

Security Concentration and Active Fund Management: Do Focused Funds Offer Superior Performance?

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Abstract

We examine gross fund returns based on the number of securities held and find no evidence that focused funds outperform diversified funds. After deducting expenses, focused funds significantly underperform. Controlling for various fund characteristics, fund performance is positively related to the fund's number of holdings both before and after expenses. We find evidence linking focused fund underperformance to agency and liquidity problems. Finally, the attrition rate of focused funds is higher than that of diversified funds. These results do not support the view that managers holding focused portfolios have superior stock-picking skills or that focused funds provide value to investors.

Keywords: mutual fund performance, focused fund, security concentration, best ideas

JEL Classifications: G11, G20

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1. Introduction

Beginning with Jensen (1968), a number of empirical studies show that actively managed mutual funds, on average, underperform relative to the market and various risk-adjusted benchmarks. The average underperformance of actively managed funds, however, does not preclude the possibility of superior performance by a subset of mutual funds. The question of whether some fund managers have superior investment skills therefore continues to be of considerable interest to academics and practitioners alike. This study examines whether fund managers who concentrate on a small number of securities are able to produce superior performance.

To add value beyond that offered by a passive index fund, the manager of an active equity mutual fund must seek out undervalued securities. The Treynor-Black method has long served as a popular approach, where the fund manager holds a large well-diversified portfolio and only deviates from this portfolio at the margin to take advantage of securities thought to be undervalued. This allows the manager's performance to closely track a similar diversified benchmark, while providing fund investors with a diversified portfolio. An alternative approach to active fund management is for the manager to focus on a relatively small set of securities and concentrate the holdings of the portfolio in those securities. In contrast to most mutual funds, which hold 100 or more positions, such a "focused" fund would typically hold fewer than 40 positions, often marketed as the manager's "best ideas."¹ A focused fund does not pretend to approximate the market, which also means the manager cannot easily hide a lack of skill by mimicking the market's performance. Accordingly, it would be reasonable to expect fund managers with superior ability to identify undervalued stocks to gravitate toward holding a more concentrated portfolio in order to better exploit their talents.

Alternatively, there are at least two possible arguments why focused funds should not outperform diversified funds. First, the decision by fund managers to hold concentrated portfolios could be influenced by the agency conflict between mutual fund companies and fund shareholders. Prior studies find a convex flow-performance relation, where high returns are rewarded by investor cash flow to a greater extent than low returns are penalized (e.g., Chevalier and Ellison, 1997; Sirri and Tufano, 1998). This serves as an implicit incentive for fund managers, especially low-skill managers who are likely to underperform, to increase the riskiness of their portfolios. If predominantly low-skill managers find it desirable to exploit this relation by increasing risk through holding a relatively small number of securities, this could lead to a negative relation between fund performance and portfolio concentration.

Second, focused funds likely hold less liquid portfolios due to their smaller number of holdings. As the ownership stake in a firm becomes relatively large, the

¹ Focused funds are alternatively referred to as concentrated, compact, select or undiversified funds. As we use these terms in this paper, our primary concern is the number of securities a manager can reasonably give attention to rather than the particular covariance structure of the assets in the portfolio.

fund is unable to quickly react to new information without their trading having a substantial price impact that would diminish the performance of the fund. Also, since the investment flows from routine purchases and redemptions must be spread over a relatively small number of securities, even liquidity-motivated trades can have a relatively large price impact. Therefore, even if managers of focused funds have better stock-picking ability, their funds might not perform better than diversified funds because of liquidity problems.

We use several common performance benchmarks to examine whether funds concentrated in relatively few securities do in fact offer superior performance. We merge the CRSP mutual fund and Thompson Financial mutual fund holdings databases over 1984–2002. Fund performance is measured by raw returns, the Fama-French three-factor model, and the Carhart four-factor model using both gross returns (before expenses) and net returns (after expenses). While examining returns before expenses is potentially more revealing of any ability managers may possess, we also look at net returns since these are more relevant to investors.

We analyze the relation between fund concentration and performance using a portfolio approach and find that, on a gross return basis, there is no evidence fund performance is significantly related to fund concentration. However, concentrated funds have higher expenses. Thus, net of fees, there is some evidence of worse performance. For example, net of expenses the quintile of funds with the fewest holdings realizes an economically and statistically significant annual three-factor alpha of -1.44% . In contrast, we find that the performance of funds with the most holdings does not significantly differ from the benchmarks on either a gross or net return basis. After controlling for other fund characteristics in a cross-sectional regression, funds with a large number of holdings significantly outperform funds with a small number of holdings both before and after expenses.

We further find that the underperformance of focused funds is related to stock return momentum. Focused funds have negative momentum factor exposure, which differs significantly from the positive momentum exposure of diversified funds. Based on the four-factor benchmark, focused fund underperformance disappears in a portfolio setting, but remains significant in the regression analysis. Thus, higher fees and negative momentum exposure explain much, but not all, of the underperformance of focused funds.

For comparison with our results based on the number of fund holdings, we also compute two alternative definitions of fund concentration: an index of security concentration based on security weights relative to the market portfolio, and the industry concentration index of Kacperczyk, Sialm, and Zheng (2005). We double-sort funds by industry concentration and number of holdings into 25 portfolios and find that superior performance is associated with both high industry concentration and a large number of holdings. We also find that the number of holdings provides significant incremental information for explaining fund performance controlling for both security and industry concentration.

As an alternative evaluation measure, we compute the return performance of each fund in our sample from the individual stock holdings of the fund, using the benchmark procedure of Daniel, Grinblatt, Titman, and Wermers (1997). Whether looking at the aggregate performance of holdings or performance of fund trades, we find no evidence that more focused funds outperform. To the contrary, we find that the performance of focused fund security trades is significantly worse than that of diversified funds, consistent with the hypothesis that agency problems are a factor in explaining focused fund performance. Focused funds also have significantly higher return volatility and tracking errors. These findings are consistent with a risk-taking explanation, where low-skill managers could find it attractive to exploit the asymmetric cash-flow response to fund returns by holding more concentrated and therefore riskier portfolios. If a significant proportion of focused funds have low-skill managers, then this could explain our performance findings.

To provide evidence on whether liquidity problems can explain focused fund performance, we construct measures of fund liquidity using data from the CRSP U.S. stock database and the Thompson mutual fund holdings database. We show that the portfolios of focused funds are less liquid than those of diversified funds, implying that a focused fund cannot change its position quickly in response to new information without a substantial price impact from trading. This suggests that focused funds underperform diversified funds in part because they hold less liquid portfolios. In sum, liquidity problems and agency problems both appear to contribute to focused fund underperformance.

The underperformance of focused funds could prompt a higher likelihood of liquidation or acquisition of these funds. To test this, we compare the attrition rate between focused and diversified funds, and consistent with this intuition, we find that focused funds are much more likely to be acquired or liquidated than diversified funds. As noted by Elton, Gruber, and Blake (2001), funds tend to have poor returns prior to liquidation or acquisition, and these returns tend to be missing in the CRSP mutual fund database just before the fund disappears. The result is that an upward bias is present when measuring performance among focused funds. In spite of this upward bias on the performance of focused funds, we find some evidence that focused funds underperform passive benchmarks and their diversified peers. Overall, our results do not support the view that fund managers focusing on a small number of holdings are more skilled.

2. Related literature

A considerable body of literature examines the performance of mutual funds and the question of whether some fund managers have superior investment skills. Jensen (1968), Gruber (1996) and Carhart (1997), among others, show that mutual funds on average underperform their relevant benchmarks after expenses. Grinblatt and Titman (1989) and Wermers (2000) find that the stock holdings of growth-oriented and high turnover funds outperform the benchmarks. Ahmed and Nanda (2005) find evidence of outperformance by quantitatively managed growth funds. A number of studies have

attempted to identify the existence of fund manager investment skill by examining the tendency of performance to persist among some funds. For example, Grinblatt and Titman (1989, 1992), Hendricks, Patel, and Zeckhauser (1993), Goetzmann and Ibbotson (1994), Brown and Goetzmann (1995) and Gruber (1996) find persistence in mutual fund performance. Carhart (1997) and Sapp and Tiwari (2004) demonstrate that stock return momentum can account for the persistence in performance and apparent profitability of persistence-based investment strategies. Wermers (2004) finds that fund return persistence is partially driven by cash flows from investors who chase performance, and Avramov and Wermers (2006) relate performance persistence to industry-based fund manager skill.

Our particular interest is the relation between fund manager skill and portfolio concentration. A recent study seems to support the idea that fund managers holding concentrated portfolios have superior investment skills. Kacperczyk, Sialm, and Zheng (2005) examine the performance of actively managed equity mutual funds from 1984 to 1999 while controlling for the fund's level of industry concentration. They group fund holdings into one of ten industry types and find that more concentrated funds perform better than funds that are diversified across industries, attributing this difference to better stock-picking and style-timing abilities of the concentrated funds.²

While the classification of securities by industry type, as in Kacperczyk, Sialm, and Zheng (2005), represents one reasonable definition of concentration, we propose an alternative, perhaps more intuitive, measure of fund concentration. Specifically, we measure mutual fund concentration based on the number of security holdings in the fund. Defining concentration at the security level as opposed to the industry level is motivated by several important considerations. First, because information gathering is costly in terms of time and resources, a fund manager can only give focused attention to a limited number of securities. Accordingly, in the money-management industry, the term "focused fund" is most often applied to a fund holding a small number of positions.³ By focusing on a small number of firms, a skilled fund manager should be better able to produce and exploit informational advantages. Second, the possible dimensions along which a fund manager may possess informational advantages should not necessarily be limited to industry alone. We would expect managers to seek

² Ivković, Sialm, and Weisbenner (2004) find similar evidence for individual investors. They examine the brokerage account holdings of investors and find evidence that portfolios concentrated in three or fewer stocks outperform more diversified portfolios, concluding these concentrated investors possess information advantages.

³ Morningstar.com, for example, states that "generally, a focused fund will hold fewer than 40 stocks, and some of the most focused funds hold fewer than 20 names." Both the 1940 Investment Company Act and the Internal Revenue Service (IRS) define diversification in terms of the number of individual firms held by the fund, rather than the number of industries represented in the portfolio. According to the Investment Company Act of 1940, for 75% of the assets of the fund, a diversified fund is limited to no more than 5% of fund assets in any one issuer. Therefore, a mutual fund could invest 25% in one issuer and 75% in 15 issuers, giving a minimum total of 16 unique names held by the fund. According to the IRS, regarding 50% of fund assets, the fund may not invest more than 5% in any one issuer. As for the remaining 50% of its assets, the fund may not invest more than 25% in any one issuer. Thus, a fund meeting only the minimum IRS requirements could theoretically hold as few as 12 positions. See Pozen (2002) for a detailed discussion.

informational advantages among any number of firm characteristics. Finally, defining fund concentration by the number of holdings does not require the creation of an arbitrary industry benchmark. We are thus not forced to group dissimilar industries together into a limited number of categories in order to develop a performance metric. We also note that information on the number of fund holdings is more readily available to fund investors than the industry-concentration measure developed by Kacperczyk, Sialm and Zheng (2005). Thus, it is consistent with industry parlance, recognizes the resource constraints of a fund manager, and is more intuitive, to define a focused fund simply by the number of firm names in its portfolio.

Shawky and Smith (2005) examine whether there is an optimal number of holdings for a mutual fund. Their focus is on the trade-off between diversification benefits and transactions and monitoring costs. They adopt fund Sharpe ratio as a performance metric and report a quadratic relationship between Sharpe ratio and the number of holdings, suggesting that the number of holdings that optimizes fund Sharpe ratio is well over 400 stocks. However, we note that a focus on Sharpe ratio as a performance metric is biased toward finding a relatively large well-diversified portfolio to be optimal simply due to the volatility reduction that naturally occurs from greater diversification. We also seek to quantify any value added (or subtracted) by fund managers, which is not a focus of Shawky and Smith (2005).

3. Data and preliminary analysis

3.1. Sample description

We construct a mutual fund sample by merging data from the CRSP Survivor-Bias Free U.S. Mutual Fund Database with the Thompson Financial Mutual Fund Holdings Database. The Thompson holdings database contains quarterly or semi-annual stock holdings for all U.S. mutual funds. The data are collected from reports filed by mutual funds with the SEC and from voluntary reports provided by the funds.⁴ The CRSP Mutual Fund Database provides information on fund returns, total net assets (TNA), fees, investment objectives, and other fund characteristics. Both the mutual fund holdings database and the CRSP mutual fund database are free of survivor bias. We merge these two databases by using the MFLINK file obtained from the Wharton Research Data Services (WRDS).⁵

Our sample includes all domestic equity funds that exist in both databases during 1984–2002. We exclude international funds, sector funds, specialized funds, and balanced funds, because these funds could have risk characteristics that are not spanned

⁴ A detailed description of this database may be found in Wermers (2000).

⁵ The MFLINK file does not provide a one-to-one match between the two databases. When a fund in the Thompson holdings database is matched with multiple funds in the CRSP mutual fund database, this is usually because the CRSP database reports each share class separately as a fund. We deal with these situations by combining multiple share classes into a single fund. There are also a number of cases where a fund in the CRSP database is matched with multiple funds in the holdings database. In these cases, we use other fund information such as TNA value and age to identify the “best” match.

by the factors driving the returns of most other mutual funds. We also exclude index funds, funds that have TNA less than one million dollars, and funds that have fewer than 12 stocks held.⁶ For each stock held by a fund, we obtain the market capitalization from the CRSP stock database and the book-to-market ratio from Compustat. Data on stock trading volume are also obtained from the CRSP stock database.

Many mutual funds have multiple share classes, and the CRSP mutual fund database lists each share class as a separate fund. These share classes represent claims on the same underlying assets and have the same returns before expenses and loads, typically only differing in fee structure (e.g., load vs. no-load) or clientele (e.g., institutional vs. retail). Because our study examines the effect of fund holdings and these classes always hold the same portfolio, we combine the different classes into a single fund. Specifically, we sum the *TNA* of each share class to obtain the *TNA* for the fund. For fund characteristics such as expense ratio, we use the *TNA*-weighted average across all share classes. The final sample contains 2,278 funds comprising 16,399 fund-years.

3.2. Descriptive statistics

Panel A of Table 1 presents descriptive statistics for the complete mutual fund sample and Panel B reports statistics for sample quintiles based on the number of stocks held by the fund. Across all funds, the average number of holdings is approximately 90. In Panel B we see that funds in the smallest holdings quintile, which we refer to as “focused” funds, hold only 29 stocks on average. Funds in the largest quintile, which we broadly refer to as diversified funds, hold approximately 229 distinct stocks. Focused funds tend to be much smaller than diversified funds, with average *TNA* of \$199 million versus \$1.55 billion for diversified funds. We also note that focused funds tend to be younger than all other funds, have the highest expense ratios, and carry the largest cash balances. The average cash balance is 7.8% for diversified funds versus a significantly higher 12.8% for focused funds. As Edelen (1999) points out, higher cash balances are correlated with increased liquidity trading, and are generally detrimental to fund performance. To gauge whether there exist style differences across holdings quintiles, the table also reports the average size, book-to-market, and momentum deciles of fund holdings.⁷ We note that diversified funds tend to be more value oriented, while focused funds tend to hold larger stocks. Finally, focused funds are riskier, having the greatest cross-sectional volatility and the greatest tracking error with respect to the Fama and French (1993) three-factor model. Focused funds

⁶ The 12 holding minimum is imposed for consistency with the IRS requirement establishing qualifications for pass-through tax treatment of fund gains.

⁷ Size and book-to-market deciles are based on NYSE breakpoints, while momentum deciles are based on breakpoints using all NYSE, Amex and Nasdaq stocks. We measure momentum by using the cumulative stock return over the past 12 months.

Table 1

Descriptive statistics for mutual fund sample

The sample comes from the CRSP mutual fund database and the Thompson fund holdings database and includes all U.S. equity mutual funds that existed at any time during 1984–2002. We exclude index funds and funds with TNA less than \$1 million or fewer than 12 holdings. For each item, we compute the cross-sectional averages in each year. The reported statistics are computed from the time series of the 19 annual cross-sectional average figures for each item. Panel A reports statistics for the entire sample, and Panel B reports the mean of each data item when funds are sorted into quintiles by number of holdings. Fund Age is the number of years a fund has survived since its inception. Turnover is the minimum of aggregate purchases or sales of securities during the year divided by the average TNA, total load fee is the sum of maximum front-end load fees and maximum sales charges paid when withdrawing money from the fund, and expense ratio is the percentage of total investment that shareholders pay for the fund's operating expenses. Tracking error is the estimated standard error from the Fama-French three-factor model.

Panel A: Full sample statistics

	Mean	Median	Std dev
Number of holdings (NUMHOLD)	90.85	93.43	15.01
Industry concentration index (ICI) – %	6.37	6.32	0.79
Security concentration index (SCI) – %	2.49	2.41	0.33
Total net assets (TNA) – \$mil	649.81	490.54	369.67
Fund age (AGE) – yrs	14.71	13.57	3.84
Turnover (TURN) – %	89.93	88.62	12.80
Expense ratio (EXP) – %	1.27	1.30	0.10
12b-1 fee (12B1) – %	0.20	0.19	0.03
Total load (LOAD) – %	2.41	2.30	0.59
Cash – %	8.99	10.11	3.28
Stock – %	88.29	86.92	3.96
Size of holdings (mean decile)	7.57	7.51	0.33
B/M of holdings (mean decile)	3.84	3.93	0.39
Momentum of holdings (mean decile)	6.82	6.94	0.50

Panel B: Means by holdings quintile

	Number of holdings quintile				
	1 (focused)	2	3	4	5 (diversified)
Number of holdings (NUMHOLD)	29.38	46.07	62.46	87.95	228.83
Industry concentration index (ICI) – %	9.99	6.39	5.80	5.24	4.41
Security concentration index (SCI) – %	4.67	2.72	2.15	1.68	1.20
Total net assets (TNA) – \$mil	199.19	267.30	480.56	754.54	1549.43
Fund age (AGE) – yrs	12.81	12.85	15.19	16.70	15.97
Turnover (TURN) – %	94.05	79.10	95.26	93.50	88.55
Expense ratio (EXP) – %	1.50	1.30	1.24	1.17	1.13
12b-1 fee (12B1) – %	0.18	0.19	0.20	0.21	0.20
Total load (LOAD) – %	2.05	2.36	2.55	2.88	2.20
Cash – %	12.81	9.45	8.47	7.72	7.83
Stock – %	82.76	87.93	89.36	90.14	89.47
Size of holdings (mean decile)	7.64	7.80	7.65	7.62	7.15
B/M of holdings (mean decile)	3.79	3.79	3.69	3.82	4.12
Momentum of holdings (mean decile)	6.69	6.78	6.91	6.87	6.82
Tracking error – %	2.00	1.62	1.58	1.47	1.26
Cross-sectional volatility – %	3.00	2.45	2.44	2.40	2.14
Average number of funds	173.10	172.84	172.58	173.32	172.26

as a group have an average tracking error of only 2% per month. This is somewhat higher than that of diversified funds at 1.25% per month, but is small in magnitude when compared to the market volatility, which is about 4% per month. Thus, in terms of the covariance structure of the portfolio, even the most focused funds are fairly diversified.

3.3. Determinants of security concentration

Before examining the issue of fund performance, we explore the determinants of security concentration. Each year, we regress the logarithm of the number of fund holdings on a set of fund characteristics. Explanatory variables include the logarithm of TNA, the logarithm of fund age, the logarithm of fund family TNA, expense ratio, total load, the average size and book-to-market deciles of the fund's holdings, and the logarithm of manager tenure. Coefficient estimates from each year are averaged, and results are reported in Table 2. Since the number of holdings is likely to be persistent from year to year, yearly regressions are not independent. As a result, Fama and MacBeth (1973) standard errors are biased downward. Hence we report the number of the coefficients that are significantly positive or negative.

Table 2 shows that smaller funds, funds that belong to smaller fund families, and funds with higher expense ratios tend to hold fewer stocks. In addition, there is some evidence that funds with fewer securities tend to hold large stocks and growth stocks. Data for manager tenure are only available since 1992, and regression results for this subperiod show that managers with longer tenure tend to hold fewer stocks.

4. Security concentration and fund performance

4.1. Alternative concentration measures

In addition to number of holdings, we introduce two alternative measures of concentration to examine focused fund performance. Specifically, we compute an index of security concentration and the industry concentration index (ICI) of Kacperczyk, Sialm, and Zheng (2005).⁸ For a fund holding N stocks, we define a security concentration index (SCI) each month as follows:

$$SCI = \sum_{i=1}^N (w_i - \bar{w}_i)^2, \quad (1)$$

where w_i is the value weight of stock i in the portfolio and \bar{w}_i is the value weight of stock i in the market portfolio. In contrast to focusing on the total number of firms a manager can reasonably track, the SCI measures the relative size of the bets the manager is placing in the firms held. The ICI follows Kacperczyk, Sialm, and Zheng (2005) and measures each month the industry weights

⁸ We also compute all tests using a Herfindahl index of security concentration. We find no material difference in results from those reported using SCI.

Table 2

Determinants of security concentration

The dependent variable is the logarithm of the number of holdings. The table reports the time series average of the 19 annual cross-sectional average regression estimates for each variable. Fund Family TNA is the total TNA of all funds in the family to which a given fund belongs. Since turnover data are missing in 1991 and manager tenure data are only available for the latter time period, these variables are only included in estimates over the 1992–2002 subperiod.

	1984–2002			1992–2002		
	Average coefficient	# Significant and positive	# Significant and negative	Average coefficient	# Significant and positive	# Significant and negative
Intercept	3.766	19	0	4.268	11	0
Log TNA	0.152	19	0	0.115	11	0
Log fund age	-0.050	1	11	-0.068	0	9
Log fund family TNA	0.049	18	0	0.048	11	0
Expense ratio	-0.115	1	9	-0.216	0	9
Total load	0.585	7	3	2.033	6	0
Size of holdings decile	-0.073	1	9	-0.072	0	11
B/M of holdings decile	0.026	6	0	0.024	4	0
Turnover				0.013	1	0
Log manager tenure				-0.067	0	6
Average R^2	0.33			0.30		

of a fund relative to the industry weights of the overall stock market. The ICI is

$$ICI = \sum_{j=1}^{10} (x_j - \bar{x}_j)^2, \quad (2)$$

where x_j are the value weights for each of the ten industries held by the fund and \bar{x}_j are the industry weights of the market portfolio. The ICI captures the degree to which a fund manager is concentrated among ten general categories of industries.

4.2. Performance evaluation measures

In addition to looking at raw returns, we evaluate fund performance using two common benchmark models: the Fama and French (1993) three-factor model and a four-factor extension as in Carhart (1997). The Fama-French three-factor model is

$$r_{p,t} = \alpha_p + \beta_{1,p}RMRF_t + \beta_{2,p}SMB_t + \beta_{3,p}HML_t + e_{p,t}. \quad (3)$$

Here, $r_{p,t}$ is the monthly return on a portfolio of funds in excess of the one-month T-bill return; $RMRF$ is the excess return on a value-weighted market portfolio; and

SMB and *HML* are returns on zero-investment factor-mimicking portfolios for size and book-to-market. The Carhart four-factor model is

$$r_{p,t} = \alpha_p + \beta_{1,p}RMRF_t + \beta_{2,p}SMB_t + \beta_{3,p}HML_t + \beta_{4,p}UMD_t + e_{p,t}, \quad (4)$$

where $r_{p,t}$, *RMRF*, *SMB*, *HML* are as in the three-factor model and *UMD* is the return on the zero-investment factor-mimicking portfolio for one-year momentum in stock returns.

Finally, we evaluate fund performance based on the stock holdings of the fund and on the trades the fund makes. For this purpose, we use the characteristic-based benchmark return procedure of Daniel, Grinblatt, Titman, and Wermers (1997, DGTW). DGTW benchmark returns are the value-weighted returns to portfolios of stocks sorted into quintiles by size, book-to-market, and past 12-month returns, yielding 125 portfolios. The DGTW-adjusted return is the fund's raw return minus its characteristic-matched DGTW benchmark return.⁹

4.3. Fund performance: Portfolio approach

To examine fund performance, we sort all funds into quintiles based on security concentration.¹⁰ For each quintile, we calculate the equal-weighted average raw portfolio return and estimate an alpha based on each of the factor models described in regression Equations (3) and (4).

Panel A of Table 3 reports performance for each quintile as well as the difference between the smallest and largest number of holdings quintiles. Based on raw returns, focused funds underperform diversified funds by an insignificant 0.07% ($t = 1.31$) using gross returns and by 0.10% per month ($t = 1.97$) using net returns. Alphas based on gross returns are not significantly different from zero for the smallest number of holdings quintile of funds. However, the smallest number of holdings quintile marginally underperforms the largest quintile by 0.06% (0.72% annually) based on the three-factor alpha, significant at the 10% level.

The alphas computed from net returns range from 0% to -0.12% per month and are lowest for the focused funds. Specifically, for focused funds the three-factor alpha is -0.12% (-1.44% annually) and the four-factor alpha is -0.08%, significant at the 5% and 10% levels, respectively. In short, there is some evidence that focused funds underperform passive benchmarks after expenses. In contrast, none of the alphas for diversified funds are significantly different from zero. Finally, in comparing the two extreme quintiles, we find evidence that focused funds underperform diversified funds. In particular, the difference in three-factor alphas between focused and diversified funds is -0.10% (-1.20% annually) and is significant at the 1% level. This

⁹ Further details on the DGTW benchmarking procedure are on Russ Wermers' website.

¹⁰ The sorting variable is lagged number of holdings, and the quintile portfolios are rebalanced annually. Rebalancing the portfolio more frequently does not qualitatively change the results.

Table 3

Performance of funds based on security concentration

Panel A presents the performance of portfolios of funds sorted into quintiles each year based on the number of fund holdings. Portfolio performance is evaluated by raw excess returns and by the estimated portfolio alpha. Regression results for the three-factor and four-factor models, each estimated over the entire sample period, are presented. Results are reported based on fund gross returns (before expenses) and net returns (after expenses). Panel B reports the regression coefficients from the four-factor model. *t*-statistics are in parentheses.

Panel A: Performance by number of holdings quintile

Number of holdings quintile	Gross return			Net return		
	Raw return	3-factor α	4-factor α	Raw return	3-factor α	4-factor α
1 – focused	0.53 (1.77)*	0.01 (0.21)	0.04 (0.80)	0.40 (1.36)	-0.12 (-2.45)**	-0.08 (-1.76)*
2	0.55 (1.78)*	0.02 (0.46)	0.04 (0.85)	0.44 (1.43)	-0.09 (-1.81)*	-0.07 (-1.34)
3	0.60 (1.85)*	0.06 (1.17)	0.03 (0.64)	0.50 (1.54)	-0.04 (-0.74)	-0.07 (-1.23)
4	0.60 (1.84)*	0.09 (1.80)*	0.05 (1.09)	0.50 (1.55)	-0.00 (-0.06)	-0.04 (-0.73)
5 – diversified	0.59 (1.87)*	0.07 (1.57)	0.04 (0.85)	0.50 (1.58)	-0.02 (-0.44)	-0.05 (-1.17)
1 – 5 (<i>t</i> -statistic)	-0.07 (-1.31)	-0.06 (-1.73)*	0.00 (0.01)	-0.10 (-1.97)**	-0.10 (-2.76)***	-0.03 (-1.00)

Panel B: Four-factor model regression coefficients

Number of holdings quintile	β_{mkt}	β_{smb}	β_{hml}	β_{umd}
1 – focused	0.941 (76.90)***	0.140 (9.29)***	0.013 (0.72)	-0.026 (-2.46)**
2	0.974 (79.57)***	0.133 (8.76)***	-0.007 (-0.38)	-0.017 (-1.63)
3	1.012 (75.42)***	0.188 (11.32)***	-0.008 (-0.43)	0.024 (2.09)**
4	0.997 (81.14)***	0.226 (14.89)***	-0.043 (-2.36)**	0.031 (2.86)***
5 – diversified	0.988 (86.70)***	0.292 (20.76)***	0.022 (1.31)	0.028 (2.88)***
1 – 5 (<i>t</i> -statistic)	-0.047 (-5.87)***	-0.152 (-15.42)***	-0.009 (-0.77)	-0.055 (-7.90)***

***, **, * indicate statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

difference is larger compared to that based on gross returns, which can be explained by the higher expense ratios for focused funds in Table 1.

Panel B of Table 3 displays the estimated coefficients from the four-factor model. The momentum coefficient of focused funds is significantly negative, whereas that of diversified funds is significantly positive. Focused funds appear to take a losing

contrarian strategy, and this helps clarify the finding in Panel A of diminished under-performance under the four-factor benchmark. The difference between the momentum coefficients of focused funds and diversified funds is significant at the 1% level. Finally, focused funds have significantly less exposure to the market and size factors than do diversified funds.

4.4. *Number of holdings and industry concentration*

Kacperczyk, Sialm, and Zheng (2005) find that funds concentrated by industry offer superior performance. In results not reported, we confirm this finding in our sample, though with somewhat weaker significance than they report. In this section we explore the relation between number of holdings and industry concentration. We perform an independent double-sort of funds by ICI quintile and number of holdings quintile, yielding 25 portfolios of funds. We then estimate and report three-factor alphas based on gross returns for each portfolio in Table 4.

All of the nominally negative alphas, none of which is significant, appear toward the upper left corner of the table, corresponding to funds with few holdings and little industry concentration. More striking are the large, positive, significant alphas appearing in the lower right corner of the table. For example, funds with the largest number of holdings and the most industry concentration have a monthly alpha of 0.23% (2.76% annually), significant at the 5% level. Among the quintile of funds with the highest industry concentration, funds with the largest number of holdings outperform those with the fewest holdings by 0.17% per month (2.04% annually). Similarly, among the quintile of funds with the largest number of holdings, funds that are most concentrated by industry outperform those with the least concentration by 0.19% per month (2.28% annually). By comparison, for all funds in the sample the difference in performance between extreme quintiles of industry concentration is 0.14% per month (1.68% annually) based on a three-factor benchmark of gross returns.¹¹ The fact that funds with a small number of holdings are not benefiting from industry concentration could indicate the difficulty of placing effective industry bets with so few stocks held in the portfolio. Similar to the analysis of ICI, we also examine the relationship between SCI and number of holdings, but, in results not reported in detail, find that SCI is noninformative regarding fund performance.

4.5. *Fund performance: Cross-sectional regressions*

To examine whether the relation between fund concentration and performance is independent of other fund characteristics, we further test the determinants of fund

¹¹ Kacperczyk, Sialm, and Zheng (2005) report a difference in performance between extreme quintiles of industry concentration of 0.13% per month (1.56% annually) based on a four-factor benchmark of gross returns.

Table 4

Performance of funds based on number of holdings and industry concentration index

This table presents the risk-adjusted performance of portfolios of funds independently double-sorted into quintiles based on number of holdings and quintiles based on industry concentration index (ICI). Portfolio performance is evaluated by the estimated alpha from the three-factor model. Results are reported based on fund gross returns (before expenses). In the last column, the table reports the difference in performance of focused and diversified portfolios. In the last row, the table reports the difference in performance of extreme portfolios based on industry concentration. *t*-statistics are in parentheses.

ICI quintiles	Number of holdings quintile					1–5
	1 (focused)	2	3	4	5 (diversified)	
1 – (industry diversified)	–0.01 (–0.18)	–0.02 (–0.57)	–0.01 (–0.16)	0.01 (0.23)	0.04 (0.16)	–0.05 (–1.00)
2	–0.01 (–0.26)	–0.04 (–0.98)	0.01 (0.29)	0.02 (0.41)	0.05 (0.93)	–0.06 (–1.01)
3	0.00 (0.06)	0.01 (0.09)	0.01 (0.17)	0.04 (0.59)	0.05 (0.74)	–0.04 (–0.62)
4	–0.03 (–0.44)	0.07 (1.14)	0.09 (1.14)	0.22 (2.62)***	0.12 (1.44)	–0.14 (–2.03)**
5 – (industry concentrated)	0.06 (0.87)	0.04 (0.36)	0.30 (2.63)***	0.15 (1.42)	0.23 (2.22)**	–0.17 (–2.12)**
5 – 1	0.07 (0.89)	0.06 (0.57)	0.30 (2.67)***	0.14 (1.38)	0.19 (1.95)*	

***, **, * indicate statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

performance using regression. We estimate the following cross-sectional model each month:

$$\begin{aligned} \alpha_i = & b_0 + b_1 \log(\text{ICI}_{t-1})_i + b_2 \log(\text{SCI}_{t-1})_i + b_3 \log(\text{Number of Holdings}_{t-1})_i \\ & + b_4 \log(\text{TNA}_{t-1})_i + b_5 (\text{Expense Ratio}_{t-1})_i + b_6 \log(\text{Fund Age}_{t-1})_i \\ & + b_7 (\text{Total Load}_{t-1})_i + b_8 \log(\text{Turnover}_{t-1})_i + b_9 (\text{Return}_{t-1})_i \\ & + b_{10} (\text{Cash Flow}_{t-1})_i + e_i. \end{aligned} \quad (5)$$

The dependent variable is either raw fund return or alphas based on the three-factor or the four-factor model. To construct alpha, we estimate coefficients from a 36-month rolling regression (months $t-36$ through $t-1$) of fund returns on the respective factors. Alpha is then calculated each month from the estimated coefficients and the current month realizations of the independent variables. The choice of explanatory variables follows Chen, Hong, Huang, and Kubik (2004).¹² We calculate the past year's fund cash flow as follows:

$$\text{CASH FLOW}_t = \frac{\text{TNA}_t - \text{TNA}_{t-1} (1 + R_t) - \text{MGTNA}_t}{\text{TNA}_{t-1}}, \quad (6)$$

where R_t is the fund return and MGTNA_t is any assets acquired from merger.

¹² The turnover data are missing for all funds in year 1991 in the CRSP mutual fund database, so we use the turnover in 1990 for this year.

Table 5

Security concentration and fund performance: cross-sectional regressions

The table reports time series average results from monthly cross-sectional regressions of fund alpha on various explanatory variables, including the logarithm of number of holdings, the logarithm of security concentration index (SCI), and the logarithm of industry concentration index (ICI). Fund factor coefficients are calculated from a 36-month rolling regression over the 1984–2002 sample period according to either the three-factor or the four-factor model. Alpha is then calculated each month from factor realizations and the estimated factor coefficients. Results are reported for alphas based on fund gross returns (before expenses) and fund net returns (after expenses). Numbers in parentheses are *t*-statistics calculated using the Fama and MacBeth (1973) method.

	Gross return			Net return		
	Raw return	3-factor α	4-factor α	Raw return	3-factor α	4-factor α
Intercept	0.512 (3.60)	-0.184 (-1.63)	-0.045 (-0.40)	0.486 (3.43)	-0.214 (-1.90)	-0.075 (-0.68)
Log ICI	0.012 (0.72)	0.037 (1.65)*	0.038 (1.71)*	0.010 (0.56)	0.035 (1.54)	0.035 (1.58)
Log SCI	0.018 (0.35)	0.017 (0.29)	0.061 (1.05)	0.021 (0.42)	0.020 (0.35)	0.064 (1.10)
Log number of holdings	0.066 (2.28)**	0.067 (2.30)**	0.083 (2.71)***	0.067 (2.29)**	0.068 (2.31)**	0.083 (2.70)***
Log TNA	-0.003 (-0.41)	-0.010 (-1.18)	-0.015 (-1.91)*	0.000 (-0.05)	-0.007 (-0.86)	-0.012 (-1.54)
Expense ratio	0.016 (0.56)	0.004 (0.14)	0.010 (0.35)	-0.053 (-1.88)*	-0.064 (-2.17)**	-0.059 (-2.06)**
Log fund age	-0.016 (-1.63)	-0.010 (-0.95)	-0.013 (-1.28)	-0.018 (-1.87)*	-0.011 (1.10)	-0.015 (-1.49)
Total load	-0.002 (-0.79)	-0.001 (-0.20)	-0.001 (-0.39)	-0.003 (-1.01)	-0.001 (-0.45)	-0.002 (-0.63)
Log turnover	0.011 (0.88)	0.030 (1.45)	-0.019 (-1.32)	0.009 (0.67)	0.026 (1.26)	-0.023 (-1.54)
Lagged fund return	0.018 (5.87)***	0.014 (5.24)***	0.012 (4.83)***	0.018 (5.98)***	0.014 (5.35)***	0.013 (4.94)***
Lagged fund flow	-0.028 (-1.26)	-0.009 (-0.32)	-0.008 (-0.29)	-0.027 (-1.22)	-0.008 (-0.29)	-0.007 (-0.23)
Average R^2	0.45	0.12	0.11	0.45	0.12	0.11

***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

Table 5 reports time series averages of regression coefficients from the monthly cross-sectional regressions, along with Fama and MacBeth (1973) *t*-statistics. The average coefficient on the logarithm of number of holdings is positive and significant for raw returns and for three-factor alphas, computed from either gross or net returns. This indicates that funds with fewer holdings perform more poorly, all else equal. Furthermore, the underperformance is not explained by stock return momentum, since the number of holdings is also positively and significantly related to four-factor alphas. Fund expense ratio is negatively related to performance in the regressions using net returns. Finally, lagged fund return is the only other reliable predictor of fund performance, being significantly positive in all six regressions. This finding is

consistent with Chen, Hong, Huang, and Kubik (2004), who also find that lagged fund return has predictive value for fund performance.¹³

4.6. Performance of stock holdings and trades

In evaluating performance, the above analysis relies on factor models of fund returns that adjust for risk and style differences. However, Grinblatt and Titman (1989) and Daniel, Grinblatt, Titman, and Wermers (1997) analyze fund holdings directly and find that funds outperform relevant benchmarks based on the underlying stock returns. Following DGTW, we compute mutual fund performance from the individual stock holdings using characteristic-based benchmarks. We also track the performance of fund purchases and sales to account for the information content of trading decisions.

In Panel A of Table 6 the DGTW-adjusted returns are reported by number of holdings quintile for horizons of one quarter and one year. Looking at returns measured over one quarter, we find that all categories tend to outperform the benchmark in terms of holdings, though focused funds do so the least of all five quintiles, and at the 10% level of significance. This result is consistent with Wermers (2000), who finds that securities held by funds tend to outperform characteristic benchmarks on a pre-expense and pre-transaction costs basis. We also see that funds with a larger number of holdings perform marginally better than those with few holdings, echoing earlier performance results based on factor models. Comparing the two extreme quintiles, the difference in adjusted performance is 0.26%, significant at the 10% level. At the one-year horizon, the performance of the largest holdings quintile is reliably positive, whereas the performance of the smallest holdings quintile is not. The difference between the two, however, is not statistically significant.

A similar picture of significant overperformance by funds with a larger number of holdings emerges when analyzing fund purchases and sales. The one quarter horizon DGTW-adjusted returns in Panel B of Table 6 show that funds in the third, fourth, and fifth holdings quintile earn reliably higher returns in their buys than in their sells. Funds in the two fewest holdings quintiles earn nominally higher returns in their buys than their sells, but the difference is not statistically significant. At the one-year horizon, we find that the buys of focused funds *underperform* their sells by 0.3% while the buys of diversified funds *outperform* sells by 0.35%. This difference of 0.65% is significant at the 5% level. Not only is this evidence supportive of our earlier finding that funds with few holdings tend to underperform funds with many holdings, but this is also suggestive of lower-skill management in focused funds, a possibility we address below.

¹³ Omitting lagged returns from the regression, we find similar parameter estimates for number of holdings, but with substantially larger *t*-statistics.

Table 6

Performance of stock holdings and trades

The table reports performance measured using the Daniel, Grinblatt, Titman, and Wermers (1997, DGTW) procedure. DGTW benchmark returns are the value-weighted returns to portfolios of stocks that have been sorted into quintiles by size, book-to-market, and past 12-month returns, yielding 125 portfolios. The DGTW-adjusted return is the fund raw return minus the characteristic-matched DGTW benchmark return. Panel A and Panel B both present DGTW-adjusted return performance for quintiles of funds based on the number of holdings. Panel B presents results separately for security purchases and sales. *t*-statistics are in parentheses.

Panel A: Performance of holdings

Number of holdings quintile	One-quarter-ahead return		One-year-ahead return	
	Raw return	DGTW-adjusted return	Raw return	DGTW-adjusted return
1 – focused	3.64 (3.57)***	0.36 (1.84)*	14.32 (4.78)***	0.75 (1.64)*
2	3.71 (3.65)***	0.40 (2.55)**	14.13 (4.57)***	0.72 (1.88)*
3	4.01 (3.70)***	0.48 (2.05)**	14.72 (4.78)***	0.83 (1.38)
4	3.81 (3.32)***	0.53 (1.74)*	14.52 (4.52)***	0.92 (1.42)
5 – diversified	3.95 (3.62)***	0.62 (2.17)**	14.62 (5.08)***	1.05 (2.00)**
5 – 1 (<i>t</i> -statistic)	0.30 (1.41)	0.26 (1.81)*	0.30 (0.44)	0.30 (0.90)

Panel B: Performance of trades

Number of holdings quintile	One-quarter-ahead return			One-year-ahead return		
	Buy	Sell	Buy-Sell	Buy	Sell	Buy-Sell
1 – focused	0.06 (0.56)	–0.12 (–0.94)	0.18 (1.36)	0.16 (0.36)	0.44 (0.96)	–0.30 (–0.84)
2	0.03 (0.23)	–0.10 (–0.69)	0.13 (0.96)	0.18 (0.61)	0.21 (0.46)	–0.04 (–0.10)
3	0.10 (0.97)	–0.30 (–2.35)**	0.40 (3.69)***	0.15 (0.35)	–0.05 (–0.08)	0.19 (0.44)
4	0.10 (1.09)	–0.23 (–1.68)*	0.33 (2.80)***	0.31 (0.81)	–0.16 (–0.29)	0.47 (1.12)
5 – diversified	0.13 (1.16)	–0.15 (–1.11)	0.27 (2.72)***	0.54 (1.60)	0.18 (0.41)	0.35 (1.00)
5 – 1 (<i>t</i> -statistic)	0.07 (0.52)	–0.03 (–0.21)	0.09 (0.64)	0.38 (0.98)	–0.25 (–1.18)	0.65 (1.97)**

***, **, * indicate statistical significance at the 0.01, 0.05, and 0.10 level, respectively.

5. Discussion and further analysis

There are at least two potential explanations for the finding that focused funds tend to underperform diversified funds. First, it could be that the decision by fund

managers to hold concentrated portfolios is influenced by the agency conflict between mutual fund companies and fund shareholders. Previous studies such as Chevalier and Ellison (1997) and Sirri and Tufano (1998) find a convex flow-performance relation, where high returns are rewarded by investor cash flow more than low returns are penalized.¹⁴ This serves as an implicit incentive for fund managers, especially low-skill managers who are likely to underperform, to increase the riskiness of their portfolios. If predominantly low-skill managers find it desirable to exploit this relation by increasing risk through holding a relatively small number of securities, this could lead to a negative relation between fund performance and portfolio concentration.¹⁵ The finding from the previous section that focused-fund security trades underperform those of diversified funds suggests that agency problems are indeed present.

Second, transactions costs represent a significant drag on fund performance (Keim and Madhavan, 1998; Wermers, 2000). Focused funds likely hold less liquid portfolios due to their smaller number of holdings. Specifically, a focused fund is more likely to hold a relatively large proportion of the outstanding float or daily trading volume of a given firm, thus facing a larger potential price impact from trading (Chan and Lakonishok, 1995; Keim and Madhavan, 1997). In addition, as the ownership stake in any given firm becomes relatively large, the fund may be unable to quickly react to new information. Therefore, focused funds could underperform because of liquidity problems.

Chan and Lakonishok (1995) and Keim and Madhavan (1997) find that the price impact of a trade, which can be thought of as the deviation of the trade price from the price that would have prevailed had the trade not occurred, is by far the largest component of transactions costs for institutional trades. These studies also show that price impact and institutional trading costs increase with trade difficulty, which is positively related to relative order size and negatively related to a stock's market capitalization. Since we don't have trade or order data, we use the size of holdings to construct two alternative proxies for the fund's liquidity concern. For the first, we express the number of shares of each stock held by a fund as a percentage of the average daily trading volume in those shares, and then take the value-weighted average for the fund's portfolio. To compute the second proxy, we express the number of shares of each firm held by a fund as a percentage of the number of shares outstanding for that firm, and then take the value-weighted average for the fund's portfolio.

¹⁴ Cash flow is the lifeblood of an open-end fund. The benefits of increased cash flow to a fund include an increased asset base, leading to proportionally greater revenue from expenses charged to investors, and possibly increased compensation accruing to the fund manager. The penalties for low or negative cash flow to the fund include loss of revenue and potential extinction of the fund (and the manager's job). A low-skill manager might already feel more exposed to these potential penalties and would therefore be more prone to taking on more risk.

¹⁵ Chevalier and Ellison (1997) consider portfolio holding changes conditional on past relative performance within the period. In contrast, we note that our paper, like Kacperczyk, Sialm, and Zheng (2005), considers a choice in holdings that is unconditional regarding within-period performance, but is instead conditioned on manager type.

Table 7

Security concentration and portfolio liquidity

Panel A presents regressions where the (fund average of) number of shares held as a percentage of the average daily trading volume is the dependent variable used to measure fund liquidity, and Panel B presents regressions where the (fund average of) number of shares held as a percentage of the number of shares outstanding is the dependent variable. The table reports the time series average of the 19 annual cross-sectional average regression estimates for each variable.

Panel A: Shares held as a percentage of average daily trading volume

	Average coefficient	# Significant and positive	# Significant and negative
Intercept	4.585	19	0
Log TNA	0.823	19	0
Log fund age	0.007	3	0
Expense ratio	-0.090	0	3
Total load	-0.034	0	5
Size decile	-0.581	0	19
Log number of holdings	-0.625	0	19
Average R^2	0.44		

Panel B: Shares held as a percentage of shares outstanding

	Average coefficient	# Significant and positive	# Significant and negative
Intercept	1.470	19	0
Log TNA	0.280	19	0
Log fund age	-0.007	0	0
Expense ratio	0.020	2	0
Total load	-0.009	0	6
Size decile	-0.192	0	19
Log number of holdings	-0.219	0	19
Average R^2	0.56		

We regress each liquidity measure on a set of control variables, including our measures of fund concentration, in each year and average the yearly coefficient estimates. Using fund shares divided by trading volume as the dependent variable measuring liquidity, Panel A of Table 7 reports that increased fund concentration is significantly associated with less liquidity in all 19 yearly regressions. Fund size is also significant in all 19 years, where larger funds are less liquid than smaller funds. Including the average size decile of the fund's holdings as a regressor, we also see that holding smaller firms' stock is correlated with less fund liquidity.

Panel B of Table 7 uses fund shares divided by shares outstanding as the dependent variable measuring liquidity. The results in Panel B for the significance of fund concentration, fund size, and size of firms held are identical to those in Panel A. Thus, we find strong evidence in support of the hypothesis that focused funds are less liquid than diversified funds, which implies that focused funds likely incur

higher transaction costs from trading and are therefore at a competitive disadvantage compared to diversified funds.

6. Fund acquisition and liquidation

Massa (2003) argues that mutual fund families are often motivated to introduce and keep certain types of funds largely for purposes of product differentiation. Investors, he argues, place value on being able to cheaply switch between fund offerings in the same family. As long as the fund fulfills a perceived niche in the family's menu of offerings, then some underperformance may be tolerated. Even so, funds that significantly underperform should be more likely to liquidate or be merged into other funds, which could impose costs on investors in the form of capital gains taxes and unexpected portfolio rebalancing. Also, to the extent that underperforming funds disappear more quickly from the sample for a particular group, the underperformance of the group may be understated in comparison to other funds.

We examine this issue by first looking at the incidence of fund disappearance for the five fund concentration quintiles. Panel A of Table 8 shows that 38.1% of focused funds are eventually acquired or liquidated, as opposed to only 18.3% of diversified funds. Over a three-year horizon, 9.4% of focused funds, but only 3% of diversified funds, disappear, a dramatically higher rate of attrition for focused funds.

We also conduct a logit analysis of the likelihood of acquisition or liquidation. The results are in Panel B of Table 8. Controlling for fund size, family size, and fund age, we find a significantly greater likelihood of disappearance for focused funds. Also, we see that smaller funds are more likely to disappear, as are funds that belong to a large fund family. This makes sense, as funds that are unsuccessful would likely fail to grow in size, and funds that are part of a large family would be easier to merge into another fund. Logit results for the likelihood of a fund disappearing within the next three years are nearly identical. Thus, overall, focused funds are more likely to disappear from the sample, probably due to underperformance or the inability to attract cash flow, or, most likely, both.

The greater frequency of disappearance also tends to mask the true level of underperformance for a sample of focused funds, suggesting that performance measures in this study as well as previous studies of concentrated funds are potentially overstated. Elton, Gruber, and Blake (2001) show that funds tend to have poor returns prior to liquidation or acquisition, and these returns tend to be missing in the CRSP mutual fund database just before the fund is liquidated or acquired. This results in an upward bias when measuring performance among focused funds, and suggests that measures of focused fund performance may be too optimistic, especially when compared to those of other funds that do not drop out of the sample at such a high rate. In spite of this upward bias on the performance of focused funds, we find evidence that focused funds underperform passive benchmarks and diversified funds.

Table 8

Likelihood of acquisition and liquidation

Panel A reports the percentage of funds that were either acquired or liquidated for each fund concentration quintile. Panel B reports results of a logit analysis using the incidence of fund liquidation or merger as the dependent variable. *p*-values are in parentheses.

Panel A: Percent of funds being acquired or liquidated

Number of holdings quintile	Percent of funds acquired or liquidated	Percent of funds acquired or liquidated in three years
1 – focused	38.1	9.4
2	38.1	8.8
3	30.2	5.5
4	25.2	5.8
5 – diversified	18.3	3.0

Panel B: Logit analysis of likelihood of being acquired or liquidated

	Likelihood of being acquired or liquidated	Likelihood of being acquired or liquidated in three years
Intercept	0.78 (0.01)	0.40 (0.18)
Log number of holdings	–0.19 (0.01)	–0.23 (0.01)
Past 3-year performance rank	–0.77 (0.01)	–1.33 (0.01)
Log TNA	–0.27 (0.01)	–0.38 (0.01)
Log fund family TNA	0.07 (0.01)	0.12 (0.01)
Log fund age	–0.10 (0.09)	–0.25 (0.12)

7. Conclusions

If a subset of managers can add value by identifying undervalued securities, then we would expect to see these skilled managers gravitate toward focused funds in order to better capitalize on their talents. Indeed, this is consistent with the marketing of these funds as representing managers' "best ideas." By concentrating the resources of the fund on securities believed to be undervalued, the manager of a focused fund who has skill should be able to produce superior results that are not diluted by shares held only for diversification of the portfolio.

We examine whether funds that are focused in a small number of securities offer investors superior performance. The results show that managers of focused funds do not perform better, and after deducting expenses these funds significantly underperform. Controlling for a number of other variables, we find further evidence

that funds with a larger number of holdings perform significantly better, both before and after expenses. Furthermore, our work complements that of Kacperczyk, Sialm, and Zheng (2005) by showing that the number of holdings provides independent information about fund performance beyond that in industry concentration. The finding that funds holding a small number of securities do not benefit from industry concentration could mean that these funds lack the flexibility to effectively concentrate by industry.

We discuss the possibility that due to the asymmetric response of investor cash flow to performance and the resulting risk-taking incentive, the idea of holding a focused portfolio may in fact be attractive to more *unskilled* managers. Evidence that focused funds have greater return volatility and poor trade performance is consistent with this explanation. We further find that focused funds are at a disadvantage due to holding relatively illiquid portfolios. Finally, we show that the incidence of liquidation and merger is significantly higher for focused funds, indicating that these funds have difficulty competing with more diversified funds.

Our findings are consistent with the unfavorable evidence in the literature on the performance of actively managed funds in general, where a common recommendation is that fund investors simply adopt a diversified passive index portfolio. Since focused funds do not represent a separating equilibrium where skilled managers can be easily identified by investors, an implication of our findings is that investors ought to be cautious when considering focused funds. A potential selling point for these funds is that holding a small, select group of securities may be viewed as a signal of manager skill and a precursor of superior performance. Our results, however, show that these funds underperform diversified funds, especially after expenses, and are more likely to be acquired or liquidated. In sum, despite the marketing appeal, we find no evidence that fund focus translates into value for investors, while providing several reasons for viewing an investment in these funds with caution.

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