversion in their investment choices (Rockenbach et al. 2007; Sutter 2007).

The rich psychology literature on decision making pioneered the study of heuristics and biases and has extensively studied their influence on judgment at the individual level (Hastie and Dawes 2009; Kahneman et al. 1982). However, significantly less psychological research has considered the impact of individual biases on group judgment and decisions (Kerr et al. 1996; Tindale et al. 2003). This literature has found only limited evidence that groups can attenuate the influence of individual judgmental biases. Yet, hindsight bias (Stahlberg et al. 1995) and attribution errors (Wittenbaum and Stasser 1995; Wright et al. 1990; Wright and Wells 1985), for

example, have been found to be slightly attenuated by group discussions.

Group decisions might be less susceptible to judgmental biases because of the tendency of groups to correct the errors of their members. The work of Laughlin and associates on group problem solving has extensively documented that, on average, group decisions are superior to those of individuals on tasks with a significant intellective component, i.e. where the correctness or superiority of a particular decision alternative can be demonstrated (Laughlin 1980; Laughlin et al. 1998; Laughlin and Ellis 1986; Laughlin and Hollingshead 1995). Thus, group interaction can have a debiasing effect as long as an unbiased or less biased group member (or members) can win out over biased majorities during group discussions (Kerr et al. 1996; Kerr and Tindale 2004).

Hypothesis 1a: Team decision making attenuates the disposition effect bias in organizational decisions.

Psychological research has, however, also offered evidence and arguments which suggest that group decision making may accentuate rather than attenuate the impact of individual judgmental biases. For example, groups exacerbate the base-rate neglect bias (Kahneman and Tversky 1973), whereby people focus disproportionately on individuating information and underweight general base rates when making predictions (Argote et al. 1990; Argote et al. 1986); groups exhibit greater overconfidence in the accuracy of their own judgment (Heath and Gonzalez 1995; Lichtenstein and Fischhoff 1977; Stephenson et al. 1986); groups suffer more than individuals from optimistic bias (Buehler et al. 2005; Kahneman and Tversky 1979a), giving highly favorable estimates of the time it will take to complete an upcoming task; groups are more likely to be influenced by the existence of past, sunk costs with group decision making

amplifying the frequency and severity with which escalation of commitment occurs (Smith et al. 1998; Whyte 1993).

Research on group decision making has demonstrated that information and preferences which are shared by the majority of group members dominate group discussions and determine group decisions (Stasser and Titus 1985). Due to this common-knowledge effect (Gigone and Hastie 1993, 1996), one of the most robust and replicated effects in the group decision literature (for a review, see Wittenbaum and Stasser 1996), any idiosyncratic information and preferences individual members may have are unlikely to be mentioned and attended to in group discussions. Instead, group discussions and decisions will be dominated by the shared, systematic component of group members' information and preferences.

Importantly, a group decision process driven by the information and preferences group members have in common can result in a choice shift at the group level (Davis 1973; Davis and Hinsz 1982; Lamm and Myers 1978). Thus, group shift phenomena can have important implications in relation to the quality of group decisions when judgmental biases are systematic and widely shared among individuals. If a decision task triggers a shared systematic individual judgmental bias (cf. Kahneman et al. 1982), group decision making should be expected to accentuate that bias (Tindale et al. 2003).

Hypothesis 1b: Team decision making accentuates the disposition effect bias in organizational decisions.

Debiasing Organizational Decision Making: The Impact of Decision Process

A voluminous organizational theory literature has explored the extent to which

organizational decision making approximates (or diverges from) stylized models of rational choice and action (e.g. Allison 1971; Cyert and March 1963; Eisenhardt and Zbaracki 1992; Simon 1997) as well as the relationship between decision process rationality and organizational performance (Dean and Sharfman 1996; Eisenhardt 1989; Fredrickson and Iaquinto 1989; McNamara and Bromiley 1997). Though these studies have provided evidence of the bounded rationality of organizational decisions and have enriched our understanding of the relationship between decision process and organizational performance and effectiveness, they do not specifically examine whether and how organizations' decision making process can help mitigate the disposition effect bias.

An organization may be able to isolate itself from the impact of its members' biases by replacing the cognitive shortcuts they would otherwise use when making judgments with formal decision models (Fischhoff 1982). After all, organizations often enact formal decision rules to try to compensate for the bounded rationality of their decision makers (March and Simon 1958). Thus, differences in decision making process among organizations can be expected to have a significant influence on their propensity to commit decision errors. The possibility of individual-level bias affecting organizational decisions should be lower, the more an organization's decision process relies on objective data and quantitative decision models and the less it draws on decision makers' subjective judgment. Consequently, as long as the decision models used by organizations are not significantly biased by design, decision making by formal models should attenuate the disposition effect bias in organizational decisions.

Hypothesis 2: Decision making by formal models attenuates the disposition effect bias in organizational decisions.

METHODS

Empirical Setting

The empirical setting for this study is the U.S. mutual fund industry. Mutual funds are organizations that pool capital contributed by their shareholders for the purpose of investing in a diversified portfolio of securities - stocks, bonds, money market instruments or other securities and investable assets. Their emergence as a distinct organizational form (Levinthal and Myatt 1994) in the U.S.A. is traced back to the establishment of The Massachusetts Investment Trust, the first mutual fund, in Boston in 1924 (Gremillion 2001; Lounsbury 2007). Each individual mutual fund is an investment company with a separate legal existence under the Investment Company Act of 1940. It has its own capital, shareholders, board of directors responsible for monitoring the management of the fund's assets as well as a specified investment policy described in the fund's prospectus. The investment management of a fund's assets can be done internally but is usually contracted out to management companies, such as Fidelity, Vanguard, Putnam, or Dreyfus. The set of funds a management company provides investment management services to is often referred to as a fund family. Each mutual fund has one or more designated investment professionals, fund managers, responsible for the day-to-day management of their fund's portfolio of securities and all corresponding investment decisions.

Mutual funds offer a rare and particularly suitable setting for studying the implications of organizational design on organizational decision-making and performance. First, decision-making, i.e. deciding what assets to buy, sell or keep, is integral to managing a mutual fund. Second, organizational structure and decision process differ across funds and these differences are observable. Third, given the heavily regulated nature of the industry, extensive and detailed

survival-bias-free longitudinal data on the characteristics and performance of each mutual fund is available for research purposes. Finally, the mutual fund industry is an industry of great economic significance and substantive interest being the world's largest financial intermediary with over $12 trillion of assets under management (Investment Company Institute 2008). All these considerations make mutual funds a natural laboratory for studying the effects of organizational structure and decision process on the quality of organizational decisions.

Data and Sample

The mutual fund data used in this study come from a variety of sources. One source is the Survivor-Bias-Free U.S. Mutual Fund Database maintained by the Center for Research in Security Prices (CRSP) at the University of Chicago. The CRSP Mutual Fund Database is designed to facilitate research on the historical performance of mutual funds by using survivor-bias-free data (Center for Research in Security Prices 2009). It covers all (live and dead) equity, bond, and money market mutual funds since December 1961. For each fund, the CRSP Mutual Fund Database provides a complete historical record, including comprehensive monthly data on its name, identifying information, launch and termination dates, net asset values, investment category, fees, assets under management, returns, fund family, etc.

Since the estimation of mutual funds' decision-making (disposition effect) bias requires comprehensive holdings-level data on fund portfolio decisions, unavailable from the CRSP Mutual Fund Database, a second source of data is the Thomson Financial CDA/Spectrum Mutual Funds database. The CDA/Spectrum database provides survivor-bias-free data on the holdings of individual mutual funds on a quarterly basis collected from funds' SEC filings and fund prospectuses since 1980. A third source of data – the CRSP Stock Files database – was used to

obtain the historical prices of all stocks held in the portfolios of mutual funds since 1980.

A fourth data source is the Morningstar Mutual Funds OnDisc database which provides the names of all current and past managers a mutual fund has had as well as the dates when their tenures began and ended. This data is leveraged to get at the organizational structure of mutual funds. Using Morningstar's manager name data for 1995-2007, I classify funds as either solo-managed, if managed by a single individual in a given period, or team-managed, if managed by a management team (two or more managers at a time).

Finally, since the above four data sources do not provide information on the type of decision process funds use, and in particular the extent to which it relies on formal models, I develop and leverage a proprietary database containing the names and identifiers of U.S. mutual funds which use a quantitative decision process. The data was acquired through comprehensive searches of the SEC Edgar mutual funds database, the Dow Jones Factiva news and business information database and the universe of web-hosted information indexed by Google for mentions of the terms "quantitative", "quant", "disciplined", "computer", "model", "algorithm", or related and derivative terms in conjunction with the terms "mutual fund" or "mutual funds". The prospectuses and websites of all mutual funds uncovered through these searches were examined to determine the extent to which they adhered to a quantitative fund management process and only those funds whose prospectuses explicitly indicated that the fund's investment decisions are made by a computer-based, quantitative model were kept and coded as "quantitative" mutual funds. To further verify the reliability of the classification of funds' decision making process I compared it with the classifications contained in Morningstar's mutual

fund reports. For a large sample of funds[2], Morningstar, a leading mutual fund research provider, provides one-page reports which since 2007 include a "Governance and Management" section that presents a short biography of the managers and describes how they manage the portfolio, including whether or not a fund is run using a quantitative investment process. The agreement between both categorizations was virtually complete[3].

To arrive at the final sample used in this study, I start with the entire population of US mutual funds over the years 1998 to 2007[4]. Next, following the prior literature on mutual funds, I focus my analysis on actively managed domestic diversified equity mutual funds[5]. As CRSP devotes one observation per period for each share class of each mutual fund, I use the unique WFICN (Wharton Financial Institution Center Number) fund number to aggregate fund data across share classes into one observation per fund-year. For characteristics that vary across fund share classes such as returns and expense ratios, I take a weighted average using the total net assets of each class as the weights. For the total net assets of a fund, I use the sum of the total net assets of all the classes of that fund. The resulting final sample contains 11,310 fund-year observations on 2,045 funds.

Measures

Dependent Variables. Following extant research in the mutual fund literature (Dhar and Zhu 2006; Frazzini 2006; Goetzmann and Massa 2008; Kumar 2009; Odean 1998), I measure the

[2] One thousand five hundred and four as of September 2008.
[3] The only difference being that three more US equity funds were identified and classified as quantitative based on the Morningstar reports.
[4] The year 1998 was chosen as the beginning year as it is the first for which there are more than 30 quantitative funds in the sample.
[5] I keep only funds classified by Lipper as diversified equity funds with Lipper investment objective codes CA (Capital Appreciation), EI (Equity Income), G (Growth), GI (Growth and Income), I (Income), MC (Mid-Cap), SG (Small-Cap), and MR (Micro-Cap).

extent to which a mutual fund's trades exhibits a disposition effect by the disposition spread: the difference between the proportion of gains realized and the proportion of losses realized by a mutual fund in a given period[6].

Specifically, each quarter in which a mutual fund in the sample sells shares of a stock, each stock in its portfolio during that period is placed into one of four categories. For every stock in the fund's portfolio that is sold, a "realized gain" is counted if the current stock price exceeds the average price at which the shares were purchased, and a "realized loss" is counted otherwise. For every stock in the fund's portfolio that is not sold, a "paper gain" is counted if the current stock price exceeds the average price at which the shares were purchased, and a "paper loss" is counted otherwise[7]. From the total number of realized and paper gains a fund has in a given year, I compute the percentage of gains realized (PGR):

$$PGR_{it}(Number) = ((\text{no. of realized gains}_{it}) / (\text{no. of realized gains}_{it} + \text{no. of paper gains}_{it}))*100 \quad (1)$$

where *i* and *t* index fund and time period (year) respectively. In words, $PGR_{it}(Number)$ computes the number of gains that were realized as a percentage of the total number of gains that could have been realized by a fund in a given year. A similar percentage is computed for losses:

$$PLR_{it}(Number) = (\text{no. of realized losses}_{it} / (\text{no. of realized losses}_{it} + \text{no. of paper losses}_{it}))*100 \quad (2)$$

[6] For convenience and ease of interpretation I calculate and express the above proportions in percentage terms (by multiplying them by a hundred) in my analyses.

[7] I follow Frazzini (2006) and use the stock price at the end of a quarter (the quarterly holdings report date) as a proxy for the buying or selling price. Results are qualitatively similar if I assume that trades take place halfway through the quarter or at the beginning of the quarter.

where *i* and *t* index fund and time period (year). In words, $PLR_{it}(Number)$ computes the number of losses that were realized as a percentage of the total number of losses that could have been realized by a fund in a given year.

The extent to which fund *i* exhibits a disposition effect in year *t* is captured by the disposition spread $DISP_{it}$, measured by the difference between PGR_{it} and PLR_{it}:

$$DISP_{it}(Number) = PGR_{it}(Number) - PLR_{it}(Number) \quad (3)$$

I also measure the disposition spread using the dollar value, as opposed to the number, of (realized and paper) gains and losses by multiplying each (realized or paper) share gain or loss by its dollar value and calculating PGRit(Value), PLRit(Value) and DISPit(Value) according to equations (1) to (3) using dollar values instead of share numbers.

Independent Variables. The two key independent variables of interest to this study are organizational structure and decision-making process. To construct a measure for funds' organization structure I use data on the organizational structure of mutual funds from the Morningstar Mutual Funds OnDisc database. Morningstar provides the names of all current and past managers a mutual fund has had as well as the dates when their tenures began and ended. Using Morningstar's manager name data, I classify funds as either solo-managed, if managed by a single individual in a given period, or team-managed, if managed by a management team (two or more managers at a time). The measure of organizational structure used in my empirical analyses is, thus, a dummy variable (Team) that takes a value of one for team-managed funds and zero otherwise.

To devise a proxy for the extent to which a funds' decision process relies on formal models, I construct a dummy variable which takes a value of one for quantitative mutual funds and zero otherwise (*Quant*). Quantitative mutual funds are a relatively new breed of funds in which computers, as opposed to human fund managers, make the buy and sell decisions for the fund by selecting stocks on the basis of explicit quantitative investment models. These funds do not utilize the judgment and subjective opinions of portfolio managers in their daily investment decisions, relying instead on formal quantitative models (algorithms) to select securities (Laise 2006; Zhao 2006). As Richard C. Grinold and Ronald N. Kahn of Barclays Global Investors put it, "the goal is to replace heroic personalities contending in an atmosphere of greed and fear with compelling hypotheses subjected to hard data" (Bianco 2007). In quantitative funds, fund managers' main responsibility is the development as well as ongoing monitoring, review and updating of their funds' investment algorithms which includes forming formal investment models as well as testing model performance on historical and real-time market data.

In traditional (fundamental) equity mutual funds, on the other hand, stock selection and asset allocation are performed by fund managers who, while often utilizing quantitative analyses as an input to their decision making, have the latitude to make investment decisions based on their subjective judgment and opinions. They may decide to invest in a company because they are primarily attracted by its unique product or service, a talented management team, promising research and development, a defensible monopoly position, or other factors such as a general concerns about the business sentiment and environment (Edwards 2000). Thus, compared to quantitative funds, traditional funds' decision making process relies less on formal models and more on the subjective judgment of their managers.

Control Variables. To avoid spurious correlations, I control for the effect of variables that might influence funds' disposition effect while being correlated with the independent variables of interest to this study. First, I control for the effect of fund size through a variable (Fund Size) measuring the logarithm of annual fund assets under management (AUM) in millions of U.S. dollars. Next, I control for the size of the mutual fund family a fund is related to through a variable (Family Size) measuring the logarithm of the total assets a focal fund's family had under management in a given year (in millions of U.S. dollars). One would expect that decision makers in larger funds and fund families may rely more heavily on established decision policies and criteria and less on idiosyncratic individual judgment heuristics compared to decision makers in smaller units and families (Scott 1992; Sutcliffe and McNamara 2001). Third, I control for the effect of fund age. This is in line with the possibility that learning from experience may influence decision makers' heuristics and biases to some degree. To account for the effect of funds' age on their disposition effect, I construct a variable measuring the logarithm of fund age in years (Fund Age). Next, I control for the effect of generalized learning from the competitive experience of other funds related to the same family. To take this effect into account, I control for fund family age by constructing a variable measuring the logarithm of the focal fund's family age in years (Family Age[8]).

I further control for possible spurious correlations that may arise from fund differences in costs, trading strategy and capacity status. I control for fund costs by a variable measuring the percent of a fund's assets paid by shareholders to cover the fund's operating expenses, including management fees (*Expenses*). To adjust for the non-normal distribution of values, I take a logarithmic transformation of this variable. I next control for differences in fund's trading

[8] To measure family age, I use the CRSP Mutual Funds database to derive the age of the oldest fund in the focal fund's family.

strategies by including a measure of the turnover of the securities held in a fund's portfolio (*Turnover*). Turnover is calculated by CRSP as the minimum of aggregated sales or aggregated purchases of securities, divided by the average annual total net assets of the fund. This variable is expressed in percentage terms and logarithmically transformed. I also control for the possibility that decision makers' heuristics may be affected by a fund's capacity status. It is not uncommon for fund managers to close a fund to new investments if they decide that the fund has grown too large to be managed effectively. To control for this, I include a dummy variable taking a value of one when a fund is open to investors and zero when a fund is closed to new investors (*Open*).

Furthermore, I control for the effect of competition. I expect increased competition to have a negative effect on fund bias. To account for the effect of competition on funds' disposition effect, I construct a variable measuring (the logarithm of) the count of the number of funds in a focal fund's category in a given year (Funds in Category).

Moreover, I control for the effect of fund performance and market performance on funds' disposition bias. Fund performance is measured by total monthly fund return, i.e. the annual return on the fund's portfolio, including reinvested dividends. Market performance is measured by the return on the Standard & Poor's 500 index in a given year.

Finally, to control for stable unobserved effects influencing funds' decision making process I include a fixed effect for each investment category-year combination as well as a fixed effect for the fund family a focal fund is associated with in all regression models. All control variables except for the category-year and fund family fixed effects are lagged by one period.

Analytical Approach

The empirical analysis is performed using pooled OLS regression models. In order to correct for any heteroscedasticity or non-independence of error terms that may be present in the data, I use heteroscedasticity-robust estimates of the standard errors (White 1980), clustered by fund (Rogers 1993). Table 1 presents descriptive statistics and correlation matrix for the variables used in this study.

-- TABLE 1 ABOUT HERE --

RESULTS

Table 2 presents the results of econometric analyses employing OLS regression models with heteroscedasticity-robust standard errors clustered by fund. The influence of structure and process on the bias in funds' decision-making is investigated using two different measures of the disposition effect - DISP (Number) in models 1, 3, 5, 7 and DISP (Value) in models 2, 4, 6 and 8 respectively.

-- TABLE 2 ABOUT HERE --

Models 1 through 8 include all control variables as well as category-year and fund family fixed effects. In all models, the results suggest a highly significant ($p<.01$) negative relationship between fund size and the magnitude of funds' disposition effect. Larger funds exhibit lower levels of disposition bias. The estimated effect of family size is likewise negative, yet not

statistically significant. Other things being equal, the disposition spread of funds associated with larger fund families is not significantly lower than that of funds associated with smaller fund families. Likewise, the results provide no evidence that funds' disposition effect is significantly influenced by their age or their families' age.

Funds' expense ratio (Expenses) is negatively related to their disposition spread, though not significantly. High cost funds with expensive management are no less biased than their lower cost, frugal counterparts. Somewhat surprisingly, the degree of turnover of the securities comprising a focal fund's investment portfolio is not significantly related to its degree of disposition bias. While the positive sign of the estimated coefficients indicates that funds which trade more are more likely to exhibit the disposition effect, the lack of significance can be interpreted as suggesting that the disposition bias is not confined to funds with particularly high portfolio turnover.

Interestingly, a fund's capacity status (open vs. closed to new investors) is negatively related to its disposition bias which would suggest that open funds are less biased than closed funds. Fund managers often claim that they close funds to protect investor returns[9]. Closed funds prohibit fund share purchases by new investors and operate only with existing assets or, in some cases, with existing assets as well as new money from existing investors. An example is the Fidelity Magellan Fund, one of the largest mutual funds in the United States, which closed to

[9] For example, Bill McVail, portfolio manager of the Turner Small-Cap Growth Fund, recently closed it to new investors and was quoted in the Wall Street Journal as saying ''we want to make sure we can perform for our clients. If we left it open, it would have compromised our ability to provide value.'' (See Talley, K., 2005, ''Sorry, This Small-Cap Fund Is Full – More Managers Close Door to Potential New Investors, Citing the Stocks' Illiquidity,'' Wall Street Journal, August 22, 2005: p. C13.)

new investment in 1997[10]. The findings of this study are, however, consistent with the results of a recent study by Bris et al. (Bris et al. 2007) which finds that mutual funds generate positive excess returns before they close yet do not earn excess returns after they close. This outcome is consistent with this study's finding of a negative, though not statistically significant, impact of fund closing on fund decision-making quality.

The estimation results, furthermore, provide no evidence of a significant relationship between the number of funds in a given category and the magnitude of funds' disposition spread. Fund returns are inversely related to funds' disposition effect, in line with prior studies, yet this study finds no evidence that this relationship is statistically significant. Funds' disposition spread is also negatively related to the overall market return, though once again the relationship is not statistically significant.

If decision making by formal models attenuates the disposition effect bias in organizational decisions, one would expect to find that the disposition spread of quantitative funds is significantly lower than that of comparable traditional funds. The estimated coefficient on Quant in models 5 to 8 is indeed negative and highly statistically significant ($p<.01$). Decision making process significantly affects the degree of disposition effect bias in organizational decisions.

Models 3, 4, 7 and 8 empirically examine whether organizational structure affects organizations' disposition effect. Extant theory is unequivocal about the effect of organizational structure on the disposition effect bias. The estimated coefficient on the Team variable is,

[10] See Gasparino, C., and S. E. Frank, 1997, ''Magellan: Closing the Door – Magellan's Lead May Be Followed,'' Wall Street Journal, August 28, 1997, p. C17.

however, not statistically significant in all models, lending no support to either side of the debate. Thus, this study finds no evidence that decision making by teams accentuates or attenuates the disposition effect bias in organizational decisions[11].

Robustness

To examine the impact of structure and decision making process on the likelihood of a fund exhibiting a positive disposition spread – rather than on the relative magnitude of its disposition spread – I create binary versions of the DISP(Number) and DISP(Value) variables. All positive values are coded as one and all non-positive values as zero. Table 3 presents the results of logistic regression models (with heteroscedasticity-robust standard errors clustered by fund) estimating the effect of organizational structure and decision making process on organizations' likelihood of exhibiting a positive disposition spread[12]. The results correspond to the evidence presented in Table 2 providing further support that organizations employing decision making by formal models are significantly less likely to exhibit a disposition effect. As in Table 2, there is no evidence of a statistically significant effect of team decision making on funds' disposition effect bias.

-- TABLE 3 ABOUT HERE --

Using the Morningstar Mutual Funds OnDisc manager name data to classify a fund as team-managed if two or more people are listed as its managers may occasionally lead to a

[11] All results are robust to the inclusion of an interaction effect for structure and decision process; the interaction is not statistically significant.

[12] The slight reduction in sample size is due to the lack of variance in outcomes for some funds (such observations are dropped from the sample by STATA's logit estimation routine).

misclassification of its organizational structure whenever each of the managers independently runs a portion ("sleeve") of the fund's portfolio. In such cases, a fund utilizes decentralized rather than team decision making (Csaszar 2011). Unfortunately, the comprehensive Mutual Funds OnDisc database does not contain the data needed to make this distinction. However, for a sample of funds, Morningstar also offers comprehensive one-page reports which since 2007 include a "Governance and Management" section with sufficient information to distinguish between team and sleeve structure. As in Csaszar (2011), I utilize this data source to code the organizational structure of the mutual funds for which one-page Morningstar reports exist as Team (centralized), Sleeve (decentralized) and Individual as of December 2007. Since such information does not exist for years prior to 2007, the resulting organizational structure dummy variables for the above categories are time-invariant. Fortunately, changes to the organizational structure of funds from the sample covered by Morningstar's one-page reports were rare in the mid-2000s (Csaszar 2011). To test the robustness of my empirical results to the distinction between Team and Sleeve structure, I estimate the effect of organizational structure and decision making process on funds' disposition spread over the period 2003-2007 using the Team and Sleeve organizational structure variables coded from Morningstar's 2007 mutual fund reports. The study's findings on the effects of decision making by teams and by formal models are not affected by this robustness test (Table 4).

-- TABLE 4 ABOUT HERE --

To address the concern that a potential endogeneity of fund structure and decision making process may bias estimation results, I use multivariate probit models to account for the

selection process and estimate funds' disposition spread simultaneously with their choice of organizational structure and decision making process. In the selection equations, *Fund Portfolio Breadth* is measured as the logarithm of the number of different stocks held in a mutual fund's portfolio as of the end of each period (i.e. year). *Family Portfolio Breadth* is measured as the logarithm of the number of mutual funds belonging to a fund family (within the universe of equity mutual funds tracked by the CRSP US Mutual Fund Database) as of the end of each period. Both variables are lagged by one period. To avoid misclassification of funds' organizational structure when estimating the effect of team decision making, all funds identified as having a Sleeve (decentralized) structure by Morningstar's 2007 mutual fund reports are excluded from the sample. Table 5 reports the results of multivariate probit estimations (Ashford and Sowden 1970; Heckman 1978; Wilde 2000) of the effect of structure and decision process on the disposition spread over the sample observation period (1997-2008). The main findings remain intact. The estimated coefficient on the *Team* variable is not statistically different from zero (at $p<.1$), while the estimated coefficient on the *Quant* variable is negative and highly significant ($p<.05$).

-- TABLE 5 ABOUT HERE --

CONCLUSIONS

Can organizations mitigate the impact of individual biases on organizational decisions? On a large sample of mutual fund decisions, this study finds robust empirical evidence that organizational context can play a fundamental role in controlling the impact of individual

judgmental biases on the quality of organizational decisions. Organizational decision making process is found to significantly affect the bias in organizational outcomes. In particular, decision making by formal models significantly reduces the likelihood and extent of a disposition effect bias in mutual fund investment decisions. The results suggest that a significant debiasing of organizational outcomes can be achieved through the design of the organizational context in which decisions are made. The findings call for a significant increase in the scholarly effort devoted to this promising, yet relatively underexplored area of management research.

This study advances several streams of research. It adds to the small body of empirical work examining the factors leading to decision biases and errors in the day-to-day decisions of business organizations (Csaszar 2011; Guler 2007; McNamara and Bromiley 1997; McNamara et al. 2002; Staw et al. 1997; Staw and Hoang 1995). It contributes to the Carnegie tradition (Cyert and March 1963; March and Simon 1958; Simon 1947) in organizational research by exploring whether and how organizations – through structure and decision process – can overcome the limitations posed by bounds on individual rationality and improve the quality of organizational decisions (Argote and Greve 2007; Christensen and Knudsen 2010; Corner et al. 1994; Csaszar 2011; Gavetti et al. 2007; Knudsen and Levinthal 2007; Levinthal and Warglien 1999; Williamson 1998). It thereby also advances extant organizational design and decision making research on the debiasing capacity of organizations (Beck and Plowman 2009; Kahneman and Lovallo 1993; March and Shapira 1987; McNamara and Bromiley 1997; Sutcliffe and McNamara 2001). Finally, it makes a contribution to the growing body of research on the disposition effect and to the mutual fund literature by documenting the impact of organizational structure and decision making process on the disposition effect bias of mutual funds (e.g. Frazzini 2006; Shapira and Venezia 2001; Shefrin and Statman 1985; Weber and Camerer 1998).

The findings do not come without limitations. For one, the investigation is limited to one specific type of judgmental bias (the disposition effect) and one setting (equity mutual funds). It is also limited to exploring two specific aspects of the organizational context – structure and decision making process. The study of how the organizational context in which decisions are made enhances or inhibits particular decision errors could be extended by future research to other types of decision biases and errors, other empirical settings, and other aspects of the organizational context. Future research could also investigate the performance advantages as well as possible disadvantages of organizational architectures which aim to enhance or inhibit specific managerial decision tendencies. Moreover, further studies are needed to explore whether and how the capacity of the organizational context to mitigate (or indeed amplify) decision biases and behavioral tendencies is contingent on relevant management team composition and decision process characteristics, on the political, institutional, and social environment of organizations as well as on their evolution over time.

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TABLE 1

Correlations and Descriptive Statistics

	Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1	DISP Number	-0.01	8.84													
2	DISP Value	0.32	12.23	0.78												
3	Team	0.57	0.50	0.02	0.03											
4	Quant	0.04	0.20	-0.03	-0.04	0.01										
5	Fund Size	5.36	1.83	-0.07	-0.08	0.05	0.03									
6	Family Size	8.87	2.54	-0.04	-0.05	0.06	0.03	0.58								
7	Fund Age	2.12	0.82	-0.02	-0.02	0.01	-0.04	0.46	0.12							
8	Family Age	3.09	0.89	-0.01	-0.01	-0.03	-0.06	0.36	0.62	0.40						
9	Fund Return	9.45	22.26	-0.03	-0.03	-0.02	0.03	0.07	0.02	-0.03	-0.01					
10	Expenses	1.33	0.56	0.05	0.06	-0.05	-0.09	-0.31	-0.26	-0.11	-0.01	-0.02				
11	Turnover	0.91	0.85	0.03	0.03	-0.04	0.04	-0.15	-0.01	-0.10	-0.01	0.00	0.18			
12	Open	0.81	0.39	0.03	0.03	0.05	0.01	-0.07	0.04	0.01	0.03	-0.17	0.04	0.03		
13	Funds in Category	6.06	0.71	-0.01	-0.04	0.03	-0.05	0.01	0.03	0.01	0.03	-0.11	-0.07	-0.06	0.23	
14	Market Return	6.61	17.71	-0.03	-0.04	-0.01	0.00	0.05	0.00	0.01	0.00	0.66	-0.03	-0.05	-0.44	-0.09

All correlations greater than 0.022 (in absolute value) are significant at $p<0.01$

TABLE 2

Results of Regression Analysis of Disposition Spread (DISP)

	Model							
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Dependent Variable:	DISP Number	DISP Value	DISP Number	DISP Value	DISP Number	DISP Value	DISP Number	DISP Value
Team			-0.03	-0.02			-0.03	-0.00
			(0.22)	(0.31)			(0.22)	(0.31)
Quant					-2.18	-3.67	-2.18	-3.67
					(0.80)***	(1.25)***	(0.80)***	(1.25)***
Fund Size	-0.38	-0.54	-0.38	-0.54	-0.38	-0.52	-0.38	-0.52
	(0.09)***	(0.12)***	(0.09)***	(0.12)***	(0.09)***	(0.12)***	(0.09)***	(0.12)***
Family Size	-0.05	-0.02	-0.05	-0.02	-0.07	-0.06	-0.07	-0.06
	(0.18)	(0.26)	(0.18)	(0.26)	(0.18)	(0.26)	(0.18)	(0.26)
Fund Age	0.18	0.14	0.18	0.14	0.17	0.13	0.17	0.13
	(0.18)	(0.24)	(0.18)	(0.24)	(0.18)	(0.24)	(0.18)	(0.24)
Family Age	0.60	0.16	0.60	0.16	0.58	0.13	0.58	0.13
	(0.50)	(0.66)	(0.50)	(0.66)	(0.50)	(0.66)	(0.50)	(0.66)
Fund Return	-0.00	-0.01	-0.00	-0.01	-0.00	-0.01	-0.00	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Expenses	-0.04	-0.02	-0.04	-0.02	-0.06	-0.05	-0.06	-0.05
	(0.37)	(0.71)	(0.37)	(0.71)	(0.37)	(0.71)	(0.37)	(0.71)
Turnover	0.12	0.14	0.11	0.14	0.13	0.16	0.13	0.16
	(0.18)	(0.25)	(0.18)	(0.25)	(0.18)	(0.25)	(0.18)	(0.25)
Open	-0.32	-0.56	-0.32	-0.56	-0.31	-0.54	-0.31	-0.54
	(0.49)	(0.67)	(0.49)	(0.67)	(0.49)	(0.66)	(0.49)	(0.66)
Funds in Category	0.25	-0.61	0.25	-0.61	0.25	-0.61	0.25	-0.61
	(0.67)	(0.80)	(0.67)	(0.80)	(0.67)	(0.81)	(0.67)	(0.81)
Market Return	-0.00	-0.03	-0.00	-0.03	-0.01	-0.03	-0.01	-0.03
	(0.05)	(0.09)	(0.05)	(0.09)	(0.05)	(0.09)	(0.05)	(0.09)
Constant	-3.19	-1.10	-3.15	-1.08	-3.12	-0.99	-3.09	-0.99
	(3.46)	(4.63)	(3.48)	(4.65)	(3.47)	(4.63)	(3.48)	(4.64)
Category-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund Family Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11310	11310	11310	11310	11310	11310	11310	11310
R-squared	0.15	0.15	0.15	0.15	0.15	0.16	0.15	0.16

Robust standard errors in parentheses (clustered by fund). The unit of analysis is the fund-year.
* p<.1; ** p<.05; *** p<.01

TABLE 3

Results of Logistic Regression Models of Disposition Spread (DISP)

	Model							
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Dependent Variable:	DISP Number	DISP Value	DISP Number	DISP Value	DISP Number	DISP Value	DISP Number	DISP Value
Team			0.06	-0.05			0.07	-0.04
			(0.06)	(0.06)			(0.06)	(0.06)
Quant					-0.52	-0.48	-0.52	-0.48
					(0.20)***	(0.20)**	(0.19)***	(0.20)**
Fund Size	-0.10	-0.08	-0.10	-0.08	-0.09	-0.07	-0.09	-0.07
	(0.02)***	(0.02)***	(0.02)***	(0.02)***	(0.02)***	(0.02)***	(0.02)***	(0.02)***
Family Size	-0.02	-0.03	-0.02	-0.03	-0.02	-0.04	-0.02	-0.04
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Fund Age	0.03	0.01	0.04	0.01	0.03	0.00	0.03	0.00
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Family Age	0.14	0.00	0.13	0.01	0.13	0.00	0.13	0.00
	(0.11)	(0.12)	(0.11)	(0.12)	(0.11)	(0.12)	(0.11)	(0.12)
Fund Return	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Expenses	0.09	0.08	0.09	0.08	0.09	0.07	0.09	0.07
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
Turnover	0.02	-0.04	0.02	-0.04	0.02	-0.04	0.02	-0.04
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Open	-0.02	-0.11	-0.02	-0.11	-0.02	-0.11	-0.02	-0.10
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
Funds in Category	0.08	-0.16	0.08	-0.16	0.08	-0.16	0.08	-0.16
	(0.20)	(0.22)	(0.20)	(0.22)	(0.20)	(0.22)	(0.20)	(0.22)
Market Return	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Constant	-1.11	1.50	-1.15	1.53	-1.06	1.54	-1.10	1.57
	(1.45)	(1.54)	(1.45)	(1.54)	(1.45)	(1.55)	(1.45)	(1.55)
Category-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund Family Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11015	11026	11015	11026	11015	11026	11015	11026
Log-likelihood	-7059.54	-6931.07	-7058.78	-6930.70	-7054.14	-6926.58	-7053.34	-6926.23

Robust standard errors in parentheses (clustered by fund). The unit of analysis is the fund-year.
* p<.1; ** p<.05; *** p<.01

TABLE 4

Results of Logistic Regression Models of Disposition Spread

	Model					
Variable	**1**	**2**	**3**	**4**	**5**	**6**
Dependent Variable:	DISP Number	DISP Value	DISP Number	DISP Value	DISP Number	DISP Value
Team	0.00	-0.01			0.02	0.01
	(0.18)	(0.18)			(0.18)	(0.18)
Sleeve	0.09	0.23			-0.01	0.11
	(0.27)	(0.27)			(0.28)	(0.28)
Quant			-0.62	-0.77	-0.62	-0.75
			(0.30)**	(0.36)**	(0.31)**	(0.38)**
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2001	2018	2001	2018	2001	2018
Log-likelihood	-1237.51	-1246.83	-1235.11	-1243.48	-1235.11	-1243.38

Robust standard errors in parentheses (clustered by fund). The unit of analysis is the fund-year. Full set of controls, including fund-year and family fixed effects included. * p<.1; ** p<.05; *** p<.01

TABLE 5

Results of Multivariate Probit Regression Analysis of Disposition Spread

	Model					
Variable	**1**	**2**	**3**	**4**	**5**	**6**
Dependent Variable:	Team	Quant	DISP Number	Team	Quant	DISP Value
Team		0.01	0.10		-0.00	0.02
		(0.02)	(0.12)		(0.00)	(0.13)
Quant	0.13		-0.38	0.11		-0.36
	(0.30)		(0.14)***	(0.32)		(0.14)***
Fund Portfolio Breadth	0.16	0.82		0.16	0.82	
	(0.03)***	(0.09)***		(0.03)***	(0.09)***	
Family Portfolio Breadth	0.09	-0.03		0.09	-0.03	
	(0.04)**	(0.22)		(0.4)**	(0.22)	
Fund Size	-0.01	-0.05	-0.05	-0.01	-0.04	-0.04
	(0.01)	(0.05)	(0.01)***	(0.01)	(0.05)	(0.01)***
Family Size	0.08	-0.28	-0.02	0.08	-0.28	-0.03
	(0.03)**	(0.11)***	(0.02)	(0.03)**	(0.11)***	(0.02)
Fund Age	-0.11	0.02	0.03	-0.11	0.03	0.00
	(0.03)***	(0.10)	(0.02)	(0.03)***	(0.10)	(0.02)
Family Age	0.13	0.56	0.07	0.13	0.57	-0.01
	(0.08)	(0.32)	(0.07)	(0.08)	(0.34)	(0.07)
Fund Return	-0.00	0.00	0.00	-0.00	0.00	-0.00
	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)
Expenses	-0.19	-0.08	0.10	-0.18	-0.09	0.09
	(0.05)***	(0.19)	(0.04)**	(0.05)***	(0.19)	(0.04)**
Turnover	-0.10	0.16	0.03	-0.11	0.15	0.00
	(0.02)***	(0.08)**	(0.02)	(0.02)***	(0.08)**	(0.02)
Open	-0.06	-0.16	0.03	-0.05	-0.13	-0.03
	(0.08)	(0.25)	(0.07)	(0.08)	(0.25)	(0.07)
Funds in Category	-0.00	-0.56	0.07	-0.00	-0.56	-0.08
	(0.13)	(0.29)*	(0.11)	(0.13)	(0.28)**	(0.11)
Market Return	-0.00	-0.00	0.00	-0.00	-0.00	-0.00
	(0.24)	(0.16)	(0.02)	(5.11)	(16.50)	(0.02)
Constant	0.08	-0.03	-0.02	0.02	-0.03	-0.02
	(0.18)	(0.07)	(0.06)	(0.09)	(0.12)	(0.06)
Category-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Fund Family Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations		10501			10519	
Log-likelihood		-11737.68			-11637.46	

Robust standard errors in parentheses (clustered by fund). The unit of analysis is the fund-year.
* p<.1; ** p<.05; *** p<.01