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ABSTRACT

We study the decisions and performance of managers who are also chair of the board (duality managers). We hypothesize that duality managers take more risky decisions and deliver worse performance than non-duality managers due to reduced level of control and replacement risk. Using the mutual fund industry as our laboratory we provide strong support for these hypotheses: Duality managers take risk that they could easily avoid, deviate from their benchmarks, make extreme decisions, and, consequently, deliver extreme performance outcomes. Furthermore, their average underperformance is 2.5 percent. All effects are the stronger, the more power the manager has in the board.

JEL classification: G23, G34

Keywords: Manager duality, governance, managerial decisions, agency conflicts, mutual funds

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1 Introduction

Agency problems are imminent when the decision makers do not bear the wealth effects of their decisions. Therefore, companies typically separate decision making from decision control. The board of directors' role is to control the decisions of the managers and – as the last resort – to fire poor performing managers (see, e.g., Fama and Jensen (1983)). A natural conflict of interest arises if a manager is also member of the board of directors and, thus, controlling herself. This problem is particularly severe if the manager of a company is also chairing the board. Although advocates of such a duality structure emphasize the advantage of ensuring clear responsibilities for the success of the company, empirical evidence suggests that manager duality often leads to poor company performance (see, e.g., Rechner and Dalton (1991)) and makes it difficult for the board to remove poorly performing duality managers (see, e.g., Goyal and Park (2002)).

This paper is the first to analyze the consequences of manager duality on the decisions they take. We use the fund industry as our laboratory to explore this issue since managerial decisions in the fund industry are more prescribed and more precisely observed than in other industries. This makes the fund industry attractive for exploring issues of general interest in corporate finance (see, e.g., Almazan et al. (2004)).[1]

We hypothesize that the reduced level of control and replacement risk of duality managers has two main consequences. First, duality managers take more risky decisions since their compensation scheme is more option-like as compared to non-duality managers. Like all managers, they benefit from good outcomes (e.g., by receiving bonus packages) but they bear

[1] Besides that, looking at the consequences of manager duality in the fund management industry is important in itself since the decisions in the mutual fund industry are highly relevant for millions of investors using mutual funds to save for retirement. According to ICI (2013) more than 2.1 trillion USD are held in mutual funds just through 401(k) plans at the year-end 2012. The huge amount of money being in danger makes it important to understand the consequences of manager duality in the fund industry.

a lower risk of being fired if the outcomes are bad. Second, duality managers use their flexibility in their own interest, spend less effort on their work, and eventually deliver a worse performance than non-duality managers. Furthermore, we hypothesize that the consequences for managerial decisions and performance are stronger, the more the duality manager dominates the board. Our empirical results strongly support all three hypotheses.

In our first set of tests we find strong support for the hypothesis that duality managers take more risky decisions than non-duality managers. They hold less diversified portfolios, deviate more from their benchmarks, take more unsystematic risk, and follow more extreme investment styles. For example, less than 20% of the non-duality managers take as extreme market bets as the average duality manager.

In our second set of tests, we look at the performance consequences of manager duality. With respect to the average performance consequences, we find that funds run by duality managers (duality funds) significantly underperform funds run by non-duality managers (non-duality funds). This result holds no matter how we measure performance. In a standard multivariate regression approach we find an underperformance of up to 2.5 percent per year and in a matched-sample analysis the underperformance goes up to 3.4 percent per year. All these numbers are based on gross returns, i.e., they do not reflect the funds' expense ratios. Looking at net returns makes the underperformance of duality funds even stronger since they charge significantly higher total expense ratios (1.7 percent versus 1.3 percent). Furthermore, consistent with their risky decisions, we find that duality managers achieve more extreme performance outcomes than non-duality managers.

We rule out various alternative explanations for our findings. We adopt an instrumental variable approach to rule out endogeneity issues. We show that the more risky decisions of duality managers do not arise because duality managers face fewer investment restrictions. In contrast, they take more risk even though they are less frequently allowed to

use leverage, options, or illiquid assets in their portfolios. We also rule out the possibility that the poor performance of the duality managers is caused by the recent financial crisis, which overlaps with our sample period. One might suspect that their high risk taking might have led to poor performance only during the financial crisis, but this is not true. Our results are the same for the period before and during the financial crisis. Finally, we rule out the possibility that the performance effect is driven by a family size effect (duality funds might be more prevalent in small fund families and, as suggested by Chen et al. (2004), small fund families might have disadvantages associated with trading commissions and lending fees leading to worse average performance in small families).

In our third set of tests, we analyze whether the strength of the duality effect on managerial decisions and performance depends on the extent the manager dominates the board. We show that the consequences are much weaker if the manager is only an ordinary member of the board but not chairing it; the effect almost disappears. Furthermore, the effect of duality on managerial decision taking and performance is smaller when independent board members gain importance. This is the case when there are more independent directors on the board and when they have a stronger incentive to monitor the fund (proxied by the amount of their own money they have invested in the fund). These findings suggest that the consequences of duality on managerial decisions and performance can be mitigated by reducing the manager's power on the board.

Our paper contributes to three strands of the literature. First, it is related to the corporate finance literature that examines the impact of manager duality on firm performance (see, e.g., Brickley, Coles, and Jarrell (1997), and Rechner and Dalton (1991)). The main contribution to this literature is that our paper is, to our knowledge, the first to look at the consequences of duality on the managerial decisions, not just the average performance outcome.

Second, our paper contributes to the growing literature on the impact of managerial power on managerial behavior and firm performance. Adams, Almeida, and Ferreira (2005) show that firms whose CEOs have more decision-making power experience more variability in performance. In a similar vein, Tang, Crossan, and Rowe (2011) show that dominant CEOs tend to have a strategy that deviates from the industry central tendency and thus extreme performance outcomes. Bebchuk, Cremers, and Peyer (2011) show that firms run by dominant CEOs deliver worse performance. We add to this literature by first showing that duality managers (which obviously have more power than non-duality managers) tend to take more risky decisions and deliver worse and more extreme performance outcomes. Furthermore, we show that these effects are the more pronounced, the more power the duality manager has relative to other board members.

Finally, our paper contributes to the literature on mutual fund governance which highlights the importance of independent board members for fund performance and manager replacement (see, e.g., Ding and Wermers (2012), Fu and Wedge (2011), Ferris and Yan (2007), Khorana, Tufano, and Wedge (2007), and Tufano and Sevick (1997)). We add to this literature in two ways: To begin with, we are the first to study the consequences of poor governance due to manager duality in the fund industry. Besides that, we are the first who look at the consequences of fund governance on the investment decisions of fund managers.

2 Data

For our empirical analysis we use various data sources. From the CRSP Survivor-Bias Free Mutual Fund Database we gather information on mutual funds' monthly returns, total net assets, and other fund characteristics.[2] We focus on actively managed, U.S. domestic equity

[2] Source: CRSP, Center for Research in Security Prices. Graduate School of Business, The University of Chicago. Used with permission. All rights reserved.

funds and exclude bond funds as well as index funds. We use the Lipper objective code to define a fund's investment objective. We aggregate the Lipper segments into seven broad categories: Aggressive Growth, Growth and Income, Income, Growth, Sector Funds, Utility Funds, and Mid-Cap Funds. If a fund offers multiple share classes, we aggregate them at the fund level to avoid multiple counting. We concentrate on single managed funds since we conjecture that the duality effect is most pronounced if the manager has the full power to make the investment decisions. We exclude fund-year observations for which less than 12 months of return data are available. To calculate the characteristic selectivity performance measure of Daniel et al. (1997) we link the CRSP funds to the Thomson Financial Mutual Fund Holdings Database and match the stock returns from the CRSP Monthly Stock Database to the holdings data.

Furthermore, we match the CRSP funds to the funds in the Morningstar Principia Database using fund ticker, fund name, and manager name. The Morningstar database provides detailed information on a manager's biography that includes data on the manager's educational background, e.g., whether she holds an MBA, a PhD, or a Chartered Financial Analysts (CFA) designation, and the date that a manager was first assigned to a fund. We calculate a manager's industry tenure as the number of years since the year that Morningstar reports to be her first year managing a fund in the Morningstar database. We determine the manager's gender by comparing the manager's first name to a list published by the United States Social Security Administration (SSA) that contains the most popular first names by gender.

The final data source is the Statement of Additional Information (SAI), which is Part B of the mutual fund's prospectus. It includes detailed information on each board member. The SAI is contained in the SEC filings 485APOS and 485BPOS which can be downloaded as text files from SEC EDGAR. We match these files with the CRSP funds using

the fund's name. For each fund we manually collect the following information for each board member from the SEC files: Name; whether she is interested or independent as defined by the Investment Company Act (ICA); board member's ownership in the fund. The ownership is reported in five ranges: None; $1–$10,000; $10,001–$50,000; $50,001–$100,000; over $100,000.

Our final sample consists of 1,901 fund-year observations covering the period 2005 - 2009. Table 1 reports summary statistics for the number of funds in the sample, their size (measured as total net assets), their expense ratio, age, and turnover ratio.

– Please insert TABLE 1 approximately here –

Overall, our sample covers a total of 634 distinct funds. The average fund size is around 1.7 billion USD. Its evolution over time clearly reflects the effect of the subprime crisis. The average expense ratio in our sample decreases from 1.45 percent in 2005 to 1.24 percent in 2009. The average fund in our sample is about 17 years old and turns over about 93 percent of its portfolio per year. Over the sample period, the turnover ratio increases from 85 percent to 102 percent.

In Table 2 we report characteristics for duality and non-duality funds and managers.

– Please insert TABLE 2 approximately here –

As shown in Panel A, for about 14 percent of all fund-year observations (covering 84 distinct funds), the manager also acts as chair of the fund's board. Duality funds are much smaller than non-duality funds. The mean duality fund is only about half the size of the mean non-duality fund. Furthermore, duality funds charge significantly higher expense ratios. Regarding a fund's age and turnover, we do not find a significant difference between duality and non-duality funds.

Panel B reports the distribution of funds across market segments, separately for duality and non-duality funds. Duality funds are observed in all market segments. They are overrepresented in the growth segment and underrepresented among the sector funds.

In Panel C we look at the characteristics of the managers in our sample. The numbers in this panel are calculated at the manager level and refer to a total of 559 managers from which 54 managers also chair their fund's boards. We find that almost none of these duality managers are female. The percentage is lower than the percentage of female managers in non-duality funds. Furthermore, duality managers differ from non-duality managers with respect to their education and experience: Duality managers hold a PhD more often and have more industry experience.

3 Impact of Duality on Managerial Decisions

In this section, we test our first main hypothesis: Duality managers take more risky decisions than non-duality managers.

We use several measures to capture different ways duality managers can take risk: First, we use unsystematic risk as a general measure of risk that could be avoided by diversification. Second, we adopt two measures (stock concentration, industry concentration) to capture the risk coming from taking large bets on specific stocks or industries. The next two measures (active share, tracking error) capture to what degree managers deviate from their benchmark. Finally, we examine whether managers take large bets on specific investment styles.

We calculate the unsystematic risk based on Carhart (1997)'s four-factor model. In each calendar year we regress a fund's excess return on the four factor-mimicking portfolio

returns using the twelve monthly return observations of the respective year.[3] The annualized standard deviation of the residual is our measure of unsystematic risk.

We compute the stock concentration as the sum of the squared portfolio weights for all stocks. We do so for each quarter and then average the quarterly stock concentrations to come up with a yearly measure. To calculate the industry concentration we use the same approach but now based on the industry weights. We first sort all stocks into ten industries, as in Kacperczyk, Sialm, and Zheng (2005), and then calculate the weight for a specific industry in a portfolio by summing up the portfolio weights of all stocks belonging to that industry. The sum of the squared industry weights (averaged across the quarters of a year) is our measure of industry concentration.

To measure how a manager deviates from her benchmark, we use the active share and tracking error measures of Cremers and Petajisto (2009) and Petajisto (2013).[4] The active share is calculated as the absolute difference between the portfolio weight of a stock and the stock's weight in the respective benchmark, summed over all positions of the stock universe and divided by two. The tracking error is defined as the residual standard deviation from a regression of excess fund returns on excess benchmark returns.

To measure the extremity of a fund manager's investment style, we again estimate the Carhart (1997) four-factor model for each fund *i* in each year *t* as we did for the unsystematic risk. From this model, we use the sensitivities (beta exposures) regarding the four factors (market factor (MKT), size factor (SMB), value factor (HML), momentum factor (MOM)) to capture the fund's investment style. We follow Bär, Kempf, and Ruenzi (2011) and construct extremity measures for a manager's factor sensitivities as:

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[3] We downloaded the factor-mimicking portfolio returns for the four-factor model and the risk-free rate from Kenneth French's website at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

[4] We downloaded the active share and tracking error data from Antti Petajisto's website at http://www.petajisto.net/data.html.

$$EM_{i,t}^{S} = \frac{|\beta_{i,t}^{S} - \bar{\beta}_{k,t}^{S}|}{\frac{1}{N^{k}} \cdot \sum_{j=1}^{N^{k}} |\beta_{j,t}^{S} - \bar{\beta}_{k,t}^{S}|}. \quad (1)$$

S represents the investment style analyzed (MKT, SMB, HML, and MOM, respectively) and N^{k} gives the number of funds in a specific market segment *k* in a given year *t*. $EM_{i,t}^{S}$ shows high values for funds that strongly deviate in their exposure to a specific style ($\beta_{i,t}^{S}$) from the average exposure of their market segment ($\bar{\beta}_{k,t}^{S}$) in absolute terms. We divide the absolute deviation by the average absolute deviation in the corresponding market segment and respective year to make our style extremity measure comparable across styles, segments, and time. It equals one for the average fund.

We run pooled OLS-regressions and use the respective risk measure as dependent variable:

$$\begin{aligned} Risk_{i,t} = \alpha + \beta D_{i,t}^{Duality} + \gamma_1 \ln(Size_{i,t-1}) + \gamma_2 TO_{i,t} + \gamma_3 FA_{i,t} \\ + \phi_1 D_{i,t}^{Female} + \phi_2 D_{i,t}^{MBA} + \phi_3 D_{i,t}^{CFA} + \phi_4 D_{i,t}^{PhD} + \phi_5 Tenure_{i,t} + \varepsilon_{i,t}. \end{aligned} \quad (2)$$

Our main independent variable is the duality dummy which equals one if the manager of a fund also serves as the chair of the board of directors of that fund in the respective year and zero otherwise. We add further variables to control for fund and manager characteristics. At the fund level, we use the logarithm of the fund's lagged size, the fund's yearly turnover ratio (TO), and the fund's age (FA) as control variables in the regression. At the manager level, we use dummies to control for the manager's gender and her educational degrees (MBA, CFA, and PhD). In addition, we use the manager's industry tenure (measured in years) as a control variable. To control for any unobservable time or segment effects that could equally affect all funds in a given year or a particular market segment, respectively, we also include time and segment fixed effects in the regressions. Standard errors are clustered at the fund level. Results are reported in Table 3.

– Please insert TABLE 3 approximately here –

Our results clearly support our first main hypothesis: Duality managers take much more risk than non-duality managers.

The unsystematic risk of their portfolios is significantly (at 1%-level) higher. The difference of more than 1.3 percentage points is huge given that the total unsystematic risk of non-duality funds is only 3.9 percent (calculated in unreported analysis).

Duality managers take this risk by holding more concentrated portfolios, i.e., they take more bets on specific stocks and industries. The difference in stock (industry) concentration is significant at the 1% (10%)-level. Comparing the coefficient of the duality dummy (0.0116) with the average stock concentration measure for non-duality funds (0.0250) shows that the stock concentration of duality funds is almost 50 percent larger than the stock concentration of non-duality funds. The economic dimension can be illustrated with the following example: A non-duality manager would achieve a stock concentration measure of 0.025 if she holds an equally weighted portfolio of 40 stocks. In contrast, the duality manager would have to hold only 27 stocks in her equally weighted portfolio to achieve the concentration measure of 0.037 ($\approx 0.025 + 0.0116$). The difference in industry concentration is less pronounced, but still economically significant. The average value for non-duality funds is 0.2790, meaning that the industry concentration of duality funds is about 10 percent larger than the industry concentration of non-duality funds.

Duality managers also deviate more from their benchmarks than non-duality managers. They take higher active shares and tracking errors. Both differences are statistically significant at the 1%-level, but they are also very significant from an economic point of view. Given the average level of active share (78.55%) and tracking error (5.84%) for non-duality

funds, the coefficients for the duality dummy mean that the active share of duality funds is about 13% and the tracking error about 50% larger.

Finally, the results confirm that duality managers follow much more extreme investment styles than non-duality managers. The duality dummy is positive and significant at the 1%-level for three out of four styles (and at the 5%-level for HML). The size of the coefficient is also economically significant. This becomes clear when comparing the coefficients for the duality dummies with the average extremity measures for the non-duality group. The respective numbers are 0.91 for MKT, 0.95 for SMB, 0.96 for HML, and 0.95 for MOM. Thus, the extremity measure is more than 60 percent larger for duality funds than for non-duality funds when looking at the market factor MKT. Putting it differently, only 17% percent of the non-duality managers take as extreme market risk as the average duality manager (calculated in an unreported analysis). The differences are smaller for the other style factors, but still remarkably high: The extremity measures are more than 30 percent larger for duality funds than for non-duality funds when looking at the SMB, HML, and MOM factor, respectively. Since the average style exposure hardly differs between duality and non-duality funds (calculated in an unreported analysis), our results imply that duality managers take extreme style bets in both directions. This means, for example, that some duality managers take a huge amount of market risk while others avoid taking market risk. Some duality managers follow a pure momentum strategy by buying past winners while others do exactly the opposite and follow a contrarian strategy. [5]

Regarding the control variables, we find that a fund's turnover ratio is positively related to a fund's risk and fund size is negatively related to it, consistent with Chevalier and Ellison (1999) and Bär, Kempf, and Ruenzi (2011). The other fund characteristics and all

[5] Only the exposure to the size factor is significantly (at the 10%-level) larger for duality funds.

manager characteristics usually have no significant impact on the risk taking of fund managers.

Overall, the results of our analysis clearly support our first main hypothesis: Duality managers follow much more risky strategies than non-duality managers. They diversify to a lesser degree, are more willing to deviate from their benchmark, and follow more extreme strategies. Such a behavior is highly sensible since it allows duality managers to benefit from good outcomes by receiving bonus packages without bearing a high risk of being fired if the outcomes are bad.

4 Impact of Duality on Manager Performance

In this section, we analyze the effect of duality on the performance of managers. In Section 4.1 we test the second main hypothesis of our paper: Duality managers deliver worse performance than non-duality managers. Furthermore, we study an implication arising from our results in Table 3: Since duality managers follow more extreme investment styles, we expect them to deliver more extreme performance outcomes. We test this hypothesis in Section 4.2.

4.1 Level of Performance

In this section we test our second main hypothesis: Duality funds perform worse than non-duality funds. We use three performance measures: (i) fund return, (ii) Carhart (1997)

four-factor alpha, and (iii) the characteristic selectivity measure of Daniel et al. (1997) which measures performance using holdings data of the fund.[6]

We compute the performance measures (i) and (ii) based on gross fund returns since gross returns measure better the quality of the investment decisions of the fund manager. To calculate a fund's gross returns, we divide a fund's yearly expense ratio by twelve and add it back to the fund's monthly net return observations. By construction, the characteristic selectivity measure (iii) is not influenced by a fund's expense ratio and, thus, also measures the quality of the investment decisions of the manager.

The three performance measures differ with respect to their risk adjustment. The return measure is not adjusted for fund risk at all. The Carhart (1997) four-factor model is adjusted for risk using a linear factor structure, and the characteristic selectivity (CS) measure captures risk by benchmarking the fund with a characteristic-matched portfolio of stocks.

The Carhart (1997) alpha is the constant from the four-factor model, estimated as in Section 3. In our regressions, we use the annualized alpha. The CS measure for a fund in month τ is calculated as:

$$CS_{\tau} = \sum_{j=1}^{N} w_{j,\tau-1}\left(r_{j,\tau} - r_{j,\tau}^{b}\right). \qquad (3)$$

$w_{j,\tau-1}$ is the portfolio weight of stock j at the end of month $\tau-1$, $r_{j,\tau}$ is the return of stock j in month τ and $r_{j,\tau}^{b}$ is the return of the characteristic benchmark matching stock j. Since portfolio holdings are available only quarterly, we have no monthly updates of the fund holdings and, thus, use the most recent portfolio holdings to calculate $w_{j,\tau-1}$. We then compound the monthly CS observations to get a yearly measure.

[6] The data on the characteristic benchmarks are taken from Russ Wermer's website, http://www.rhsmith.umd.edu/faculty/rwermers/ftpsite/Dgtw/coverpage.htm.

We conduct multivariate regressions as in the previous section, but now use the annualized performance measures as dependent variables in the regressions. Our main independent variable is again the duality dummy which equals one if the fund's manager also serves as the chair on the fund's board of directors in the respective year and zero otherwise. The control variables are the same as in Section 3. We again control for time and segment fixed effects in the regressions. Standard errors are clustered at the fund level. Results are provided in Table 4.

– Please insert TABLE 4 approximately here –

The results of the multivariate regressions (Panel A of Table 4) support our second main hypothesis: Duality funds achieve significantly worse performance than non-duality funds.

The returns differ by 1.2 percent per year after controlling for fund and manager characteristics. This is a huge number given that the average gross return of non-duality funds is only 6.3 percent per year (calculated in unreported analysis). Using the risk-adjusted performance measures, the difference between duality and non-duality funds becomes even bigger. It is about 2.3 percent per year based on the Carhart (1997) four-factor alpha and about 2.5 percent per year based on the characteristic selectivity measure of Daniel et al. (1997). The performance levels show that non-duality funds deliver a positive risk-adjusted performance before costs (alpha= 1.61%, CS= 0.56%) whereas duality funds deliver a negative performance – even before costs.

Regarding the control variables, we find a negative influence of fund size and turnover on performance in most specifications and CFA managers seem to deliver a slightly better performance. The other control variables are significant only sporadically.

To check the robustness of our results, we conduct a matched-sample comparison between duality and non-duality funds. We match each duality fund with an equally weighted

portfolio of non-duality funds that match the duality fund with respect to various matching criteria. In our base case we match funds based on fund segment, year, and fund size. We use fund size as a basic sorting criterion since size has been shown to have an impact on fund performance (e.g., Berk and Green (2004), Chen et al. (2004), and our results in Panel A). Thus, we link a duality fund to all non-duality funds belonging to the same market segment and the same fund-size decile in a specific year. In the base case, we find a matching portfolio for almost all duality funds. The number of fund-year observations goes down only from 261 to 254 when applying the year-segment-size matching criterion.

We also use additional matching criteria to further account for factors that have been shown to influence fund performance in the literature. We add fund turnover, as Carhart (1997) and Chen et al. (2004) have shown that turnover has a negative impact on fund performance (see also our results in Panel A). Given the empirical evidence of Golec (1996), we also use industry tenure as an additional matching criterion. Thus, we link a duality fund to all non-duality funds belonging to the same market segment and the same fund-size decile and the same turnover-quintile (tenure-quintile) in a specific year. We use quintiles for these additional sorting criteria since the number of matches goes down by another one third if we use deciles instead. As additional matching criteria we use the information whether the manager holds either an MBA or a CFA. We apply these additional sorting criteria since various studies (e.g., Golec (1996), Gottesman and Morey (2006), Kempf, Fang, and Trapp (2013)) have documented that manager education has an impact on fund performance.

For each duality fund and its matching non-duality fund portfolio we calculate the same performance measures as above. The average performance differential between duality funds and their respective matching non-duality fund portfolio are provided in Panel B of Table 4 for the various matching criteria. The results are remarkably strong. In all 15 cases the performance differential is significantly negative, i.e., duality funds deliver worse

performance than comparable non-duality funds. The level of the underperformance is similar to the level reported in Panel A.

Overall, our results clearly support our second main hypothesis: Duality managers deliver a worse performance than non-duality managers. Thus, our findings with respect to average performance in the fund industry are similar to findings in other industries as documented by, e.g., Rechner and Dalton (1991), Brickley, Coles, and Jarrell (1997).

4.2 Performance Extremity

After having tested for the impact of manager duality on the level of performance, we now turn to the impact on the extremity of performance. Since duality managers take more extreme decisions (see Section 3) and these decisions determine the performance outcome, we hypothesize that duality managers also deliver more extreme performance outcomes.

We follow Bär, Kempf, and Ruenzi (2011) and calculate the extremity measure EM^P in each year as:

$$EM_{i,t}^{P} = \frac{| P_{i,t} - \overline{P}_{k,t} |}{\frac{1}{N^k} \cdot \sum_{j=1}^{N^k} | P_{j,t} - \overline{P}_{k,t} |}. \quad (4)$$

P stands for the respective performance measure and $\overline{P}$ for the average performance of all funds in the same market segment. We measure the performance extremity EM^P as the absolute deviation of a fund's performance from the average performance of all funds in the same market segment and divide it by the average absolute deviation of all funds in the segment. Thus, the average fund has an extremity measure of one, by definition.

To analyze whether the performance extremity measures differ for duality and non-duality funds, we run regressions where the performance extremity measures are the

dependent variables. The most important independent variable in the regressions is again the duality dummy and the control variables are the same as before.

– Please insert TABLE 5 approximately here –

Table 5 clearly shows that duality managers deliver much more extreme performance outcomes than non-duality managers. The difference is highly significant in both a statistical and economic sense. The coefficient for the duality dummy is different from zero at the 1%-level in all cases, and the size of the coefficient is huge given that the performance extremity of non-duality funds is about 0.94 for all performance measures, on average (calculated in unreported analysis). These extreme performance outcomes might make duality funds attractive for investors who otherwise gamble in the stock market and invest in lottery-stocks (see, e.g., Kumar (2009)).

The control variables have an impact similar to that in Table 3 where we look at the impact of duality on managerial decisions. A high fund's turnover ratio is related to risky behavior and extreme performance outcomes. In contrast, fund size is negatively related to risky behavior and performance extremity. Both findings are consistent with Bär, Kempf, and Ruenzi (2011).

5 Alternative Explanations

In this section, we test alternative explanations for our main results. We start by checking whether our analysis is plagued by an endogeneity problem. For example, one might imagine that a fund company wants to offer a fund with a risky investment style for some exogenous reason and, therefore, wants to leave the fund manager flexibility in decision making by appointing her as fund manager and chair of the fund's board. Then, we would

have a causality issue in our analysis. We rule out this possibility by adopting an instrumental variable approach using two-stage least squares regressions in Section 5.1.

Our first main result (duality fund managers take more risky decisions) might just reflect the fact that duality funds are less constrained for some reason. Although this would not be consistent with the equilibrium argument of Almazan et al. (2004), it is certainly possible. To rule out this possibility, we control for investment constraints of funds in Section 5.2.

For our second main result (duality fund managers deliver worse performance) we test two alternative explanations. First, the result might occur only because our sample period covers the recent financial crisis. Since duality managers take more risk and markets went down in the financial crisis, the high-risk strategy might have destroyed the performance of the duality managers. To control for the impact of the financial crisis, we look at the pre-crisis period and the crisis period separately in Section 5.3. Second, we test whether our performance result is caused by a family size effect. If duality managers are more prevalent among smaller fund families and if smaller fund families underperform, as suggested by Chen et al. (2004), the underperformance of duality funds might be a simple family size effect. To rule out this possibility, we control for family size in Section 5.4.

The following sections clearly show that our main results are not caused by these alternative explanations. All our findings remain robust.

5.1 Causality

To address the causality problem, we adopt an instrumental variable approach using two-stage least squares regressions (2SLS) as in Ferris and Yan (2007) and Adams, Mansi, and Nishikawa (2010). We use a firm's complexity as our instrumental variable since the governance structure is known to be related to a firm's complexity (see, e.g., Linck, Netter,

and Yang (2008)) and since we do not expect the firm's complexity to have an impact on the performance and investment decisions of the managers of individual funds except through its impact on the governance structure. To measure complexity we follow the idea of Boone et al. (2007) that the complexity of a firm increases with the number of market segments in which the firm is active and with its age. Therefore, we use the number of investment objectives for each fund family and the age of the fund family as our instrumental variables.[7]

In the first stage of the 2SLS procedure we relate the duality dummy to our instrument variables as well as fund characteristics (log of lagged fund size, turnover, fund age) and manager characteristics (female dummy, MBA dummy, CFA dummy, PhD dummy, industry tenure). We also allow for segment and time fixed effects. The first-stage results (not reported in detail for sake of brevity) confirm that our instrumental variables are well suited. The F-statistic takes a value of at least 30, suggesting that the instrumental variables are highly relevant. Looking at the instrumental variables separately shows that the number of investment objectives has a significantly negative impact on duality (at the 1%-level) whereas family age is not significant at conventional levels.[8] Thus, our results of the first stage suggest that fund families with low complexity tend to choose the duality structure.

In the second stage we re-run our analyses using the fitted value of the first stage instead of the duality dummy. The second stage results are presented in Table 6. For sake of brevity we only report the results for the duality dummy but not for the controls. The Hansen J-statistics suggest that the instruments used are appropriately uncorrelated with the disturbance terms.

– Please insert TABLE 6 approximately here –

[7] Ferris and Yan (2007) and Adams, Mansi, and Nishikawa (2010) use the same variables but use fund turnover and manager tenure as additional instrumental variables. We leave the latter out since we expect them to be directly linked to managerial decisions and performance. See our results in the previous sections and the empirical evidence provided by Carhart (1997), Chen et al. (2004), Chevalier and Ellison (1999), and Golec (1996).

[8] Therefore, we run a second specification leaving out family age as instrumental variable. The first and second stage results remain qualitatively the same.

The results of the two-stage regressions all confirm the main conclusions drawn earlier: Duality managers take more risky decisions (Panel A), deliver worse performance (Panel B) and achieve more extreme performance outcomes (Panel C). The Duality dummy has the hypothesized sign and is significant at the 1% level in all cases. This suggests that our main results are not flawed by an endogeneity problem.

5.2 Impact of Constraints

To test whether the higher risk taking of duality managers results from facing fewer constraints, we hand-collected constraint information from the N-SAR reports of the funds and matched them to CRSP as in Christoffersen, Evans, and Musto (2013). In the N-SAR reports the fund managers have to answer (yes/no) whether the investment policy allows pre-specified investment practices. We collect this information for the same investment practices as Almazan et al. (2004): borrowing of money, margin purchases, short selling, writing or investing in options on equities, writing or investing in stock index futures, and investments in restricted securities. The first three restrictions affect the funds' ability to use leverage, the next two the use of derivatives, and the final one their ability to invest in illiquid assets. Based on this information we calculate the aggregate constraint score for each fund in each year as in Almazan et al. (2004).[9]

In Table 7 we provide information about the restrictedness of funds. We report the percentage of restricted funds for each investment practice and the average aggregate constraint score. We do so separately for duality funds and non-duality funds.

– Please insert TABLE 7 approximately here –

[9] The score is calculated in the following way: Within each category of restrictions (use of leverage, use of derivatives, investing in illiquid assets), we first calculate the within-category score as the proportion of restricted activities in that category. The overall restriction score is obtained by equally weighting the three within-category scores.

Table 7 clearly rules out the possibility that duality managers take more risk because they are less constrained. On the contrary, duality funds are significantly more constrained than non-duality funds. This finding is consistent with the idea of Almazan et al. (2004) that constraints are more common when other monitoring mechanisms are less able to mitigate agency problems. Since agency problems are particularly severe if the manager of a company is also the chair of the board, it comes as no surprise that duality funds are more constrained.

Although Table 7 rules out the possibility that duality managers are able to take more risk due to lower constraints, we check the general impact of constraints on our results by adding the overall constraint score as an additional control variable in our multivariate regressions. The results are provided in Table 8. For sake of brevity we report only the results for the duality dummy and the constraint score, but not for the remaining control variables. They have the same qualitative impact as in the earlier tables.

– Please insert TABLE 8 approximately here –

Table 8 shows that our main results do not change when controlling for the restrictedness of funds. The constraint score has hardly ever a significant impact in the regressions. The conclusions of our analysis remain unchanged: Duality managers take more risky decisions (Panel A) and deliver worse (Panel B) and more extreme (Panel C) performance outcomes.

5.3 Impact of Financial Crisis

To rule out the possibility that duality funds deliver worse performance only because our sample period covers the financial crisis, we divide our sample in two sub-samples. The

first sub-sample covers the pre-crisis years 2005 and 2006 and the second sub-sample covers the crisis years 2008 and 2009.[10] Results are presented in Table 9.

– Please insert TABLE 9 approximately here –

We first look at Panel B of Table 9, which shows the impact of duality on performance separately for the pre-crisis and the crisis period. The duality variable has a negative sign for all performance measures in the pre-crisis period as well as in the crisis period. In each period, the coefficient is significant in two (out of three) cases. This suggests that our finding that duality fund managers deliver a worse performance than non-duality fund managers is not driven by the financial crisis.

The other panels of Table 9 show that our results with respect to the investment behavior of managers hold for the pre-crisis period as well as for the crisis period: Duality managers take more risk (Panel A), and consequently deliver more extreme performance outcomes (Panel C).

Overall, the results of this section clearly show that our main findings in Section 3 and 4 are not driven by the financial crisis.

5.4 Impact of Family Size

We now test whether our second main result (duality funds deliver worse performance) is caused by a family size effect. If duality managers are more prevalent among smaller fund families and if smaller fund families underperform as suggested by Chen et al. (2004), the underperformance of duality funds might just be a family size effect.

[10] We leave out year 2007 since the financial crisis started in this year and it is not clear whether to classify year 2007 as a pre-crisis or a crisis year. As a robustness check we run the analysis also counting year 2007 as a pre-crisis year or as a crisis year; the results remain qualitatively unchanged.

When comparing the size of fund families that do not offer duality funds among their single-managed funds (non-duality families) with those which do (duality families), we indeed find remarkable differences. Non-duality families are far larger than duality families. The average total net assets of a non-duality family (calculated as the total net assets of all team- and single-managed mutual funds in the family) is 114,088 Mio. USD whereas the respective number for a duality family is only 3,505 Mio. USD. The difference is significant at the 1%-level.

To check whether these differences in family characteristics explain our results, we re-run our multivariate regressions but now use family size (measured as total net assets of a family) as an additional control variable. The results for the main variables are presented in Table 10.

– Please insert TABLE 10 approximately here –

Panel B of Table 10 shows that the duality effect on performance is not a family size effect in disguise. Even after controlling for family size, duality funds deliver a worse performance than non-duality funds. The coefficient for the duality dummy is negative in all cases and significant based on risk-adjusted performance measures. Furthermore, Panel B provides no convincing evidence that fund performance is positively related to family size as in Chen et al. (2004). Although the respective coefficients are positive in all models of Panel B, only one of them is marginally significant.[11]

Looking at the relation between family size and managerial decision taking (Panel A) we find that managers behave more carefully in large fund families, which is consistent with Chevalier and Ellison (1999) who show that the risk of being laid off is higher in large families. Nevertheless, our results with respect to the decisions of duality managers remain

[11] When using the number of funds in a family as an alternative proxy for family size, our results remain qualitatively the same.

unchanged: Duality funds take more risky decisions (Panel A) and deliver more extreme performance outcomes (Panel C).

6 Impact of the Power of the Manager

In this section we test whether the strength of the behavior and performance effects depends on the power the fund manager has in the board. In particular, we test two hypotheses: (i) The effect is weaker if the manager is an ordinary member of the board, but not chairing the board. (ii) The effect is weaker if the influence of independent directors in the board is stronger. The first hypothesis is tested in Section 6.1, the second in Section 6.2.

6.1 Fund Manager as Ordinary Member of the Board

The chair takes the most prominent position in the board since she leads the questioning of the management's decisions, evaluates the manager, reports the findings to the board, and influences how issues are presented (see, e.g., Barclift (2011)). Therefore, the manager's impact on the board is stronger if she acts as chair (what we define as duality) compared to being only an ordinary member of the board.

We now define two dummy variables to differentiate between fund managers who are chair of the board (duality dummy) and fund managers who are ordinary members of the board (board member dummy). The base group consists of the funds in which the manager is not a member of the board. We thus extend our multivariate regression models by adding the board member dummy. The results are provided in Table 11.

– Please insert TABLE 11 approximately here –

The bottom line of Table 11 is that it makes a difference whether the fund manager is an ordinary member of the board or its chair.

Looking at the managerial decisions (Panel A), we find that both duality managers and board member managers tend to take more risky decisions than managers who are not members of the board. However, the effect is much stronger for duality members. All coefficients are significant at the 1%- or 5%-level for duality managers, but only five (out of nine) coefficients are significant for ordinary board member managers.

Looking at the performance consequences shows even more pronounced differences: We again find a strong negative impact of manager duality on fund performance in all cases, but there is no significantly negative impact on performance if the manager is only an ordinary member of the board (Panel B). With respect to performance extremity (Panel C), we find results consistent with the behavioral results in Panel A: Both groups tend to deliver more extreme performance outcomes, but the effect is much stronger for duality managers than for board member managers.

Overall, our findings suggest that managers who are members of the board behave differently from managers who are not board members. They tend to take more risky decisions and deliver lower and more extreme performance outcomes. However, all effects are much stronger when the manager is not just an ordinary member of board, but its chair. This suggests that it matters how much power the manager has in the board.

6.2 Independent Members of the Board

Several studies suggest that board independence goes along with good governance (see, e.g., Byrd and Hickman (1992), Cotter, Shivdasani, and Zenner (1997), Ding and Wermers (2012), Khorana, Tufano, and Wedge (2007), Tufano and Sevick (1997), and

Weisbach (1988)). However, Cremers et al. (2009) point out that a lack of ownership could lead independent directors to be less active monitors. Therefore, we hypothesize that the governance is particularly strong if there are many independent directors on the board and if they have invested their own money in the fund. In that case we expect that they act as a stronger counterbalance to the duality manager in the board and leave her less power. Therefore, we hypothesize that the effect of duality on managerial decisions and performance is weaker in that case.

To test this hypothesis we regress the dependent variables used in the multivariate regressions of Sections 3 and 4 on the duality dummy and the usual control variables but now additionally include interaction terms between the duality dummy and the governance factors (number of independent directors, ownership of the independent directors) as independent variables. The coefficients of these interactions can be interpreted as the impact of the respective governance factor on the duality consequences. We measure independent directors' ownership as the average ownership of the independent directors in a specific fund. As ownership information is only disclosed using specified dollar ranges, we use the ranges' respective mean to proxy for a director's ownership in a fund and divide it by 1,000 USD to make the coefficients' magnitude more feasible. For the highest range, which has no upper limit, we assume that a director's ownership equals the range's lower limit as in Khorana, Servaes, and Wedge (2007). Results are presented in Table 12.

– Please insert TABLE 12 approximately here –

Panel A of Table 12 shows that independent directors have some impact on the decisions of duality managers. The interaction terms have the expected (negative) sign in 15 (out of 18) cases, but they are significant at the conventional levels only in seven cases. We get a similar conclusion when looking at the performance effects (Panels B and C). The interaction coefficients typically have the opposite sign of the basic effect, i.e., independent directors

tend to reduce the negative effect of duality on fund performance. However, the effect is not very strong in a statistical sense; the interaction coefficients are insignificant in most cases. Overall, our results suggest that independent directors do form a counterpart to duality managers, but they are not able to fully prevent duality managers from making risky decisions and delivering poor and extreme performance outcomes.

Taking all results of Section 6 together, we interpret them as supporting our hypothesis: The more power the manager has in the board, the more risky the decisions she takes and the poorer and more extreme her performance is.

7 Conclusion

Separation of decision making and decision control is the common approach to avoid agency problems when the decision makers do not bear the wealth effects of their decisions. The main task of the board of directors is to oversee the management and, if necessary, replace the manager. Thus, a natural conflict of interests arises when the manager herself is also serving as the chair of the board. In our laboratory for exploring the consequences of this conflict, the mutual fund industry, this happens in 14 percent of all cases.

In this paper we document several novel findings on the consequences of this conflict: Most importantly, we find that managers who also chair the board (duality managers) tend to make more risky decisions than other managers. They take risk which could be avoided by diversifying their assets, they hold highly concentrated portfolios, deviate from their benchmarks, take extreme style bets, and, consequently, achieve extreme performance outcomes. Such a risky behavior is highly sensible since duality managers have option-like incentive schemes: They get a bonus when their bets work well but do not bear the risk of being laid off when their bets go wrong.

Furthermore, we find that duality managers underperform non-duality managers on average. They make worse investment decisions leading to an underperformance before fees between 1.2 and 2.5 percent per year and, in addition, charge fees that are higher by 0.4 percentage points per year.

Finally, we document that the effects of duality on the manager's decisions and performance depends on the extent to which the manager dominates the board. If the manager is only ordinary member of the board but not chairing it, the effect is much weaker. Independent board members are able to reduce the effect of duality, but the position of the duality manager seems to be so strong that the duality effect does not disappear.

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Table 1 – Descriptive Statistics

This table reports summary statistics for our sample of actively single-managed U.S. equity mutual funds between 2005 and 2009. The funds belong to the market segments Aggressive Growth, Growth and Income, Income, Growth, Sector Funds, Utility Funds, and Mid-Cap Funds. For each sample year as well as the total sample, we report the number of funds in the sample, the average funds' size measured as total net assets (TNA) in million US Dollar, the average funds' expense ratio (in %), the average funds' age in years, and the average funds' turnover ratio (in %).

Year	Number	Fund Size	Expense ratio	Fund age	Turnover
2005	392	1,784	1.45	16.35	85.27
2006	423	1,814	1.36	15.60	94.62
2007	431	1,995	1.29	16.19	85.69
2008	346	1,164	1.22	17.67	100.20
2009	309	1,534	1.24	18.49	101.51
Total sample	634	1,685	1.32	16.74	92.80

Table 2 – Descriptive Statistics for Duality and Non-Duality Funds

This table reports summary statistics for funds whose managers also serve as the chair of the board of directors (duality) and for funds whose managers do not (Non-duality). In Panel A, we report the fraction of funds managed (in %), the average fund size as measured by the total net assets in million USD, the average expense ratio (in %), the average fund age in years, and the average fund turnover (in %). Panel B reports the percentage of duality and non-duality funds in the various market segments. Panel C reports the fraction of female managers (in %), the fraction of managers with an MBA (in %), the fraction of managers with a CFA (in %), and the fraction of managers with a PhD (in %). The manager's gender is determined by comparing the manager's first name to a list published by the United States Social Security Administration (SSA) that contains the most popular first names by gender for the last 10 decades. Additionally, we identify the gender of managers with ambiguous first names from several internet sources like the fund prospectus, press releases, or photographs that reveal their gender. We also report the average managers' industry tenure measured in years. To come up with an average industry tenure we first calculate the tenure for each manager. As her starting date in the industry, we take the first year the manager appears in the Morningstar database and as her ending date the last year the manager is in our sample. Thus, we have a single tenure number per manager which we then average to come up with the average value provided in the table. The last column of the table reports the difference in fund and manager characteristics between duality and non-duality funds. ***, **, and * denote statistical significance for the difference in means between both groups at the 1%-, 5%-, and 10%-level, respectively.

Panel A: Fund characteristics

	Duality	Non-duality	Difference
Funds managed	13.73	86.27	
Fund size	894	1,811	-917 ***
Expense ratio	1.70	1.26	0.44 ***
Fund age	16.41	16.79	-0.38
Turnover	92.07	92.92	-0.85

Panel B: Market segments

	Duality	Non-duality	Difference
Aggressive Growth	24.52	22.68	1.84
Growth and Income	16.86	13.29	3.57
Income	6.51	3.54	2.97 **
Growth	42.15	32.87	9.28 ***
Sector	4.60	16.28	-11.68 ***
Utility	0.77	2.13	-1.36
Mid Cap	4.60	9.21	-4.62 **
Total	100.00	100.00	

Panel C: Manager characteristics

	Duality	Non-duality	Difference
Female	1.85	8.71	-6.86 *
MBA	40.74	34.26	6.48
CFA	38.89	50.50	-11.61
PhD	3.70	1.00	2.70 *
Industry tenure	17.85	10.54	7.31 ***

Table 3 – Managerial Decisions

This table presents results from pooled OLS regressions based on model (2). In the various columns we use unsystematic risk, stock concentration, industry concentration, active share, tracking error, and style extremity as the dependent variable: (1) To measure the fund's unsystematic risk, we first estimate for each fund in each year the Carhart (1997) four-factor model. We then compute the unsystematic risk as the standard deviation of the residuals from the regressions. (2) The stock concentration is measured as the sum of the squared portfolio weights for all stocks in each quarter. We then average the quarterly stock concentrations to come up with a yearly measure. (3) To measure the industry concentration, we follow Kacperczyk, Sialm, and Zheng (2005) and sort all stocks into ten industries and calculate the weight for a specific industry in a portfolio by summing up the portfolio weights of all stocks belonging to that industry. The sum of the squared industry weights (averaged across the quarters of a year) is our measure of industry concentration. (4) We use the active share und tracking error measures of Cremers and Petajisto (2009) and Petajisto (2013). (5) To quantify the style extremity we use the sensitivities (beta exposures) from the Carhart (1997) model regarding the four factors (market factor (MKT), size factor (SMB), value factor (HML), momentum factor (MOM)) to capture the fund's investment style. We then follow the approach of Bär, Kempf, and Ruenzi (2011) and calculate an extremity measure in each year:

$$EM_{i,t}^{S} = \frac{|\beta_{i,t}^{S} - \overline{\beta}_{k,t}^{S}|}{\frac{1}{N^{k}} \cdot \sum_{j=1}^{N^{k}} |\beta_{j,t}^{S} - \overline{\beta}_{k,t}^{S}|}$$

where *S* represents the investment style analyzed (MKT, SMB, HML, and MOM, respectively) and N^k gives the number of funds in a specific market segment *k* in a given year *t*. To normalize the extremity measure, we divide it by the average style deviation in the corresponding market segment and respective year. Our main independent variable is the duality dummy which equals one if the fund's manager also serves as the chair of the fund's board of directors and zero otherwise. As fund control variables we use the logarithm of the fund's lagged size (measured in millions USD), the fund's yearly turnover ratio, and the fund's age (measured in years). As manager control variables we use dummies to control for the manager's gender and her educational degrees (MBA, CFA, and PhD) as well as the manager's industry tenure (measured in years). In all regressions we include time fixed effects and segment fixed effects. Robust p-values of the regression coefficients in parentheses are based on standard errors clustered by fund. ***, **, and * denote statistical significance at the 1%-, 5%-, and 10%-level, respectively.

Table 3 – Continued

	Unsystematic risk	Stock concentration	Industry concentration	Active share	Tracking error	Style extremity			
						MKT	SMB	HML	MOM
Duality	0.0131 ***	0.0116 ***	0.0249 *	0.1044 ***	0.0310 ***	0.6034 ***	0.3194 ***	0.2955 **	0.3383 ***
	(<0.001)	(0.002)	(0.082)	(<0.001)	(<0.001)	(<0.001)	(0.003)	(0.012)	(<0.001)
Fund characteristics:									
Ln(size)	-0.0011 **	-0.0016 ***	-0.0042 **	-0.0112 ***	-0.0009	-0.0365 **	-0.0462 **	-0.0227	-0.0369 ***
	(0.016)	(<0.001)	(0.019)	(<0.001)	(0.194)	(0.046)	(0.019)	(0.101)	(0.008)
Turnover	0.0055 ***	0.0042 **	0.0117 **	0.0059	0.0068 ***	0.1444 ***	0.1197 ***	0.1670 ***	0.1512 ***
	(<0.001)	(0.033)	(0.013)	(0.332)	(<0.001)	(0.002)	(<0.001)	(0.001)	(<0.001)
Fund age	0.0001	0.0000	0.0000	-0.0003	-0.0000	-0.0005	0.0022	0.0010	0.0004
	(0.216)	(0.318)	(0.795)	(0.489)	(0.748)	(0.817)	(0.292)	(0.576)	(0.807)
Manager characteristics:									
Female	-0.0036	-0.0003	-0.0030	-0.0001	-0.0065 **	-0.0365	0.0567	-0.1587 **	-0.0829
	(0.105)	(0.913)	(0.839)	(0.998)	(0.028)	(0.676)	(0.536)	(0.018)	(0.301)
MBA	0.0012	-0.0031 *	0.0011	-0.0103	0.0026	-0.0455	0.1239 **	0.0247	-0.0174
	(0.387)	(0.055)	(0.888)	(0.405)	(0.333)	(0.402)	(0.027)	(0.646)	(0.727)
CFA	0.0015	-0.0009	-0.0037	0.0405 ***	0.0031	0.0648	0.0161	0.1151 **	0.0335
	(0.238)	(0.563)	(0.601)	(0.002)	(0.224)	(0.215)	(0.753)	(0.027)	(0.506)
PhD	-0.0037	-0.0070	0.0085	-0.0518 *	0.0076	0.6185	-0.0273	0.1103	0.2333
	(0.338)	(0.122)	(0.781)	(0.053)	(0.250)	(0.417)	(0.898)	(0.666)	(0.624)
Industry tenure	-0.0001	0.0001	0.0006	0.0006	0.0001	0.0038	-0.0056	-0.0009	-0.0004
	(0.275)	(0.681)	(0.449)	(0.485)	(0.647)	(0.520)	(0.245)	(0.878)	(0.930)
Observations	1,888	1,782	1,782	1,223	1,223	1,888	1,888	1,888	1,888
Adj. R^2	0.427	0.226	0.786	0.383	0.473	0.092	0.045	0.047	0.060

Table 4 – Performance

This table reports performance differences between duality funds and non-duality funds using three different performance measures: (1) Return, (2) Carhart (1997) four-factor alpha, and the (3) characteristic selectivity measure (CS) of Daniel et al. (1997). Performance measures are calculated using gross-of-fee returns. Panel A shows results from pooled OLS regressions like equation (2) with yearly performance measures being the dependent variables now. The main independent variable is again the duality dummy which is defined as in Table 3. The control variables are also the same as in Table 3. All regression specifications include time fixed effects and segment fixed effects. Robust p-values of the regression coefficients in parentheses are based on standard errors clustered by fund. Panel B presents results from a matched sample analysis where we match each duality fund with an equally weighted portfolio of non-duality funds using the following matching characteristics: Year, segment, fund size, turnover, tenure, and fund managers' education (MBA or CFA). In our base case, shown in the first row, we link a duality fund to all non-duality funds belonging to the same market segment and the same fund-size decile in a specific year. In the second and third row we use a fund's turnover-quintile and a manager's tenure-quintile in a specific year as additional matching criteria. In the last two rows, we use the information of whether the manager holds an MBA or a CFA as additional matching criteria. We then test whether the performance difference between duality funds and their respective matching non-duality fund portfolio is different from zero. The corresponding p-values are in parentheses. ***, **, and * denote statistical significance at the 1%-, 5%-, and 10%-level, respectively.

Panel A: Multivariate regressions

	Return	Carhart alpha	CS
Duality	-0.0119 *	-0.0226 ***	-0.0253 ***
	(0.072)	(0.003)	(<0.001)
Fund characteristics:			
Ln(size)	-0.0009	-0.0024 **	-0.0026 **
	(0.410)	(0.033)	(0.012)
Turnover	-0.0040	-0.0179 ***	-0.0057 **
	(0.175)	(<0.001)	(0.033)
Fund age	0.0003 **	0.0000	0.0001
	(0.015)	(0.736)	(0.209)
Manager characteristics:			
Female	-0.0085	-0.0042	-0.0034
	(0.277)	(0.548)	(0.608)
MBA	0.0103 **	-0.0029	0.0032
	(0.021)	(0.540)	(0.442)
CFA	0.0082 *	0.0022	0.0073 **
	(0.056)	(0.609)	(0.046)
PhD	0.0137	0.0231	0.0490 **
	(0.437)	(0.248)	(0.030)
Industry tenure	-0.0004	-0.0001	0.0004
	(0.355)	(0.862)	(0.458)
Observations	1,888	1,888	1,716
Adj. R^2	0.841	0.068	0.149

Table 4 – Continued

Panel B: Matched sample

Matching characteristics	Observations	Return	Carhart alpha	CS
Year, segment, and size	254	-0.0168 **	-0.0210 ***	-0.0175 ***
		(0.019)	(0.007)	(0.002)
Year, segment, size, and turnover	186	-0.0215 **	-0.0337 ***	-0.0259 ***
		(0.035)	(0.002)	(0.001)
Year, segment, size, and tenure	185	-0.0190 **	-0.0253 **	-0.0220 ***
		(0.040)	(0.013)	(0.001)
Year, segment, size, and MBA	226	-0.0290 ***	-0.0256 ***	-0.0215 ***
		(0.001)	(0.005)	(0.001)
Year, segment, size, and CFA	233	-0.0187 **	-0.0210 **	-0.0179 ***
		(0.022)	(0.015)	(0.004)

Table 5 – Performance Extremity

This table reports results from pooled OLS regressions like equation (2) with yearly performance extremity measures now the dependent variables. To quantify performance extremity we follow the approach of Bär, Kempf, and Ruenzi (2011) and calculate an extremity measure EM^P in each year. We measure the performance extremity EM^P as the absolute deviation of a fund's performance from the average performance of all funds in the same market segment and divided by the average absolute deviation of all funds in the segment:

$$EM_{i,t}^{P} = \frac{| P_{i,t} - \bar{P}_{k,t} |}{\frac{1}{N^k} \cdot \sum_{j=1}^{N^k} | P_{j,t} - \bar{P}_{k,t} |}$$

where *P* denotes the respective performance measure. The main independent variable is again the duality dummy which is defined as in Table 3. The control variables are also the same as in Table 3. All regression specifications include time fixed effects and segment fixed effects. Robust p-values of the regression coefficients in parentheses are based on standard errors clustered by fund. ***, **, and * denote statistical significance at the 1%-, 5%-, and 10%-level, respectively.

	Return extremity	Carhart alpha extremity	CS extremity
Duality	0.3630 ***	0.4757 ***	0.3954 ***
	(<0.001)	(<0.001)	(<0.001)
Fund characteristics:			
Ln(size)	-0.0335 ***	-0.0427 ***	-0.0428 ***
	(0.009)	(0.001)	(0.006)
Turnover	0.1958 ***	0.2473 ***	0.0850 **
	(<0.001)	(0.002)	(0.036)
Fund age	-0.0008	0.0012	-0.0003
	(0.638)	(0.481)	(0.885)
Manager characteristics:			
Female	-0.1406 **	-0.0181	-0.1040
	(0.023)	(0.832)	(0.148)
MBA	-0.0193	0.0617	0.0357
	(0.668)	(0.216)	(0.531)
CFA	0.1207 ***	0.0299	0.1377 ***
	(0.006)	(0.545)	(0.009)
PhD	0.1358	-0.1971	0.0931
	(0.558)	(0.352)	(0.719)
Industry tenure	0.0026	-0.0035	-0.0048
	(0.488)	(0.466)	(0.477)
Observations	1,888	1,888	1,716
Adj. R^2	0.089	0.105	0.039

Table 6 – Second Stage Regressions

This table reports results of the second stage from two-stage least squared (2SLS) regressions. In the first stage, we relate the duality dummy to our instrumental variables and the same control variables as in Table 3. As instrumental variables we use the number of investment objectives for each fund family and the family's age. In the second stage, we relate several dependent variables to the fitted value of the first stage (instead of the duality dummy) and to the control variables of Table 3. In Panel A the dependent variables are the managerial decision measures defined as in Table 3. In Panel B the dependent variables are the performance measures defined as in Table 4. In Panel C the dependent variables are the performance extremity measures defined as in Table 5. All regression specifications include time fixed effects and segment fixed effects. For sake of brevity, we only report the coefficients for the fitted value and the corresponding J-Statistic. Robust p-values in parentheses are based on standard errors clustered by fund. ***, **, and * denote statistical significance at the 1%-, 5%-, and 10%-level, respectively.

Panel A: Managerial decisions

	Unsystematic risk	Stock concentration	Industry concentration	Active share	Tracking error	Style extremity			
						MKT	SMB	HML	MOM
Duality	0.0227 ***	0.0282 ***	0.1156 ***	0.3181 ***	0.072 ***	1.2948 ***	0.7848 ***	0.9007 ***	0.7208 ***
	(<0.001)	(<0.001)	(0.002)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)
J-statistic	0.006	3.476 *	1.721	0.848	1.399	2.436	0.212	0.171	0.060
	(0.939)	(0.062)	(0.189)	(0.357)	(0.237)	(0.119)	(0.646)	(0.679)	(0.807)
Observations	1,888	1,782	1,782	1,223	1,223	1,888	1,888	1,888	1,888
Adj. R^2	0.415	0.179	0.769	0.192	0.362	0.043	0.020	0.006	0.042

Panel B: Performance

	Return	Carhart alpha	CS
Duality	-0.0419 ***	-0.0520 ***	-0.0577 ***
	(0.007)	(0.002)	(<0.001)
J-statistic	0.623	0.072	2.013
	(0.430)	(0.789)	(0.156)
Observations	1,888	1,888	1,716
Adj. R^2	0.840	0.059	0.136

Panel C: Performance extremity

	Return extremity	Carhart Alpha extremity	CS extremity
Duality	0.9023 ***	0.9038 ***	1.1972 ***
	(<0.001)	(<0.001)	(<0.001)
J-statistic	0.022	0.063	0.002
	(0.882)	(0.802)	(0.969)
Observations	1,888	1,888	1,716
Adj. R^2	0.053	0.087	-0.035

Table 7 – Restrictedness of Funds

This table reports the percentage of restricted duality and non-duality funds with respect to the following investment practices: borrowing of money, margin purchases, short selling, writing or investing in options on equities, writing or investing in stock index futures, and investments in restricted securities. The aggregate constraint score presented in the last row is calculated as in Almazan et al. (2004). The last column of the table reports the difference in the restrictedness for each investment practice between duality and non-duality funds. ***, **, and * denote statistical significance for the difference in means at the 1%-, 5%-, and 10%-level, respectively.

	Percentage of restricted funds		
Investment practice	Duality	Non-duality	Difference
Borrow	0.294	0.109	0.186 ***
Margin	0.892	0.832	0.060 **
Short	0.537	0.357	0.179 ***
Options	0.229	0.040	0.190 ***
Futures	0.494	0.094	0.400 ***
Restricted	0.255	0.041	0.215 ***
Score	0.397	0.180	0.217 ***

Table 8 – Impact of Constraints

This table presents results from pooled OLS regressions using various dependent variables: In Panel A the dependent variables are the managerial decision measures defined as in Table 3. In Panel B the dependent variables are the performance measures defined as in Table 4. In Panel C the dependent variables are the performance extremity measures defined as in Table 5. The main independent variable is again the duality dummy which is defined as in Table 3. Furthermore, we use the constraint score and the control variables of Table 3 as independent variables. The constraint score for each fund in each year is calculated as in Almazan et al. (2004). All regression specifications include time fixed effects and segment fixed effects. For sake of brevity, we only report the coefficients for the duality dummy and the constraint score. Robust p-values of the regression coefficients in parentheses are based on standard errors clustered by fund. ***, **, and * denote statistical significance at the 1%-, 5%-, and 10%-level, respectively.

Panel A: Managerial decisions

	Unsystematic risk	Stock concentration	Industry concentration	Active share	Tracking error	Style extremity			
						MKT	SMB	HML	MOM
Duality	0.0128 ***	0.0129 ***	0.0268 *	0.0933 ***	0.0282 ***	0.5528 ***	0.2996 **	0.3395 ***	0.3180 ***
	(<0.001)	(0.001)	(0.064)	(<0.001)	(<0.001)	(<0.001)	(0.012)	(0.001)	(0.002)
Constraint score	0.0063	0.0047	0.0251	0.0615 **	0.023 ***	0.2618	0.2290	0.1941	0.1421
	(0.165)	(0.374)	(0.353)	(0.047)	(0.003)	(0.148)	(0.142)	(0.424)	(0.387)
Observations	1,632	1,544	1,544	1,087	1,087	1,632	1,632	1,632	1,632
Adj. R^2	0.423	0.212	0.774	0.404	0.494	0.089	0.048	0.048	0.063

Panel B: Performance

	Return	Carhart alpha	CS
Duality	-0.0086	-0.0242 ***	-0.0243 ***
	(0.204)	(0.005)	(0.001)
Constraint score	0.0059	0.0005	0.0128
	(0.606)	(0.965)	(0.242)
Observations	1,632	1,632	1,488
Adj. R^2	0.844	0.073	0.139

Panel C: Performance extremity

	Return extremity	Carhart alpha extremity	CS extremity
Duality	0.3465 ***	0.5325 ***	0.4428 ***
	(<0.001)	(<0.001)	(<0.001)
Constraint score	0.2231	0.0323	0.1035
	(0.104)	(0.846)	(0.497)
Observations	1,632	1,632	1,488
Adj. R^2	0.081	0.116	0.042

Table 9 – Impact of Financial Crisis

This table presents results from pooled OLS regressions for two sub-samples and various dependent variables. The first sub-sample covers the pre-crisis years 2005 and 2006 and the second sub-sample covers the crisis years 2008 and 2009. In Panel A the dependent variables are the managerial decision measures defined as in Table 3. In Panel B the dependent variables are the performance measures defined as in Table 4. In Panel C the dependent variables are the performance extremity measures defined as in Table 5. The main independent variable is again the duality dummy which is defined as in Table 3. The control variables are the same as in Table 3. All regression specifications include time fixed effects and segment fixed effects. For sake of brevity, we only report the coefficients for the duality dummy. Robust p-values of the regression coefficients in parentheses are based on standard errors clustered by fund. ***, **, and * denote statistical significance at the 1%-, 5%-, and 10%-level, respectively.

Panel A: Managerial decisions

						Style extremity			
	Unsystematic risk	Stock concentration	Industry concentration	Active share	Tracking error	MKT	SMB	HML	MOM
Duality in pre-crisis period	0.0150 ***	0.0099 **	0.0261	0.1026 ***	0.0237 ***	0.5733 ***	0.3902 **	0.3506 **	0.3034 **
	(<0.001)	(0.012)	(0.126)	(<0.001)	(<0.001)	(<0.001)	(0.017)	(0.017)	(0.029)
Observations	810	780	780	520	520	810	810	810	810
Adj. R^2	0.417	0.245	0.765	0.413	0.351	0.143	0.045	0.051	0.028
Duality in crisis period	0.0128 ***	0.0136 **	0.0237	0.0950 ***	0.0434 ***	0.6745 ***	0.1919	0.0870	0.2884 **
	(0.001)	(0.020)	(0.149)	(<0.001)	(<0.001)	(0.002)	(0.141)	(0.626)	(0.024)
Observations	650	595	595	440	440	650	650	650	650
Adj. R^2	0.394	0.195	0.814	0.353	0.236	0.101	0.036	0.053	0.126

Panel B: Performance

	Return	Carhart alpha	CS
Duality in pre-crisis period	-0.0214 ***	-0.0186	-0.0179 **
	(0.005)	(0.117)	(0.046)
Observations	810	810	772
Adj. R^2	0.136	0.037	0.106
Duality in crisis period	-0.0045	-0.0425 ***	-0.0372 ***
	(0.668)	(0.001)	(<0.001)
Observations	650	650	568
Adj. R^2	0.924	0.108	0.157

Panel C: Performance extremity

	Return extremity	Carhart alpha extremity	CS extremity
Duality in pre-crisis period	0.3835 ***	0.5180 ***	0.5100 ***
	(0.001)	(<0.001)	(0.002)
Observations	810	810	772
Adj. R^2	0.091	0.086	0.063
Duality in crisis period	0.4101 ***	0.3964 ***	0.2361 *
	(0.003)	(0.005)	(0.074)
Observations	650	650	568
Adj. R^2	0.163	0.158	0.038

Table 10 – Impact of Family Size

This table presents results from pooled OLS regressions using various dependent variables: In Panel A the dependent variables are the managerial decision measures defined as in Table 3. In Panel B the dependent variables are the performance measures defined as in Table 4. In Panel C the dependent variables are the performance extremity measures defined as in Table 5. The main independent variable is again the duality dummy which is defined as in Table 3. Furthermore, we use the natural logarithm of a fund's family lagged total net assets and the control variables of Table 3 as independent variables. All regression specifications include time fixed effects and segment fixed effects. For sake of brevity, we only report the coefficients for the duality dummy and the family size. Robust p-values of the regression coefficients in parentheses are based on standard errors clustered by fund. ***, **, and * denote statistical significance at the 1%-, 5%-, and 10%-level, respectively.

Panel A: Managerial decisions

	Unsystematic risk	Stock concentration	Industry concentration	Active share	Tracking error	Style extremity			
						MKT	SMB	HML	MOM
Duality	0.0110 ***	0.0091 **	0.0143	0.0721 ***	0.0252 ***	0.5003 ***	0.2009 *	0.1882 *	0.2822 ***
	(<0.001)	(0.013)	(0.339)	(<0.001)	(<0.001)	(<0.001)	(0.051)	(0.099)	(0.003)
Ln(family size)	-0.0009 **	-0.0011 ***	-0.0045 **	-0.0146 ***	-0.0026 ***	-0.0431 ***	-0.0496 ***	-0.0449 ***	-0.0235 **
	(0.010)	(0.004)	(0.044)	(<0.001)	(<0.001)	(0.001)	(<0.001)	(<0.001)	(0.029)
Observations	1,888	1,782	1,782	1,223	1,223	1,888	1,888	1,888	1,888
Adj. R^2	0.432	0.234	0.788	0.419	0.492	0.100	0.057	0.056	0.063

Panel B: Performance

	Return	Carhart alpha	CS
Duality	-0.0086	-0.0179 **	-0.0220 ***
	(0.214)	(0.021)	(0.002)
Ln(family size)	0.0014	0.0019 *	0.0014
	(0.161)	(0.067)	(0.163)
Observations	1,888	1,888	1,716
Adj. R^2	0.841	0.069	0.150

Panel C: Performance extremity

	Return extremity	Carhart Alpha extremity	CS extremity
Duality	0.2720 ***	0.3933 ***	0.2613 **
	(0.001)	(<0.001)	(0.018)
Ln(family size)	-0.0381 ***	-0.0345 ***	-0.0587 ***
	(<0.001)	(0.002)	(<0.001)
Observations	1,888	1,888	1,716
Adj. R^2	0.097	0.110	0.055

Table 11 – Managerial Power: Board Chair versus Ordinary Board Member

This table presents results from pooled OLS regressions using various dependent variables: In Panel A the dependent variables are the managerial decision measures defined as in Table 3. In Panel B the dependent variables are the performance measures defined as in Table 4. In Panel C the dependent variables are the performance extremity measures defined as in Table 5. The main independent variable is again the duality dummy which is defined as in Table 3. In addition, we use a board member dummy that equals one if the fund's manager is a board member but the chair of the board and zero otherwise and the control variables of Table 3 as independent variables. All regression specifications include time fixed effects and segment fixed effects. For sake of brevity, we only report the coefficients for the duality dummy and the board member dummy. Robust p-values of the regression coefficients in parentheses are based on standard errors clustered by fund. ***, **, and * denote statistical significance at the 1%-, 5%-, and 10%-level, respectively.

Panel A: Managerial decisions

	Unsystematic risk	Stock concentration	Industry concentration	Active share	Tracking error	Style extremity			
						MKT	SMB	HML	MOM
Duality	0.0132 ***	0.0124 ***	0.0303 **	0.1103 ***	0.0328 ***	0.6553 ***	0.3317 ***	0.3319 ***	0.3646 ***
	(<0.001)	(0.001)	(0.030)	(<0.001)	(<0.001)	(<0.001)	(0.002)	(0.004)	(<0.001)
Board member	0.0015	0.0076 ***	0.0532 *	0.0666 ***	0.0203 ***	0.5462 ***	0.1289	0.3829	0.2766
	(0.681)	(0.006)	(0.087)	(0.003)	(0.005)	(0.001)	(0.397)	(0.111)	(0.116)
Observations	1,888	1,782	1,782	1,223	1,223	1,888	1,888	1,888	1,888
Adj. R^2	0.427	0.228	0.788	0.388	0.481	0.101	0.045	0.051	0.063

Panel B: Performance

	Return	Carhart alpha	CS
Duality	-0.0158 **	-0.0271 ***	-0.0240 ***
	(0.024)	(0.001)	(<0.001)
Board member	-0.0140	-0.0171	0.0127
	(0.211)	(0.156)	(0.457)
Observations	1,888	1,888	1,716
Adj. R^2	0.839	0.072	0.149

Panel C: Performance extremity

	Return extremity	Carhart alpha extremity	CS extremity
Duality	0.3836 ***	0.4958 ***	0.4214 ***
	(<0.001)	(<0.001)	(<0.001)
Board member	0.2165 *	0.2111	0.2574
	(0.074)	(0.222)	(0.225)
Observations	1,888	1,888	1,716
Adj. R^2	0.091	0.106	0.040

Table 12 – Managerial Power: Impact of Independent Board Members

This table presents results from pooled OLS regressions using various dependent variables: In Panel A the dependent variables are the managerial decision measures defined as in Table 3. In Panel B the dependent variables are the performance measures defined as in Table 4. In Panel C the dependent variables are the performance extremity measures defined as in Table 5. The main independent variable is again the duality dummy which is defined as in Table 3. In addition, we use interaction terms between the duality dummy and governance factors (# IND, Ownership IND) and the control variables of Table 3 as independent variables. # IND is defined as the number of independent board directors for each fund in each year. Ownership IND is specified as the fund ownership of the fund's average independent director in a given year, divided by 1,000 USD. All regression specifications include time fixed effects and segment fixed effects. For sake of brevity, we only report the coefficients for the duality dummy, the governance factors, and the interaction between the duality dummy and the governance factors. Other independent variables are defined as in Tables 2 and 3. All regression specifications include time fixed effects and segment fixed effects (Robust p-values of the regression coefficients in parentheses are based on standard errors clustered by fund. ***, **, and * denote statistical significance at the 1%-, 5%-, and 10%-level, respectively.

Panel A: Managerial decisions

						Style extremity			
	Unsystematic risk	Stock concentration	Industry concentration	Active share	Tracking error	MKT	SMB	HML	MOM
Duality	0.0319 ***	0.0231 **	0.0004	0.0739 *	0.0298 **	1.0715 ***	1.0263 **	0.7181 **	0.5367 **
	(<0.001)	(0.029)	(0.991)	(0.082)	(0.020)	(0.001)	(0.015)	(0.012)	(0.038)
Interaction:									
Duality* # IND	-0.0040 **	-0.0028	0.0033	0.0023	-0.0001	-0.1700 **	-0.1483 *	-0.1154 **	-0.0028
	(0.015)	(0.133)	(0.700)	(0.816)	(0.986)	(0.011)	(0.072)	(0.038)	(0.958)
Duality*Ownership IND	-0.0018 **	-0.0009	-0.0007	-0.0050	-0.0015	0.0163	-0.0626 **	-0.0149	-0.0588 **
	(0.019)	(0.336)	(0.832)	(0.273)	(0.238)	(0.700)	(0.026)	(0.520)	(0.015)
Governance factors:									
# IND	-0.0004	-0.0004	-0.0047 **	-0.0071 ***	-0.0016 ***	-0.0129	-0.0110	-0.0228 *	-0.0012
	(0.281)	(0.228)	(0.016)	(0.009)	(0.009)	(0.366)	(0.301)	(0.051)	(0.910)
Ownership IND	0.0009 **	0.0007 **	0.0011	0.0102 ***	0.0016 **	0.0247 *	0.0245 *	0.0013	0.0170
	(0.021)	(0.032)	(0.599)	(<0.001)	(0.019)	(0.050)	(0.094)	(0.932)	(0.133)
Observations	1,888	1,782	1,782	1,223	1,223	1,888	1,888	1,888	1,888
Adj. R^2	0.442	0.235	0.787	0.408	0.486	0.106	0.060	0.055	0.062

Table 12 – Continued

Panel B: Performance

	Return	Carhart alpha	CS
Duality	-0.0448 *	-0.0759 ***	-0.0271
	(0.063)	(0.001)	(0.161)
Interaction:			
Duality* # IND	0.0084 **	0.0084 *	0.0018
	(0.044)	(0.075)	(0.666)
Duality*Ownership IND	0.0007	0.0064 **	-0.0004
	(0.750)	(0.026)	(0.840)
Governance factors:			
# IND	0.0028 **	0.0015	0.0028 **
	(0.012)	(0.164)	(0.013)
Ownership IND	0.0015	-0.0008	0.0015
	(0.202)	(0.531)	(0.159)
Observations	1,888	1,888	1,716
Adj. R^2	0.840	0.079	0.152

Panel C: Performance extremity

	Return extremity	Carhart alpha extremity	CS extremity
Duality	0.6867 ***	0.6689 **	0.4750
	(0.007)	(0.030)	(0.114)
Interaction:			
Duality* # IND	-0.0734	-0.0087	0.0003
	(0.141)	(0.881)	(0.997)
Duality*Ownership IND	-0.0273	-0.0638 **	-0.0484 *
	(0.260)	(0.032)	(0.096)
Governance factors:			
# IND	-0.0201 *	-0.0123	-0.0042
	(0.059)	(0.267)	(0.755)
Ownership IND	0.0012	0.0240	0.0413 ***
	(0.913)	(0.111)	(0.005)
Observations	1,888	1,888	1,716
Adj. R^2	0.095	0.108	0.042

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