Fund Managers Who Take Big Bets: Skilled or Overconfident

Klaas P. Baks, Jeffrey A. Busse, and T. Clifton Green*

March 2006

Abstract

We document a positive relation between mutual fund performance and managers' willingness to take big bets in a relatively small number of stocks. Focused managers outperform their more broadly diversified counterparts by approximately 30 basis points per month, or roughly 4% annualized. The results hold for mimicking portfolios based on fund holdings as well as when returns are measured net of expenses. Concentrated managers outperform precisely because their big bets outperform the top holdings of more diversified funds. The evidence suggests that investors may enhance performance by diversifying across focused managers rather than by investing in highly diversified funds.

* All authors are from Goizueta Business School, Emory University, 1300 Clifton Rd., Atlanta, GA 30322. Baks is at tel 404-727-4752, email Klaas_Baks@bus.emory.edu; Busse is at tel 404-727-0160, email Jeff_Busse@bus.emory.edu; Green is at tel 404-727-5167, email Clifton_Green@bus.emory.edu.

1. Introduction

More than $3 trillion are currently invested in equity mutual funds, and despite the growing number of index funds the vast majority remains actively managed. Yet beginning with Jensen (1968), research has consistently shown that actively managed mutual funds do not outperform their benchmarks on average.[1] More recent attention focuses on characterizing the minority of funds that do outperform. Several studies indicate that positive performance persists,[2] but Carhart (1997) attributes the persistence to simplistic momentum strategies (Jegadeesh and Titman (1993)) rather than fund manager skill. Other work focuses on fund manager characteristics. For example, Chevalier and Ellison (1999) find evidence that performance is influenced by the quality of the fund manager's education.

In this article, we examine portfolio holdings and characterize fund managers based on their willingness to take big bets in a relatively small number of stocks. The theoretical impact of manager focus on performance is unclear. The behavioral literature suggests there may be a negative relation between concentration and performance. Psychologists show that in general most people are overconfident about their abilities. People are particularly overconfident when conducting difficult tasks with low predictability such as picking stocks (Griffin and Tversky (1992)). A number of studies document overconfidence among individual investors (e.g. Odean (1999)), which manifests itself through excessive trading and under-diversified portfolios. If fund managers that are willing to take big bets on a select group of stocks do so as a result of overconfidence, then concentrated managers may be associated with poorer risk-adjusted performance.

[1] See Elton et al. (1992), Malkiel (1995), and Daniel et al. (1997) for more recent evidence.
[2] See Hendricks, Patel, and Zeckhauser (1993), Goetzmann and Ibbotson (1994), Brown and Goetzmann (1995), Grinblatt, Titman, and Wermers (1995), Gruber (1996), Carhart (1997), Daniel, et al. (1997), Nofsinger and Sias (1999), Wermers (1999), Grinblatt and Keloharju (2000), and Bollen and Busse (2004).

On the other hand, research on herding among security analysts points towards a positive relation between portfolio concentration and performance. Trueman (1994) predicts that confident analysts are more willing to make bold earnings forecasts whereas less confident analysts typically issue forecasts that are near the consensus. Empirically, Clement and Tse (2005) find that bold earnings forecasts are more accurate than herding forecasts, and Gleason and Lee (2000) show that forecast revisions that deviate from the consensus produce larger price impacts. These results suggest that unconfident analysts are either less skilled or else face career concerns that make them downplay their private information and follow the herd (see also Hong, Kubrick, and Solomon (2000)).

Mutual fund managers also face incentives to herd. Siri and Tufano (1998) find that investors generally do not pull their money out of mediocre funds – portfolio managers must significantly underperform to experience outflows. As a result, fund managers that have built a sizable asset base may become risk averse, preferring to broadly diversify rather than take large bets that could lead to outflows. Wermers (1999) finds evidence that funds herd into and out of individual stocks. If herding reflects career concerns rather than investing conviction on the part of fund managers, it is possible that concentrated managers could outperform their more broadly diversified counterparts.

Our evidence indicates a positive relation between fund performance and managers' willingness to take big bets in a relatively small number of stocks. Concentrated managers outperform their more broadly diversified counterparts by approximately 30 basis points each month, or roughly 4% annualized. The results hold for mimicking portfolios based on fund holdings as well as when returns are measured net of expenses. An examination of individual holdings reveals that focused managers outperform precisely because their big bets outperform the top holdings of more diversified funds.

The findings lend support to the notion that the managers who tilt their portfolios toward their favorite stocks assess correctly the relative merits of stocks overall as well as

within their portfolios. By contrast, funds whose portfolio weights more closely approximate a uniform distribution display less ability to correctly sort stocks within their portfolio according to future performance. Overall, our results suggest that concentrated fund managers do have some ability to correctly pick stocks.

Fund managers incentives to herd towards the index may be suboptimal from an investor's perspective, since investors can diversify across managers as well as invest in passively managed assets. Our results suggest that a portfolio consisting of the holdings of concentrated, big-bet managers would outperform a highly diversified portfolio of a single manager. From a normative perspective, linking manager pay directly to performance—rare in the industry due to regulatory restrictions—would reduce the emphasis on maintaining assets under management and likely result in less-diversified portfolios that more effectively capitalize on managerial skill.

Our work is related to several papers that study fund performance using portfolio holdings. For example, Grinblatt and Titman (1989) and Wermers (2000) study similar data and find evidence that active managers outperform before fees. Chen, Jegadeesh, and Wermers (2000) find that stocks bought in aggregate by mutual funds outperform those they sell, which foreshadows our within-portfolio findings to the extent that stocks bought (sold) by managers occupy a larger (smaller) position within their portfolios. Our intra-portfolio comparisons are novel in that they allow us to examine the effects of manager focus on the performance of the fund.

Our study is also related to Kacperczyk, Sialm, and Zheng (2005), who study fund concentration based on industry sector loadings. They find evidence that fund managers that emphasize certain industries outperform broadly diversified funds by roughly 1% annualized after expenses. Their findings further indicate that the superior performance of concentrated mutual funds is primarily due to their stock selection ability, which motivates our bottom-up approach to measuring fund concentration. Indeed, when using

holdings to measure manager focus, we find differences between concentrated and unconcentrated funds of more than 3% annualized after expenses.

The paper proceeds as follows. Section 2 describes the data sample. Section 3 describes the methodology. Section 4 examines the relation between holdings concentration and performance. Section 5 concludes.

2. Data

We construct the sample using three main sources of data: Thomson Financial's CDA/Spectrum Mutual Fund Holdings database for portfolio holdings, the Center in the Research of Security Prices (CRSP) Daily Stock files for individual stock returns, and the CRSP Mutual Funds database for mutual fund returns and fund characteristics.

To construct the sample, we begin with asset allocations and style categorizations from CRSP for funds present in the CDA/Spectrum database. We select all U.S. domestic equity funds using the procedure of Pastor and Stambaugh (2002). In addition, for funds that report their complete asset allocation, we eliminate those with more than ten percent bond holdings, more than ten percent preferred stock holdings, or more than ten percent other holdings (e.g., equity derivatives). The goal of these search criteria is to isolate funds that invest predominantly in domestic equities. We further eliminate index funds, enhanced index funds, and "fund of funds" to focus on actively managed, individual funds. CDA/Spectrum includes 230,588 quarterly holding entries from 1979-2003. Of these, 66,987 meet the asset allocation and actively managed fund criteria. The funds include the prospectus objectives of small company, aggressive growth, growth, growth and income, and equity income.

Fund families often sell the same portfolio under several share classes, corresponding to different fee structures. The CRSP Mutual Funds database reports information on the share class level. When the sample includes a fund with two or more share classes, we include CRSP TNA-weighted monthly returns and expense ratios.

About 82% percent of funds during our sample period have multiple share classes. These funds have on average 2.4 share classes.[3]

We base much of our analysis on the performance of various components of fund portfolios (e.g., the top ten percent of the portfolio). We cannot precisely determine the performance of components of fund portfolios that disclose only a portion of their equity holdings, which is common in the CDA/Spectrum database, especially during the 1980s. Consequently, in order for a fund to remain in our sample during a particular quarter, we impose a filter that the fund's holding snapshot can at most deviate two percent from its actual holdings, where the percentage is based on equity assets rather than number of stocks. The two percent holdings deviation criterion reduces the sample size to 2,080 funds and 11,802 quarterly fund observations.[4]

For each fund in the sample, we collect the following data: From CDA/Spectrum we take the investment objective and complete list of quarterly security holdings (including CUSIP, company name, and number of shares). From the CRSP Mutual Fund database we take the quarterly or annual portfolio asset allocation (percentage equity, preferred stock, bond, cash, or other), quarterly total net assets, annual expense ratio, and monthly returns for the three months following the date of the portfolio holdings. For each U.S. stock that appears in a fund portfolio we take daily returns over the following quarter from the CRSP Daily Stock database.

Table 1, Panel A shows the number of quarterly fund observations each year during our 1979-2003 sample period. The sample grows substantially over time, mirroring growth in the mutual fund industry. Panel B shows that the median (average) number of holdings consists of 96 (141) securities. Given Campbell et al.'s (2001) results indicating that 50 securities diversifies a portfolio, the typical sample fund appears well

[3] We determine these multiple share class statistics using Russ Wermer's database that links CRSP mutual fund records to CDA/Spectrum data.

[4] The results in the paper are similar when conducting the analysis with a looser asset deviation criterion of 30%.

diversified. Furthermore, as one would expect, portfolios of large funds contain more stocks, on average, than portfolios of smaller funds.

3. Methodology

3.1. Statistical measures of portfolio weight distributions

We use four statistics to measure the degree to which an individual fund manager takes relatively large bets in his stock portfolio: the Herfindahl index, the normalized Herfindahl index, the Gini coefficient, and the coefficient of variation. Each statistic has been used in other contexts to measure the extent to which a sample's constitution diverges from an equal weighting. We use four different measures because each produces a slightly different measure of a fund's proclivity toward large bets, and we have no a priori reason to choose one over another.

For a given fund, the Herfindahl index is the sum of the squared portfolio weights:

$$H_p = \sum_{i=1}^{N_p} w_{pi}^2 , \tag{1}$$

where fund p has N_p equity holdings each of weight w_{pi}, with $\sum w_{pi} = 1$. The weight, w_{pi}, is the ratio of the total dollar value of the holding to the total dollar value of the entire equity portfolio. The Herfindahl index is commonly used by the U.S. department of Justice to measure industry concentration.

The normalized Herfindahl index is defined as

$$H_p^* = \frac{H_p - \frac{1}{N_p}}{1 - \frac{1}{N_p}}. \tag{2}$$

The Herfindahl index ranges from $1/N_p$ to 1, whereas the normalized Herfindahl index ranges from 0 to 1, and is invariant to the number of portfolio holdings.

The third measure that we use, the Gini coefficient, is often used to measure income inequality. It is computed as

$$G_p = \frac{\sum_{i=1}^{N_p}\sum_{j=1}^{N_p}\left|w_{pi} - w_{pj}\right|}{2N_p^2\mu\left(w_{pi}\right)}, \tag{3}$$

where $\mu\left(w_{pi}\right)$ denotes the average portfolio weight. Similar to the other measures, the Gini coefficient increases as the fund's portfolio diverges from an equal weighting. Similar to the normalized Herfindahl measure, the Gini coefficient is bounded by 0 and 1.

The final measure that we use to gauge the extent to which a fund manager takes big bets is the coefficient of variation, which measures the dispersion of portfolio weights relative to the mean portfolio weight:

$$CV_p = \frac{\sigma\left(w_{pi}\right)}{\mu\left(w_{pi}\right)}. \tag{4}$$

The four measures provide qualitatively similar rankings across groups of funds, with some notable differences. Some of the measures differ substantially in the manner in which they account for a fund's total number of portfolio holdings. For example, compared to the normalized Herfindahl index, the Herfindahl index will produce higher rankings (i.e., categorize funds as taking bigger bets) for funds with fewer holdings. As another example, the coefficient of variation is mathematically related to the normalized Herfindahl index according to $H_p^* = CV_p^2 / \left(N_p - 1\right)$. Consequently, both statistics lead to similar rankings particularly for groups of funds with large numbers of holdings. However, for groups of funds with fewer holdings, the rankings could differ somewhat. As noted earlier, the best way to account for the number of holdings in a fund's portfolio is unclear. Consequently, we examine four alternative measures. The extent to which the different measures provide similar inference provides some indication of the robustness of the results.

Table 2 summarizes the four statistics for the portfolios in our mutual fund sample. The two Herfindahl indices indicate that smaller funds take bigger bets, on

average, than bigger funds. By contrast, the Gini index and coefficient of variation indicate larger funds take bigger bets. A similar contrast can be found when comparing the first and second half of the sample. The two Herfindahl indices suggest that funds took bigger bets in the 1980s then in the 1990's, whereas the Gini index suggests the opposite. These contrasting patterns illustrate that the alternative measures capture different aspects of weight distribution inequality.

3.2. Imputed portfolio returns

For each sample fund each quarter, we estimate mimicking returns for the equity portion of the fund portfolio. Beginning with the weights associated with the portfolio holding snapshots from the end of the previous quarter, we estimate daily buy-and-hold returns over the following three months. For example, we use the portfolio holding snapshot from March 31, 2000 to estimate daily returns from April 1, 2000 through June 30, 2000. We search on the CRSP Daily Stock database for each stock holding using CUSIPs provided by CDA/Spectrum. Since CUSIPs are not unique, we search for the CUSIP as of the relevant portfolio date. The 2,080 sample mutual funds encompass a total of 1.31 million equity holdings during the sample period. We match 1.29 million holdings on CRSP. The remaining 1.15 percent consists mainly of foreign firms not listed in the U.S. A small fraction of the unmatched securities consist of U.S. companies that we could not unambiguously match on CRSP. For example, …

In addition to the mimicking returns described above, in some of the analysis we also examine the returns that a fund shareholder actually realizes, excluding loads. These latter shareholder returns are net of fund expenses and the costs associated with fund transactions. We take shareholder returns from the CRSP Survivorship Bias Free Mutual Fund Database. The CRSP returns that date back to the beginning of our holdings sample are monthly frequency.

Over the entire sample period, the mean return of the mimicking portfolios is 4 basis points per month higher than the mean return of the actual mutual funds. The mean time series correlation between the mimicking returns and the actual fund returns from CRSP is 0.XX. The high correlation indicates that the return-mimicking procedure captures much of the return dynamics of the actual mutual fund portfolios.

The tracking error between the actual and mimicking returns is attributable to three main causes. First, the portfolio holdings and weights of the actual funds change in unknown ways subsequent to the quarterly portfolio holding snapshots, whereas we compute buy-and-hold returns that assume no transactions. A second reason for the tracking error is that we mimic only the equity portion of the portfolio. Although the sample funds predominantly hold stocks (the median equity allocation is 97.1 percent), they also hold a median of 2.3 percent cash. In addition, 1.15 percent of the funds' equity holdings consist of foreign or other stocks that we cannot match to a stock on CRSP. A third reason for the tracking error is that the actual fund returns are net of trading costs, whereas the mimicking returns do not precisely account for trading costs.

In addition to computing the mimicking return for the entire portfolio, we also compute the mimicking return associated with each decile of the portfolio. We sort into deciles based on the individual holding portfolio weights, using a buy-and-hold approach beginning with the most recent portfolio-holding snapshot. For example, the top decile of a $10 million portfolio consists of the dollar-weighted return associated with the largest holdings totaling $1 million.

On average, the security's position in the portfolio indicates the manager's level of optimism for the security's future prospects relative to other securities. For a 100-security portfolio, for instance, where the top security has a five percent weighting and the bottom security has a 0.1 percent weighting, the manager must implicitly believe that the top security will outperform the bottom security in the future. Section 851(b)(4) of the Internal Revenue Code requires that, for at least 50 percent of a fund's portfolio, the fund

cannot own more than ten percent of the total equity market value of a single stock Consequently, instances are likely, especially among large funds and small capitalization stocks, in which a fund manager cannot invest in a stock an amount commensurate with his optimism for that stock. This constraint, however, is rarely binding: In this sample, fewer than 0.1 percent of individual fund holdings represent at least 9.0 percent of the total equity market value of a single stock.

3.3. Performance measures

To assess performance, we use three measures: total return, four-factor alpha, and the difference between return and the DGTW characteristic-based benchmark. Each is often used to assess mutual fund performance.

The four-factor model is

$$R_{p,t} - r_{f,t} = \alpha_p + \sum_{k=1}^{4} \beta_{pk} r_{k,t} + \sum_{k=1}^{4} \beta_{pkl} r_{k,t-1} + \varepsilon_{p,t}, \quad (5)$$

where $R_{p,t}$ is the daily return of the mimicking portfolio at time *t*, and r_f is the daily excess return on the risk free rate. The four-factor model includes the daily excess return of the market, the Fama and French (1993) size and book-to-market factors, and a momentum factor (Jegadeesh and Titman (1993)). Prior studies show that the size, book-to-market, and momentum factors control for some of the misspecification in the single-factor CAPM. We use lagged factors to control for non-synchronous trading associated with daily individual stock returns (see Dimson (1979)).

For the market return in the factor models, we use the daily CRSP NYSE/AMEX/Nasdaq value-weighted market return series. For the size factor, we use a daily version of the Fama and French (1993) value-weighted small market capitalization minus big market capitalization (SMB) factor. For the book-to-market factor, we use a daily version of the Fama French value-weighted high book-to-market minus low book-to-market (HML) factor. For the momentum factor, we use a daily, value-weighted

version of the one-year high return minus low return (up minus down, UMD) factor. Carhart (1997) uses a similar monthly frequency momentum factor. Finally, for the risk free rate, we use the return on the 30-day treasury bill. We take the SMB, HML, and UMD factors and the 30-day treasury-bill rate from Ken French's website.[5]

The DGTW measure (1997) subtracts a monthly benchmark return from the fund return. Each fund holding is matched to one of 125 benchmarks, based on a 5×5×5 sort on market capitalization, book-to-market ratio, and momentum. We combine the individual holding benchmarks into an overall fund benchmark by using the corresponding weights from the actual portfolio. We use the annually reconstituted version of the DGTW benchmarks described in Wermers (2004) and available on Russ Wermers' website.[6]

4. Performance of focused managers

4.1. Empirical procedure

We first compare the performance of funds managed by focused managers to the performance of other funds. Recall that we identify concentrated managers via four different portfolio-weight inequality measures, the Herfindahl index, the normalized Herfindahl index, the Gini coefficient, and the coefficient of variation. Each captures some aspect of inequality in the distribution of portfolio weights.

At the end of each quarter, we sort funds into deciles four times, once for each of the inequality measures, estimated using the portfolio holdings snapshot at that quarter end. We then examine the equal-weighted performance of the portfolios in each decile over the subsequent three-month post-ranking period.

We examine post-ranking period performance two different ways, depending on the frequency of the fund returns. For daily gross returns, we compute the performance

[5] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.
[6] http://www.smith.umd.edu/faculty/rwermers/ftpsite/Dgtw/coverpage.htm.

measure each month. For monthly net returns, we concatenate the three-month post-ranking periods, and then measure performance once over the entire time series of concatenated post-ranking periods. Finally, we compute the difference in performance between the top one, two, or three deciles and the bottom one, two, or three deciles respectively. We compute *t*-statistics using the approach of Fama and MacBeth (1973), where we use the standard error of the monthly time series of performance differences.

4.2. Gross returns

We begin by examining the gross performance of fund portfolios, estimated according to equation (5). Table 3 shows the results. Panel A shows the results for raw returns, aggregated to a monthly frequency. Overall, the results suggest that funds with focused managers outperform more broadly diversified funds. In all but one case, the results are directionally consistent with this proposition, and in many instances the performance differences are statistically significant. The decile containing portfolios that take the biggest bets produce average returns greater than 1.0 percent per month, while the portfolios that diverge the least from an equal weighting produce returns around 0.85 percent per month. These results produce annual return differences that range from 1.4 to 3.0 percent.

The DGTW benchmark in Panel B produces even stronger results, with all differences directionally consistent with more concentrated funds producing greater risk-adjusted returns than less concentrated funds. In addition, seven of the nine differences reported in Panel B are statistically significant at a minimum of the five percent level. The daily differences are equivalent to annualized risk-adjusted return differences ranging from 1.7 percent to 4.5 percent.

Overall, the results in Table 3 suggest that fund managers that concentrate their portfolios among a relatively small number of stocks outperform fund managers who are less concentrated. This result holds even after accounting for the potentially greater

amount of idiosyncratic risk associated with the focused funds' portfolios. However, since the returns used in the Table 3 analysis are estimated from quarterly portfolio holdings, and do not represent actual fund returns, the results in Table 3 could differ somewhat from those based on actual returns. Recall that actual returns differ from mimicking returns because they account for intra-quarter transactions as well as the costs associated with such transactions. Consequently, we now turn to an analysis of actual shareholder returns.

4.3. Shareholder returns

Table 4 shows the results associated with actual fund shareholder returns, which are net of transaction costs and fund expenses, but do not account for fund loads. Panel A reports returns, and Panel B reports four-factor alphas.

In Panel A, three of the four inequality measures give results directionally consistent with the hypothesis that funds with more focused managers outperform funds with less focused managers. However, the performance differences are statistically significant only when concentration is measured by the coefficient of variation. The results based on the Herfindahl index are directionally inconsistent with big-bet managers outperforming, although they are not statistically significant. The annualized return difference between the top and bottom decile averages around 1 percent across the four alternative measures of portfolio-weight inequality.

Eleven of the 12 four-factor alpha differences reported in Panel B directionally suggest that big-bet funds outperform funds that take relatively smaller bets. Many of the differences are statistically significant. In particular, all of the differences associated with the coefficient of variation, two of the three differences associated with the normalized Herfindahl index, and one of the three differences associated with the Gini coefficient are statistically significant at the five percent level or higher. The annualized abnormal return difference averages close to 2 percent across the four alternative measures.

Note that Table 4 does not include DGTW benchmark-adjusted results. Since shareholder returns incorporate non-equity holdings as well as intra-quarter portfolio transactions, we are unable to precisely benchmark each fund's actual shareholder returns using the DGTW approach.

4.4. Performance of top of portfolio vs. bottom

Our results thus far indicate that funds that invest a relatively greater proportion of their portfolio in their top holdings outperform funds whose holding distribution more closely approximates an equal weighting. Since top holdings substantially impact the overall fund performance of focused funds, this result suggests that focused funds pick their top holdings well. In this section, we explore the performance of the top holdings of focused funds, comparing them to the top holdings of more diversified funds as well as to their own lower-weighted holdings.

Quite often, a fund's top holdings are constrained to be of relatively large market capitalization. As an extreme example, the $50 billion Fidelity Magellan Fund would be unable to hold as its top holding TiVo Inc., which has a market capitalization of $500 million. Funds are precluded by law from holding more than ten percent of any individual stock, and the Magellan Fund has recently invested 4.1 percent of its portfolio in its top stock, which would amount to a greater investment than the entire market capitalization of many small stocks.[7] Table 5 confirms this intuition. The table shows average size and volume statistics associated with each portfolio decile, sorted by portfolio weight. Top decile holdings are about seven times as large as bottom decile holdings and trade much more frequently. Consequently, to try to control for the market capitalization constraints that many funds face at the top end of their portfolio, we compare the performance of the top holdings of big-bet funds to that of diversified funds. Later, we compare the

[7] Magellan portfolio dated March 31, 2005. Source: Morningstar Principia, October 2005.

performance of a fund's top holdings to its other holdings, understanding that the lower-ranked holdings are less constrained than the top holdings.

Table 6 reports the difference in performance between various components of big-bet fund portfolios and diversified fund portfolios. The decile indicated in Table 6 refers to the position within a fund's portfolio, ranked by portfolio weight. For example, decile 1 refers to the top decile of holdings (i.e., stocks with the largest portfolio weights). Each entry in the table represents the performance difference between stocks in that decile for the ten percent biggest-bet funds and the ten percent most diversified funds. We base the corresponding *t*-statistics on the time series of monthly differences in the spirit of Fama and MacBeth (1973). Given this procedure, Table 6 utilizes data from 20 percent of the sample funds, consisting of the ten percent biggest-bet funds and the ten percent most diversified funds. Panel A reports results based on monthly raw returns, and Panel B reports results based on daily DGTW-adjusted returns.

The return differences in Panel A indicate that the top holdings of big-bet funds produce greater returns than the top holdings of diversified funds. This result is invariant to the portfolio weight inequality measure. The return differences are economically large, with the top holdings of big-bet funds outperforming the top holdings of diversified funds by as much as 15 percent annually. The results in Panel A also indicate that the bottom decile securities (decile 10) of big-bet funds do not produce greater returns than the bottom decile securities of diversified funds. Thus, Panel A suggests that the overall performance advantage achieved by the big-bet funds is specifically attributable to their top holdings, rather than lower-ranked holdings. The results at the bottom of the panel report the difference between top and bottom decile differences, which directly address whether the performance advantage of the focused funds is due to their top holdings. These latter differences clearly indicate that the top holdings of focused funds are key contributors to their overall superior performance.

The DGTW benchmark-adjusted differences in Panel B are similar to the results in Panel A, and suggest that focused funds pick their top holdings well. Annualized abnormal return differences at the top of the portfolio range from around five percent to as much as 15 percent. The differences between top and bottom decile differences shown at the bottom of the panel also suggest that the top deciles of focused funds outperform the top deciles of diversified funds more than the bottom deciles of focused funds outperform the bottom deciles of diversified funds.

We next examine the difference in performance between a fund's top holdings and its bottom holdings, again ranked by portfolio weight. As noted above, many funds face substantial constraints at the top of their portfolio, particularly funds of substantial size. Consequently, it is not ex ante obvious that a fund's top holdings would outperform its bottom holdings, given that small cap stocks have been shown to outperform large cap stocks, on average (Banz (1981)). Also, small cap, illiquid stocks are particularly susceptible to many of the empirical asset pricing anomalies documented in the literature. See, for example, Lesmond, Schill, and Zhou (2004) and Avramov, Chordia, and Goyal (2006).

Figure 1 shows the performance of the top and bottom portfolio deciles, ranked by portfolio weight, for the ten percent biggest-bet funds and the ten percent most diversified funds. The figure indicates that, overall, the bottom portfolio decile tends to outperform the top decile for both measures of performance. As mentioned above, bottom holdings face substantially fewer constraints in terms of size and liquidity. The pattern is similar regardless of the measure of portfolio weight inequality.

The figure also shows that the performance difference between the bottom and top decile is substantially wider for diversified funds. In fact, although not obvious from the figure, the performance of the top holdings of the big-bet funds is statistically indistinguishable from the performance of the bottom holdings. By contrast, the

performance of the top holdings of diversified funds is significantly lower than the performance of their bottom holdings across both performance measures.

One interpretation of these results is that, during our sample period, illiquid, small capitalization stocks outperformed large capitalization stocks, leading to overall greater performance at the bottom of fund portfolios. Concentrated managers are constrained to place big bets among the larger capitalization stocks. Nonetheless, despite these constraints, the results suggest that the top holdings of the big-bet funds perform about as well as their bottom holdings. Diversified funds apparently are unable to pick the correct stocks at the top of their portfolio, and their top holdings significantly underperform their bottom holdings.

4.5. Fund size and style characteristics

Given the results in Table 6 and Figure 1, the performance generated by the bigger-bet funds could be driven by a difference in the size of big-bet funds (their total assets under management) compared to diversified funds. For example, if big-bet funds were smaller, on average, than diversified funds, then they may be able to hold smaller and less liquid stocks at the top of their portfolio. Ceteris paribus, their top holdings could do better than the top holdings of bigger funds, which could lead to the results documented in tables 3, 4, and 6.

Table 7, Panel A reports the average fund size of the three deciles of funds that take the biggest bets and the three deciles of funds with the most uniformly distributed portfolio weights. Contrary to what one might expect, big-bet funds tend to be considerably larger in size than the more diversified funds across three of the four measures of portfolio weight inequality. For the Gini coefficient and the coefficient of variation, the size differences are dramatic, with the average big-bet fund around nine times the size of the average diversified fund. Big-bet funds are substantially smaller than the diversified funds only when we use the Herfindahl index to gauge portfolio weight inequality.

We also examine investment style differences between big-bet and diversified funds. Although the four-factor model and DGTW benchmark control for much of the return differences associated with particular styles, they do so imperfectly. Consequently, Panel B of Table 7 reports the four-factor model beta coefficients for funds sorted into deciles according to portfolio weight inequality.

The results reveal no dramatic systematic risk or style differences between big-bet and diversified funds. Perhaps the only exception is with respect to the HML factor loading, where big-bet funds have negative loadings and diversified funds have positive loadings. These loading differences suggest that the big bet funds tend to be more growth-oriented than the diversified funds. Overall, the loadings do not appear to differ sufficiently to explain performance differences between the big-bet and diversified funds.

4.6. Passive vs. active shifts in position

Finally, we examine whether the big-bet securities arrive at their position of prominence within fund portfolios because of the active actions of fund managers, or, alternatively, because they have experienced extraordinary relative performance. That is, a portfolio that is equally weighted initially would progress over time to an uneven distribution of portfolio weights, with particular securities garnering larger portfolio weights as they increase in price. Then, relative to other holdings, the top holdings would be momentum stocks, resulting in subsequent good performance, on average, and providing an explanation for some of our earlier results. Given the results of Table 7, however, which suggest no overall difference in momentum factor loading between big-bet and diversified funds, it seems unlikely that our findings thus far are attributable to passive effects.

To examine this issue, we proceed as follows. For each fund, we examine changes in portfolio holdings between two consecutive portfolio holding dates. For each security in the portfolio, we compute a fractional change in shares held by the fund and a fractional change in security price, and then assign two percentile ranks to each stock

based on the two fractional changes. We interpret changes in shares held as an active effect, and changes in security price as a passive effect. Of course, this classification system is somewhat noisy, since one could interpret a manager's choice to not sell shares of a rapidly appreciating security as an active decision. Next, we isolate stocks that, over the course of the quarter, moved into the fund's top ten holdings (from outside the top ten). Finally, we compute the mean percentile rank associated with fractional change in shares held and the mean percentile rank associated with fractional change in security price for the top ten holding entrants. We then compare the two mean percentile ranks of big-bet funds to those of diversified funds.

In results not reported, we find that, compared to the new top holdings of diversified funds, the new top holdings of big-bet funds become top holdings due to active fund manager choices. I.e., they have larger fractional changes in shares outstanding compared to the new top holdings of diversified funds. Similarly, the new top holdings of big-bet funds have relatively lower fractional changes in price compared to the new top holdings of diversified funds. These results suggest that it is unlikely that our main findings are an artifact of some mechanical dynamic that we do not properly control for in our methodology.

5. Conclusion

Analyzing the stock-picking ability of mutual fund managers has occupied financial economists for almost 40 years. Unlike a number of controversial empirical findings, the general result that fund managers do not beat the market is widely accepted in academic circles, despite the frequent protests of practitioners. In this paper, we explore the performance of big-bet fund managers, who signal their optimism for their top holdings by investing in them a disproportionate amount of fund assets.

Using a variety of performance measures, we find that concentrated fund managers outperform their diversified counterparts. This result lends support to the

notion that the managers who are confident in their ability assess correctly the relative merits of stocks overall as well as within their portfolios. By contrast, funds whose portfolio weights more closely approximate a uniform distribution display less ability to correctly sort stocks within their portfolio according to future performance. Overall, our results suggest that focused fund managers do have some ability to correctly pick stocks. Mutual fund investors may enhance their overall performance by investing in portfolios of focused funds rather than highly diversified funds.

References

Banz, R., 1981, "The relationship between return and market value of common stock," *Journal of Financial Economics* 9, 3-18.

Campbell, J., M. Lettau, B. Malkiel, and Y. Xu, 2001, "Have individual stocks become more volatile? An empirical exploration of idiosyncratic risk," *Journal of Finance* 56, 1-43.

Carhart, M., 1997, "On persistence in mutual fund performance," *Journal of Finance* 52, 57-82.

Chen, H., N. Jegadeesh, and R. Wermers, 2000, "The value of active mutual fund management: An examination of the stockholdings and trades of fund managers," *Journal of Financial and Quantitative Analysis* 35, 343-368.

Daniel, K., M. Grinblatt, S. Titman, and R. Wermers, 1997, "Measuring mutual fund performance with characteristic-based benchmarks," *Journal of Finance* 52, 1035-1058.

Dimson, E., 1979, "Risk measurement when shares are subject to infrequent trading," *Journal of Financial Economics* 7, 197-226.

Fama, E., and K. French, 1993, "Common risk factors in the returns on stocks and bonds," *Journal of Financial Economics* 33, 3-56.

Investment Company Institute, 2001, *2001 Profile of mutual fund shareholders*, Investment Company Institute, Washington D.C.

Investment Company Institute, 2002, *Mutual fund fact book*, Investment Company Institute, Washington D.C.

Kacperczyk, M., C. Sialm, and L. Zheng, 2005, "On the industry concentration of actively managed equity mutual funds," *Journal of Finance*, 60: 1983-2011.

Lesmond, D., M. Schill, and C. Zhou, 2004, "The illusory nature of momentum profits," *Journal of Financial Economics* 71, 349-380.

Massa, M., and L. Phalippou, 2003, "Mutual funds and the market for liquidity," Working paper, INSEAD.

Myers, M., J. Poterba, D. Shackelford, and J. Shoven, 2001, "Copycat funds: Information disclosure regulation and the returns to active management in the mutual fund industry," Working paper, University of Chicago.

Pástor, Lubos, and Robert Stambaugh, 2002, Mutual fund performance and seemingly unrelated assets, *Journal of Financial Economics* 63, 315-349.

Perold, A., and Salomon, R. S., 1991, "The right amount of assets under management," *Financial Analysts Journal*, 47, 31-39.

Wermers, R., 1999, "Mutual fund herding and the impact on stock prices," *Journal of Finance* 54, 581-622.

Wermers, R., 2000, "Mutual fund performance: An empirical decomposition into stock-picking talent, style, transaction costs, and expenses," *Journal of Finance* 55, 1655-1695.

Wermers, R., 2004, "Is money really 'smart'? New evidence on the relation between mutual fund flows, manager behavior, and performance persistence," Working paper, University of Maryland.

Table 1. Sample size

Panel A shows the number of quarterly portfolio holding snapshots during each year of the sample period. Up to four portfolio snapshots for a given fund exist during any particular year. Panel B reports the mean, median, 25th percentile, and 75th percentile of the number of stock holdings in each fund portfolio. The portfolio holdings are from Thomson Financial's CDA Spectrum database.

Panel A. Funds by year

Year	Number	Percent	Cumulative percent
1979	7	0.06	0.06
1980	55	0.47	0.53
1981	46	0.39	0.92
1982	40	0.34	1.25
1983	69	0.58	1.84
1984	84	0.71	2.55
1985	101	0.86	3.41
1986	82	0.69	4.10
1987	92	0.78	4.88
1988	115	0.97	5.85
1989	136	1.15	7.01
1990	125	1.06	8.07
1991	133	1.13	9.19
1992	128	1.08	10.28
1993	155	1.31	11.59
1994	166	1.41	13.00
1995	219	1.86	14.85
1996	389	3.30	18.15
1997	378	3.20	21.35
1998	746	6.32	27.67
1999	933	7.91	35.58
2000	1,822	15.44	51.02
2001	1,553	13.16	64.18
2002	2,322	19.67	83.85
2003	1,906	16.15	100.00
Total	11,802	100.00	

Panel B. Holding statistics

	All	1979-1991	1992-2003	Small	Large
Mean	128	111	146	86	165
Median	95	85	105	70	140
25th	63	58	68	50	98
75th	150	131	170	106	208

Table 2. Porfolio weight inequality measures

The table summarizes fund portfolio weight inequality measures. Panel A shows the mean, median, 25th percentile, and 75th percentile of four different measures of portfolio weight distribution inequality. Panel B reports the correlations between the four alternative portfolio weight distribution inequality measures. We calculate the mean, median, 25th percentile, and 75th percentiles each quarter and then average across quarters. We define small and large funds are relative to the median level of total net assets in each quarter. Fund holdings are from Thomson Financial's CDA Spectrum database.

Panel A. Portfolio weight inequality measures

	All	1979-1991	1992-2003	Small	Large
A1. Herfindahl					
Mean	0.026	0.028	0.024	0.032	0.022
Median	0.024	0.027	0.021	0.030	0.020
25th	0.017	0.019	0.015	0.023	0.015
75th	0.032	0.035	0.030	0.038	0.026
A2. Normalized Herfindahl					
Mean	0.014	0.015	0.013	0.015	0.013
Median	0.012	0.013	0.010	0.013	0.011
25th	0.008	0.009	0.007	0.009	0.009
75th	0.017	0.018	0.016	0.018	0.016
A3. Gini					
Mean	0.54	0.54	0.54	0.49	0.59
Median	0.55	0.55	0.55	0.49	0.60
25th	0.45	0.44	0.45	0.39	0.53
75th	0.64	0.63	0.64	0.59	0.66
A4. Coefficient of variation					
Mean	1.11	1.10	1.13	0.97	1.25
Median	1.07	1.07	1.07	0.94	1.22
25th	0.83	0.83	0.84	0.73	1.04
75th	1.33	1.31	1.35	1.19	1.44

Inequality measure	*H**	*G*	*CV*
H	0.89	0.02	0.07
*H**		0.36	0.39
G			0.89

Table 3. Fund performance vs. portfolio weight inequality using gross returns

The table reports gross equity portfolio performance for deciles of portfolios based on a portfolio weight inequality measure. *H* refers to the Herfindahl measure, *H** refers to the normalized Herfindahl measure, *G* refers to the Gini coefficient, and *CV* refers to the coefficient of variation. Decile 1 (10) consists of portfolios that take relatively small (big) bets on portfolio stocks. Panel A shows monthly returns, and Panel B shows daily DGTW benchmark-adjusted returns. Fund holdings are from Thomson Financial's CDA Spectrum database; stock returns are from the CRSP daily stock files. The sample period covers 1979 through 2003.

	H		*H**		*G*		*CV*	
Decile	Perf	*t*-stat	Perf	*t*-stat	Perf	*t*-stat	Perf	*t*-stat
				Panel A. Return				
1	0.0106	3.06	0.0099	2.85	0.0106	3.11	0.0100	2.97
2	0.0110	3.08	0.0090	2.47	0.0073	2.07	0.0074	2.07
3	0.0115	3.26	0.0098	2.72	0.0100	2.91	0.0097	2.77
4	0.0112	3.15	0.0111	3.22	0.0116	3.07	0.0124	3.33
5	0.0097	2.87	0.0097	2.84	0.0110	3.06	0.0103	2.84
6	0.0110	3.03	0.0108	3.14	0.0114	3.12	0.0117	3.25
7	0.0078	2.11	0.0104	2.90	0.0092	2.54	0.0097	2.66
8	0.0090	2.31	0.0107	2.92	0.0103	2.77	0.0102	2.55
9	0.0113	3.28	0.0105	2.84	0.0118	3.35	0.0108	3.05
10	0.0129	3.25	0.0129	3.21	0.0122	3.31	0.0127	3.77
10-1	0.0023	1.41	0.0030	1.75	0.0016	1.03	0.0028	1.99
9:10-1:2	0.0026	1.14	0.0046	1.76	0.0061	2.54	0.0062	2.48
8:10-1:3	0.0001	0.03	0.0055	1.72	0.0064	2.09	0.0067	2.08
				Panel B. DGTW benchmark-adjusted return				
1	-0.00007	-2.44	-0.00007	-1.99	-0.00001	-0.31	-0.00005	-1.34
2	-0.00002	-0.68	-0.00011	-2.18	-0.00013	-2.72	-0.00011	-2.04
3	0.00000	-0.08	-0.00007	-1.65	-0.00003	-0.80	-0.00005	-1.13
4	-0.00001	-0.22	0.00002	0.52	0.00001	0.21	0.00003	0.60
5	0.00000	0.01	-0.00006	-1.66	-0.00001	-0.13	-0.00002	-0.57
6	-0.00003	-0.54	0.00001	0.15	0.00002	0.47	0.00003	0.79
7	-0.00007	-1.28	-0.00001	-0.12	-0.00007	-1.26	-0.00005	-0.98
8	-0.00007	-1.30	0.00001	0.15	-0.00003	-0.62	-0.00005	-0.78
9	0.00000	-0.09	-0.00003	-0.46	0.00002	0.44	-0.00001	-0.24
10	0.00012	1.73	0.00009	1.24	0.00004	0.74	0.00008	2.02
10-1	0.00018	2.80	0.00015	2.22	0.00005	0.91	0.00012	2.62
9:10-1:2	0.00020	2.30	0.00023	2.24	0.00020	2.49	0.00022	2.63
8:10-1:3	0.00013	1.20	0.00030	2.51	0.00021	1.99	0.00023	2.01

Table 4. Fund performance vs. portfolio weight inequality using shareholder returns

The table reports fund shareholder returns for deciles of portfolios based on a portfolio weight inequality measure. *H* refers to the Herfindahl measure, *H** refers to the normalized Herfindahl measure, *G* refers to the Gini coefficient, and *CV* refers to the coefficient of variation. Decile 1 (10) includes portfolios that take relatively small (big) bets on portfolio stocks. Panel A shows monthly returns, and Panel B shows daily four-factor alpha. Fund holdings are from Thomson Financial's CDA Spectrum database; fund returns are from the CRSP mutual fund database. The sample period covers 1979 through 2003.

	H		*H**		*G*		*CV*	
Decile	Perf	*t*-stat	Perf	*t*-stat	Perf	*t*-stat	Perf	*t*-stat
				Panel A. Return				
1	0.0089	2.80	0.0085	2.77	0.0080	2.67	0.0074	2.47
2	0.0093	2.88	0.0075	2.30	0.0063	1.97	0.0068	2.11
3	0.0091	2.91	0.0075	2.30	0.0084	2.76	0.0081	2.58
4	0.0100	3.16	0.0088	2.79	0.0089	2.61	0.0080	2.41
5	0.0082	2.63	0.0083	2.64	0.0090	2.74	0.0100	3.06
6	0.0084	2.62	0.0087	2.78	0.0092	2.81	0.0089	2.76
7	0.0073	2.21	0.0080	2.38	0.0088	2.71	0.0086	2.61
8	0.0063	1.85	0.0075	2.30	0.0079	2.40	0.0079	2.22
9	0.0090	2.87	0.0098	3.10	0.0088	2.78	0.0088	2.75
10	0.0082	2.45	0.0086	2.54	0.0094	2.92	0.0101	3.49
10-1	-0.0007	-0.47	0.0001	0.08	0.0014	1.06	0.0027	2.29
9:10-1:2	-0.0010	-0.51	0.0024	1.18	0.0039	1.93	0.0047	2.33
8:10-1:3	-0.0038	-1.63	0.0024	0.90	0.0034	1.35	0.0045	1.79
				Panel B. Four-factor alpha				
1	-0.0007	-0.97	-0.0007	-0.78	-0.0004	-0.45	-0.0013	-1.47
2	-0.0002	-0.18	-0.0018	-1.62	-0.0028	-2.48	-0.0019	-1.58
3	0.0005	0.60	-0.0018	-1.86	-0.0001	-0.12	-0.0014	-1.53
4	0.0012	1.25	0.0003	0.31	-0.0010	-1.09	-0.0015	-1.68
5	-0.0005	-0.49	-0.0008	-0.91	-0.0002	-0.21	0.0011	1.00
6	0.0004	0.44	-0.0005	-0.57	0.0002	0.17	0.0000	0.03
7	-0.0016	-1.34	-0.0012	-1.36	0.0000	-0.01	-0.0002	-0.18
8	-0.0030	-2.72	-0.0013	-1.16	-0.0004	-0.40	-0.0011	-0.90
9	0.0006	0.58	0.0025	2.38	0.0009	0.92	0.0005	0.49
10	-0.0002	-0.14	0.0005	0.38	0.0006	0.59	0.0024	2.99
10-1	0.0005	0.38	0.0012	0.77	0.0010	0.80	0.0037	3.26
9:10-1:2	0.0013	0.67	0.0055	2.75	0.0047	2.46	0.0060	3.10
8:10-1:3	-0.0022	-0.95	0.0060	2.29	0.0045	1.86	0.0063	2.68

Table 5. Characteristics of portfolio holdings

The table shows characteristics of stocks in each portfolio dollar decile, sorted by portfolio weight. Decile 1 (10) reflects top (bottom) holdings.

Decile	Size ($B)	Volume ($M)	Number
1	78	362	3.3
2	59	264	4.7
3	45	207	5.5
4	36	166	6.3
5	30	142	7.2
6	25	124	8.3
7	22	109	9.8
8	18	97	12.0
9	15	86	16.0
10	12	73	33.6

Table 6. Performance of big-bet vs. diversified portfolios, by holding size

The table reports differences in gross equity portfolio performance between big-bet funds and diversified funds for deciles of portfolios based on a portfolio weight inequality measure. *H* refers to the Herfindahl measure, *H** refers to the normalized Herfindahl measure, *G* refers to the Gini coefficient, and *CV* refers to the coefficient of variation. Decile 1 (10) consists of portfolios that take relatively small (big) bets on portfolio stocks. Panel A shows monthly returns, and Panel B shows daily DGTW benchmark-adjusted returns. Fund holdings are from Thomson Financial's CDA Spectrum database; stock returns are from the CRSP daily stock files. The sample period covers 1979 through 2003.

	H		*H**		*G*		*CV*	
Decile	Perf	*t*-stat	Perf	*t*-stat	Perf	*t*-stat	Perf	*t*-stat
				Panel A. Return				
1	0.0082	1.68	0.0071	1.66	0.0126	4.10	0.0108	3.21
2	0.0092	2.04	0.0114	2.60	0.0040	1.48	0.0039	1.09
3	0.0015	0.30	0.0030	0.54	0.0029	0.87	0.0080	1.41
4	0.0030	0.88	0.0021	0.66	0.0025	0.94	-0.0003	-0.10
5	0.0017	0.41	0.0025	0.66	0.0021	0.67	0.0049	1.46
6	0.0056	2.10	0.0019	0.47	0.0007	0.25	0.0026	0.87
7	0.0054	1.22	0.0030	1.09	-0.0028	-1.24	0.0040	1.15
8	0.0073	2.22	0.0067	1.87	0.0018	0.88	0.0036	1.64
9	-0.0040	-1.42	0.0007	0.19	-0.0024	-0.80	-0.0019	-0.61
10	0.0003	0.11	0.0013	0.49	-0.0034	-1.33	0.0007	0.31
10-1	0.0079	1.66	0.0058	1.37	0.0160	3.84	0.0102	2.48
9:10-1:2	0.0211	2.62	0.0165	2.22	0.0224	3.11	0.0160	2.18
8:10-1:3	0.0153	1.84	0.0127	1.53	0.0235	2.73	0.0204	2.36
				Panel B. DGTW benchmark-adjusted return				
1	0.0004	2.24	0.0004	1.71	0.0006	4.59	0.0002	0.61
2	0.0004	2.43	0.0006	3.60	0.0001	1.14	0.0002	1.03
3	0.0000	0.12	0.0001	0.38	0.0000	0.03	0.0003	1.06
4	0.0002	1.19	0.0001	0.68	0.0001	0.82	0.0000	0.09
5	0.0000	-0.06	0.0001	0.33	0.0002	1.31	0.0004	1.90
6	0.0002	2.25	0.0000	0.17	-0.0001	-0.48	0.0001	0.75
7	0.0004	1.80	0.0002	1.18	-0.0001	-1.17	0.0002	1.32
8	0.0004	1.92	0.0003	1.38	0.0001	1.08	0.0002	1.34
9	-0.0001	-0.51	0.0000	-0.09	-0.0001	-1.05	-0.0001	-0.85
10	0.0002	0.94	0.0001	0.44	-0.0002	-2.05	0.0000	-0.10
10-1	0.0003	1.39	0.0003	1.18	0.0008	4.50	0.0002	0.50
9:10-1:2	0.0008	2.40	0.0009	2.88	0.0011	3.76	0.0005	0.96
8:10-1:3	0.0003	0.74	0.0007	1.41	0.0010	3.06	0.0007	1.56

Table 7. Characteristics of big-bet vs. diversified funds

The table shows average fund size (Panel A) and factor loadings from the four-factor model (Panel B) for deciles of portfolios based on a portfolio weight inequality measure. The reported beta coefficients are the sum of the contemporaneous and lag coefficients estimated with daily data. We average coefficients across funds within each quarter and then across quarters. Fund holdings are from Thomson Financial's CDA Spectrum database; stock returns are from the CRSP daily stock files. The sample period covers 1979 through 2002.

Decile	*H*	*H**	*G*	*CV*
		Panel A. Fund size		
1	727	244	150	154
2	889	333	224	223
3	720	381	252	253
8	359	713	728	685
9	328	814	1084	1062
10	243	652	1383	1351
10-1	-485	409	1232	1197
		Panel B. Factor loadings		
B1. Market beta				
1	1.01	1.01	0.99	1.01
2	1.06	1.02	1.04	1.02
3	1.00	1.06	0.98	1.04
8	1.11	1.00	1.02	1.09
9	0.98	0.93	0.95	0.99
10	1.04	1.01	1.00	0.89
10-1	0.03	-0.01	0.01	-0.12
B2. SMB beta				
1	0.32	0.17	0.03	0.05
2	0.15	0.26	0.13	0.12
3	0.14	0.15	0.12	0.16
8	0.12	0.09	0.13	0.13
9	0.12	0.10	0.10	0.09
10	0.06	0.11	0.08	0.08
10-1	-0.26	-0.06	0.05	0.03
B3. HML beta				
1	0.09	0.12	0.10	0.13
2	0.08	0.11	0.12	0.08
3	-0.01	0.10	0.02	0.12
8	0.08	-0.07	-0.06	-0.04
9	0.03	-0.15	-0.11	-0.08
10	0.01	-0.07	-0.04	-0.10
10-1	-0.08	-0.19	-0.13	-0.23
B4. UMD beta				
1	0.03	-0.02	-0.07	-0.06
2	0.02	-0.01	-0.03	-0.05
3	0.00	-0.01	-0.02	0.01
8	-0.02	0.05	-0.02	0.01
9	-0.05	-0.05	-0.02	0.01
10	-0.05	-0.04	0.04	-0.01
10-1	-0.08	-0.02	0.11	0.05

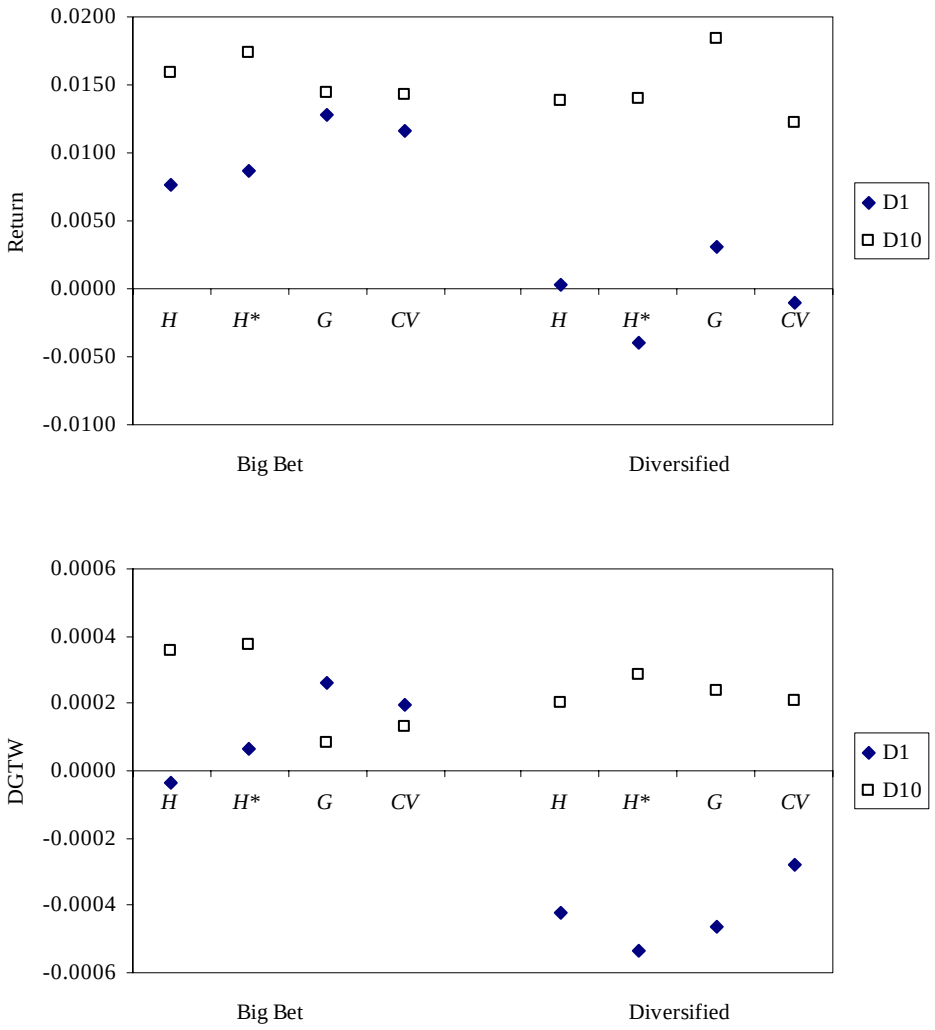

Figure 1. Performance of largest and smallest positions
The figure shows the performance of the top and bottom portfolio holding deciles, ranked by portfolio weight. Panel A shows monthly returns, and Panel B shows daily DGTW benchmark-adjusted returns. *H* refers to the Herfindahl measure, *H** refers to the normalized Herfindahl measure, *G* refers to the Gini coefficient, and *CV* refers to the coefficient of variation. The returns are gross of expenses. Fund holdings are from Thomson Financial's CDA Spectrum database; stock returns are from the CRSP stock database. The sample period covers 1979 through 2003.