MUTUAL FUNDS: GOVERNANCE AND HOLDINGS

by

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ABSTRACT

MUTUAL FUNDS: GOVERNANCE AND HOLDINGS

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In this dissertation I examine the role of governance and holdings within the mutual funds industry to determine if active managed fund strategies are affecting fund flows and increasing returns. My first two essays focus on dividend juicing and the results of this strategy and the types of boards of directors that would allow this strategy to be implemented. My third essay focuses on the concentration of holdings and the effect on the overall fund performance. I use hand collected data on the governance characteristics of the board of directors as well as the economic data and holdings of the funds themselves to assist in my calculations.

In the first essay, I examine incidences of dividend juicing among mutual funds. Dividend juicing is the method by which mutual fund managers realize additional dividends for their shareholders by manipulating holdings. Harris, Hartzmark, and Solomon (2015) find evidence that juicing is associated with higher turnover, increased taxes and lower returns. They conclude dividend juicing is costly and is employed to exploit unsophisticated investor demand for higher dividends. I reexamine this issue utilizing a more rigorously defined data set and with a more robust methodology and find that, contrary to the existing literature, dividend juicing is associated with higher returns and positive outcomes for the shareholder, and this is most evident in funds with a dividend yield higher than 0.5%.

In the second essay, I provide new evidence to suggest that a higher incidence of mutual fund board of director independence helps to create an environment conducive to actively employing dividend juicing tactics in off-reporting periods to increase dividend yields, higher returns, and lower expenses. Coupled with the lower turnover rate, this helps to establish that independence of the board helps to generate investors by enticing them with higher dividend payouts. Overall, the results are consistent with this being a good strategy for those funds that attempt it.

In the third essay, I study mutual funds and the puzzle of diversification and active trading strategies among fund managers. I utilize multiple economic factors, a well matched and fully clean sample set by using the Pastor, Stambaugh and Taylor (2013) methodology to ensure the highest level of accuracy and attempt to show economic reasoning for funds that choose to be actively non-diversified, rather than fully diversified. At this time, there is no economic evidence to suggest a valid reason not to move away from idiosyncratic risk and open investors up to the damage a non-diversified portfolio could incur.

Table of Contents

CHAPTER 1

INTRODUCTION

In this study, I use mutual funds, asset prices, and board of directors data to determine how mutual funds are allocating dividends, whether they are creating above expected payouts artificially, whether board independence plays a role in this action, and whether the allocation of assets under management into a non-diversified make up is beneficial to the investor and the fund as a whole. Dividend policy is a topic with many pros and cons starting with the seminal work on the subject by Modigliani and Miller in 1961 wherein they show that investors should be indifferent to dividends. Gordon (1959) and Ross (1971) both show that investors do prefer dividends and Baker and Wurgler (2004) show that the desire for dividend payouts is largely dependent on the clientele that the fund is attempting to attract. By increasing these dividend payouts artificially, by "dividend juicing", that is, reallocating assets during non-reporting periods to assets that pay out more and higher dividends, and then rebalancing the portfolio to match their stated investment criteria for the reporting time frame, mutual funds could be attempting to attract more cash seeking investors to pump up their assets under management and increase their fund inflows. I test this hypothesis multiple ways utilizing holdings data from Thomson Reuters, asset pricing, including dividend payout data from CRSP, and fund data on the make up of the board of directors to test whether an independent board or board chair will create a different environment for activities such as dividend juicing. Finally, I use the same fund data to determine whether the assets under management that are not being allocated in what would be considered a diverse methodology are being done so in such a way as to manipulate or

take advantage of market fluctuations, or whether it is a strategy that is unconventional in its execution.

In the first essay, I attempt to determine the level at which mutual funds are dividend juicing to artificially increase their dividend payouts to attract investors. The literature for dividend policy is heavy on both sides of whether investors want dividends, or should be expecting dividends. Modigliani and Miller (1961) claim that investors should be indifferent to dividends, whereas Baker and Wurgler (2004) say that funds paying dividends do so because the investors are seeking them out. Harris, Hartzmark, and Solomon (2015) show that investors are seeking out dividend paying funds; however, these funds tend to incur larger expenses to juice their dividends so these investors are foolishly allocating their funds to higher expense funds while chasing the cash payouts. To determine the level of juicing I utilize a dividend juicing ratio that was originally laid out by Harris, Hartzmark and Solomon (2015) and I create an implied dividend yield variable that is based off the holdings at the time of reporting to compare to the actual paid out dividend yield. After reexamining the original paper using a more robust sample set and methodology, I conclude that the dividend juicing policies of mutual funds with a dividend yield higher than 0.5% is both beneficial to the investor and associated with higher overall returns.

In the second essay, I examine whether or not a board of directors' independence is paramount to a positive dividend juicing strategy, or if there is a way to tell whether a mutual fund is juicing its dividends based on the overall make-up of the board of directors. Independence among boards of directors or an independent chair of the board has been shown to be more beneficial overall to a funds performance and transparency (Tufano and Sevick, 1997, Fu and Wedge, 2011). The more independent board members the better the performance, and the

higher the level of independence, the more likely a board is to replace an underperforming fund manager (Ding and Wermers, 2005). If a fund manager knows they need to bring in investors to keep their job, they are more likely to invoke strategies such as dividend juicing to attract investors that are seeking these funds. I analyze this issue by using the robust sample set of dividend juicing funds as in Chapter 2, and I add in data for the board of directors that was hand collected from Form 485 of the public filings of the funds as required by the SEC. After analyzing the board structure and comparing it to incidences of dividend juicing, I confirm that there is a higher incidence of dividend juicing among more independent boards and boards with an independent chair. I also find that these funds are associated with lower expense ratios, lower turnover, and higher returns. When comparing to funds that are actively seeking out ways to reduce dividends, I find the exact opposite is true in all regard. They are less associated with independence, they have higher expenses, higher turnover, and lower fund flows.

In the third essay, I examine the asset allocation of mutual funds that choose to actively manage their funds and allocate them in a manner that is not generally seen to be as diversified. In the recent past, the Sequoia Fund, one of the largest actively traded mutual funds in the market and home to many pension and retirement funds, chose to hold more than 25% of their total assets in one stock, Valeant Pharmaceuticals. Over the course of approximately a year, the fund lost over 50% of its total net worth and investors fled due to the falling value and lack of management foresight. Markowitz (1952) laid out the fundamental reasoning for diversification and showed that investors will receive overall better returns with a diversified investment. Since the function of a mutual fund is to diversify its holdings for the investor so they don't have to, having a non-diversified portfolio must be an active managed strategy with some specific intent. Overall, active managed strategies tend to underperform (Pastor, Stambaugh, Taylor, 2015,

Chong, Lee, Sio, 2020, Berk and green 2004, Perrold and Saloman 1991), so the use of them in supposedly already diversified portfolios cannot be sustained in the long term for investor growth. I analyze and compare the standard economic metrics for mutual funds based on a diversification threshold of less than 10 assets and any fund with more than 15% of their funds in one asset. I find that as the instance of non-diversified holdings in the funds increases, the expense ratios increase, the fund contracts, and benchmark adjusted returns fall. There is no overall economic reason for holding a non-diversified portfolio in a financial instrument that is meant to be diversified by its very nature.

The rest of the study is divided in four chapters. Chapter 2 discusses the act of dividend juicing among mutual funds and the outcomes from doing so. Chapter 3 analyzes the make-up and independence of the boards of directors and board chairs of dividend juicing funds to determine if there is any homogeneity among them or if there is no consistent make-up. Chapter 4 examines the asset management of funds that choose to actively ignore the standard diversification rules of investing to determine if their performance is validated by concentrating assets. Chapter 5 is the conclusion.

CHAPTER 2

JUICING THE DIVIDEND YIELD FOR HIGHER MUTUAL FUND RETURNS

Section 1: Introduction

There is a rich literature on the importance of firms' dividend policies to stock investors beginning with the Gordon (1959) and Ross (1977) view that investors prefer dividends and Modigliani and Miller's (1961) proposal that dividend policy is largely irrelevant. More recently, Baker and Wurgler (2004) argue that demand for dividends is heterogenous and that firms tailor payout policies to address the desires of different investor clienteles. However, little is known about how investors value dividends generated inside of mutual fund portfolios. Because fund manager compensation is a function of fund size, managers have incentives to construct portfolios that cater to dividend preferences – but only if investors have preferences. Harris, Hartzmark, and Solomon (2015 and henceforth HHS), examine mutual fund dividend strategies. Specifically, they investigate whether and why some funds employ dividend juicing strategies. Dividend juicing is the practice of temporarily altering fund holdings by selling low dividend yield stocks to finance the purchases of high dividend yield stocks prior to the ex-dividend date of high yield stocks and then rebalancing back to the prior positions. The additional dividends artificially create higher dividend yields. Since mutual funds only have to report holdings quarterly, managers can harvest dividends between quarters to inflate dividend yields and attract dividend-seeking investors. HHS find that dividend juicing funds attract inflows, especially from unsophisticated investors, incur higher expenses, and have higher turnover and trading costs. Overall, the findings in HHS support the notion that dividend juicing represents an agency cost to investors and that investors naively allocate flows to higher cost funds.

This paper examines mutual fund dividend strategies using a robust dataset designed to eliminate fund return and net asset data errors. This approach is critical given that these variables are used to calculate investor flows and to assess fund performance. I begin by first comparing the actual dividends received and reported by the fund to the implied dividends based on reported holdings to determine if there are any additional dividends received during the non-reporting periods. Next, I break down the funds that are paying dividends versus non-dividend paying funds, as funds that aren't paying dividends cannot be juicing. Of those funds paying dividends, I use a threshold of a dividend yield of 0.5% or greater which makes up approximately the top 30% of the sample set. This cutoff was used in HHS, and stands out as a good indicator for the cutoff between potential juicing and non-juicing dividend paying funds in my analysis. By focusing on likely juicing dividend paying funds, this reduces any noise generated from funds that either are avoiding dividends, or that have implied dividends that are approximately equal to their reported dividends and allows for a more robust analysis. These dividend paying funds are more likely to hold dividend paying stocks and they are not actively attempting to reduce their dividend payout.

Looking at dividend strategy by investment objective of the fund shows that Large Cap funds, and more specifically Large Cap Value and Blend funds represent a large overall proportion of potentially dividend juicing funds. Of the 2,859 funds that are in the funds analyzed and having a dividend yield greater than or equal to 0.5%, these two categories contribute 1,884 of those funds. When looking at the different dividend strategies across time, I find that the strategy of whether or not to juice dividends has changed over the sample period of 2000 to 2014. While the number of fund year observations with dividend payouts increased through 2008 and then started declining, the dividend juicing ratio shows a steady decrease from 2000 to 2012 with a slight uptick

afterwards, indicating that this strategy is not one that is always in favor among fund managers and is not necessarily a go to active dividend strategy among the majority of funds.

Next, I regress the differing categories of dividend juicing, along with standard fund characteristics, against both the *Net Market Adjusted Return* and the *Net Benchmark Adjusted Return* to determine what is driving this strategy. I find that when comparing the *Net Market Adjusted Return* there is a positive and significant correlation among the *Dividend Juicing Ratio* and the returns. This shows that as the juicing ratio increases, these market returns increase as well, and there are no other significant correlations among the variables either positive or negative. However, when looking at the *Net Benchmark Adjusted Return*, the significance among the juicing ratio drops from 1% to 5%, and decreases by approximately half (14 basis points) while still remaining positive. As well, the *Fund Flow* is suddenly positive and significant. This shows that flows are correlated with the benchmark returns, but not the market returns, which implies that investors, while some are dividend seeking, are more concerned with the investment objective and returns as compared to their investment category. This leads to rational investing choices over irrational choices. Further, when the same regression is broken down by the top 25%, 10%, 5%, 2.5% and 1% of juicing funds, the results hold for all but the top 1% in the *Net Market Adjusted Returns* regression, and conversely show that in the benchmark adjusted regression, only the top 1% remains significant. *Fund Flow* remains positive and significant across all regressions with the benchmark adjusted returns. This reinforces the belief that dividends are not driving the investors as the benchmark returns are unaffected by the additional dividends, yet these funds have higher positive and significant flows. This holds as well when doing outlier removal for robustness checks up to at least 20% of the outliers removed. So while there is mixed evidence to show that juicing affects returns, there is no evidence that shows that it reduces returns and there is no relation

between dividend juicing and fund flows, which means investors are not necessarily seeking out funds purely on an irrational basis of dividend payouts, and are in fact investing rationally.

This paper contributes to the literature in two distinct areas. First, it shows that active managers can increase dividends and still have positive returns on a consistent basis. The unique reporting aspect to mutual funds allows them a degree of freedom to manipulate their holdings in between reporting periods. Second, it posits that dividend juicing, when done correctly, can have the potential costs and turnover mitigated by active managers but does not attract investors as evidenced by the fund flows being not correlated with high levels of dividend juicing. This reinforces the belief that investors are overall rational and choose to invest based on rational standards and not irrationally seeking higher dividend payouts.

Section 2: Data, Variable Measures, Sample Descriptions

2.1 Data Set

The initial data for this paper came from the same sources as the original HHS paper to keep the data selection process as close as possible. The mutual fund holdings are from the Thomson Reuters database and they pull their data from the N-CSR, N-CRS, and N-Q filings with the SEC. The initial holdings data comprises the years 1988-2017 and takes into account that mutual funds did not have to report quarterly earnings until 2004, although there were many funds that chose to do so prior to this time (Wermers, Yao, and Zhao, 2008). For this initial data set, the mutual fund returns, distributions and other fund data, as well as the stock data was pulled from CRSP.

When merging the holdings data with the fund and stock data, the MFLinks table was utilized as provided by the Wharton Research Data Services. This table provides a link between the CRSP "fundno" and the Thomson Reuters "fundno" which is called "wficn." The "wficn" number is the linking and driving force at the fund level as there are multiple share classes for each "wficn." Since the ultimate data set requires annualized fund level data, I first start at the share class level to remove duplicates and aggregate any multi-year entries. I utilize the same methodology for removing funds as HHS used. All funds that did not meet the CRSP objective code of "ED", U.S. Domestic equity, were dropped, as well as all non-U.S. based funds, and any fund that had less than 90% of its holdings as common stock. In addition, I removed funds that were flagged as ETF/ETN and not open to investors, as there should be no close ended funds in the sample for a more robust look at the trading strategies of the average investor.

Once this was complete, I had two datasets, the CRSP data and the holdings data from Thomson Reuters. I merged using the MFLinks file on the "wficn" variable and created a single

working database of holdings and mutual fund data at the share class level. All variables to this point identically matched HHS. When aggregating to the fund level, I utilized value-weighted averages of all the share classes for each year and combined them for a single fund-year observation based around the "wficn" identifier. All variables were aggregated in order to give annualized fund-level totals to be utilized for the final data set. Like Frazzini (2006), I imposed two additional filters, such that any fund reporting shares under management that were higher than the reported shares outstanding for that stock are removed, and conversely, any fund that shows to have a value of their assets less than the total value of the shares (price of shares * number of shares held) are removed. This data set is identical to the one created by HHS.

Additionally, to ensure the highest quality data sample, I imposed a larger restriction by generating and utilizing a well-matched fund sample of a merged CRSP/Morningstar database based off the Pastor, Stambaugh, and Taylor (2013) (henceforth known as PST) methodology. PST merged CRSP and Morningstar to eliminate incorrect data bias between the two major datasets for fund information. Using the PST method, all corresponding CRSP and Morningstar data is merged, cleaned, and all funds that have matching data are considered to be "well matched" and can have either CRSP or Morningstar data utilized and the results will be the same. Once the well-matched database was created, I made a linking file using the CRSP "fundno" generated from that well-matched set, and merged it with the finalized CRSP/Thomson Reuters data set. By imposing this restriction, I can confidently say that the CRSP data is accurate and that it matches as much as possible the data found in Morningstar. This gives the opportunity to use a data set with as few data errors as possible.[1] Since the idea of dividend juicing is to ultimately create higher dividend payments for investors, the analysis utilizes both the full well-matched dataset and a restricted

[1] Full well-matched sample methodology from Pastor, Stambaugh, Taylor (2013) available upon request

sample of the funds with a dividend yield > 0.5%. This was used in the original HHS paper and proves out in our analysis below as a good metric for the higher dividend paying funds.

2.2 Variable Measures

In the original HHS paper, the authors used a net market adjusted return as their dependent variable. For this paper, I analyzed all my data using the net fund returns as reported, a gross fund return (by adding back in the expenses), a gross benchmark adjusted fund return (annual gross fund return – the benchmark return for that style as described by Morningstar from our well matched data set), a net benchmark adjusted fund return (net fund return – benchmark return), a gross market adjusted fund return (gross annual fund return – return on Russell 3000), and a net market adjusted fund return (net annual fund return – Russell 3000 return). While all returns gave a slightly different economically significant factor when the initial analysis was completed, as seen in Section 3 below, I chose to use the net market adjusted returns and compare them to the net benchmark adjusted returns. This gives a slightly more conservative outlook and therefore any results should be of a more robust and higher quality. The implied dividend yield was calculated utilizing the holdings data to generate an implied dividend and then dividing that by the annual total net assets.

$$Implied\ Dividend\ Yield(i,t) = \frac{Annual\ Implied\ Holdings\ Dividend(i,t)}{Annual\ Total\ Net\ Assets(i,t)} \qquad (1)$$

The dividend juicing ratio is a measure of dividend juicing presented by HHS and is the actual paid out dividends as reported in CRSP divided by the implied dividends that should have been

paid out using the holdings data to calculate the amounts based off the individual assets. The actual paid out dividends are calculated using the dividend amount of the fund provided by CRSP/Morningstar with the 12b-1 and other expense fees added back in. Funds must net expenses against their cash flows at the end of the day, and for most funds this will be income derived from holding interest paying or dividend paying assets. By law, mutual funds must pay out all income they receive at least once a year, so the ability to measure what a fund should be paying out, based on their holdings, versus what they are actually paying out, will give us an estimator for any potential dividend juicing.

$$Dividend\ Juicing\ Ratio\ (i,t) = \frac{Annual\ Paid\ Out\ Dividend(i,t)}{Annual\ Implied\ Holdings\ Dividend\ (i,t)} \qquad (2)$$

Any ratio greater than 1.0 would indicate that a fund paid out more in dividends than should have been possible if they only held the assets as reported at that time. Since there can be some variation in holdings, it is not automatically assumed that any fund that has a ratio greater than 1.0 is automatically juicing their dividends at this time. Since this is an annualized number, we can capture the fact that most funds tend to pay out their dividends towards the end of the year to avoid paying more in corporate taxes (Sialm and Starks, 2012) and therefore it helps reinforce the idea that using quarterly data is less efficient than annualized data.

Finally, any fund observations with missing economic data is dropped, and further restrictions are imposed on the data set. To counteract incubation bias (Gervais, Lynch, and Musto, 2005) (Evans, 2010) I drop any fund that has an age of less than 5 years. This is to reduce the effect of new, mostly unproven funds that most likely are not available to the public, or that have

additional investment criteria that may not be denoted by the category they are in. As well, any fund that has a calculated average annual Total Net Asset value of less than $10 million is dropped as a potential indicator of incubation bias. This is to help ensure that any fund in the data set is a well-established fund that will have a consistent operational history.

2.3 Data Set Descriptions

If a fund were juicing dividends, it would be a simple matter of examining the shares held and the dividends paid out on a daily basis. However, funds do not report dividends except for on a quarterly (and sometimes yearly) basis, so the dividends paid out must be inferred from the holdings that are reported. Reconciling this with the CRSP stock data is prone to reporting and timing errors, therefore, this data set has been cleaned and matched with Morningstar data per the PST methodology. Using this methodology allows for a more certain valuation by the ultimate dataset. The summary statistics for the cleaned, well-matched data set can be found in Table 2, Panel A. There is a total of 1,247 Funds with 9,479 fund year observations in the ultimate data set covering the years 2000 to 2014. Utilizing the PST methodology for a more accurate sample set has still provided a close approximation of the final set used by Harris, Hartzmark, and Solomon (2015) who had a final sample set of 2,224 funds and 9,418 fund year observations. The mean value of the *Dividend Juicing Ratio* is 1.02, which puts it in approximately the 60th percentile as compared to the remainder of the funds. This shows that the majority of the funds are paying what they reported with approximately 40% of the funds leaning towards potential juicing of their dividends. For the purposes of this paper, to make sure that we are looking at funds that are paying out dividends, when the sample set is run, a restriction of all funds with a *Dividend Yield* greater than 0.5% is used. The mean for the *Dividend Yield* is 0.37% in the summary statistics of the full sample set. This shows that again, using the 0.5% threshold is in line with juicing ratio as this is at

the approximate 65th percentile, above the mean juicing ratio of 1.02. Comparatively, the summary statistics show that the *Implied Dividend Yield* mean is 0.61%, 24 basis points higher on average. The average *Net Return* for the funds in the sample set is 7.62%, with the 50th percentile being 10.65%. Additional measures and breakdowns of varied alternate sample sets that do not refute the findings of the paper available upon request.

To determine if there are any individual factors that can immediately be pointed to as the root cause, or base determinant, of potential juicing, I calculated the mean of the *Dividend Juicing Ratio* compared with the sample set as broken down by the deciles of 6 base economic factors. Column 1 shows that the *Log TNA* is a good indicator for potential juicing. As the value of the total net assets increases, so does the average *Dividend Juicing Ratio*, which simply means that the more assets under management, the more likely the fund manager is to be able to use those assets to create more dividends. In column 2, we see that the *Implied Dividend Yield* has an increasing average of the juicing ratio except for the top 2 deciles. This is consistent among the next two columns as well, *Net Market Adjusted Return* and *Net Benchmark Adjusted Return*. Column 5, *Expense Ratio*, tells an interesting story in that the lower the expense ratio, the higher the potential for juicing. As the expense ratio increases, it even appears to show that there are funds in top 5 deciles that are under paying dividends with an average of the *Dividend Juicing Ratio* less than 1. Column 6, *Fund Flows*, appears to stay fairly constant which shows that they are not a factor in whether or not a fund manager in engaged in dividend juicing.

As the market moves throughout the years, investor sentiment changes and what investors want out of their investments change as well (Baker and Wurgler, 2005). To determine if there is a correlation between potential juicing and yearly effects, I broke the sample set down into its constituent years and compared three factors against all funds and their years where the *Dividend*

Yield is greater than 0. The mean of the *Dividend Yield* only fluctuates a maximum of 25 basis points across all 15 years of the sample from 2000 to 2014 with a low of 0.52% and a high of 0.77%. The mean of the *Implied Dividend Yield*, likewise, fluctuates only 46 basis points from 0.50% to 0.96%. Both of these show fairly stable and economically insignificant fluctuations over the years. However, the *Dividend Juicing Ratio* shows a definite trend downwards over time starting at 2.7728 in 2000 to 1.3275 in 2014. This trend dips in 2008-2009 during the housing crisis, and stays down for the next few years. In 2013 there is an uptick during the time of heavy market resurgence. The key here is the difference in the ratio from 2003 to 2004 where it drops from 2.7020 to 1.9117, a decrease of 0.7903 which is indicative of a difference between the two of almost 30% overall. In May of 2004, the SEC adopted Rule RIN 3235-AG64, which mandated stricter reporting by all open-ended mutual funds, and specifically required all funds to report quarterly holdings. This higher mandatory reporting, which must be certified by the fund's principal executive and financial officers, hassled to a more open and more scrutinized mutual fund environment, which can be seen to have a deleterious effect on the dividends and potential juicing capabilities of fund managers. This is not to say that it has gone away, just that the increased reporting requirements have made it less likely to happen on a regular basis.

Mutual funds are a way to diversify holdings, and investment is drawn by investors wanting to invest in a particular type, or style, of fund. To determine if there is a potential sector or style of fund that is pre-dominantly juicing, I broke the sample set down into the Fund Investment Objectives, as described by Morningstar. There are four main objective categories, US Large Cap Funds, US Mid-Cap Funds, US Small-Cap Funds, and Other. Within the first three, there are also 3 sub-groups; Value, Blend, and Growth. Value funds, being more fundamentally based than either Blend or Growth, are the smallest of the 3 sub-groups in each category. The Blend category, being

a mix of both Value and Growth, is larger than the Value, but not as big as the Growth. In all 3 main categories, the Growth sector is the largest representation. Table 2, Panel B shows the breakdown below. Of the 9,479 fund year observations, 5,552 (58.5716% of the total observations) are US Large Cap Funds. 1,877 fund year observations (19.8017% of the total observations) are US Mid-Cap Funds, 2,017 fund year observations (21.2786% of the total observations) are US Small Cap Funds and 33 fund year observations are classified as Other (0.3481% of the total observations). Since the sample set used in the regressions later in the paper have a restriction of having a *Dividend Yield* greater than 0.5%, and to compare the funds in the categories to see which is paying out more in dividends. As a comparison, there are also 2 columns showing the *Implied Dividend Yield* at the same thresholds. Column 3 shows the observations in each category with the *Implied Dividend Yield* greater than 0, which is all of the funds in the sample set. Column 5 shows the breakdown for funds with an actual *Dividend Yield* greater than 0, with 5,673 in this column. The difference between column 3 and column 5 shows that the *Implied Dividend* yield never reaches 0.00% even though it gets extremely close, whereas the actual *Dividend Yield* as reported by CRSP/Morningstar has 3,806 fund year observations that reported 0 dividend payouts.

Comparing column 7 and 9, with the threshold being greater than 0.5%, there is a difference of 1,527 fund year observations between the implied and the actual dividends as reported. Looking at column 11 and 12, the mean of the *Dividend Juicing Ratio* is markedly higher for all categories when compared to the full sample set (column 11) and the sample set of the funds with a *Dividend Yield* greater than 0.5%. This is to be expected if it is assumed that a higher juicing ratio is an indication of higher dividend payouts, so that when you have a concentration of dividend paying funds, the mean will be higher. In column 11, with the full sample set, the two categories with the highest mean of the *Dividend Juicing Ratio* are both the US Large Value sub-category and the

Other category. Going from column 11 to column 12 they switch places for first and second, but still remain the two highest potential juicing categories. If we ignore the Other category, since it is only 0.3481% of the total observations, we see that second place goes from the US Large Blend sub-category in column 11 to US Small Cap growth in column 12. This is interesting because growth stocks tend to pay less in dividends as they are re-investing capital to grow.

Section 3: Empirical Results

3.1 Dividend Juicing and Returns

To help determine the best return to utilize when doing the regression analysis, the four standard returns were compared to basic economic drivers of the fund, *Gross Market Return, Gross Benchmark Return, Net Market Adjusted Return,* and *Net Benchmark Adjusted Return.* By examining the cross-sectional determinants of the returns, we can see if the *Dividend Juicing Ratio* in conjunction with the *Dividend Yield* has an effect on overall fund returns. By running a linear regression with the following formula, we can determine whether or not the *Dividend Juicing Ratio* is an economic driver of returns for the funds in the sample set.

$$NetMarketAdjusted_{i,t} = \alpha + \beta_1 DividendJuicingRatio_{i,t} + \beta_2 DividendYield_{i,t} + \beta_3 FundFlow_{i,t} + \beta_4 FundFlowVolatility_{i,t} + \beta_5 FundTurnover_{i,t} + \beta_6 LogTNA_{i,t} + \beta_7 ExpenseRatio_{i,t} + YearEffects + StyleEffects + \mu_{i,t} \quad (3)$$

In column 2 and 4, *Dividend* Yield is removed from equation 3 and in column 3 and 4, *Net Market Adjusted Return* is replaced with *Net Benchmark Adjusted Return.* In addition, in columns 3 and 4, there are no Style Fixed Effects since this would generate collinearity with the already adjusted return based on the sector benchmarks. Standard errors are clustered by year and Fund IDs. With the *Net Market Adjusted Return* and the *Net Benchmark Adjusted Return* as the dependent variables in each of the equations, we can see what economic factors have the highest impact. The *Dividend Juicing Ratio* in Columns 1 through 3 are significant and positive to the 1% level and in column 4 it is significant and positive to the 5% level. With or without the *Dividend Yield*, column 1 and 2 are only 1 basis point apart and highly significant with a coefficient on the *Dividend Juicing Ratio*

of 0.0032 and 0.0033 respectively. This means that a fund that is potentially juicing is 0.33% more likely to have better returns. Less significant, we can see that Fund Flow volatility is negative and significant at the 10% level in column 1 which tells us that higher returns are associated with less movement in and out of the fund, which implies that it is 1.19% more likely to be more stable.

When comparing column 1 and 2 to the *Net Benchmark Adjusted Return* in column 3 and 4, the *Dividend Ratio* is still positive and significant to the 1% level. With one basis point separating the two regressions 0.0017 and 0.0018, we can still see that an incidence of potential juicing is going to show higher returns 0.18% of the time. When comparing the market adjusted and benchmark adjusted returns it should be noted that the *Fund Flow*, when corrected for the benchmark returns is positive and significant at the 1% level. This shows that funds with higher flows will show an increase in *Net Benchmark Adjusted Returns* 1.04% of the time. AS in Column 1 and 2, the *Fund Flow Volatility* is negative and significant to the 10% level showing that these funds perform better when they are more stable and less volatile. Additional tables that run the same regressions on the *Gross Benchmark Return*, the *Gross Market Return,* and the *Fund Return,* that do not refute the findings of the paper are available upon request. Additionally, a table utilizing the entire sample set, not restricted to those fund year observations with a *Dividend Yield* greater than 0.5% with the *Net Market Adjusted Return,* and the *Net Benchmark Adjusted Return,* that do not markedly change the findings of the paper, are available upon request.

3.2 Different Dividend Juicing Levels and Returns

Now that the incidence of juicing is associated positively with returns, which cross-section of the funds that investors are flocking to are most likely to juice can be determined. Table 4 is a cross-sectional linear regression with the *Net Market Adjusted Return* as the dependent variable. Column 1 includes the *Dividend Juicing Ratio,* and the remainder of the economic variables from

Table 3; *Dividend Yield, Fund Flow, Fund Flow Volatility, Fund Turnover, Log TNA,* and *Expense Ratio.* Going through columns 2-6, the *Dividend Ratio* (β_1) is replaced with a dummy variable that is narrowing the scope of the funds that are potentially juicing. The dummy variables start off in column 2 as a 1 for all funds in the top quartile all the way to the funds with a juicing ratio in the top 1% in column 6. This table uses the same equation set up as equation 3 for Table 3, with Year and Style Fixed effects and standard errors clustered around year and Fund ID's. This table utilizes the same restrictions as Table 3, with all fund year observations having a *Dividend Yield* greater than 0.5% Column 1 is the same information as in Table 3, column 1 and shows the juicing ratio positive and significant at the 1% level. Column 2 is showing only the funds in the top quartile of the *Dividend Juicing Ratio* (juicing ratio 1.5000 and higher) and it is positive and significant to the 5% level. When narrowing the scope to the top 25% of potentially juicing funds, we lose a little bit of significance, but it is slightly more positive, 0.63% versus 0.32%, than when it is all funds in the sample set. Column 3 shows that when the sample is narrowed to the top 10% of potentially juicing funds (juicing ratio 4.1000 and higher) the coefficient is positive and significant to the 1% level reading as 0.97%. As the regression progresses through the top 5% and top 2.5% of the *Dividend Juicing Ratio*, the factors remain both positive and significant at the 5% and 1% levels respectively. When the chart progresses to the top 1% of the *Dividend Juicing Ratio* (column 6) which has a juicing factor of 7.3000 to 10.5000, it is no longer significant, yet still positive. This could indicate that there are some data issues with the top 1% in the sample set, as a *Dividend Juicing Ratio* of 7.3000 means that a fund would have to have paid out 7.3 times the dividends as indicated by their holdings alone, after adjusting for expenses, with a maximum of 10.5 times what their holdings indicated. While it is possible with large funds to have the capital to move around in between reporting periods, the *Expense Ratio* would most likely increase with the added

transactions and active management of the fund, yet there is no evidence to indicate that the higher the *Dividend Juicing Ratio* the higher the *Expense Ratio.* This table shows that the *Dividend Juicing Ratio* and dividend juicing, is a significant contributor to overall market adjusted returns.

Having looked at the effect on *Net Market Adjusted Returns* for the top 25% of funds that are potentially juicing their dividends, Table 5 is running the same linear regression to determine if the pattern still holds when we account for *Net Benchmark Adjusted Returns*. Using these two different returns helps to determine whether this is an industry wide issue, or an issue that is limited to specific sectors of funds, or funds that may require larger payouts to retain investors. The regression utilizes the following regression with Year fixed effects and standard errors clustered by Year and Fund ID's.

$$NetBenchamrkAdjusted_{i,t} = \alpha + \beta_1 DividendJuicingRatio_{i,t} + \beta_2 DividendYield_{i,t} + \beta_3 FundFlow_{i,t} + \beta_4 FundFlowVolatility_{i,t} + \beta_5 FundTurnover_{i,t} + \beta_6 LogTNA_{i,t} + \beta_7 ExpenseRatio_{i,t} + YearEffects + \mu_{i,t} \quad (4)$$

Equation 4 is only modified from column 1 by replacing the *Dividend Juicing Ratio* (β_1) with dummy variables that are a 1 if they match the descriptor of the fund year observations, which are category rankings of the Top 25% of potential dividend juicing funds up to the Top 1% of potential dividend juicing funds as seen in Table 4 as well. Column 1 is a replication of Table 3, Column 3 as a base point to start from. Column 2, fund year observations with juicing ratios in the top 25% (juicing ratio 1.5000 and greater), and column 4, fund year observations with juicing ratios in the Top 5% (juicing ratio greater than 4.1000), are both positive, but not significant. This is in contrast to Table 4, where they were both positive and significant as factors for the *Net Market Adjusted*

Returns. Column 3 and Column 5, which are showing the results for the Top 10% of potentially juicing fund year observations and the Top 2.5% of potentially juicing fund year observations, are both positive and significant, but only at the 10% level. This trend continues on into column 6, the Top 1% of potentially juicing fund year observations. While Table 4 showed that it was positive, it was insignificant, here when regressing on the *Net Benchmark Adjusted Return*, it is positive and significant to the 5% level. With a coefficient of 0.0137, this shows that for every 1unit change in the independent variable, there is a 1.37% change in the benchmark adjusted returns associated with these funds. Again, the data shows a positive and significant association with potentially juicing funds driving returns, which, when coupled with the positive and significant to the 1% level *Fund Flows* in each regression of this table help support the supposition that investors are actively seeking higher returns and that managers are using these incoming flows to help create off-the-book dividends to create a cycle of returns and investor draws.

3.3 Outliers and Robustness Checks

To make sure that the sample is not being driven by outliers, I utilized a sample identification method to determine the robust Mahalanobis distances against the robust standardized residuals as evidenced in Adams, et al (2019). Figure 1 shows that there are but a few fund year observations that meet the criteria of being outliers as outlined below. The two horizontal boundary lines measure ±2.25, the values that separate the ±1.25% most remote regions from the observations in the sample set, and anything above or below these lines horizontally are seen to be extreme. These are measured using robust standard residuals in the y plane against the dependent variable. In the horizontal, or x plane, the robust Mahalanobis distance measures the outliers in the independent variable space. As evidenced in the graph, the vertical line to the left has all the fund year observations clustered right at the edge of it except for a small few. These few outliers are not

extreme enough to be driving any outlier results and the sample set is robust to outlier driven returns.

To further verify that there are no outlier issues with the regressions and the driving data results behind Tables 3, 4 and 5, Table 6 below is an OLS regression analysis that recreates Table 3, Columns 2 and 4 with varying degrees of outliers removed. Table 6 represents the sample set with a *Dividend Yield* greater than 0.5% regressed against the *Net Market Adjusted Return* and the *Net Benchmark Adjusted Return* to compare the results after removing multiple levels of outliers. Column 1 and column 4 have 2% of the outliers removed in the sample set, the top and bottom 0.5% of the vertical axis and the right 1% on the horizontal axis for a total of 2% removed. In both columns the *Dividend Juicing Ratio* is positive and significant at the 1% level with a 5-basis point difference between them at 0.28% and 0.23% respectively. Columns 2 and 5 have the top and bottom 1.25% of the vertical axis and the right 2.5% of the horizontal axis, for a total of 5% of the outliers removed. In these regressions the coefficient on the *Dividend Juicing Ratio* is positive and significant to the 10% level against the *Net Market Adjusted Return*, however it is positive but insignificant against the *Net Benchmark Adjusted Return*. This is consistent with Table 4 and 5 where the benchmark returns were more conservative as compared to the market adjusted returns. Moving to columns 3 and 6, the top and bottom 2.5% of the vertical outliers are removed and the right horizontal 5% are removed for a total of 10% of the outliers being removed, leaving 90% of the original sample set used in the regressions. Both columns are positive and significant with column 3 being at the 5% level and column 6 at the 1% level. The discrepancy among the 5% removal and the 10% removal is evidence of further study being required, but since the results against the returns hold even with 10% of the sample removed, it can be posited that the sample and the results are not being driven by outliers in the data. Of note, the *Fund Flow* Volatility holds

true in all but column 3 that less volatility is equating to higher returns to the 5% and 1% level, as indicated in Table 3, 4 and 5. The variable statistics for the breakdown of each column for Table 6 is available upon request.

Section 4: Conclusions

In this study, I have shown that funds with a dividend yield greater than 0.5% show positive correlation with returns and evidence of dividend juicing. While there is evidence of a positive correlation among all the funds in the data set, the ones that generate higher dividend yields appear to juice their dividends more effectively. With turnover being insignificant in the higher dividend yield funds, the results show that an active fund manager can control, to an extent, the damage that is always a possibility with active trading (Chen et al 2000). The original paper by Harris, Hartzmark, and Solomon (2015) showed that funds had an increase in turnover, lower returns, and higher taxes for the investors. I have shown, using a more robust sample set, that these conclusions are not accurate. There is no evidence of higher turnover and there is evidence to support increased returns overall for effective dividend juicing. Investors will naturally pay higher taxes for dividends than they will for capital returns, however that is not part of the scope of this paper, but it can be extrapolated that if investors want more dividends, and the fund managers are juicing their dividends to give them more payouts, they will have to pay more in taxes on these increased payouts. The reason for added dividend payouts is not explained in this study, only that it is happening based on the evidence. Investors want dividends for multiple reasons that are fairly well explained already, however that does not explain why managers and executives of the funds would go to the trouble of moving assets around and risking exposure and expenses to increase their dividend payouts in the short term, then rebalancing to make sure they are in line with their funds' prospectus at the time of reporting their holdings. Conversely, while dividend juicing is not inherently bad, when looking at fund flows, I find that this strategy, while correlated with higher *Net Market Adjusted Returns,* does not show any correlation with an increase or decrease in fund

flows. Looking at *Net Benchmark Adjusted Returns*, I find the exact opposite in that the returns are not correlated with dividend juicing, but that fund flows are positive and significant. This shows that overall investors are acting rationally and investing based not on the higher dividends, but for investment objective and the higher returns as compared to others in the same category.

The determinants of why a fund would go to the trouble of dividend juicing are interesting and bear further study. Funds can pay out to investors by utilizing dividends or returning capital, and the fact that many funds apparently choose to juice their dividends is telling in and of itself. The types of funds that are juicing may be trying to attract smaller individual investors or small retail investors, two groups that don't have the necessary capability to determine where the extra returns and dividends are coming from, but are rewarding what they consider to be good investments. In the context of Modigliani-Miller, the investors should want to receive the capital returns as they are taxed differently than a payout marked as dividends. Smaller investors may not be aware of this, and even if they are, may not care and are willing to take on the extra tax burden associated with it. If this behavior is driving the investor to these funds, it is in the best interest of the fund managers to ensure that the dividend payouts remain steady or increase. With markets moving in all directions, they may have to resort to off-the-books juicing to keep their core clientele happy. While the reasons for dividend juicing are not apparent from this data, a more thorough study of fund managers and Board of Director governance may shed some light on who is more likely to utilize these types of strategies. Are certain funds, or actively trading fund managers, more attractive to investors because of the dividends paid out, or are these fund managers attempting to attract a specific type of investor? Either way, when done correctly, effective dividend juicing appears to be beneficial and positively associated with the returns associated with these funds and the attraction of new investors.

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Tables

Table I: Variable Definitions

This table provides variable definitions for the sample used in the analysis. The data covers the period from 2000 to 2014 for 1,247 funds comprising 9,479 fund-year observations. Data is from the CRSP, Morningstar, and Thomson Reuters databases.

Variables	Definition	Data Source
Dividend Yield	Annual Fund Dividend Yield (%)	CRSP/Morningstar
Implied Dividend Yield	Calculated annual implied dividend yield using the dividends paid based on reported holdings divided by the fund TNA	CRSP/Thomson Reuters
Fund Flow	Calculated annual fund flows using TNA and Net Return (%)	CRSP
Fund Flow Volatility	Calculated annual fund flow volatility from the standard deviation of the monthly fund flows	CRSP
Fund Turnover Ratio	Calculated average of the share class turnover ratio	CRSP
Expense Ratio	Expense ratio taken from CRSP using well matched fund data (%)	CRSP
Total Net Assets	Average annual TNA at the fund level calculated using the quarterly CRSP data at the share class level	CRSP
Gross Return	Calculated annual gross returns (decimal)	CRSP/Morningstar
Net Return	Calculated annual fund return net of expenses (decimal)	CRSP/Morningstar
Gross Benchmark Return	Calculated annual fund gross return minus benchmark returns (decimal)	CRSP/Morningstar
Net Benchmark Return	Calculated annual fund net return minus benchmark returns (decimal)	CRSP/Morningstar
Gross Market Return	Calculated annual fund gross return minus Russell 3000 return (decimal)	CRSP/Morningstar
Net Market Return	Calculated annual fund net returns minus Russell 3000 return (decimal)	CRSP/Morningstar
Log Total Net Assets	Log of Total Net Assets	CRSP/Morningstar
Dividend Juicing Ratio	Ratio used by Harris, Hartzmark and Solomon (2015) created using the actual dividend amounts reported in CRSP divided by the implied dividends generated from the fund holdings data (ratio)	Calculated
Dividend Juicing Top 25%	Funds with a dividend ratio (actual over implied dividends) in the top 25% of the dataset	Calculated
Dividend Juicing Top 10%	Funds with a dividend ratio (actual over implied dividends) in the top 10% of the dataset	Calculated
Dividend Juicing Top 5%	Funds with a dividend ratio (actual over implied dividends) in the top 5% of the dataset	Calculated
Dividend Juicing Top 2.5%	Funds with a dividend ratio (actual over implied dividends) in the top 2.5% of the dataset	Calculated
Dividend Juicing Top 1%	Funds with a dividend ratio (actual over implied dividends) in the top 1% of the dataset	Calculated

Table II: Summary Statistics

Note: All variables are defined in Table I. We provide summary statistics for our CRSP, Morningstar, and Thomson Reuters matched sample of 1,247 funds and 9,479 fund-year observations covering the period 2000–2014. To mitigate the effects of very small funds, incubated funds, and data anomalies we removed fund-year observations with less $10 million in total net assets, fund ages less than five years, or are in the top 1% in terms of dividend yield, implied dividend yield, dividend juicing ratio, or in the top and bottom 1% in terms of flow, flow volatility, and turnover. Panel A reports dividend and fund characteristics descriptive statistics. Panel B reports mean dividend juicing values by deciles of select variables. Panel C provides mean dividend variables by year for dividend paying funds. Panel D reports the incidence of dividends and dividend juicing by investment objective and the level of dividends.

Panel A: Descriptive Statistics

VARIABLES	N	MEAN	SD	MIN	p1	p5	p25	p50	p75	p95	p99	MAX
Dividend Juicing Ratio	9,479	1.0200	1.5200	0.0000	0.0000	0.0000	0.0000	0.4006	1.5000	4.1000	7.3000	10.5000
Dividend Yield	9,479	0.0037	0.0046	0.0000	0.0000	0.0000	0.0000	0.0020	0.0060	0.0134	0.0188	0.0235
Implied Dividend Yield	9,479	0.0061	0.0057	0.0000	0.0003	0.0008	0.0026	0.0047	0.0074	0.0161	0.0295	0.0590
Net Return	9,479	0.0762	0.2135	-0.6538	-0.4593	-0.3756	-0.0171	0.1065	0.2003	0.3837	0.4973	0.8333
Net Benchmark Adj. Return	9,479	-0.0007	0.0741	-0.5443	-0.1689	-0.1015	-0.0390	-0.0069	0.0285	0.1212	0.2551	0.6136
Net Market Adj. Return	9,479	0.0263	0.0852	-0.4312	-0.1514	-0.0892	-0.0216	0.0152	0.0621	0.1794	0.3107	0.6261
Expense Ratio	9,479	0.0140	0.0040	0.0000	0.0015	0.0046	0.0091	0.0120	0.0136	0.0179	0.0240	0.05010
Fund Flow	9,479	0.0151	0.4464	-0.9131	-0.7960	-0.5912	-0.2014	-0.0257	0.1636	0.7085	1.7900	3.7900
Fund Flow Volatility	9,479	0.0461	0.1674	0.0018	0.0023	0.0036	0.0082	0.0159	0.0337	0.1197	0.6960	2.9400
Fund Turnover	9,479	0.7926	0.5721	0.0325	0.0475	0.1200	0.3725	0.6625	1.0600	1.9375	2.7200	3.4500
Log TNA	9,479	20.0000	1.6900	13.1000	15.8000	17.2000	18.9000	20.0000	21.1000	22.8000	24.0000	25.9000
Number of Funds	9,479	1,247										

Panel B: Dividend Juicing by Deciles of Select Variables

Decile	Log TNA	Implied Dividend Yield	Net Market Adjusted Returns	Net Benchmark Adjusted Returns	Expense Ratio	Fund Flow
Overall Sample	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
1	0.6750	0.2120	0.5110	0.5560	2.4280	1.0250
2	0.7380	0.4040	0.7690	0.9360	1.8580	1.0300
3	0.7130	0.6690	0.9680	1.0180	1.2170	1.0320
4	0.8140	0.8190	1.2020	1.1930	1.1980	1.0280
5	1.0350	1.2040	1.2840	1.1910	0.8560	1.0180
6	0.8770	1.5280	1.2270	1.2580	0.7080	1.0110
7	1.0970	1.6120	1.1920	1.0590	0.7440	1.0020
8	1.2110	1.6650	1.0860	1.0450	0.5650	1.0150
9	1.3630	1.3250	0.9610	0.9270	0.4080	1.0010
10	1.6410	0.7250	0.9620	0.9790	0.1700	1.0010

Panel C: Dividend Paying Funds by Year

Year	Number of Fund-Year Observations with Dividend Yield > 0	Actual Dividend Yield	Implied Dividend Yield	Dividend Juicing Ratio
2000	207	0.0066	0.0069	2.7728
2001	248	0.0055	0.0059	2.5100
2002	279	0.0059	0.0054	2.7321
2003	285	0.0056	0.0050	2.7020
2004	331	0.0057	0.0090	1.9117
2005	396	0.0059	0.0081	1.9379
2006	418	0.0064	0.0073	2.0572
2007	445	0.0069	0.0094	1.6756
2008	476	0.0075	0.0078	1.3695
2009	499	0.0059	0.0062	1.5377
2010	453	0.0052	0.0077	1.1041
2011	447	0.0060	0.0089	1.0362
2012	464	0.0077	0.0096	1.1887
2013	372	0.0054	0.0062	1.3337
2014	353	0.0055	0.0063	1.3275
Total	5,673	0.0062	0.0075	1.6981

Panel D: Incidence of Dividends by Investment Objective

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	All Obs.		Implied Yield > 0		Actual Yield > 0		Implied Yield > 0.5%		Actual Yield > 0.5%		Juicing Ratio All Obs.	Actual Yield > 0.5%
Investment Objective	Obs.	(%)	Obs.	(%)	Obs.	(%)	Obs.	(%)	Obs.	(%)	m=1.0020	m=1.7000
US Large Cap Funds	5,552	58.5716	5,552	100.0000	4,194	75.5403	3,017	54.3408	2,266	40.8141	1.4341	2.5218
US Large Value	1,403	14.8011	1,403	100.0000	1,362	97.0777	1,181	84.1768	980	69.8503	2.4732	2.8760
US Large Blend	1,793	18.9155	1,793	100.0000	1,564	87.2281	1,190	66.3692	904	50.4183	1.6714	2.3596
US Large Growth	2,356	24.8549	2,356	100.0000	1,268	53.8200	646	27.4194	382	16.2139	0.6347	1.9966
US Mid-Cap Funds	1,877	19.8017	1,877	100.0000	760	40.4901	664	35.3756	308	16.4092	0.4613	1.6544
US Mid Cap Value	438	4.6207	438	100.0000	360	82.1918	286	65.2968	200	45.6621	1.0196	1.5786
US Mid Cap Blend	393	4.146	393	100.0000	237	60.3053	216	54.9618	80	20.3562	0.6334	1.6573
US Mid Cap Growth	1,046	11.0349	1,046	100.0000	163	15.5832	162	15.4876	28	2.6769	0.1628	2.1873
US Small Cap Funds	2,017	21.2786	2,017	100.0000	692	34.3084	682	33.8126	267	13.2375	0.3615	1.7440
US Small Cap Value	298	3.1438	298	100.0000	221	74.1611	195	65.4362	104	34.8993	0.8933	1.7958
US Small Cap Blend	653	6.8889	653	100.0000	341	52.2205	321	49.1577	135	20.6738	0.4896	1.4701
US Small Cap Growth	1,066	11.2459	1,066	100.0000	130	12.1951	166	15.5722	28	2.6266	0.1343	2.8718
Other	33	0.3481	33	100.0000	27	81.8182	23	69.6970	18	54.5455	2.3207	3.7468
Total	9,479	100.0000	9,479	100.0000	5,673	59.8481%	4,386	46.2707%	2,859	30.1614%	9,479	2,859

Table III: Dividend Juicing and Fund Returns

Note: All variables are defined in Table 1. This table reports coefficients from OLS regressions of annual fund net market adjusted and benchmark adjusted returns on dividend juicing, yield and other fund characteristics variables. The our CRSP, Morningstar, and Thomson Reuters matched data cover the period 2000–2014 for 685 funds and 2,859 fund-year observations with dividend yields greater than 0.50%. To mitigate the effects of very small funds, incubated funds, and data anomalies we removed fund-year observations with less $10 million in total net assets, fund ages less than five years, or are in the top 1% in terms of dividend yield, implied dividend yield, dividend juicing ratio, or in the top and bottom 1% in terms of flow, flow volatility, and turnover. Funds with dividend yields below 0.50% are removed to minimize the influence of dividend minimization strategies. Fund-level clustered robust standard errors are in parentheses as indicated. Year and fund style fixed effects are included in designated models. The notations *** and ** denote significance at the 1% and 5% levels, respectively.

	(1)	(2)	(3)	(4)
Variables	Net Market Adjusted	Net Market Adjusted	Net Benchmark Adjusted	Net Benchmark Adjusted
Dividend Juicing Ratio	0.0032***	0.0033***	0.0018***	0.0017**
	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Dividend Yield	0.2913		-0.1575	
	(0.3170)		(0.2914)	
Fund Flow	0.0029	0.0027	0.0104***	0.0105***
	(0.0032)	(0.0032)	(0.0031)	(0.0031)
Fund Flow Volatility	-0.0119	-0.0121	-0.0118	-0.0117
	(0.0068)	(0.0068)	(0.0065)	(0.0065)
Fund Turnover	-0.0014	-0.0015	-0.0010	-0.0010
	(0.0024)	(0.0024)	(0.0023)	(0.0023)
Log TNA (x1000)	-0.2016	-0.3023	0.0335	0.0867
	(0.7261)	(0.7177)	(0.6868)	0.6796)
Expense Ratio	0.0061	0.0053	-0.0020	-0.0017
	(0.0036)	(0.0035)	(0.0032)	(0.0032)
Constant	0.0144	0.0239	0.0724***	0.0698***
	(0.0641)	(0.0633)	(0.0171)	(0.0164)
Year FE	X	X	X	X
Style FE	X	X		
Observations	2859	2859	2859	2859
Adjusted R-squared	0.2706	0.2706	0.1151	0.1154

Table IV: Dividend Juicing Levels and Fund Market Adjusted Returns

Note: All variables are defined in Table 1. This table reports coefficients from OLS regressions of annual fund net market adjusted returns on dividend juicing, yield and other fund characteristics variables. The our CRSP, Morningstar, and Thomson Reuters matched data cover the period 2000–2014 for 685 funds and 2,859 fund-year observations with dividend yields greater than 0.50%. To mitigate the effects of very small funds, incubated funds, and data anomalies we removed fund-year observations with less $10 million in total net assets, fund ages less than five years, or are in the top 1% in terms of dividend yield, implied dividend yield, dividend juicing ratio, or in the top and bottom 1% in terms of flow, flow volatility, and turnover. Funds with dividend yields below 0.50% are removed to minimize the influence of dividend minimization strategies. Fund-level clustered robust standard errors are in parentheses as indicated. Year and fund style fixed effects are included in designated models. The notations *** and ** denote significance at the 1% and 5% levels, respectively.

	Net Market Adjusted Returns					
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Dividend Juicing Ratio	0.0032***					
	(0.0007)					
Dividend Juicing Top 25%		0.0063**				
		(0.0027)				
Dividend Juicing Top 10%			0.0097***			
			(0.0029)			
Dividend Juicing Top 5%				0.0084**		
				(0.0036)		
Dividend Juicing Top 2.5%					0.0129***	
					(0.0047)	
Dividend Juicing Top 1%						0.0090
						(0.0072)
Dividend Yield	0.2913	0.4179	0.4202	0.4603	0.4396	0.4886
	(0.3170)	(0.3163)	(0.3144)	(0.3143)	(0.3145)	(0.3146)
Fund Flow	0.0029	0.0027	0.0030	0.0029	0.0032	0.0029
	(0.0032)	(0.0033)	(0.0032)	(0.0033)	(0.0033)	(0.0033)
Fund Flow Volatility	-0.0119*	-0.0109	-0.0115	-0.0116	-0.0120	-0.0111
	(0.0068)	(0.0068)	(0.0068)	(0.0068)	(0.0068)	(0.0068)
Fund Turnover	-0.0014	-0.0016	-0.0015	-0.0017	-0.0016	-0.0017
	(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0024)
Log TNA (x1000)	-0.2016	-0.0390	-0.1040	-0.0796	-0.0899	-0.0061
	(0.7261)	(0.7264)	(0.7262)	(0.7273)	(0.7268)	(0.7268)
Expense Ratio	0.0061	0.0056	0.0050	0.0039	0.0039	0.0036
	(0.0036)	(0.0037)	(0.0036)	(0.0036)	(0.0036)	(0.0036)
Constant	0.0144	0.0195	0.0177	0.0189	0.0281	0.0251
	(0.0641)	(0.0643)	(0.0642)	(0.0643)	(0.0642)	(0.0643)
Year Fixed Effects	X	X	X	X	X	X
Style Fixed Effects	X	X	X	X	X	X
Observations	2,859	2,859	2,859	2,859	2,859	2,859
Adjusted R-squared	0.2706	0.2672	0.2685	0.2671	0.2677	0.2661

Table V: Dividend Juicing Levels and Fund Benchmark Adjusted Returns

Note: All variables are defined in Table 1. This table reports coefficients from OLS regressions of annual fund net benchmark adjusted returns on dividend juicing, yield and other fund characteristics variables. The our CRSP, Morningstar, and Thomson Reuters matched data cover the period 2000–2014 for 685 funds and 2,859 fund-year observations with dividend yields greater than 0.50%. To mitigate the effects of very small funds, incubated funds, and data anomalies we removed fund-year observations with less $10 million in total net assets, fund ages less than five years, or are in the top 1% in terms of dividend yield, implied dividend yield, dividend juicing ratio, or in the top and bottom 1% in terms of flow, flow volatility, and turnover. Funds with dividend yields below 0.50% are removed to minimize the influence of dividend minimization strategies. Fund-level clustered robust standard errors are in parentheses as indicated. Year and fund style fixed effects are included in designated models. The notations *** and ** denote significance at the 1% and 5% levels, respectively.

	Net Benchmark Adjusted Returns					
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Dividend Juicing Ratio	0.0018***					
	(0.0007)					
Dividend Juicing Top 25%		0.0032				
		(0.0025)				
Dividend Juicing Top 10%			0.0049			
			(0.0027)			
Dividend Juicing Top 5%				0.0019		
				(0.0034)		
Dividend Juicing Top 2.5%					0.0087	
					(0.0044)	
Dividend Juicing Top 1%						0.0137**
						(0.0068)
Dividend Yield	-0.1575	-0.0684	-0.0677	-0.0162	-0.0617	-0.0526
	(0.2914)	(0.2904)	(0.2879)	(0.2873)	(0.2870)	(0.2864)
Fund Flow	0.0104***	0.0104***	0.0105***	0.0105***	0.0107***	0.0106***
	(0.0031)	(0.0031)	(0.0031)	(0.0031)	(0.0031)	(0.0031)
Fund Flow Volatility	-0.0118	-0.0112	-0.0115	-0.0113	-0.0118	-0.0114
	(0.0065)	(0.0065)	(0.0065)	(0.0065)	(0.0065)	(0.0065)
Fund Turnover	-0.0010	-0.0011	-0.0010	-0.0012	-0.0011	-0.0011
	(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0023)
Log TNA (x1000)	0.0000	0.0001	0.0001	0.0002	0.0001	0.0001
	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Expense Ratio	-0.0020	-0.0022	-0.0025	-0.0031	-0.0030	-0.0030
	(0.0032)	(0.0032)	(0.0032)	(0.0032)	(0.0032)	(0.0032)
Constant	0.0724***	0.0737***	0.0744***	0.0751***	0.0756***	0.0750***
	(0.0171)	(0.0171)	(0.0171)	(0.0171)	(0.0171)	(0.0171)
Year Fixed Effects	X	X	X	X	X	X
Observations	2859	2859	2859	2859	2859	2859
Adjusted R-squared	0.1151	0.1135	0.1140	0.1131	0.1142	0.1143

Standard errors in parentheses, *** p<0.01, ** p<0.05

Figure 1: Outliers

Note: Rousseeuw and van Zomeren (1990) outlier detection plot for the CRSP, Morningstar, and Thomson Reuters matched data cover the period 2000–2014 for 685 funds and 2,859 fund-year observations with dividend yields greater than 0.50%. Robust standardized residuals measure each observation's outlyingness in the market adjusted returns (Y) dependent variable space. Observations with robust standardized residuals outside the region identified by the two horizontal boundaries located at +/- 2.25 (values from the standard normal distribution that separate the +/- 1.25% most remote regions from the central mass of observations) are classified as extreme. Robust distance measures multivariate outlyingness in the (X) independent variable – dividend juicing and controls - space. Observations with robust distances to the right of the vertical boundary located at ($\chi^2_{p,0.975}$), where p is the number of parameters in the model, are high leverage points. Vertical outliers are located outside of the horizontal and to the left of the vertical boundaries. Good leverage points are inside the horizontal and to the right of the vertical boundaries. Bad leverage points are outside the horizontal and to the right of the vertical boundaries. The red numbers identify the observations.

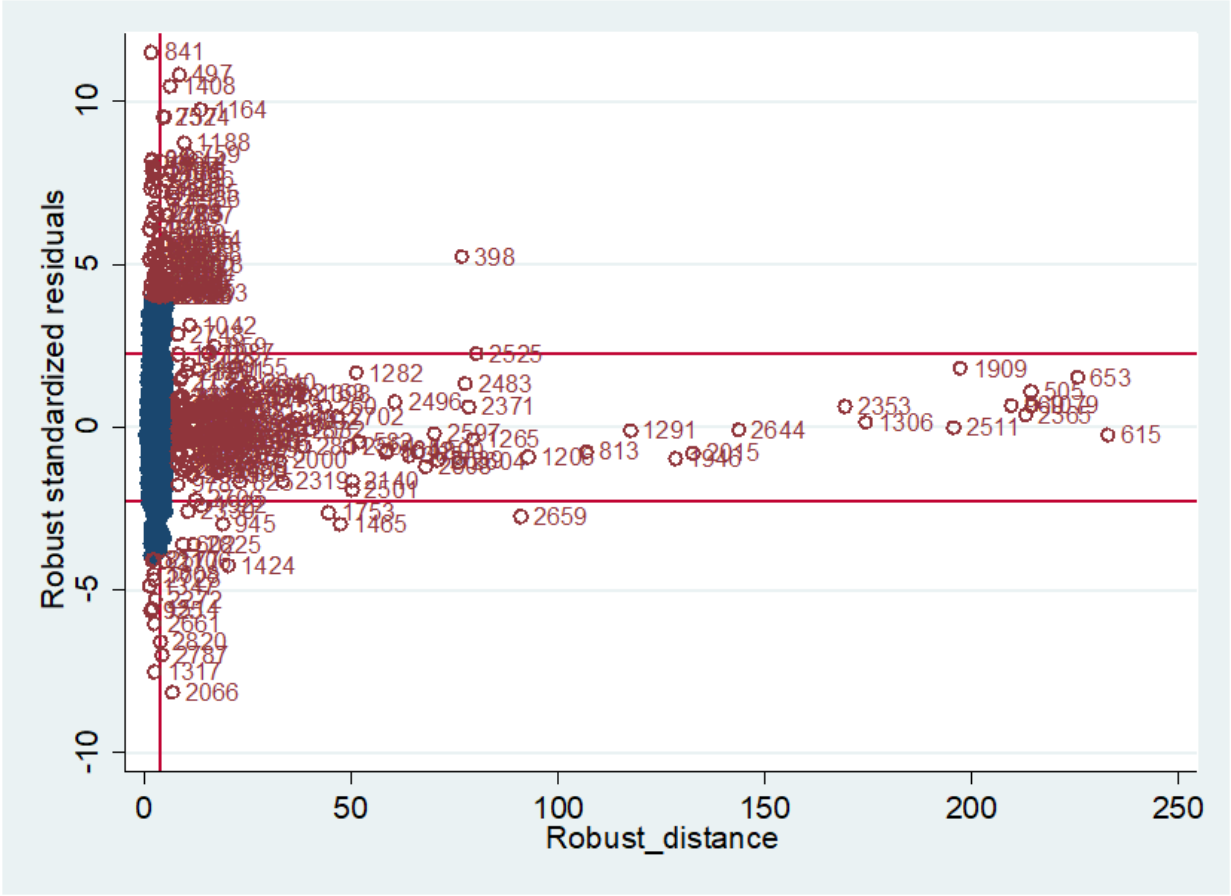

Table VI: Outlier Robustness Tests

Note: All variables are defined in Table 1. This table reports coefficients from OLS regressions of annual fund net market and benchmark adjusted returns on dividend juicing, yield and other fund characteristics variables. Column 1 and 4 have 2% of the outliers removed (the top and bottom 0.5% and the horizontal 1%). Column 2 and 5 have 5% of the outliers removed the top and bottom 1.25% and the horizontal 2.5%), Column 3 and 6 have 10% of the outliers removed (the top and bottom 2.5% and the horizontal 5%). The CRSP, Morningstar, and Thomson Reuters matched data cover the period 2000–2014 for 685 funds and 2,859 fund-year observations with dividend yields greater than 0.50%. To mitigate the effects of very small funds, incubated funds, and data anomalies we removed fund-year observations with less $10 million in total net assets, fund ages less than five years, or are in the top 1% in terms of dividend yield, implied dividend yield, dividend juicing ratio, or in the top and bottom 1% in terms of flow, flow volatility, and turnover. Funds with dividend yields below 0.50% are removed to minimize the influence of dividend minimization strategies. Fund-level clustered robust standard errors are in parentheses as indicated. Year and fund style fixed effects are included in designated models. The notations *** and ** denote significance at the 1% and 5% levels, respectively.

	Net Market Adjusted			Net Benchmark Adjusted		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	98%	95%	90%	98%	95%	90%
Dividend Juicing Ratio	0.0028***	0.0017	0.0027**	0.0023***	0.0012	0.0032***
	(0.0008)	(0.0009)	(0.0012)	(0.0007)	(0.0008)	(0.0009)
Fund Flow	0.0042	-0.0004	-0.0030	0.0112***	0.0062**	0.0034
	(0.0033)	(0.0033)	(0.0034)	(0.0030)	(0.0028)	(0.0027)
Fund Flow Volatility	-0.0346***	-0.0285**	-0.0295	-0.0359***	-0.0312***	-0.0485***
	(0.0127)	(0.0139)	(0.0190)	(0.0113)	(0.0118)	(0.0153)
Turnover	-0.0016	-0.0032	-0.0047**	0.0008	-0.0011	-0.0021
	(0.0024)	(0.0023)	(0.0023)	(0.0021)	(0.0020)	(0.0019)
Log TNA (x1000)	-1.4484**	-1.3719	-1.1922	-0.3350	-0.3267	-0.5639
	(0.7242)	(0.7094)	(0.6972)	(0.6467)	(0.6006)	(0.5630)
Expense Ratio	0.0083**	0.0038	0.0026	-0.0003	-0.0031	-0.0023
	(0.0034)	(0.0033)	(0.0033)	(0.0030)	(0.0028)	(0.0027)
Constant	0.1698***	0.1622***	0.1586***	0.0650***	0.0449***	0.0425***
	(0.0176)	(0.0174)	(0.0173)	(0.0157)	(0.0147)	(0.0140)
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Style Fixed Effects	YES	YES	YES	NO	NO	NO
Obs.	2781	2652	2419	2781	2652	2419
Adjusted R-squared	0.2357	0.2022	0.1910	0.1165	0.0843	0.0954

Standard errors are in parenthesis *** p<0.01, ** p<0.05

CHAPTER 3

MUTUAL FUND GOVERNANCE AND DIVIDEND POLICY

Section 1: Introduction

Mutual funds rely on their board of directors to monitor and evaluate senior fund management. These boards must, by law, must be at a majority (50% + 1) of independence. In 2004, the SEC passed new rules stating that a board must consist of 75% of independent directors and an independent board of directors' chair. This rule was overturned in Chamber of Commerce v. SEC, 412 F.3d 133 (D.C. Cir. 2005), and it was reverted back to the 2002 requirement of a majority. The reason for independence is to allow a more effective management structure and to provide security for the shareholders whose interests may diverge from the parent company that owns the fund (Hermalin and Weisbach, 2003). The idea that a higher level of independence of a board of directors or a board chair is beneficial is well established in the literature (Tufano and Sevick, 1997; Fu and Wedge, 2011). The SEC, in section 2(a)(19), defines and independent board member as a "non-interested person", which means that the board member cannot be affiliated with the fund, parent company of the fund, the investment adviser or their company, the sub-adviser, or principal underwriter. These definitions apply to the immediate family members of the board member, and all fund affiliates.

Higher numbers of independent board members have been associated with better performance, as well as having been shown to have a higher likelihood of replacing underperforming portfolio managers (Ding and Wermers, 2005), which gives the managers incentives to draw in more investors through active management strategies, one such being

dividend juicing. While Khorana, Tufano and Wedge (2007) studied the impact of board independence on mergers, they also found that independent boards are less tolerant of under-performance. This is illustrated in this paper where independence among board members and the board chair are negative and significant in conjunction with higher expenses, higher turnover, lower returns, and lower dividend payouts. A 2003 paper by Del Guercio, Dann, and Partch analyzed board structures in closed-end funds and found that there is strong evidence of an association between a fund's willingness to take actions in favor of shareholders and the board structure, highly independent versus the minimum requirement for independence. While this study was on closed-end funds, my data set is for only open-ended funds, however the evidence of dividend juicing and better performance that I illustrate in this paper would suggest that the willingness to take action for shareholders among independent board members in open-ended funds is comparable. Actively trading during off-reporting periods to increase dividend payouts and dividend yields, with an eye to increasing returns, would absolutely fall under the auspices of a willingness to take action in favor of shareholders. The overall compensation of the fund managers involved in dividend juicing is not a part of this paper but will be investigated later, along with the persistence of the dividend juicing action and fund manager tenure. Since the board of directors oversees the fund manager, this extra willingness on the part of independent boards may be beneficial to the longevity of the strategy.

Why would a fund manager choose a strategy of paying out higher than expected dividends, when rationally, an investor should choose to receive capital returns rather than cash payouts? The seminal paper on dividends, Miller and Modigliani (1961), show that dividends are irrelevant to investors as they can mitigate the decision in a perfect capital market. If the decision to receive dividends is irrational, then the two main explanations are taxes and behavior. In the

U.S., ordinary dividend distributions are taxed at the ordinary income rate, assuming the fund is held in a non-tax-exempt account, such as a basic trading account, while capital gains and capital distributions are taxed at the capital gains rate, which is lower. If the decision to receive dividends isn't based on taxation principles, then a more likely reason would be a behavioral reasoning. Shefrin and Statman (1984) developed what they called the "behavioral life cycle) theory of dividends, which is based on the self-control of the investor. This states that investors want to restrict themselves to consuming less or none of their capital and only consume the current payouts in the form of dividends. This is most especially seen in retirees and elderly investors. While this is similar to Gordon (1961, 1962), Gordon stipulates that the reasoning is based on future uncertainty whereas Shefrin and Staman (1984) show that there are investors specifically wanting the payouts now to save capital for a future, regardless of the uncertainty. Dong, Robinson, and Veld (2005) uphold the assumption that dividend seeking investors do so for reasons that are behavioral rather that rational, and this can be extrapolated to show that with the growing number of baby boomers reaching retirement age, the desire for income that is not tied to labor income is much stronger and there is a larger pool of investors who want the cash payouts. This is ample reasoning for fund managers to want to, and attempt to juice their dividends.

While I do not attempt to determine the reasoning behind the actions of the fund managers in this paper, I do seek to prove that there is ample evidence to suggest a relationship between dividend juicing funds, which do so to draw in more investors by paying out higher cash dividends and increasing overall returns, and a higher incidence of independence among mutual fund board of directors and board chairs. In addition, I will show that not only are these findings consistent, there is a linear correlation among funds at the opposite end of the spectrum, where

lower dividend payouts, lower returns, and higher expense ratios are associated with lower overall independence of the board and the board chair.

Section 2: Data, Variable Measures, Sample Description

2.1 Economic Characteristics and Holdings

The mutual fund economic data is pulled from CRSP and Morningstar to help ensure as accurate a data set as possible by utilizing the Pastor, Stambaugh, and Taylor(2015) methodology for combining CRSP and Morningstar data to create a "well-matched" set of mutual fund economic data based around the ticker, CUSIP, and name. Any non-matched funds are dropped from the sample to ensure that the final sample set is of the highest accuracy possible. Pastor, Stambaugh, and Taylor (2015) created a method to verify and reconcile all Morningstar and CRSP data so that either dataset could be used and the corresponding "well-matched" fund observations can have the associated data pulled from either data set with no loss of accuracy. To maintain consistency, all economic mutual fund data is pulled from CRSP for all fund observations and merged with the "well-matched" dataset, and any observations not matched up were dropped. Once this was completed, I create a linking file to be used for merging with the holdings data based around the CRSP "fundno" variable.

The mutual fund holdings are from the Thomson Reuters database and they pull their data from the N-CSR, N-CRS, and N-Q filings with the SEC. The initial holdings data comprises the years 1988-2017 and takes into account that mutual funds did not have to report quarterly earnings until 2004, although there were many funds that chose to do so prior to this time (Wermers, Yao, and Zhao, 2008). The Thomson Reuters data set only includes the fund name, an identifier "wficn", the year and month of the reported holdings, whether or not it is quarterly or annually, and the ticker, name, and number of shares at each reporting period. The "wficn" is an identifier that is utilized to link to the CRSP "fundno" through a table created by the Wharton Research Data Services (WRDS) known as the MFLinks Table. After acquiring the Thomson

Reuters data and verifying the data integrity and removing any duplicate holdings information at the share class level, the data for each stock ticker was needed to create a snapshot of the reported holdings at each quarter. The stock data was downloaded from CRSP and merged utilizing the date and ticker. From this data merge, I calculated the value of each holding by multiplying the number of shares held in the fund by the stock price and aggregating across the share class level. At this stage, I had two datasets to use, the Thomson Reuters holdings data, and the CRSP "well-matched" sample set with all of the economic data.

Once the holdings data is finalized, a metric for comparison among the economic data is needed. CRSP has a reported dividend yield for mutual funds, but to verify and double check the accuracy of the dividend yield, and to help determine whether or not dividend juicing is happening, an *Implied Dividend Yield* is created using the holdings data and the stock data pulled from CRSP. This *Implied Dividend Yield* is generated by adding the total dollar amount of dividends paid out to the holdings reported during the holding periods for the year and then dividing by the annual total net assets. To calculate the actual paid out dividend total, I added back in the 12b-1 and other expense fees as reported to get as close to the actual amount paid out by the holdings. Funds must net their expenses against the income and cannot pay any dividend distributions if there are no profits left over after expenses.

$$Implied\ Dividend\ Yield(i,t) = \frac{Annual\ Implied\ Holdings\ Dividend(i,t)}{Annual\ Total\ Net\ Assets(i,t)} \qquad (4)$$

This gives an accurate reporting of what dividends the fund should have been receiving to compare to the yield as actually reported by the fund itself. The dividend juicing ratio is a measure of dividend juicing presented by Harris, Hartzmark, and Solomon (2015) and is the actual paid out

dividends as reported in CRSP divided by the implied dividends that should have been paid out using the holdings data to calculate the amounts based off the individual assets.

$$Dividend\ Juicing\ Ratio\ (i,t) = \frac{Annual\ Paid\ Out\ Dividend(i,t)}{Annual\ Implied\ Holdings\ Dividend\ (i,t)} \quad (5)$$

Any ratio greater than 1.0 would indicate that a fund paid out more in dividends than should have been possible if they only held the assets as reported at that time. Since there can be some variation in holdings, it is not automatically assumed that any fund that has a ratio greater than 1.0 is automatically juicing their dividends at this time. Since this is an annualized number, we can capture the fact that most funds tend to pay out their dividends towards the end of the year to avoid paying more in corporate taxes (Sialm and Starks, 2012) and therefore it helps reinforce the idea that using quarterly data is less efficient than annualized data.

The two data sets are merged utilizing the MFLinks Table around the "wficn" and CRSP "fundno" identifier to create a single large dataset of all the mutual fund information and holdings at the share class level. All funds that do not meet the CRSP objective code of "ED", U.S. Domestic equity, are dropped, as well as all non-U.S. based funds, and any fund that had less than 90% of its holdings as common stock. In addition, I remove funds that are flagged as ETF/ETN and not open to investors, as there should be no close ended funds in the sample for a more robust look at the trading strategies of the average investor. Additionally, like Frazzini (2006), I impose additional restrictions on any fund that shows to have a value of their assets less than the total value of the shares (price of shares * number of shares held) are removed, and that

any fund reporting shares under management that are higher than the shares reported outstanding for that stock were removed.

I analyzed all my data using the net fund returns as reported, a gross fund return (by adding back in the expenses), a gross benchmark adjusted fund return (annual gross fund return – the benchmark return for that style as described by Morningstar from our well matched data set), a net benchmark adjusted fund return (net fund return – benchmark return), a gross market adjusted fund return (gross annual fund return – return on Russell 3000), and a net market adjusted fund return (net annual fund return – Russell 3000 return). While all returns gave a slightly different economically significant factor when the initial analysis was completed, as seen in Section 3 below, I choose to use the net market adjusted returns and compare them to the net benchmark adjusted returns. This gives a slightly more conservative outlook and therefore any results should be of a more robust and higher quality. The additional tables showing the different return regressions are available upon request, and do not change the conclusions of the paper.

Once the holdings and the share class level data are merged, I aggregate the data to the fund level. I used value-weighted averages of all the share classes for each year and combine them for a single fund year observation around the "wficn" identifier, which is the WRDS variable for the fund level data. All variables are aggregated to the annualized fund level for the final data set. At this point, the dataset is robustly accurate by using the combined "well-matched" Pastor, Stambaugh, and Taylor (2015) methodology and having been cleaned using the methods found in Harris, Hartzmark, and Solomon (2015) and Frazzini (2006). Having created a fund level dataset with aggregated variables for the fund year observations, the governance characteristics must be added before any additional cleaning of the sample set can be done.

2.2 Governance Characteristics

I utilized governance data found in Morningstar and the Statement of Additional Information (SAI) that is provided in each fund's prospectus in Form 485. Morningstar contains many economic and governance variables at the share class level, however since I am using a "well-matched" fund sample set, the only Morningstar variables required are Institutional Share classes and board and trustee data. The *Institutional Ratio* is a variable that shows the percentage of the institutional assets under management at the fund level. The decision to use CRSP for as many variables as possible is to help reduce the amount of potential discrepancies involved in assembling the final sample set. Typical mutual funds have multiple filings and to reduce the amount of overlap and potential errors, all data is collected from the forms whose submission date is closest to December 31st of each year.

Board and trustee independence is mandated under the Investment Company Act of 1940 to be at a majority (50% + 1) minimum. The rules change that was to be implemented in 2004 to change the independence to a minimum of 75% was overturned in a legal challenge. The definition of an outsider or independent, as outlined by the SEC (2004), is someone who is not an employee, not an employee's family member, not a 5% shareholder of a registered broker-dealer, or is not a trustee who is not affiliated with any recent legal counsel to the fund. Using these definitions, 4 variables are created to encapsulate the data. The first is a dummy variable for the chairman of the board which is a 1 if the chair is recognized as an outsider. Second, the number of outsiders to the board. This variable is a simple count of the number of board members that meet the definition of outsider. The third variable is a percentage that shows how

much of the board of trustees are outsiders. This is a viable metric to showcase how the boards have changed over time in relation to independence. Lastly, the size of the board as a whole to put the other variables in context. To minimize interactions this variable is transformed into the log of the board size.

Once the governance characteristics are calculated and tabulated, they are merged with the CRSP and holdings data set. After the merge, any fund observations with missing governance or economic data is dropped, and further restrictions are imposed on the data set. To counteract incubation bias (Gervais, Lynch, and Musto, 2005) (Evans, 2010) I drop any fund that has an age of less than 5 years. This is to reduce the effect of new, mostly unproven funds that most likely are not available to the public, or that have additional investment criteria that may not be denoted by the category they are in. As well, any fund that has a calculated average annual Total Net Asset value of less than $10 million is dropped as a potential indicator of incubation bias. This is to help ensure that any fund in the data set is a well-established fund that will have a consistent operational history. Finally, I create three additional dummy variables to use as markers for ranges of funds. The first is called *Dividend 90*, and is a 1 if any fund has a dividend juicing ratio of 0.90 or less. This is to capture all funds that are most likely not juicing. Next, *Dividend 100* is a 1 if the dividend juicing ratio is between 0.90 and 1.10. This will indicate any fund that is paying out dividends, with a margin of error in calculations and reported data, that should coincide with their holdings as reported. Finally, *Dividend 110* is a 1 if the dividend juicing ratio is greater than or equal to 1.10. This will be indicative of any fund that may potentially be juicing.

2.3 Descriptive Statistics

When determining whether or not mutual fund governance, through the Board of Directors or the Chair, is using dividend juicing to increase returns and draw in investors, such as was found in Essay One, there are economic and governance variables that must be taken into account. This sample set includes open-ended publicly available funds and since the scope of the paper is focused on what types of boards or directors would possibly be induced to juice their dividends, it is not limited to just public or private ownership. Table 2 has the descriptive statistics for the sample set to be used in the regressions later in the paper. The overall sample set consists of 9,479 fund year observations from 1,247 separate funds. This is utilizing the well-matched PST methodology to make sure the data is as correct and similar across multiple data platforms, in this case CRSP and Morningstar. Starting with the governance characteristics, the *Percent Outsider* has a mean of 0.81 which shows that the majority of the boards are made up of independents (outsiders), as required by the SEC in 2004 when it required a 75% minimum make-up of independent board members. This law has since been overturned however; in practice most boards continue with the higher percentage of independent directors. Since the data set covers 2000-2014, there are some years where the minimum of a majority of independents were the requirement (2002-2014), and 2 years of coverage where the original minimum of 40% was the requirement. The *Number of Outsiders* has a mean of 7.1797, with a maximum of 31 members. The jump from 14 to 31 in the top 1% shows that overly large boards are not representative of the sample set. The *Independent Chair* mean of 0.5341 shows that the board chairperson is fairly evenly split between independent outsiders and company insiders. The definition of an independent versus an insider is laid out in Section 2(a)(19) of the Investment Company Act of 1940 and an independent is a “not interested person” party to the fund. The

economic characteristics of the fund are analyzed using standard indicators *Fund Flow, Fund Flow Volatility, Turnover, Log TNA, Expense Ratio, Dividend Yield, and Institutional Ratio*, which is the ratio of the overall fund owned by institutional investors. The *Dividend Juicing Ratio* is defined in Section 2, along with the *Implied Dividend Yield, Dividend Ratio 90, Dividend Ratio 100,* and *Dividend Ratio 110.* There are additional versions of the descriptive statistics with additional filters available upon request.

Section 3: Empirical Results

3.1 Correlations

Examining all of the governance and economic variables together in a pairwise correlation matrix in Table 3 gives an idea of the direction of the data. As was found in Essay 1, dividend juicing (potentially any fund with a *Dividend Juicing Ratio* > 1.00) is positively associated with higher returns, and this holds true with a positive and significant, to the 1% level, correlation of 0.0580. When comparing the *Implied Dividend Yield* and the *Dividend Yield* to the *Dividend Juicing Ratio*, this is positive and significant to 1% level, with a correlation of 0.0480 and 0.6300 respectively. This would be expected as the higher the dividends, the more likely that there is the potential for dividend juicing. Looking at the governance characteristics, the *Dividend Juicing Ratio* shows a negative and significant, to the 1% level, correlation with both the *Percent Outsider* and *Independent Chair*. This indicates that more highly independent boards and independent board chairs are less likely to juice their dividends. However, as seen in Table 2, 62% of the fund year observations in the sample set have a juicing ratio less than 0.90. This is a false negative for the whole sample set as born out in Table 4. This would imply that the more independence in the board of directors, the less likely they are to attempt to actively manage the fund by going off the prospectus in the hopes of creating a draw to bring in more investors. Active management does not typically equate to higher returns, when those returns are measured across all economic characteristics (Pastor, Stambaugh, and Taylor, 2015; Ding and Wermers, 2002; Chen, Jegadeesh, Wermers, 2000). Measuring funds based off higher than normal dividends shows higher returns, but the persistence of those returns has not been measured in this paper. The correlation between the *Net Market Adjusted Returns*, while positive and significant in funds that have a higher juicing ratio, are negative and significant to the 1% level at -0.550 for

Percent Outsider and -0.0620 for *Independent Chair*. Again, the sample set has a majority of funds with a juicing ratio less than 0.90, so this is reflecting the majority of the sample set, not the whole sample set. This reinforces the negative and significant outlook between dividend juicing and independent boards for the majority of the sample. A comparison of the mean difference in differences was conducted and did not significantly change the estimation of any of the variables, and the table is available upon request.

3.2 Dividend Policy Determinants

Table 4, Panel A is using a LOGIT regression model to break down the sample set into funds that aren't potentially actively juicing (*Dividend Ratio 90)*, funds that are paying out what their holdings say they should be paying out (*Dividend Ratio 100)*, and funds that are potentially actively juicing and paying out more than their holdings should allow for (*Dividend Ratio 110)*. I used LOGIT regression in this paper as there is no guarantee of any linear relationship between the dependent and independent variables. The base LOGIT equation for Table 4, Panel A is as follows:

$$logit(DividendRatioxx) = \beta_0 + \beta_1(IndependentChair\ or\ PercentOutsider)_i + \beta_2 InsitutionalRatio_i + \beta_3 ImpliedDividendYield_i + \beta_4 FundFlow_i + \beta_5 FundFlowVolatility_i + \beta_6 Turnover_i + \beta_7 LogTNA_i + \beta_8 ExpenseRatio_i + \varepsilon_i \quad (6)$$

All iterations of the formula are clustered around FundIDs off the entire sample set of 9,479 fund year observations and 1,247 separate funds. To make sure there is no collinearity between the two main board governance variables, *Percent Outsider* and *Independent Chair*, the regression is run twice for each dependent variable. In column 1 and 2, which accounts for 62% of the overall sample set, there is the negative and significant, to the 1% level for *Percent Outsider* with a coefficient of -1.0050, and to the 5% level with *Independent Chair* and a coefficient of -0.2043,

interaction between the dependent variable and the two main board governance variables. This is similar to what was shown in Table 3 for the whole sample set. However, comparing this to column 5 and 6 where the dependent variable is all fund year observations with a juicing ratio greater than 1.10, we see that it is positive and significant for both variables. *Percent Outsider* is significant to the 5% level with a coefficient of 0.8392, and *Independent Chair* is significant to the 1% level with a coefficient of 0.2272. When broken down into the potentially juicing versus potentially non-juicing funds we can see that independence has the effect of being more highly correlated with those funds that are potentially juicing. Of note, funds that are potentially juicing have a negative correlation among the *Expense Ratio* that is significant to the 1% level and positive and significant to the 1% level for funds with lower dividend payouts. Interestingly, it also appears that funds with lower incidences of dividend payouts have positive and significant turnover rates to the 1% significance level and funds that are potentially juicing their dividends have a negative and significant, to the 1% level, instances of turnover. This shows that funds with a higher dividend payout have less movement of capital into and out of the fund during the year.

Table 4, Panel A is looking at only the base economic and governance factors associated with potential juicing. Once *Net Market Adjusted Return* is added to the equation, and the variables are lagged to give a better observation of any performance changes, the correlations should not change drastically. Table 4, Panel B is utilizing the same equation as Table 4, Panel A with the addition of the return variable. The fund year observations are clustered by FundIDs across the whole sample of 8,232 fund year observations, which is less than the non-lagged variables due to the removal of observations that are dropped when they become lagged.

$$logit(DividendRatioxx) = \beta_0 + \beta_1\left(IndependentChair_{lag} or\ PercentOutsider_{lag}\right)_i + \beta_2 InsitutionalRatio_{lag_i} + \beta_3 NetMarketAdjustedReturn_{lag_i} + \beta_4 ImpliedDividendYield_{lag_i} + \beta_5 FundFlow_{lag_i} + \beta_6 FundFlowVolatility_{lag_i} + \beta_7 Turnover_{lag_i} + \beta_8 LogTNA_{lag_i} + \beta_9 ExpenseRatio_{lag_i} + \varepsilon_i \quad (7)$$

Using another LOGIT regression with the 3 breakdowns of the *Dividend Juicing Ratio* into its 3 categories, *Dividend Ratio 90*, *Dividend Ratio 100*, and *Dividend Ratio 110*, gives a clearer picture as to how the interactions are occurring between the economic variables and the board governance. As in Table 4, Panel A the *Percent Outsider* and *Independent Chair* are negative and significant, to the 5% level in the lagged iteration, in column 1 and 2 which correspond to the approximate 62% of the sample set which are funds with a juicing ratio of less than 0.90. In addition to this, *Net Market Adjusted Returns* is negative and insignificant in the lagged form. In Essay 1, there was shown direct correlation between potential dividend juicing funds and positive and significant returns. This potential anti-juicing of dividends is not covered in the scope of this paper but is for future study. Column 1 and 2 show the same positive and significant correlation between turnover and reduced dividends, and the *Implied Dividend Yield* is negative and significant to the 1% level. This makes a weak argument for the anti-juicing theory as the implied dividend should be the same as the reported dividends, however, the discrepancy among them is what is driving the juicing theory. The board governance showing that funds with lower dividend juicing ratios are less likely to be overwhelmingly independent and less likely to be led by an independent chair. This means they are more likely to be following the mandate of the fund sponsor as insiders and not actively managing the funds to draw in dividend seeking investors.

Column 3 and column 4, the middle of the road funds, which comprise approximately 4.36% of the sample set, have lower expense ratios and are positive and significant to the 1% level with the *Implied Dividend Yield*. This is what would be expected if they are paying out what they should be paying out according to their holdings. Both of the governance variables are positive however they are insignificant. It makes sense economically that funds that pay out roughly the same number of actual dividends as implied dividends would not be influenced by either an insider led board of directors or independent board as they are following the mandate of the prospectus closely. Adjusted market returns are negative and insignificant, which shows that these supposed non-actively managed funds are not over-performing, or under-performing.

Moving to column 5 and 6, the potential dividend juicing fund year observations which make up approximately 32.78% of the sample set, there is confirmation of Table 4, Panel A. When adding in *Net Market Adjusted Returns*, the governance variables stay positive and significant however there are slight adjustments. The *Independent Chair* coefficient increases from 0.2272 at the 1% significance level to 0.2591, and remains at the 1% level. The *Percent Outsider* variable goes from 0.8322 and the 5% significance level to 0.6785 and the 10% significance level. This makes it slightly weaker but still significant and still positive. The returns are positive and insignificant once lagged; however, the *Implied Dividend Yield* is highly positive and significant to the 1% level with coefficients of 66.6277 for column 5 and 66.3055 for column 6. *Turnover* is consistently negative and significant to the 1% level in column 5 and 6 which continues to show that the juicing funds are lower turnover funds. The *Expense Ratio* is large, negative, and significant to the 1% level, which reinforces in the lagged regression the same information as Table 4, Panel A. Alternate regressions have been run of Table 4, Panel A and B with no clustering by FundID as a robustness test with nearly identical results, no changes to the

significant variables in any coefficients, except for a few basis points, or the significance level of the findings, with the tables being available upon request.

3.3 Robustness and Outliers

To make sure there are no outliers driving the results, I used STATA's outlier functionality to create a horizontal and vertical outlier graph to measure the robust distance as compared to the robust standardized residuals. This will allow any major driving outliers to be seen. As can be seen in Figure 1 below, there are but a handful of outliers with no extreme data points. There are 9 distinct outliers in the graph, and none of them are the max value on any variable in the summary statistics (Table 2). Number 1057, Fifth Third Disciplined Large Cap Value Fund, has the second highest *Dividend Ratio* of 10.1947, but that is the only variable of extreme note, all the rest are below the 75th percentile. Number 2437, Keeley All Cap Value Fund, has a *Board Size* of 34, with the maximum being 38, making it the 2nd highest in the sample. Number 6892, Fifth Third Structured Large Cap Plus Fund, Number 6932, Delaware Value Fund, and Number 7190, Thrivent Large Cap Growth Fund, are all in the top 1% of the *Turnover*, but none of them are at the maximum. The one thing all these funds have in common is that they are all withing the *Dividend Ratio 110* range, meaning that their juicing ratios are all over 1.10. It is safe to say that these fund year observations are not driving the results seen in Table 4 Panel A and B.

To determine the final robustness of the results, I replicate Table 4, Panel B with outliers removed to make sure the results still hold true. Removing the outliers and getting the same results will reinforce that there are not just a handful of funds driving the overall results in the sample. This table is based off Table 4, Panel B, Equation number 4, with each dependent variable having 2 columns. For the dependent variable *Dividend Ratio 90*, column 1 and 2 are

replicating Table 4, Panel B, column 1 and 2 with 5% of the outliers removed. This is repeated for each of the variables *Dividend Ratio 100,* and *Dividend Ratio 110.* In each column of the dependent variables, the top and bottom 1.25% of horizontal outliers are removed and the right most 2.5% of vertical outliers are removed for a total of 5% of the sample dropped and 95% of the sample remaining.

In Table 5, we can see the same story unfolding even with 5% of the outliers removed. Column 1 and 2, show the same significant variables as Table 4, Panel B. There are negative and significant to the 5% and 1% levels coefficients for *Independent Chair* and *Percent Outsider*, along with a largely negative and significant *Implied Dividend Yield,* and a largely positive and significant *Expense Ratio*. Columns 5 and 6, with the dependent variable of *Dividend Juicing 110,* has an equally compelling story as Table 4, Panels A and B. With the lagged independent variables and 5% of the sample set removed, the results are economically the same. Once again, the *Independent Chair* and *Percent Outsider* are both significant and positive, as has been seen in previous tables. The same can be seen in the positive and significant to the 1% level of the *Implied Dividend Yield,* the negative and significant to the 1% level *Turnover,* and *Expense Ratio.* This is solid evidence that the outliers are not driving the results of the regressions and the analysis of the data. The same regressions were run at the 98% and 90% level with no significant change to the results of the output. These additional regressions, along with descriptive statistics for each sample set are available upon request.

Section 4: Conclusions

In this essay I investigate the association between mutual fund board of directors' independence and the incidences of dividend juicing. Mutual funds have a fairly broad definition for what constitutes an independent member as laid out in Section 2(a)(19) of the Investment Company Act of 1940 where an independent is a "not interested person" in the fund structure. By definition, this would imply that they are not beholden to the fund parent structure for their livelihood, which gives them more leeway to operate outside the bounds of what would be considered a more structured and traditional environment. Dividend juicing, by the act of doing it, is operating outside the bounds of the fund's investment objectives and prospectus, unless that fund was set up solely to provide higher than normal dividends, rather than diversification and steady cash flow through capital returns as most fund vehicles are designed for. The governance of mutual funds is most relevant when discussing funds that are actively managed, as most non-actively managed funds (such as Index funds) will most likely not be subject to manipulation during the non-reporting periods.

My analysis indicates that there is a strong association with independent boards of directors and independent board chairs and higher incidences of juicing. I also confirm that these funds have lower expense ratios, lower turnover, and higher returns. When comparing funds with a higher than expected dividend juicing ratio, to funds that have a lower than expected dividend juicing ratio, I find that the exact opposite is true. In funds with a dividend juicing ratio less than 0.90, there is higher turnover, higher expense ratios, and lower overall returns. In addition, these funds show to have lower incidences of independent board members and independent board chairs. In funds that are paying out dividends that are reflected by their holdings, I find that there

is no significance, while having positive coefficients, to independent board members or board chairs. This evidence suggests that the mutual fund board of directors and board chairs that are highly independent will tend to operate out of the traditional bounds of the prospectus to attempt to draw in more investors by aiming to provide higher returns, higher dividends, and lower expenses by juicing their dividends and operating differently than the funds stated prospectus in off reporting periods.

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Tables

Table I: Variable Definitions

This table provides variable definitions for the sample used in the analysis. The data covers the period from 2000 to 2014 for 1,247 funds comprising 9,479 fund-year observations. Data is from the CRSP, Morningstar, and Thomson Reuters databases.

Variables	Definition	Data Source
Fund Characteristics		
Dividend Juicing Ratio	Ratio used by Harris, Hartzmark and Solomon (2015) created using the actual dividend amounts reported in CRSP divided by the implied dividends generated from the fund holdings data (ratio)	Calculated
Dividend Ratio 90	Dummy variable that is a 1 for any fund year with a dividend ratio <= 0.90	Calculated
Dividend Ratio 100	Dummy variable that is a 1 for any fund year with a dividend ratio between 0.90 and 1.10	Calculated
Dividend Ratio 110	Dummy variable that is a 1 for any fund year with a dividend ratio >= 1.10	Calculated
Dividend Yield	Annual Fund Dividend Yield reported on the N-CSR	CRSP/Morningstar
Expense Ratio	Expense ratio as reported in the CRSP database	CRSP/
Flow	Calculated annual fund flows using TNA and Net Return	CRSP
Flow Volatility	Calculated annual fund flow volatility from the standard deviation of the monthly fund flows	CRSP
Implied Dividend Yield	Calculated annual implied dividend yield using the dividends paid based on reported holdings divided by the fund TNA	CRSP/Thomson Reuters
Net Benchmark Return	Calculated annual fund net return minus benchmark returns	CRSP/Morningstar
Net Market Return	Calculated annual fund net returns minus Russell 3000 return	CRSP/Morningstar
Turnover Ratio	Calculated average of the share class turnover ratio	CRSP
Total Net Assets	Average annual TNA at the fund level calculated using the quarterly CRSP data at the share class level	CRSP
Governance Characteristics		
Board Size	Number of directors on mutual fund board	Form 485
Outsider	Proportion of outside/disinterested/independent directors/trustees on a board	Form 485
Number of Outsiders	Number of outside/disinterested/independent directors/trustees on a board	Form 485
Independent Chair	Indicator variable if the chairman of the board is classified as an outsider	Form 485
Institutional Ratio	Ratio of institutional class holdings to Total Net Assets	CRSP/Morningstar

Table II: Descriptive Statistics

Note: All variables are defined in Table I. This table provides summary statistics for the CRSP, Morningstar, Form 485, and Thomson Reuters matched sample of 1,247 funds and 9,479 fund-year observations covering the period 2000–2014. To mitigate the effects of very small funds, incubated funds, and data anomalies we removed fund-year observations with less $10 million in total net assets, fund ages less than five years, or are in the top 1% in terms of dividend yield, implied dividend yield, dividend juicing ratio, or in the top and bottom 1% in terms of flow, flow volatility, and turnover.

Variables	N	mean	sd	min	p1	p5	p25	p50	p75	p95	p99	max
Board Size	9,479	8.8079	3.2734	1.0000	3.0000	4.0000	7.0000	9.0000	10.0000	13.0000	17.0000	38.0000
Percent Outsider	9,479	0.8101	0.1105	0.0000	0.5000	0.6250	0.7500	0.8000	0.8750	1.0000	1.0000	1.0000
Number of Outsiders	9,479	7.1797	2.9440	0.0000	2.0000	3.0000	5.0000	7.0000	9.0000	12.0000	14.0000	31.0000
Independent Chair	9,479	0.5341	0.4989	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Institutional Ratio	9,479	0.2422	0.3380	0.0000	0.0000	0.0000	0.0000	0.0353	0.4436	0.9806	1.0000	1.0000
Net Market Adjusted Return	9,479	0.0263	0.0852	-0.4312	-0.1514	-0.0892	-0.0216	0.0152	0.0621	0.1794	0.3107	0.6261
Fund Flow	9,479	0.0151	0.4464	-0.9131	-0.7960	-0.5912	-0.2014	-0.0257	0.1636	0.7085	1.7888	3.7943
Fund Flow Volatility	9,479	0.0461	0.1674	0.0018	0.0023	0.0036	0.0082	0.0159	0.0337	0.1197	0.6960	2.9356
Turnover	9,479	0.7926	0.5721	0.0325	0.0475	0.1200	0.3725	0.6625	1.0600	1.9375	2.7225	3.4525
Log TNA	9,479	20.0115	1.6885	13.1224	15.7931	17.2463	18.9121	20.0145	21.0990	22.7947	23.9790	25.8999
Expense Ratio	9,479	0.0114	0.0041	0.0000	0.0015	0.0046	0.0091	0.0112	0.0136	0.0179	0.0224	0.0501
Dividend Yield	9,479	0.0037	0.0046	0.0000	0.0000	0.0000	0.0000	0.0020	0.0060	0.0134	0.0188	0.0235
Implied Dividend Yield	9,479	0.0061	0.0057	0.0000	0.0003	0.0008	0.0026	0.0047	0.0074	0.0161	0.0295	0.0590
Dividend Juicing Ratio	9,479	1.0163	1.5179	0.0000	0.0000	0.0000	0.0000	0.4006	1.4969	4.0962	7.3019	10.4657
Dividend Ratio 90	9,479	0.6287	0.4832	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Dividend Ratio 100	9,479	0.0436	0.2041	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000
Dividend Ratio 110	9,479	0.3278	0.4694	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000
Number of Funds	9,479	1,247										

Table III: Correlations

Note: All variables are defined in Table I. This table provides pairwise correlations for our CRSP, Morningstar, Form 485, and Thomson Reuters matched sample of 1,247 funds and 9,479 fund-year observations covering the period 2000–2014. To mitigate the effects of very small funds, incubated funds, and data anomalies we removed fund-year observations with less $10 million in total net assets, fund ages less than five years, or are in the top 1% in terms of dividend yield, implied dividend yield, dividend juicing ratio, or in the top and bottom 1% in terms of flow, flow volatility, and turnover. All bold numbers are significant to the 5% or 1% level.

Variables	Board Size	Outsider	Indep. Chair	Institutional Ratio	Dividend Juicing Ratio	Actual Dividend Yield	Implied Dividend Yield	Net Market Adjusted Return	Flow	Flow Volatility	Turnover	Log TNA
Board Size	1.0000											
Outsider	0.1220	1.0000										
Indep. Chair	0.0980	0.3850	1.0000									
Instit. Ratio	-0.0750	0.0560	0.0680	1.0000								
Juicing Ratio	0.0160	-0.0360	-0.0550	0.0480	1.0000							
Act. Div. Yield	0.0360	0.0050	-0.0090	0.0460	0.6300	1.0000						
Imp. Div. Yield	0.0430	0.0720	0.0630	-0.0000	0.0480	0.3290	1.0000					
Mkt. Adj. Ret.	-0.0240	-0.0550	-0.0620	-0.0110	0.0580	0.0010	-0.0110	1.0000				
Flow	-0.0220	-0.0250	-0.0500	0.0120	-0.0050	-0.0280	0.0100	-0.0360	1.0000			
Flow Volatility	-0.0010	0.0180	0.0400	0.0610	-0.0040	-0.0080	0.0250	-0.0080	0.2300	1.0000		
Turnover	0.0190	0.0230	0.0360	-0.0040	-0.2000	-0.2180	-0.1360	-0.0100	-0.0050	0.0330	1.0000	
Log TNA	0.2140	0.0180	-0.0740	-0.0980	0.1930	0.1360	0.0210	-0.0310	0.0420	-0.0770	-0.2000	1.0000
Expense Ratio	0.0010	0.0170	0.0810	-0.2090	-0.3990	-0.4310	-0.1140	0.0230	-0.0220	0.02100	0.1860	-0.3410

Table IV: Dividend Policy Determinants

Note: All variables are defined in Table 1. This table reports coefficients from logistic regressions of dividend ratio thresholds on fund governance, dividend, and other fund characteristics variables. The our CRSP, Morningstar, Form 485, and Thomson Reuters matched data cover the period 2000–2014 for of 1,247 funds and 9,479 fund-year observations covering the period 2000–2014. To mitigate the effects of very small funds, incubated funds, and data anomalies we removed fund-year observations with less $10 million in total net assets, fund ages less than five years, or are in the top 1% in terms of dividend yield, implied dividend yield, dividend juicing ratio, or in the top and bottom 1% in terms of flow, flow volatility, and turnover. Fund-level clustered robust standard errors are in parentheses as indicated. Year and fund style fixed effects are included in designated models. The notations *** and ** denote significance at the 1% and 5% levels, respectively.

Panel A: Determinants of Dividend Policy

	Dividend Dumping		Dividend Accepting		Dividend Juicing	
VARIABLES	Dividend Ratio 90	Dividend Ratio 90	Dividend Ratio 100	Dividend Ratio 100	Dividend Ratio 110	Dividend Ratio 110
	(1)	(2)	(3)	(4)	(5)	(6)
Board Size	-0.0143	-0.0145	0.0216	0.0235	0.0096	0.0090
	(0.0136)	(0.0136)	(0.0157)	(0.0157)	(0.0148)	(0.0148)
Independent Chair		-0.2043**		0.0364		0.2272***
		(0.0847)		(0.1162)		(0.0874)
Percent Outsider	-1.0050***		0.8329		0.8392**	
	(0.3627)		(0.4827)		(0.3757)	
Institutional Ratio	0.2357	0.2383	0.1615	0.1757	-0.2448	-0.2550*
	(0.1450)	(0.1459)	(0.1692)	(0.1678)	(0.1505)	(0.1517)
Implied Dividend Yield	-11.9355	-12.0053	29.5050***	30.1470***	3.2169	2.8482
	(6.3559)	(6.3753)	(4.9332)	(4.8990)	(6.3413)	(6.3442)
Fund Flow	0.1193	0.1122	-0.0448	-0.0490	-0.1127	-0.1026
	(0.0711)	(0.0717)	(0.1188)	(0.1195)	(0.0760)	(0.0764)
Fund Flow Volatility	-0.0766	-0.0668	0.1611	0.1647	0.0400	0.0237
	(0.1458)	(0.1472)	(0.2369)	(0.2344)	(0.1524)	(0.1559)
Turnover	0.5875***	0.5793***	-0.1641	-0.1612	-0.5776***	-0.5695***
	(0.0798)	(0.0800)	(0.1094)	(0.1088)	(0.0822)	(0.0825)
Log TNA	0.0086	0.0050	-0.0552	-0.0536	0.0062	0.0105
	(0.0298)	(0.0297)	(0.0386)	(0.0389)	(0.0305)	(0.0304)
Expense Ratio	330.2235***	332.4628***	-59.0573***	-58.6505***	-327.1368***	-331.0424***
	(17.0459)	(17.0098)	(13.3721)	(13.2408)	(17.5175)	(17.6427)
Constant	-2.7265***	-3.3732***	-2.3325***	-1.7365**	2.3715***	2.8872***
	(0.7320)	(0.6800)	(0.9024)	(0.8522)	(0.7552)	(0.6965)
Year FE	X	X	X	X	X	X
Style FE	X	X	X	X	X	X
Log Likelihood Ratio	-5010.7312	-5011.4326	-1671.1784	-1672.6625	-4815.4247	-4811.7668
Pseudo R2	0.1987	0.1986	0.0158	0.0149	0.1969	0.1976
Events	5,959	5,959	413	413	3,107	3,107
Observations	9,479	9,479	9,479	9,479	9,479	9,479

Robust standard errors in parentheses *** p<0.01, ** p<0.05

Panel B: Determinants of Dividend Policy with Lagged Returns

	Dividend Dumping		Dividend Accepting		Dividend Juicing	
VARIABLES	Dividend Ratio 90	Dividend Ratio 90	Dividend Ratio 100	Dividend Ratio 100	Dividend Ratio 110	Dividend Ratio 110
	(1)	(2)	(3)	(4)	(5)	(6)
Board Size_lag	-0.0129	-0.0120	0.0305*	0.0319*	0.0054	0.0037
	(0.0144)	(0.0144)	(0.0170)	(0.0171)	(0.0155)	(0.0155)
Independent Chair_lag		-0.2275**		0.0075		0.2591***
		(0.0902)		(0.1222)		(0.0932)
Percent Outsider_lag	-0.7856**		0.5542		0.6758*	
	(0.3964)		(0.5365)		(0.4107)	
Institutional Ratio_lag	0.0319	-0.0316	-0.8235	-0.8440	0.1630	0.2512
	(0.3563)	(0.3584)	(0.6307)	(0.6279)	(0.3567)	(0.3577)
Market Adj. Returns_lag	16.8684	18.2131	21.3653	22.4815	-19.7372	-21.7690
	(14.8689)	(14.9714)	(17.7927)	(17.6403)	(15.6001)	(15.7309)
Implied Dividend Yield_lag	-73.8784***	-73.7989***	26.2593***	26.8040***	66.6277***	66.3055***
	(8.6157)	(8.5636)	(6.2901)	(6.2360)	(7.7346)	(7.6882)
Fund Flow_lag	-0.0966	-0.1059	0.0562	0.0536	0.0944	0.1064
	(0.0692)	(0.0691)	(0.1334)	(0.1342)	(0.0729)	(0.0726)
Fund Flow Volatility_lag	-0.0093	-0.0054	-0.9065	-0.8939	0.1483	0.1427
	(0.1927)	(0.1954)	(0.9234)	(0.9129)	(0.1865)	(0.1905)
Turnover_lag	0.5714***	0.5673***	-0.1993*	-0.1969*	-0.5517***	-0.5475***
	(0.0795)	(0.0799)	(0.1132)	(0.1127)	(0.0817)	(0.0821)
Log TNA_lag	-0.0039	-0.0074	-0.0743*	-0.0732*	0.0235	0.0280
	(0.0313)	(0.0312)	(0.0414)	(0.0416)	(0.0323)	(0.0321)
Expense Ratio_lag	31,085.1738***	31,482.1064***	-5,061.1740***	-4,981.6136***	-30,875.1307***	-31,451.9720***
	(1,757.7288)	(1,766.6384)	(1,432.6497)	(1,417.6890)	(1,803.4685)	(1,825.4978)
Constant	-2.0806***	-2.5720***	-1.7384*	-1.3391	1.5783**	1.9684***
	(0.7694)	(0.7103)	(0.9585)	(0.9035)	(0.7994)	(0.7338)
Year FE	X	X	X	X	X	X
Style FE	X	X	X	X	X	X
Log Likelihood Ratio	-4292.8958	-4288.6528	-1504.2932	-1504.8802	-4129.4267	-4121.9481
Pseudo R2	0.2124	0.2132	0.0153	0.0149	0.2094	0.2108
Events	5,136	5,136	376	376	2,720	2,720
Observations	8,232	8,232	8,232	8,232	8,232	8,232

Robust standard errors in parentheses *** p<0.01, ** p<0.05

Figure 1

Horizontal and vertical outliers of financial restricted sample set

Funds with less than $10MM in Total Net Assets, and Fund Age less than 5 years removed. The top 1% of Dividend Yield, Implied Dividend Yield, Dividend Juicing Ratio, Fund Flow, Fund Flow Volatility, Fund Turnover, and the bottom 1% of Fund Flow, Fund Flow Volatility and Fund Turnover have been removed due to data anomalies. See Table 1 for variables definitions. The restricted data covers the period from 2000 to 2014 for 1,247 funds comprising 9,479 fund-year observations. All data pulled from CRSP, Morningstar, and Thomson Reuters database. This is based on the full dataset for well-matched funds utilizing the Pastor, Stambaugh, and Taylor (2015) protocol for matching fund data across CRSP and Morningstar. This graph shows that the dataset is uniform with very few remaining outliers, which shows the restrictions make the data more efficient without losing any reliability.

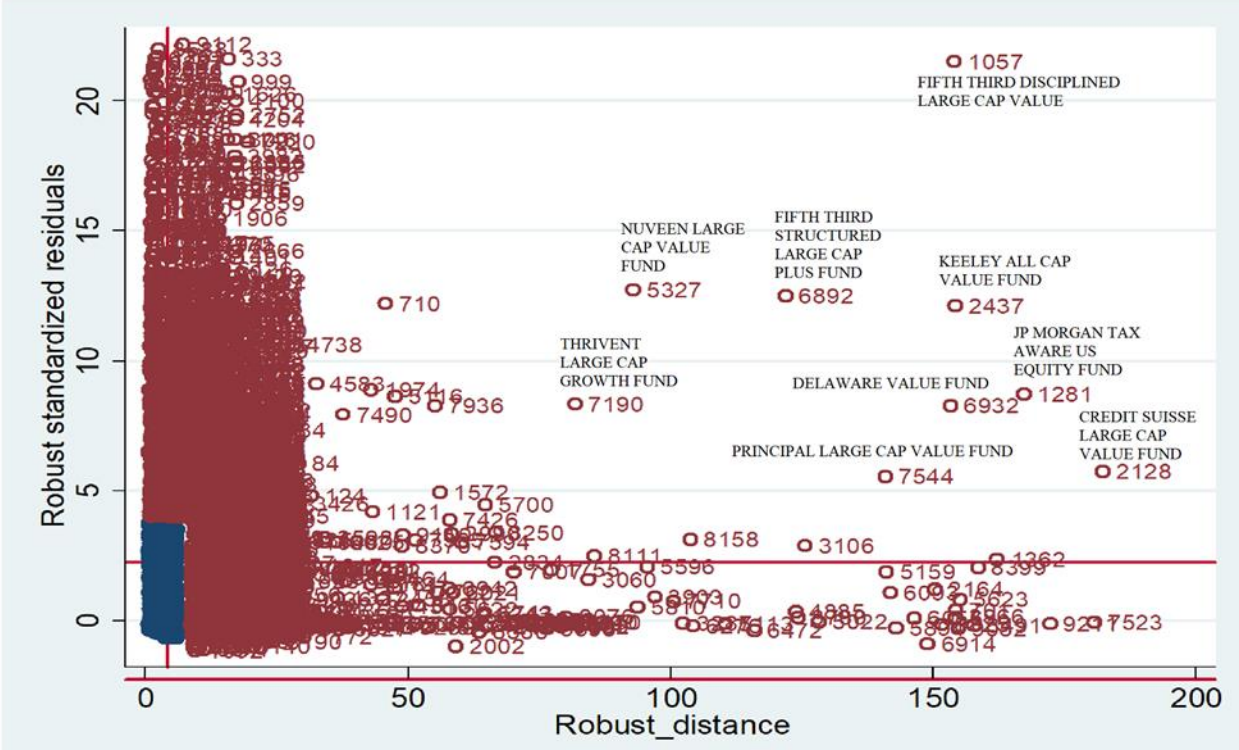

Table V: Dividend Policy Determinants – Robustness to Outliers

Note: All variables are defined in Table 1. This table reports coefficients from logistic regressions of dividend ratio thresholds on fund governance, dividend, and other fund characteristics variables. The our CRSP, Morningstar, Form 485, and Thomson Reuters matched data cover the period 2000–2014 for of 1,247 funds and 9,479 fund-year observations covering the period 2000–2014. To mitigate the effects of very small funds, incubated funds, and data anomalies we removed fund-year observations with less $10 million in total net assets, fund ages less than five years, or are in the top 1% in terms of dividend yield, implied dividend yield, dividend juicing ratio, or in the top and bottom 1% in terms of flow, flow volatility, and turnover. Fund-level clustered robust standard errors are in parentheses as indicated. Year and fund style fixed effects are included in designated models. The notations *** and ** denote significance at the 1% and 5% levels, respectively.

	Dividend Dumping		Dividend Accepting		Dividend Juicing	
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	95%	95%	95%	95%	95%	95%
Board Size_lag	-0.0118	-0.0107	0.0321*	0.0333*	0.0034	0.0017
	(0.0149)	(0.0150)	(0.0175)	(0.0176)	(0.0160)	(0.0160)
Independent Chair_lag		-0.2498***		0.0095		0.2810***
		(0.0906)		(0.1241)		(0.0937)
Percent Outsider_lag	-0.9288**		0.4656		0.8385**	
	(0.3989)		(0.5399)		(0.4119)	
Institutional Ratio_lag	0.0526	-0.0170	-0.7118	-0.7269	0.1140	0.2072
	(0.3636)	(0.3655)	(0.6573)	(0.6551)	(0.3615)	(0.3622)
Net Market Adj Return_lag	0.1745	0.1880	0.2097	0.2182	-0.2028	-0.2226
	(0.1495)	(0.1506)	(0.1814)	(0.1798)	(0.1573)	(0.1587)
Implied Dividend Yield_lag	-79.6179***	-79.5316***	28.5046***	28.8933***	70.9519***	70.6829***
	(8.7760)	(8.6961)	(6.5320)	(6.4857)	(7.8965)	(7.8145)
Fund Flow_lag	-0.0958	-0.1066	0.0505	0.0487	0.0944	0.1075
	(0.0723)	(0.0721)	(0.1371)	(0.1378)	(0.0763)	(0.0759)
Fund Flow Volatility_lag	-0.0163	-0.0100	-0.8852	-0.8744	0.1583	0.1510
	(0.2126)	(0.2158)	(0.9792)	(0.9686)	(0.2041)	(0.2088)
Turnover_lag	0.5888***	0.5843***	-0.2281*	-0.2262*	-0.5628***	-0.5580***
	(0.0794)	(0.0797)	(0.1182)	(0.1178)	(0.0811)	(0.0814)
Log TNA_lag	0.0046	0.0009	-0.0700*	-0.0692	0.0143	0.0192
	(0.0318)	(0.0317)	(0.0424)	(0.0427)	(0.0326)	(0.0325)
Expense Ratio_lag	313.1107***	317.5442***	-51.6694***	-51.1944***	-310.1129***	-316.2869***
	(17.7011)	(17.7679)	(14.4707)	(14.3302)	(18.1398)	(18.3297)
Constant	-2.1504***	-2.7476***	-1.7253*	-1.3885	1.6415**	2.1501***
	(0.7738)	(0.7172)	(0.9794)	(0.9207)	(0.8021)	(0.7393)
Year FE	X	X	X	X	X	X
Style FE	X	X	X	X	X	X
Log Likelihood Ratio	-4087.8209	-4083.7735	-1459.5398	-1459.944	-3934.1302	-3926.903
Pseudo R2	0.2145	0.2153	0.0160	0.0158	0.2098	0.2113
Events	5,850	5,850	409	409	3,032	3,032
Observations	7,870	7,870	7,870	7,870	7,870	7,870

CHAPTER 4

MUTUAL FUNDS AND DIVERSIFICATION, A CONTINUING PUZZLE

Section 1: Introduction

In early 2016, the Sequoia Fund, one of the largest Value funds in the market, and a fund that counted one of its founders as Warren Buffets mentor, had to dump over 50 million shares of a company called Valeant Pharmaceuticals after taking over $3.5 billion in losses from holding the shares of the company as approximately 28.72% of its holdings at its peak. The fund was famous for its ability to outperform the S&P 500 consistently due to its combination of thorough research and years of experience of its founders. Valeant Pharmaceuticals was a Canadian drug company that did no actual research and development, instead they purchased other companies and rights to drugs and increased the prices on the current crop of drugs on offer. For a few years this strategy worked and the stock price, as originally bought by the Sequoia Fund went from around $19.50 to $260.00 in just a few years. Then Valeant took on a large acquisition financed entirely by debt, and the fund should have realized that it's holdings of almost 30% of this single stock wasn't such a good idea from a diversification standpoint. As the stock started to fall, the manager of the fund decided to double down when the stock had dropped to $120 a share and bought an additional investment of approximately $500 million. All in all, the fund lost almost 50% of its value within one year and had a whopping -18.86% return for the year. As of the date of the article in the Washington Post, August 12, 2017, the fund had started to recover and was back up to around $8.5 Billion in assets and around 25 stocks in its portfolio. This lack of diversification nearly cost the fund its existence, and it definitely cost all shareholders profits and value (Heath - Washington Post, 2017). Why would a company known

for its ability to actively and consistently beat the S&P 500 ignore such an obvious imbalance in its diversification?

Basic portfolio diversification theory is rooted in the seminal Markowitz (1952) paper where he demonstrates that rational investors can receive better overall returns by diversification. The basis of the theory is based off of future expected returns and the diversification should be allocated to include those funds with a higher expected future return with lower volatility of those returns. He does not necessarily recommend the portfolio with the lowest variance on returns and postulates that investors can increase returns by increasing variance. Most investors do not have the analytical skills, the time, or the desire to build their own portfolios, so mutual funds were created as a way to help investors achieve the diversification required to avoid unsystematic risk and take the guesswork out of investing by having a fund manager do the work for them. There are many different types of funds for the specific investment type that any potential investor could possibly desire from market index funds, to sector specific funds, to income funds to growth and value funds. This theory was extended by Sharpe (1964) and Lintner (1965) to show that diversification among risky assets could allow investors to diversify away all risk but economic activity, or market risk / beta.

Asset allocation as a policy is one of the key factors in explaining the performance of funds over time and across fund families (Ibbotson and Kaplan, 2000). Asset allocation policy directly affects the diversification of a fund's portfolio and as shown by Shawky and Smith (2005), diversification is a key principle of modern portfolio management. Straight diversification of assets under management is not simply a matter of holding different assets, they must have an appropriate covariance-variance mix (Statman, 1987) and they must meet the funds proscribed prospectus investment objective. Just holding more assets won't necessarily do

the job, however holding more of the right assets will (Statman, 1987,2004; Domian et al 2003, 2007), and holding an increasing number of the correct assets will spread the risk out more evenly. As found by Evans and Archer (1968), the economic benefits of diversification will be at the point of diminishing returns at around 10 assets. Statman (1987) declares that using a securities market line shows that a well-diversified portfolio will have at least 30 to 40 assets in it. More recently, Newbould and Poon (1993,1996) show that anywhere from 8 to 20 assets will give full diversification of the fund. In a randomness test, Fabozzi (1995) proclaimed that an investor could get maximum diversification by randomly selecting 20 common stocks. There is no consensus as to what constitutes diversification among a portfolio of assets, however, depending on how you measure the success of the asset and when the fund holds those assets whether the market is bullish or bearish.

Managers have reasons for actively trading their assets and for which assets they hold at any given time. Not every fund manager can pick stocks or financial instruments perfectly, and more than 77% of them pick based solely on last year's winners (Grinblatt et al, 1995) which is simply momentum investing (Carhart, 1997). One potential possibility for managers utilizing a non-diversification strategy could be that they have information normal investors do not as they are operating inside the financial sphere as opposed to outside and have information not available to everyone (Dybvig et al, 1999). Performance is a large factor in a fund managers choice and not always do they successfully equate the current years returns to previous investment cycles (Shaffer, 1998; Gehrig, 1998; Broecker, 1990). Looking at equity mutual funds as a whole, Bello (2007) showed that as an investment category they were not diversified enough and that some managers even shift their overall risk by increasing idiosyncratic risk exposure (Chen et al 2011). Why fund managers choose to non-diversify and increase their risk exposure is not well known.

I start out by examining reported fund quarters to determine the different levels of concentration, or non-diversification. There are 14,452 fund quarter observations comprising 2,043 funds over the span of 2000-2015. I break the concentration variables into manageable groups of 1 asset under management, 5 assets, 10 assets, funds with at least 15% of their assets in one stock, and a variable that shows the percentage of the overall funds under management in the top 10 assets. Once this is complete, I break out the top 25 funds that have the most concentrated reportings and compare their overall performance and find that they are all performing poorly in these quarters of non-diversification. Next, I examine the trend by year of concentration versus non-concentration and find that over the span of the data set this strategy is greatly diminished in 2015 as compared to 2000.

Regressing the net benchmark and net market returns against standard mutual fund economic indicator variables as well as the individual concentration variables I show that when looking at purely net market returns, there is a positive and significant correlation between concentration and the quarterly return, as well as fund flow, total net assets, and a negative correlation among flow volatility and institutional investors. Looking at net benchmark returns, I see no correlation of any significance for the concentration variables, and a reduction in assets and fund flows. Regressing fund flows and expense ratio as dependent variables for robustness check on the data set, I find that is no significance on the concentration variables, but positive and significant correlations with net benchmark returns. With the expense ratio as the dependent variable the concentration variables are all positive and significant which makes sense as a fund rebalances its holdings to create these non-diversified quarters, they will incur more expenses with constant rebalancing. Ultimately, I show over time that concentration has as impact on

market adjusted returns with positive flows and an increase in net assets, however these are less than 100 basis points in all categories and very negligible.

Section 2: Data, Variable Measures, Sample Description

2.1 Data Set

The data to create the sample set is derived from two separate sources, one part from CRSP for the economic and financial characteristics, and Thomson Reuters for the mutual fund holdings as reported by the funds themselves. The Thomson Reuters data comes from the N-CSR, N-CRS, and N-Q filings with the SEC, and the dataset comprises the years 1988-2017. And takes into account that mutual funds did not have to report quarterly earnings until 2004, although there were many funds that chose to do so prior to this time frame (Wermers, Yao, and Zhao, 2008). This portion of the data contains the share class level holdings as reported on either a Quarterly or Annual basis, the assets under management by name and ticker, and the number of shares held at the time of reporting. The mutual fund economic and financial data, including monthly returns, distributions, and other fund data is pulled from CRSP for the same time period of 1988-2017.

The holdings data is first sorted by fund, year and month and then is checked to ensure no duplicates in terms of holdings are present as a potential error in the data. Since this paper focuses on what actual assets are under management at any reporting time, all data must be left at the share class level, and left as quarterly data. While quarterly data is not the most efficient for determining dividend payouts (Sialm and Starks, 2012), for comparing other characteristics against holdings it is the most accurate breakdown possible. The holdings data is bare bones at this point in the process and is set aside to start work on the economic and financial factors pulled from CRSP. Before any calculations are made I remove the first set of funds, keeping only those funds that have the CRSP objective code of "ED", U.S. Domestic Equity, and making sure that any remaining funds were based in the U.S. and that any fund had to have at least 90% of its

holdings as common stock. As well, any fund that is flagged as an ETF/ETN and not open to investors is removed as there should be no closed-end funds in the sample for a more robust look at what is available to the average investor.

Using the CRSP data the dividend yield is either pulled for the quarter, or calculated if there are monthly payouts. The expense ratio is taken directly from the reporting in CRSP. Mutual fund flow, flow volatility, and turnover ratio are all calculated quarterly at the share class level. Fund age is calculated based on the year first reported and the current year of the observation. The standard deviation of the share class is calculated using the daily returns as reported in CRSP. Once the standard deviation is calculated, the Sharpe ratio is calculated using the quarterly returns minus the risk-free rate, then divided by the standard deviation. I analyzed all my data using the net fund returns as reported, a gross fund return (by adding back in the expenses), a gross benchmark adjusted fund return (annual gross fund return – the benchmark return for that style as described by Morningstar from our well matched data set), a net benchmark adjusted fund return (net fund return – benchmark return), a gross market adjusted fund return (gross annual fund return – return on Russell 3000), and a net market adjusted fund return (net annual fund return – Russell 3000 return). While all returns gave a slightly different economically significant factor when the initial analysis was completed, as seen in Section 3 below, I chose to use the net market adjusted returns and compare them to the net benchmark adjusted returns. This gives a slightly more conservative outlook and therefore any results should be of a more robust and higher quality.

Once this is completed it is time to merge the CRSP economic and financial data with the holdings data. To do this I used a file provided by Wharton Research Data Services that provides a link from the CRSP "fundno" variable to the Thomson Reuters version of this known as the

"wficn" identifier. The linking file, known as MFLinks Table, has both the "wficn" and its corresponding CRSP "fundno". Once this is integrated into the CRSP data, it is a simple matter of merging the holdings data in. Once the data set is complete, I impose two additional restrictions as per Frazzini (2006). I remove any fund that shows any holdings with shares under management higher than the reported shares outstanding for that asset, and any fund that reported total assets under management as less than the total value of their holdings (number of shares held * price of shares). Additionally, to ensure the highest quality data sample, I imposed a larger restriction by generating and utilizing a well-matched fund sample of a merged CRSP/Morningstar database based off the Pastor, Stambaugh, and Taylor (2015) methodology. Pastor, Stambaugh, and Taylor (2015) merged CRSP and Morningstar to eliminate incorrect data bias between the two major datasets for fund information. Using the Pastor, Stambaugh, and Taylor (2015) method, all corresponding CRSP and Morningstar data is merged, cleaned, and all funds that have matching data are considered to be "well matched" and can have either CRSP or Morningstar data utilized and the results will be the same. Once the well-matched database was created, I made a linking file using the CRSP "fundno" generated from that well-matched set, and merged it with the finalized CRSP/Thomson Reuters data set. By imposing this restriction, I can confidently say that the CRSP data is accurate and that it matches as much as possible the data found in Morningstar. Even though Morningstar data is not used in this paper, having a data set that can be verified and is accurate across multiple sources allows for a more robust sample set.

2.2 Variable Measures

At this point, I need to create a set of dummy variables and holdings variables to correspond to the desired levels of testing. The first variable is simply a count of the total number

of assets being held at each reporting quarter for each share class level of the fund, *Number Of Assets Held*. While Morningstar has a variable in its database for "% of Assets in the Top 10 Holdings", it does not have all of the reported numbers and is missing a fair amount of the data, so I manually calculate it for each share class level of the fund by calculating the percent of each asset to the total dollar amount held. Each share class observation then has the holdings sorted and counted by the percentage and the top 10 holdings are added together. If the fund has ten or less holdings the total is 1.0, or 100%. Next, three dummy variables are created to tag each fund with three categories; *1 ASSET, 5 ASSETS OR LESS, 10 ASSETS OR LESS*. For example, if the fund has only 4 assets in holdings, it will be tagged with the *5 ASSETS OR LESS.* All *1 ASSET* funds are also included in the *5 ASSET OR LESS* level and the *10 ASSET OR LESS* level as it is cumulative. This is based solely on the number of holdings in each observation. Finally, the diversified/non-diversified holdings indicator. This is a dummy variable that is a 1 for any fund that has a single holding comprising more than 15% of the total holdings for that observation, aptly named *15% Threshold*. While the concept of diversification was first pointed out by Markowitz (1952) when he laid out the groundwork for Modern Portfolio Theory, the general assumption is that 10 or more assets is a diversified portfolio. Thus, if an equal-weighted portfolio has 10 assets, no asset will be over 10%. Assuming rounding and other errors, moving the threshold to 15% for any one asset will allow for any portfolio with more than 6 assets to have an equal-weighted spread with less than 15% in one asset. This gives a measure for funds that are holding an inordinate amount of their capital in one or more large asset holdings that goes against Modern Portfolio Theory.

Lastly, I impose a few final filters that have become standard practice among the mutual fund literature. To counteract incubation bias (Gervais, Lynch, and Musto, 2005) (Evans, 2010) I

drop any fund that has an age of less than 5 years. This is to reduce the effect of new, mostly unproven funds that most likely are not available to the public, or that have additional investment criteria that may not be denoted by the category they are in. As well, any fund that has a calculated average annual Total Net Asset value of less than $10 million is dropped as a potential indicator of incubation bias. This is to help ensure that any fund in the data set is a well-established fund that will have a consistent operational history.

2.3 Descriptive Statistics

The descriptive statistics are for the fully cleaned and prepped data set consisting of 14,452 quarterly fund observations, of 2,043 funds covering the years of 2000-2015. Of note, the funds in the data set have a dividend yield with a mean of 0.06%, and a maximum of 5.48%, with the top 1% being in the range of 0.77% to 5.48%. The fund quarter observations have a *Standard Deviation* of 4.55% with the top 1% going from 10.22% to 26.74%. The funds have an *Institutional Ratio* with a mean of 14.97% and a maximum of 100% comprising the top 1.5% of the observations. When comparing the number of assets under management at any observed quarter, the mean is 29.9067 from a minimum of 1 asset in the bottom 5% of observed fund quarters all the way up to 2,034 assets under management at the maximum. On average, based on a percentage of the assets under management, 78.08% of each fund's assets are in the top 10 holdings. As a benchmark, comparing the percentage of assets under management to the whole, and determining which funds have 15% or more of their assets in at least one holding is useful for determining whether a fund is over-leveraged into a single asset. If every holding is at least 15% of the assets under management, then the maximum number of holdings possible is 6.67, on average, which is less than the 10 holdings needed to be diversified according to Modern Portfolio Theory. 51.70% of the fund quarter observations contain at least one holding that holds

15% or more of the fund's assets. When comparing the actual number of holdings undermanagement, of note is that 39.27%% of fund quarter observations have 10 holdings or less, 20.31% of the overall data set have 5 holdings or less, and 5.51% of the total quarterly fund observations have only 1 holding under management. For a breakdown of various aspects of the full sample set additional descriptive tables are available upon request.

Section 3: Empirical Results

3.1 Most Concentrated Funds

Mutual fund diversification is a factor of the amount of each asset under management and the spread of risk across those assets. Markowitz (1952) lays down the groundwork for Modern Portfolio Theory and shows that a mix of approximately 10 assets should give the most diversification required before there are diminishing returns to the risk aversion and you reach the level of market risk only, that which cannot by definition be diversified away. Using this number of 10 assets under management is a good starting point to determine whether a mutual fund, which by their very nature are supposed to provide investors with a fully diversified vehicle for investment, are actually diversified and whether they are earning a better return or not during these periods of non-diversification. Since mutual funds can rebalance their holdings at will, and they only are required to report their holdings once a quarter, the analysis in this paper is done at the quarterly observation level, rather than the yearly observation level as is most common. Table 3, Panel A is a list of the top 25 funds by number of quarters they held 10 assets or less in their portfolio with a comparison of their average *Net Market Adjusted Return*, average *Net Benchmark Adjusted Return*, and their average Sharpe ratios, with their Morningstar FundID and Fund Name as listed in their database. The first fund on the list, Pacific Advisors Small Cap Value Fund, with 7 quarters of holding only 1 asset and 13 quarters of 10 assets or less, was liquidated on April 6th, 2020, with a final stock price of $8.53 and a ticker symbol of PASMX. At the time of liquidation, the fund had total assets of $3,595,600, a return of 3.25%, and a Morningstar rating of 1. Number 2 on the list is the Perkins Discovery Fund with 6 quarters of holding 1 single asset, and 8 quarters of holding 10 assets or less. This fund was first launched on April 15th, 1998 and is currently still in existence with a current market price of $51.10, a stock

ticker symbol of PDFDX, with $637.95 million under assets, an expense ratio of 2.5%, and higher than average risk per Morningstar, and a 1 star 10-year Morningstar rating. Jumping to the bottom of the list, number 25, Invesco Value II Fund, was liquidated on 05/23/2011. At the time of its liquidation, it had a return of 3.13%, $30,982 in assets under management, and a Morningstar rating of 3. When comparing the average *Net Market Adjusted Return* of each of the funds for the quarterly observations in this chart, there are only 6 that average out to a return of greater than 1%. When comparing this to the average *Net Benchmark Adjusted Return*, there are only 2 funds that have a return higher than 1%, with the majority being negligible and negative. It is worth noting that all of the funds that have a Sharpe ratio greater than 2.0 have negative avg *Net Market Adjusted Returns* which would be a good indicator of either low returns or low standard deviations, meaning there isn't much change from quarter to quarter, regardless of the assets under management.

As time progresses, basic diversification theory does not change. The Modern Portfolio Theory still holds today almost 70 years later as the basic foundation for diversification. Table 3, Panel B, compares the number of observed fund quarters in which the 10 asset or less threshold is crossed, broken down by year from 2000 to 2015, with three benchmarks of the average *Net Market Adjusted Return*, the average *Net Benchmark Adjusted Return*, and the average *Sharpe Ratio.* Starting in 2000, there are 526 quarterly fund observations that have 10 assets or less under management, with 138 of those being only 1 asset. Continuing down the list, we can see an almost steady trend of decreasing non-diversity. Whereas in 2000, there 138 observations with 1 asset under management, and 526 observations of 10 assets or less, in 2015, the data set has 17 observations with 1 asset and 90 with 10 assets or less. As the number of non-diversified observations is decreasing the returns as evidenced by both the *Net Market Adjusted Return* and

the *Net Benchmark Adjusted Return*, show no consistency or trends. The *Net Market Adjusted Return* has a high of + 37.15% to a low of -27.59%, while the *Net Benchmark Adjusted Return* has a high of +1.14% to a low of -0.53%. The wildly fluctuating average returns show no particular reason as to why the funds would have undiversified holdings, or any consistency as to what they were attempting to do.

Table 4 illustrates the correlations among the variables in the sample set using a Pairwise Correlation Matrix. While there is almost uniform correlation among the variables to the 1% level, there are a few standout examples. When looking at the dividend yield, both the *10 Assets or Less* and *15% Threshold* are negative and significant to the 1% level, the *5 Assets or Less* is negative and not significant, but the *1 Asset* variable is positive and significant. The assumption at this point is that the reason to hold a single asset would be for a higher dividend payout during a single reporting period in an attempt to bump up the payouts to attempt to draw in investors in the short term. Interestingly as well, if you compare all the concentrated, or non-diversified, variables that show holdings in a few assets, their expense ratios are all positive and significant to the 1% level, with the largest being the *% Assets in Top 10 Holdings* at 0.1919 and *10 Assets or Less* at 0.1517. This is contrary to the assumption that fewer holdings would require less active management trades to maintain and would accordingly have a lower expense ratio. This is effectively saying that the more concentrated the assets the higher the expense ratios. When comparing the other major economic variables to the concentration variables, I find that *Fund Flow, Turnover, Standard Deviation, Net Benchmark Adjusted and Net Market Adjusted Returns* are all positive and significant. Conversely, *Fund Age*, and *Institutional Ratio* are all negative and significant meaning these are younger funds and less likely to have institutional holdings as part of their portfolio. The *Fund Return* is negative and significant to the 1% level for all

concentration variables. This leads to the assumption that returns are not the driving factor for these holdings. Compared to *Number of Holdings* I find that the more unique assets under management increases, the *Expense Ratio* goes down, *Fund Flows* goes down, flow volatility increases, *Fund Age* and *Institutional Ratio* both increase and become positive and significant, along with *Fund Return.* Comparing the non-diversified indicators against returns shows a negative and significant coefficient for the *Fund Return* across all 5 variables, but a positive and significant coefficient against both *Net Market Adjusted Return* and *Net Benchmark Adjusted Return* which can show a higher risk adjusted return even with a lower overall return as compared to the adjusting economic factors.

3.2 Fund Return Measures

Table 5, Panel A and B are comparing the breakdown of the non-diversified fund variables in conjunction with the either the *Net Market Adjusted Return* (Panel A), or the *Net Benchmark Adjusted Return* (Panel B) in a one observation lag to test for significance.

The equation for both Panel A and Panel B is the same with differing return Dependent Variables and alternating β_8 variables as illustrated below in equation 1.

$$Return_{i,t} = \alpha + \beta_1 DividendYield_{i,t-1} + \beta_2 ExpenseRatio_{i,t-1} + \beta_3 FundFlow_{i,t-1} + \beta_4 FundFlowVolatility_{i,t-1} + \beta_5 FundTurnover_{i,t-1} + \beta_6 LogTNA_{i,t-1} + \beta_7 InstitutionaRatio_{i,t-1} + \beta_8 (Non - DiversifiedVariable)_{i,t-1} + YearEffects + StyleEffects + \mu_{i,t} \quad (1)$$

In Panel A, the first variable of note includes a highly positive and significant to the 1% level *Dividend Yield* across all columns with the lowest coefficient being 1.6837 and the highest being 1.8204. this means that for every one percent increase in *Dividend Yield*, the return will increase

by 1.68 to 1.82 percent depending on which alternate β_8 variable we are comparing it to. *Fund Flows* are positive and significant while *Fund Flow Volatility* is negative and significant to the 1% level. This shows that money is flowing in but there is not a lot of volatility on the flows, which is good in both cases for the fund. With a positive and significant *Log TNA* we can see that the funds that are non-diversifying tend to also have larger assets under management such that as they keep increasing the funds returns continue to go up, however with the negative and significant to the 1% level across all columns of the *Institutional Ratio*, this shows that the type of investor in these non-diversifying funds tends to be more independent and less institutionalized. Comparing each of the non-diversified identifiers, it shows across all 5 variables as positive and significant to the 1% level coefficient ranging from 0.0197 to 0.0426. Since these are lagged variables, the movement of the assets in these quarterly fund observations to a non-diversified holding strategy is increasing the returns overall. The persistence of this strategy is hard to gauge, but in the short term it increases the overall returns of the fund and draws in investors.

Comparing Table 5, Panel A (*Net Market Adjusted Return*) versus Panel B (*Net Benchmark Adjusted Return*) shows an entirely different story. If the comparison were to be truly against individual returns adjusted for the market risk, this would be a good example of how diversification is not as black and white as it is made out to be. However, looking at Table 5, Panel B, when adjusted for the benchmarks in each investment category as categorized by Morningstar, the tale is the exact opposite across the board, non-diversification does not appear to work. Starting with *Dividend Yield* as in Panel A, it is now negative and significant to the 1% level across all five columns of the regression. It is consistent in its polar opposite reading when comparing to the benchmark returns. *Fund Flow* is now negative and significant to the 5% level

across all columns which is showing a decrease in cash towards the fund, as well we can see that *Turnover* is negative and significant to the 5% level which shows that there is less overall volatility. In addition, the *Log TNA* is showing negative and significant to the 1% level and it shows that as these funds increase the level of their assets, the returns are decreasing. With the *Institutional Ratio* being barely significant to the 10% level and with an average coefficient of just 8 basis points, the change withing this variable is most likely not a factor. Looking at each of the non-diversified economic variables, the target of each column of the regression, when compared to the benchmark adjusted returns, there is absolutely no significance. All coefficients are positive except for *5 Assets or Less*, however all 5 variables are within 5 basis points of each other. There is no significance or contribution to the benchmark adjusted returns.

3.3 Fund Economic Measures

In Table 6 and 7, I compare the 5 non-diversified economic variables to two standard fund variables to check that the fund data is generally behaving as it should. This is a robustness test to verify the integrity of the data set. Table 6 uses the *Fund Flow* as the independent variable against the standard lagged mutual fund economic variables with the 5 non-diversified variables individually run in the β_8 position of the regression. As you would expect to see, as the *Expense Ratio* increases, fund flows decrease at a rapid rate with all columns being significant to the 1% level and negative with coefficients ranging from -3.9986 to -4.2385. The higher the expenses the less cash you generally see flowing into the fund. The *Fund Flow Volatility* is positive and significant which shows an increase in fund flows as volatility increases, which makes sense as you can't have volatility without flows. The most telling of the economic variables is the *Net Benchmark Adjusted Return* which is highly positive and significant to the 1% level across all columns. This indicates that as the adjusted return of the fund increases, so do the *Fund Flows*,

which again is common sense as you would want to invest your money in a fund that is doing well with higher returns. Comparing the non-diversified variables to *Fund Flows* shows that, as a strategy, none of them are increasing or decreasing the flows with any confidence. Whether it's to hold one asset, 10 assets, or anywhere in between, the resulting inrush, or outrush, of capital is not occurring. Of note is that all coefficients are negative, however they are not significant to even the 10% level of satisfaction.

Table 7 compares the same regression as Table 6 with the change of putting the *Expense Ratio* as the dependent variable. Once again, this is to try and determine a reasoning for the non-diversification, as well as to verify the integrity and robustness of the overall sample set. Looking at the *Dividend Yield,* it shows negative and significant to the 10% level across all columns, so it is consistent regardless of the alternating non-diversified independent variables at the bottom of the table. *Fund Flow* and *Turnover* are both significant and positive, though while *Turnover* is consistently significant to the 1% level, *Fund Flow* is mostly significant o the 5% level with a coefficient barely above 0. Of note is that both the *Institutional Ratio* and *Net Benchmark Adjusted Return* are negative and significant to the 1% level. Both of these indicate as each variable increases the *Expense Ratio* is decreasing. This is exactly how you would expect a mutual fund to be operating. As the portion of the fund that is purchased by institutional investors increases, there is more cash flowing in, making the fund larger. As funds get larger, their overall expense ratios will go down as they are able to spread them across a larger asset base. The same can be seen with the adjusted returns. When an active management strategy is working and returns are doing well and consistent, there is less activity in the fund, so there are less expenses overall. Turning attention to the non-diversified variables, there is a clear picture that is repeated from Table 4, and that is a positive and significant correlation to the 1% level for

all 5 variables with the *Expense Ratio*. For every unit increase in one of the non-diversified variables, *Expense Ratio* goes up. This outcome should not be wholly unexpected as a fund would have to move assets around to create such a non-diversified environment, which would naturally increase the expenses incurred in the long run with rebalancing of the portfolio afterwards.

Comparing the concentration and non-diversification of assets over time, it shows a solid trend downward form the beginning of the sample set in 2000 to the end in 2015. This figure is a representation of the average, by year, of the concentration of a fund's overall assets in the top 10 holdings. In 2000, the average fund had approximately 92% of their assets under management in their top 10 holdings, whereas in 2012 it is sitting at approximately 76%. This is comparable to Table 3, Panel B which showed a declining trend in concentrated, or non-diversified assets over the life of the sample set.

Section 4: Conclusions

The whole purpose of a mutual fund is to diversify assets for investors that may not know how to do so, or that may not have the funds available to hold many positions in different expensive stocks. By investing in a diversified, pre-set portfolio, an investor can expect to have their assets under management reasonably diversified to help stave off systemic risk while attempting to mitigate downturn as much as possible. For a mutual fund to rebalance their portfolio to only hold one asset, or even 5 assets seems at best short-sighted, and at worst negligent, unless there is a specific reasoning for doing so. The persistence of such a strategy cannot be sustainable as most actively managed trading strategies tend to underperform (Pastor, Stambaugh, Taylor, 2015; Chong, Lee, Sio, 2020; Pastor and Stambaugh, 2012; Berk and Green, 2004; Perold and Salomon, 1991) in the long term.

In this paper, I have attempted to determine an economic reasoning for the behavior of funds that choose to reallocate their assets into a non-diversified, or concentrated, position. I have looked at common economic variables that are the typical reasonings that investors look to invest in mutual funds, such as dividend yields, returns, lower expenses, lower turnover, and overall utility of the fund. Comparing all of these factors, I find that as the concentration of the assets under management increases, the expense ratios increase, the fund contracts, and the benchmark adjusted returns become poorer. There appear to be no economic reasons for the concentrations of the funds and the lack of diversification. Whether this is an attempt by a fund manager to achieve a single solid return, or to time the market to get a big "win" for the fund, or even as a last ditch effort to attempt to artificially inflate the fund's performance in the short term, there is no evidence that they are succeeding. Indeed, over time, the concentration of assets

as a strategy has diminished as investors have gotten savvier and as fund managers have tried different strategies to bring in new investors.

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Tables

Table I

Variables Definitions

This table provides variable definitions for the sample used in the analysis. The data covers the period from 2000 to 2015 for 2,043 funds comprising 14,452 fund-quarter observations. All data pulled from CRSP, Morningstar, and Thomson Reuters database. This is the full dataset for well-matched funds utilizing the Pastor, Stambaugh, and Taylor (2013) protocol for matching fund data across CRSP and Morningstar.

Variables	Definition	Data Source
Dividend Yield	Quarterly Fund Dividend Yield (decimal) from CRSP / Morningstar	CRSP/Morningstar
Expense Ratio	Quarterly Expense ratio taken from CRSP using well matched fund data (%)	CRSP
Fund Flow	Calculated quarterly fund flows using TNA and Net Return (%)	CRSP
Fund Flow Volatility	Calculated quarterly fund flow volatility from the standard deviation of the monthly fund flows	CRSP
Fund Turnover Ratio	Calculated average of the share class turnover ratio	CRSP
Log Total Net Assets	Log of quarterly Total Net Assets	CRSP/Morningstar
Fund Age	Calculated Age of fund taken from well matched data from CRSP/Morningstar	CRSP/Morningstar
Standard Deviation	Calculated standard deviation from daily returns for the quarter	CRSP/Morningstar
Institutional Ratio	Percentage of institutional class holdings in fund	CRSP/Morningstar
Fund Returns	Calculated quarterly gross fund returns	CRSP/Morningstar
Net Benchmark Return	Calculated annual fund net return minus benchmark returns (decimal)	CRSP/Morningstar
Net Market Return	Calculated annual fund net returns minus Russell 3000 return (decimal)	CRSP/Morningstar
Number of Assets Held	Calculated from Thomson Reuters Holdings	Thomson Reuters
% of Assets in Top 10 Holdings	Calculated from Thomson Reuters Holdings	Thomson Reuters
1 Asset	Dummy variable for funds with 1 Asset Under Management	Thomson Reuters
5 Assets or Less	Dummy variable for funds with 5 or less assets under management	Thomson Reuters
10 Assets or Less	Dummy variable for funds with 10 or less assets under management	Thomson Reuters
15% Threshold	Dummy variable for funds with at least one asset at 15% or more of the total under management	Thomson Reuters

Table II: Descriptive Statistics

Note: All variables are defined in Table I. This table provides summary statistics for our CRSP, Morningstar, and Thomson Reuters matched sample of 2,043 funds and 14,452 fund-year observations covering the period 2000–2015. To mitigate the effects of very small funds, incubated funds, and data anomalies we removed fund-year observations with less $10 million in total net assets, fund ages less than five years, or are in the top 1% in terms of dividend yield, or in the top and bottom 1% in terms of flow, flow volatility, and turnover.

Variables	N	Mean	St.Dev	min	p1	p5	p25	Median	p75	p95	p99	max
Dividend Yield	14,452	0.0006	0.0019	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0040	0.0077	0.0548
Expense Ratio	14,452	0.0130	0.0061	-0.0026	0.0018	0.0051	0.0094	0.0121	0.0160	0.0222	0.0281	0.1840
Fund Flow	14,452	0.1417	0.9145	-0.8950	-0.7100	-0.5220	-0.1901	0.0100	0.2487	1.0142	3.0669	28.1865
Fund Flow Volatility	14,452	0.4419	1.0947	0.0000	0.0005	0.0017	0.0157	0.0715	0.3344	2.1171	6.1953	10.9383
Turnover	14,452	0.7673	0.5879	0.0400	0.0500	0.1100	0.3300	0.6200	1.0300	1.9500	2.8300	3.6300
Log TNA	14,452	19.6146	1.7675	12.2061	15.4249	16.6487	18.4121	19.6400	20.8703	22.4602	23.5309	25.8098
Fund Age	14,452	17.4670	13.7888	5.0000	6.0000	6.0000	9.0000	13.0000	20.0000	49.0000	75.0000	91.0000
Standard Deviation	14,452	0.0455	0.0197	0.0067	0.0163	0.0216	0.0308	0.0406	0.0580	0.0806	0.1022	0.2674
Institutional Ratio	14,452	0.1497	0.2864	0.0000	0.0000	0.0000	0.0000	0.0000	0.1206	0.8981	1.0000	1.0000
Fund Return	14,452	0.0184	0.0412	-0.3708	-0.0984	-0.0414	-0.0071	0.0144	0.0434	0.0876	0.1135	0.2720
Net Benchmark Adj. Ret.	14,452	-0.0004	0.0179	-0.2799	-0.0467	-0.0241	-0.0077	-0.0007	0.0064	0.0233	0.0528	0.2508
Net Market Adj. Ret.	14,452	-0.0329	0.1663	-0.3426	-0.2923	-0.2759	-0.1196	-0.0701	0.0161	0.3645	0.3898	0.4432
Number of Assets	14,452	29.9067	67.8211	1.0000	1.0000	1.0000	6.0000	14.0000	28.0000	112.0000	278.0000	2034.0000
% of Assets in Top 10	14,452	0.7808	0.2450	0.0816	0.1856	0.3021	0.5982	0.8709	1.0000	1.0000	1.0000	1.0000
1 Asset	14,452	0.0551	0.2281	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000
5 Assets or Less	14,452	0.2031	0.4023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000
10 Assets or Less	14,452	0.3927	0.4884	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000
15% Threshold	14,452	0.5170	0.4997	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Number of Obs./Funds	14,452	2,043										

Table III: Concentrated Funds and Performance

Note: All variables are defined in Table I. This table lists the funds that are the least diversified and the number of quarters they hold 1 asset, less than 5 assets, and less than ten assets. This table also provides mean fund performance measures for the quarters where the portfolio contains 10 or fewer assets. Panel A reports diversification and performance measures for the top 25 most concentrated funds. Panel B provides the distribution of the top concentrated fund-quarter observations by year.

Panel A: Top 25 Most Concentrated Funds

FundID	Fund Name (Morningstar)	1 Asset	5 Assets or Less	10 Assets or Less	Avg Net Market Return	Avg Net Benchmark Return	Avg Sharpe Ratio
FSUSA002H2	Pacific Advisors Small Cap Value Fund	7	12	13	-0.0129	0.0018	1.1649
FSUSA004AJ	Perkins Discovery Fund	6	8	8	-0.0954	0.0048	2.5782
FSUSA002RW	White Oak Select Growth Fund	6	11	13	-0.0509	0.0012	1.6726
FSUSA000NL	LKCM Small Cap Eq Fund	5	8	10	0.0011	0.0111	1.0599
FSUSA001FD	Brown Capital Management Small Company	5	10	10	0.0391	0.0058	1.0348
FSUSA0004B	Cavanal Hill Multi Cap Equity Income Fd	5	6	6	-0.0279	0.0055	1.7022
FSUSA001N6	Meridian Growth FundÂ®	5	9	14	-0.0167	0.0149	2.3239
FSUSA00083	Apex Mid Cap Growth Fund	5	6	6	0.0073	-0.0141	-1.5206
FSUSA001YJ	Pin Oak Equity	5	11	14	-0.0145	-0.0026	1.3348
FSUSA0037T	ClearBridge Large Cap Growth Fund	4	10	11	0.0459	0.0039	-0.957
FSUSA000FC	Federated Clover Value	4	5	6	0.0026	0.0003	0.9592
FSUSA002KP	LKCM Equity Fund	4	5	5	-0.0499	0.0021	2.0831
FSUSA002JV	AllianzGI NFJ Mid-Cap Value Fund	4	4	5	0.0218	-0.0044	1.5703
FSUSA004HF	DWS Micro Cap Fund	4	6	6	-0.0158	0.0056	1.3305
FSUSA00039	American Growth Fund Series One	4	5	6	-0.0811	-0.026	0.919
FSUSA0027B	Lazard US Small-Mid Cap Equity Portfolio	4	5	5	0.0127	0.0013	0.9949
FSUSA004ED	JHancock Classic Value Fund	4	4	10	-0.0236	0.0033	1.4938
FSUSA0025O	OPPENHEIMER Rising Dividends Fund	4	6	8	-0.0242	0.0029	1.6807
FSUSA003TE	Brown Advisory Opportunity Fund	4	6	6	-0.0452	-0.0031	1.3116
FSUSA0009X	Midas Magic	4	9	13	-0.0296	0.0003	0.1863
FSUSA002N9	Waddell & Reed Advisor Core Investment F	4	6	7	-0.0511	-0.0005	2.093
FSUSA001O2	Huntington Growth Fund	3	4	4	-0.0117	-0.0003	-0.1244
FSUSA000AQ	Victory RS Value Fund	3	3	8	-0.0395	0.0027	2.6967
FSUSA004QH	Heartland Select Value Fund	3	5	8	-0.0418	0.0009	2.1412
FSUSA001XC	Invesco Value II	3	8	15	-0.0262	0.0034	1.6072
				Mean	-0.0211	0.0008	1.2535

Panel B: Concentrated funds by Year

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	1 Asset	5 Assets or Less	10 Assets or Less	Net Market Return	Net Benchmark Return	Sharpe Ratio
2000	138	366	526	0.1369	0.0008	-0.5434
2001	128	418	597	0.061	0.0114	-1.9024
2002	121	374	602	0.2787	-0.0013	-4.1503
2003	96	317	522	-0.2759	-0.0021	7.6597
2004	72	288	499	-0.1054	0.0011	2.3929
2005	61	214	441	-0.063	-0.0011	0.6682
2006	54	201	412	-0.1122	0.0003	2.5024
2007	50	220	440	-0.0238	0.0014	1.4691
2008	48	205	403	0.3715	-0.0053	-5.4682
2009	59	187	410	-0.1717	-0.0008	5.0688
2010	55	206	396	-0.0865	-0.0012	2.7564
2011	36	160	323	0.0169	-0.0003	-0.8088
2012	15	103	272	-0.1125	0.000033	3.391
2013	25	95	204	-0.2743	-0.0026	10.8509
2014	21	116	253	-0.1156	-0.0024	1.4731
2015	17	59	90	0.0123	0.0016	-0.9538
Mean	49.6875	183.3750	339.7500	-0.0288	0.0002	1.5280

Table IV: Pairwise Correlations

Note: All variables are defined in Table I. This table provides pairwise correlations among selected variables. for our CRSP, Morningstar, and Thomson Reuters matched sample of 2,043 funds and 14,452 fund-year observations covering the period 2000–2015. To mitigate the effects of very small funds, incubated funds, and data anomalies we removed fund-year observations with less $10 million in total net assets, fund ages less than five years, or are in the top 1% in terms of dividend yield, or in the top and bottom 1% in terms of flow, flow volatility, and turnover. Bold numbers represent significance to the 1% and 5% level.

	Dividend Yield	Expense Ratio	Fund Flow	Flow Volatility	Turnover	Log TNA	Fund Age	Standard Deviation	Institutional Ratio	Fund Return	Net Benchmark Adjusted Return	Net Market Adjusted Return
Dividend Yield	1											
Expense Ratio	-0.0806	1										
Fund Flow	-0.0232	-0.0154	1									
Fund Flow Volatility	0.0288	-0.2001	0.0402	1								
Turnover	-0.1050	0.1426	-0.0002	-0.0698	1							
Log TNA	0.0948	-0.2740	0.0580	0.4452	-0.1268	1						
Fund Age	0.0756	-0.0268	-0.0488	0.1324	-0.0367	0.3152	1					
Institutional Ratio	-0.0896	0.1160	-0.0362	0.0599	0.1495	-0.0686	-0.0496	1				
Standard Deviation	0.0165	-0.0598	0.0239	-0.0259	0.0181	0.0605	-0.1068	0.0093	1			
Fund Return	0.0120	0.0051	-0.0661	-0.0257	-0.0034	-0.0429	-0.0021	0.0688	0.0096	1		
Net Benchmark Adj. Return	-0.0313	-0.0002	0.0074	-0.0044	-0.0186	-0.0135	-0.0024	-0.0591	0.0019	0.1926	1	
Net Market Adjusted Return	0.0378	0.0079	0.0357	0.0561	0.0105	0.0239	-0.0130	0.4340	-0.0168	-0.1147	0.0845	1
Number of Holdings	0.0072	-0.1667	-0.0192	0.0335	-0.0928	0.1121	0.0073	-0.0548	0.0282	0.0465	-0.0081	-0.0039
% Assets in top 10 Holdings	-0.0406	0.1919	0.0282	-0.0203	0.1019	-0.1683	-0.0611	0.1121	-0.0498	-0.0981	0.0268	0.0373
1 Asset	0.0104	0.0788	-0.0008	-0.0174	0.0006	-0.0825	-0.0295	0.0720	-0.0309	-0.0237	0.0163	0.0479
5 Assets or Less	-0.0114	0.1244	0.0104	-0.0119	0.0622	-0.1214	-0.0638	0.1310	-0.0445	-0.0756	0.0230	0.0763
10 Assets or Less	-0.0510	0.1517	0.0199	-0.0289	0.0700	-0.1740	-0.0831	0.1412	-0.0547	-0.0799	0.0349	0.0614
15% Threshold	-0.0354	0.1085	0.0126	0.0343	0.0631	-0.0848	-0.0403	0.1111	-0.0591	-0.1021	0.0331	0.0753

Table V: Concentration and Performance Regressions

Note: All variables are defined in Table 1. This table reports coefficients from OLS regressions of annual fund net market adjusted (Panel A) and benchmark adjusted returns (Panel B) on one-quarter lagged fund concentration and other fund characteristics variables. The our CRSP, Morningstar, and Thomson Reuters matched data cover the period 2000–2015 for 2,043 funds and 14,452 fund-quarter observations. To mitigate the effects of very small funds, incubated funds, and data anomalies we removed fund-year observations with less $10 million in total net assets, fund ages less than five years, or are in the top 1% in terms of dividend yield, or in the top and bottom 1% in terms of flow, flow volatility, and turnover. Fund-level clustered robust standard errors are in parentheses as indicated. Year and fund style fixed effects are included in designated models. The notations *** and ** denote significance at the 1% and 5% levels, respectively.

Panel A: Net Market Adjusted Returns

	Net Market Adjusted Return				
VARIABLES	(1)	(2)	(3)	(4)	(5)
Dividend Yield	1.8122***	1.7303**	1.6837**	1.7221**	1.8204***
	(0.6949)	(0.7003)	(0.6971)	(0.6923)	(0.6899)
Expense Ratio	-0.2642	-0.1146	-0.2022	-0.1786	-0.1774
	(0.2243)	(0.2119)	(0.2157)	(0.2183)	(0.2190)
Fund Flow	0.0071***	0.0072***	0.0070***	0.0070***	0.0070***
	(0.0008)	(0.0008)	(0.0008)	(0.0008)	(0.0008)
Fund Flow Volatility	-0.0043***	-0.0038***	-0.0041***	-0.0041***	-0.0045***
	(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0013)
Turnover	0.0009	0.0016	0.0012	0.0013	0.0011
	(0.0019)	(0.0019)	(0.0019)	(0.0019)	(0.0019)
Log TNA	0.0026***	0.0020***	0.0024***	0.0026***	0.0023***
	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Institutional Ratio	-0.0108***	-0.0125***	-0.0115***	-0.0111***	-0.0108***
	(0.0034)	(0.0034)	(0.0034)	(0.0034)	(0.0034)
% of Assets in Top 10 Holdings	0.0426***				
	(0.0051)				
1 Asset		0.0279***			
		(0.0070)			
5 Assets or Less			0.0274***		
			(0.0035)		
10 Assets or Less				0.0197***	
				(0.0027)	
15% Threshold					0.0213***
					(0.0026)
Intercept	0.0680***	0.0931***	0.0878***	0.0910***	0.0940***
	(0.0158)	(0.0164)	(0.0150)	(0.0150)	(0.0147)
Obs.	14452	14452	14452	14452	14452
R-squared	0.0316	0.0301	0.0329	0.0317	0.0324
Year Fixed Effects	NO	NO	NO	NO	NO
Style Fixed Effects	YES	YES	YES	YES	YES
Clustered by Fund	YES	YES	YES	YES	YES

Panel B: Net Benchmark Adjusted Returns

	Net Benchmark Adjusted Return				
VARIABLES	(1)	(2)	(3)	(4)	(5)
Dividend Yield	-0.2372***	-0.2376***	-0.2383***	-0.2339***	-0.2346***
	(0.0755)	(0.0756)	(0.0755)	(0.0752)	(0.0755)
Expense Ratio	-0.0555	-0.0555	-0.0541	-0.0574	-0.0565
	(0.0375)	(0.0372)	(0.0370)	(0.0373)	(0.0371)
Fund Flow	-0.0006**	-0.0006**	-0.0006**	-0.0006**	-0.0006**
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Fund Flow Volatility	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Turnover	-0.0008**	-0.0008**	-0.0008**	-0.0008**	-0.0008**
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Log TNA	-0.0003***	-0.0003***	-0.0003***	-0.0002***	-0.0003***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Institutional Ratio	0.0007	0.0007	0.0007	0.0008	0.0008
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
% of Assets in Top 10 Holdings	0.0001				
	(0.0005)				
1 Asset		0.0001			
		(0.0010)			
5 Assets or Less			-0.0002		
			(0.0005)		
10 Assets or Less				0.0003	
				(0.0003)	
15% Threshold					0.0002
					(0.0003)
Intercept	0.0101***	0.0101***	0.0103***	0.0097***	0.0099***
	(0.0034)	(0.0034)	(0.0034)	(0.0034)	(0.0034)
Obs.	14452	14452	14452	14452	14452
R-squared	0.0394	0.0394	0.0394	0.0394	0.0394
Year Fixed Effects	YES	YES	YES	YES	YES
Style Fixed Effects	NO	NO	NO	NO	NO
Clustered by Fund	YES	YES	YES	YES	YES

Table VI: Fund Flow and Portfolio Concentration

Note: All variables are defined in Table 1. This table reports coefficients from OLS regressions of quarterly fund flows on one-quarter lagged fund concentration and other fund characteristics variables. The our CRSP, Morningstar, and Thomson Reuters matched data cover the period 2000–2015 for 2,043 funds and 14,452 fund-quarter observations. To mitigate the effects of very small funds, incubated funds, and data anomalies we removed fund-year observations with less $10 million in total net assets, fund ages less than five years, or are in the top 1% in terms of dividend yield, or in the top and bottom 1% in terms of flow, flow volatility, and turnover. Fund-level clustered robust standard errors are in parentheses as indicated. Year and fund style fixed effects are included in designated models. The notations *** and ** denote significance at the 1% and 5% levels, respectively.

	Fund Flow					
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Dividend Yield	-0.5558	-0.6960	-0.5595	-0.5158	-0.5793	-0.6740
	(3.4100)	(3.4087)	(3.4067)	(3.4101)	(3.4092)	(3.4046)
Expense Ratio	-4.2385***	-3.9986***	-4.2168***	-4.1238***	-4.1386***	-4.1417***
	(1.4128)	(1.4239)	(1.4164)	(1.4104)	(1.4061)	(1.4169)
Fund Flow Volatility	0.0675***	0.0680***	0.0676***	0.0678***	0.0679***	0.0681***
	(0.0140)	(0.0141)	(0.0140)	(0.0141)	(0.0141)	(0.0141)
Turnover	0.0102	0.0099	0.0100	0.0100	0.0098	0.0098
	(0.0140)	(0.0140)	(0.0140)	(0.0140)	(0.0140)	(0.0140)
Log TNA	-0.0812***	-0.0822***	-0.0813***	-0.0818***	-0.0820***	-0.0817***
	(0.0087)	(0.0089)	(0.0088)	(0.0088)	(0.0089)	(0.0088)
Institutional Ratio	0.0582*	0.0564*	0.0581*	0.0573*	0.0571*	0.0568*
	(0.0313)	(0.0317)	(0.0313)	(0.0313)	(0.0315)	(0.0315)
Net Benchmark Adj Return	2.9782***	2.9622***	2.9778***	2.9678***	2.9680***	2.9694***
	(0.4064)	(0.4067)	(0.4062)	(0.4064)	(0.4068)	(0.4060)
% of Assets in Top 10 Holdings		-0.0574				
		(0.0401)				
1 Asset			-0.0105			
			(0.0317)			
5 Assets or Less				-0.0233		
				(0.0175)		
10 Assets or Less					-0.0179	
					(0.0176)	
15% Threshold						-0.0215
						(0.0178)
_cons	1.5006***	1.5751***	1.5130***	1.5321***	1.5312***	1.5309***
	(0.1687)	(0.1845)	(0.1754)	(0.1752)	(0.1769)	(0.1733)
Obs.	14452	14452	14452	14452	14452	14452
R-squared	0.1051	0.1052	0.1051	0.1052	0.1052	0.1052
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Style Fixed Effects	YES	YES	YES	YES	YES	YES
Clustered by Fund	YES	YES	YES	YES	YES	YES

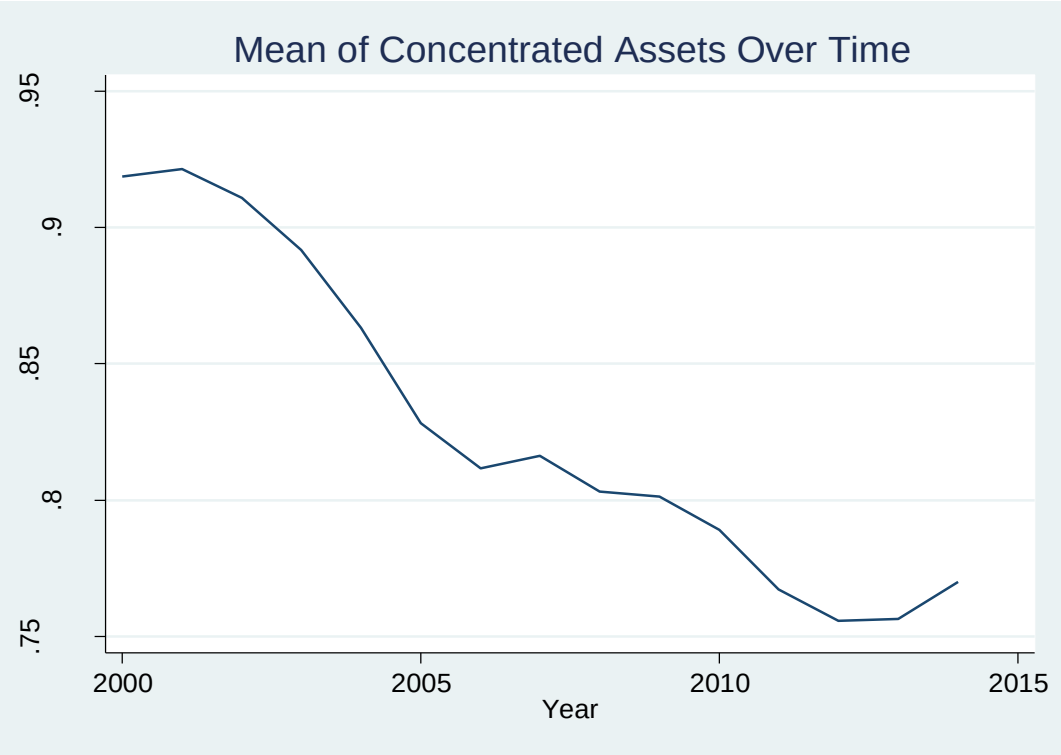
Table VII: Expense Ratios and Portfolio Concentration

Note: All variables are defined in Table 1. This table reports coefficients from OLS regressions of fund annual expense ratios on one-quarter lagged fund concentration and other fund characteristics variables. The our CRSP, Morningstar, and Thomson Reuters matched data cover the period 2000–2015 for 2,043 funds and 14,452 fund-quarter observations. To mitigate the effects of very small funds, incubated funds, and data anomalies we removed fund-year observations with less $10 million in total net assets, fund ages less than five years, or are in the top 1% in terms of dividend yield, or in the top and bottom 1% in terms of flow, flow volatility, and turnover. Fund-level clustered robust standard errors are in parentheses as indicated. Year and fund style fixed effects are included in designated models. The notations *** and ** denote significance at the 1% and 5% levels, respectively.

	Expense Ratio					
.	(1)	(2)	(3)	(4)	(5)	(6)
Dividend Yield	-0.0853	-0.0760	-0.0847	-0.0866	-0.0840	-0.0815
	(0.0467)	(0.0454)	(0.0459)	(0.0461)	(0.0463)	(0.0464)
Fund Flow	0.0001**	0.0001**	0.0001**	0.0001**	0.0001**	0.0001**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Fund Flow Volatility	-0.0006***	-0.0006***	-0.0006***	-0.0006***	-0.0006***	-0.0006***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Turnover	0.0007***	0.0008***	0.0008***	0.0008***	0.0008***	0.0008***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Log TNA	-0.0006***	-0.0005***	-0.0006***	-0.0006***	-0.0005***	-0.0006***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Institutional Ratio	-0.0012***	-0.0011***	-0.0012***	-0.0011***	-0.0011***	-0.0011***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Net Benchmark Adj Return	-0.0133***	-0.0122***	-0.0132***	-0.0128***	-0.0128***	-0.0130***
	(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0023)
% of Assets in Top 10 Holdings		0.0034***				
		(0.0004)				
1 Asset			0.0011***			
			(0.0004)			
5 Assets or Less				0.0010***		
				(0.0002)		
10 Assets or Less					0.0007***	
					(0.0002)	
15% Threshold						0.0006***
						(0.0001)
Intercept	0.0188***	0.0142***	0.0175***	0.0174***	0.0175***	0.0179***
	(0.0019)	(0.0018)	(0.0016)	(0.0017)	(0.0018)	(0.0018)
Obs.	14452	14452	14452	14452	14452	14452
R-squared	0.1266	0.1379	0.1284	0.1306	0.1297	0.1289
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Style Fixed Effects	YES	YES	YES	YES	YES	YES
Clustered by Fund	YES	YES	YES	YES	YES	YES

Figure 1: Portfolio Concentration Over Time

Note: All variables are defined in Table I. This table depicts mean fund portfolio concentration by year for our CRSP, Morningstar, and Thomson Reuters matched sample of 2,043 funds and 14,452 fund-year observations covering the period 2000–2015. To mitigate the effects of very small funds, incubated funds, and data anomalies we removed fund-year observations with less $10 million in total net assets, fund ages less than five years, or are in the top 1% in terms of dividend yield, or in the top and bottom 1% in terms of flow, flow volatility, and turnover.



CHAPTER 5

CONCLUSIONS

In this dissertation, I used mutual funds, asset prices, and board of directors data to determine how mutual funds are allocating dividends, whether they are creating above expected payouts artificially, whether board independence played a role in this action, and whether the allocation of assets under management into a non-diversified make up is beneficial to the investor and the fund as a whole. I tested this hypothesis multiple ways utilizing holdings data from Thomson Reuters, asset pricing, including dividend payout data from CRSP, and fund data on the make-up of the board of directors to test whether an independent board or board chair will create a different environment for activities such as dividend juicing. Finally, I used the same fund data to determine whether the assets under management that are not being allocated in what would be considered a diverse methodology are being done so in such a way as to manipulate or take advantage of market fluctuations, or whether it is a strategy that is unconventional in its execution.

In the first essay, I determined the level at which mutual funds that are dividend juicing appear to artificially increase their dividend payouts to attract investors. To determine the level of juicing I utilized a dividend juicing ratio that was originally laid out by Harris, Hartzmark and Solomon (2015) and I created an implied dividend yield variable that is based off the holdings at the time of reporting to compare to the actual paid out dividend yield. After reexamining the original paper using a more robust sample set and methodology, I concluded that the dividend

juicing policies of mutual funds with a dividend yield higher than 0.5% is both beneficial to the investor and associated with higher overall returns.

In the second essay, I examined whether or not a board of directors' independence is paramount to a positive dividend juicing strategy, or if there is a way to tell whether a mutual fund is juicing its dividends based on the overall make-up of the board of directors. I analyzed this issue by using the robust sample set of dividend juicing funds as in Chapter 2, and I added in data for the board of directors that was hand collected from Form 485 of the public filings of the funds as required by the SEC. After analyzing the board structure and comparing it to incidences of dividend juicing, I confirmed that there is a higher incidence of dividend juicing among more independent boards and boards with an independent chair. I also found that these funds are associated with lower expense ratios, lower turnover, and higher returns. When comparing to funds that are actively seeking out ways to reduce dividends, I found the exact opposite is true in all regard. They are less associated with independence, they have higher expenses, higher turnover, and lower fund flows.

In the third essay, I examined the asset allocation of mutual funds that choose to actively manage their funds and allocate them in a manner that is not generally seen to be as diversified. Since the function of a mutual fund is to diversify its holdings for the investor so they don't have to, having a non-diversified portfolio must be an active managed strategy with some specific intent. I analyzed and compared the standard economic metrics for mutual funds based on a diversification threshold of less than 10 assets and any fund with more than 15% of their funds in one asset. I found that as the instance of non-diversified holdings in the funds increases, the expense ratios increase, the fund contracts, and benchmark adjusted returns fall. There is no

overall economic reason for holding a non-diversified portfolio in a financial instrument that is meant to be diversified by its very nature.