Do Active Funds Perform Better In Down Markets? - New Evidence from Cross-Sectional Study

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Abstract

As discussed in Gruber (1996), the dramatic growth of actively managed funds constitutes a major puzzle in the finance literature. Despite the large amount of money invested in actively managed funds, these funds on average underperform their passive counterparts after fees. The existing literature proposes a potential explanation to the puzzle - active funds perform better in down markets when it matters the most to investors. However, empirical conclusions are hard to draw due to the short time series of data relative to the length of a business cycle. In this paper, we exploit the large panel of mutual fund data, and study the cross-sectional variation in performance cyclicality. Using data from 1980-2008, we find that the most active funds outperform the least active ones by 4.5 percent to 6.1 percent per year in down markets after adjusting for risk and expenses. On the other hand, the most active funds do not outperform in the up markets. A further investigation of the sources of fund performance suggests that active funds show better stock picking skills in the down markets. The results are robust to different measures of fund activeness and definitions of up and down markets.

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1. Introduction

The financial economics has long-time interest in whether professional money managers add values by actively picking stocks. The answer to the question not only has implications of market efficiency, but also can explain why active mutual fund industry has gained tremendous growth during the past several decades. The empirical findings are generally disappointing. On average, active fund managers do not generate performance high enough to justify the additional fees charged by them than the passive index funds (eg. Jensen,1968, Gruber, 1996, Carhart ,1997, Fama and French, 2008). Therefore, the dramatic growth of the active mutual funds despite their underperformance constitutes a major puzzle in the finance literature.

In this paper, we examine one potential source of value of active mutual funds: whether active funds deliver counter-cyclical performance that allows mutual fund investors to hedge against the down market. In testing this hypothesis, we focus on the cross-sectional variations in the cyclicality of performance, which is in contrast to the existing studies that treat the all active funds as a homogeneous group when examining a similar question[1].

Our main empirical methodology involves a difference in differences approach. First, we differentiate funds by their degree of activeness. We then study how different funds' performances vary with business cycles, and whether there is a positive

[1] Other papers that focus on the fund performance conditional on business cycles are Moskowitz (2000), Kosowski (2006), Lynch, Wachter and Boudry (2007) and Glode (2009).

association between performance counter-cyclicality and the degree of active management.

We believe that adding the cross-sectional dimension to the time-series studies gain mileages in several ways. First, the existing literature documents a large cross-sectional variation in fund activeness, and finds that more active funds show better stock selection ability. Therefore, focusing on the most active funds is likely to identify superior performance during the down market when all funds face tougher investment environment. Second, we link funds activeness to counter-cyclical performance, which provide a direct test of whether the added value of hedging against down market is indeed due to active management. Third, the time series of mutual fund returns is relatively short compared with the average length of a business cycle. Our methodology takes advantage of the large panel of dataset, and hence provides a more powerful test.

Our empirical paper examines three main questions. First, we test whether there is a cross-sectional variation in cyclicality of fund performance, and whether the cyclicality is related to fund activeness. Upon detecting the down market outperformance by active funds, we move on to explore the sources of such outperformance. Finally, we study whether mutual fund investors value active funds by paying a premium during normal times for their ability to hedge against the down-side risk.

Using data from 1980-2008, we find that active funds as one group does not significantly outperform the passive index funds during the down market, however, a

subgroup of the most active funds earn significantly higher returns than index funds when in NBER economy contraction. The result is in sharp contrast to the one when in economy expansion, where we find a slight underperformance by active funds to index funds after fees and expense.

When comparing funds within the active mutual fund category, we find stronger performance counter-cyclicality for more active funds. The most active funds outperform the least active ones by 4.5 percent to 6.1 percent per year during the down market, after adjusting for the systematic risk and management fees and costs. The results also hold in a panel regression controlling for fund size, age, family size, turnover, expenses and new money growth and asset allocations.

The macro finance literature finds evidence that the expected stock returns are associated with macroeconomic variables, but so far there is no study on whether a similar case holds for mutual fund returns[2]. Therefore, we also consider Industrial Production as an alternative proxy for business condition. We find that a higher expected return for active mutual funds is associated with depressing business conditions, after controlling the Carhart four factors. Moreover, we find that the degree of performance counter-cyclicality increases with funds' degree of activeness, which reinforces our previous results when NBER business cycle definition is used.

[2] The only exception is Glode(2009), which the author studies how aggregate mutual fund return varies with real consumption growth.

To understand the sources of the down-market performance by active funds, we consider both stock selection ability and timing ability. We find a significant increase in stock picking ability as measured by DGTW Characteristic selection ability (CS) and Industry Selection ability (IT). However, we do not find a superior down-market timing ability for more active funds. This suggests that stronger counter-cyclicality by the active funds is likely coming from insider knowledge about firm-specific information rather than market-wise factors.

Finally, we link our findings to the puzzle of the growth of active mutual fund industry, first proposed by Gruber (1996). We find that despite the time-varying performance by active funds, fund managers charge fees that hardly change over time. On average, more active funds charge significantly higher fees, which wash out the slight outperformance of the before-fee return during the up market. The results suggest that mutual fund investors are willing to pay high premiums during a normal time for active funds' ability to hedge against economic downturns.

There are a couple economic rationales of why skilled managers are more likely to do better in the down market. First, managers of firms tend to withhold more bad news than good news, which may lead to less information breached to the market by managers during the down market[3].Thus, the information opaqueness provides a better profit

[3] Shin(2003) formally models the relationship between disclosing incentives and asset returns. Kothari, Shu and Wysocki(2008) finds empirical evidence that mangers withhold bad news. There are a numerous econometric papers documenting the "Leverage effect", first documented by Black (1976), featuring an increase in return volatility following a low stock return. Campbell et al. (2001) documents higher market, industry and idiosyncratic volatility during the down markets.

opportunity for the informed manager in the down market. Second, the up markets are more likely subject to investor sentiments or noise trader risk[4], which combined with the limit to arbitrage, can lead to big loss even for sophisticated rational investors[5]. While in the down market, as noise traders withdraw from the market, professional money managers are more likely to succeed by trading on signals about the fundamentals of the firms.

The rest of the paper is organized as the following: Section One discusses the related literature and how our paper adds to the existing studies. Section Two explains the main empirical methodology. Section Three presents information on the datasets used in the paper, and summarizes the empirical proxies for fund performance and activeness. Section Four compares active and passive mutual fund performance over business cycle. Section Five relates the performance during recession to fund activeness. Section Six explores the sources of down-side market performance. Section Seven studies active funds management fees and before fee performance. Section Eight concludes.

1 Related literature

Academic research documents disappointing evidence on whether active mutual funds outperform passive index funds. Using mutual fund return data over various sample

[4] Odean (1998), Barber and Odean (1999), Lowenstein et al. (2007), Hou, Xiong and Peng (2009) find that individual investors pay more attention in the up market than in the down market.

[5] Daniel, Hirshleifer, and Subramanyam (1998, 2001), Scheinkman and Xiong (2003), Statman, Thorley Vorkink (2006) develop theories in which over -confident investors combining with limit to arbitrage lead to stocks being over priced than fundamentals. Abreu and Brunnermeier (2003), Brunnermeier and Nagel (2004) provide both theoretical justification and empirical evidence that even rational institutional investors may have incentives to ride bubbles.

periods, Jensen(1968), Malkiel (1995), Gruber(1996), Carhart (1997), and Fama and French (2008) all find that returns after fees and expenses of active mutual funds are lower than those of passive index funds. The underperformance can not justify the fast growth of the active mutual fund industry. Gruber (1996) and Zheng (1999) provide a partial explanation to the puzzle. They find that mutual fund investors are more rational than they appear as they can pick funds that perform better than the average funds.

This paper examines another potential explanation of why investors may favor active mutual funds. Active funds earn better returns during the down market which provide a hedge against the down-side risk. Glode (2009) develops a theoretical model along this line to rationalize the simultaneous arising of the underperformance and mutual fund investing. Papers that empirically examine the explanation include Moskowitz (2000), Kosowski (2006) and Lynch, Wachter and Boudry (2007). However these papers focus on the time-series variation of aggregate mutual fund performance. Our paper differentiates funds by their degree of activeness, which provides a more direct link of counter-cyclical performance to active management.

Although mutual funds as a group deliver disappointing risk-adjusted returns, the literature documents a large cross-sectional variation in mutual fund performance. Kacperczyk, Sialm, and Zheng (2005) argue that mutual fund managers may decide to deviate from a well-diversified portfolio and concentrate their holdings in industries where they have informational advantages. Cremers and Petajisto (2007) propose a measure of Active Share for individual mutual funds to capture the share of portfolio

holdings that differ from the benchmark index. They find that funds with the highest Active Share values significantly outperform their benchmark, On the hedge fund side, Sun, Wang and Zheng (2009) develop a measure of fund Strategy Distinctive Index (SDI) to capture how a hedge fund deviate from its peers, and find that more distinctive funds generate higher returns than less distinctive ones. In this paper, we study how active funds' outperformance vary with the business cycle, and find that active funds only significantly outperform less active ones in the down market.

More generally, this paper is related to asset pricing tests on whether macroeconomics variables can serve as systematic risk factors. Chen, Roll, and Ross (1986) find a number of macroeconomic variables are priced in individual stock returns. More recently, Campbell and Diebold (2009) find that expected business conditions consistently affect expected excess returns for stocks in a statistically and economically significant counter-cyclical fashion, after controlling the standard financial predictors. Our paper finds that a similar counter-cyclicality exists for mutual fund returns. Moreover, the degrees of the performance counter-cyclicality vary across funds with their degree of activeness.

2 Methodology

In this section, we explain the empirical methodology used in the paper. One major methodology difference between our paper and the existing papers that also study active mutual fund performance over business cycles is that we differentiate among active funds by their degrees of activeness. The existing papers treat all active funds as a

homogeneous group, and study whether the whole universe of active mutual funds deliver better performance during down market as appose to up market. In this paper, we study whether a subgroup of relatively more active funds earn better returns than passive index funds or less active ones. So our study combines both time-series and cross-sectional analysis.

We focus on cross-sectional study for a few reasons. First, although all active funds claim themselves to be active, the literature has found large cross-sectional variation in terms of their true activeness by examining their portfolio holdings. Moreover, funds with high degree of activeness on average deliver superior performance than closet indexers. Therefore by focusing on more active funds, it is more likely to identify superior skills, which may be especially indispensible when profit opportunities are fewer.

A more profound reason is related to the fundamental question of whether active asset management adds value. The existing literature argues that one of the values of active mutual funds is the counter-cyclical performance that can provide a hedging against the down market. However, there has been no study showing that the counter-cyclical performance is indeed due to active management. Thus, by studying whether the down-market outperformance is tied to the degree of activeness, we provide a more direct test to the fundamental question.

Finally, adding the cross-sectional dimension may increase the power of the test. The earliest mutual fund perform data goes back to only 1960s and mutual funds are not dominant until early 1990s. The times series is relatively short compared to the length of a business cycle, thus a study based on the small sample size may be lack of power. In contrast, our study takes advantage of the large cross sections of mutual funds that exist, which increase the sample size tremendously.

Combining both time-series and cross-sectional dimensions boils down to the difference-in-differences approach, which is illustrated in figure 1. First, we compute the difference in performance between the most and least active funds, for down and up market separately, we then take the difference of the two differences. Thus, our study tests whether the more actives deliver stronger counter-cyclical performance than the less actives. The difference-in-differences approach not only directly links fund performance to fund activeness, but also control for the potential bias in risk adjustment, provided that the bias affects all funds to the same degree.

3 Data and empirical measures

3.1 Data

The main data set has been created by merging the CRSP Survivorship Bias Free Mutual Fund Database with the CDA/Spectrum holdings database, NBER business cycle expansion and contraction dates, Global Insight Basic Economics data and the CRSP stock price data. The CRSP Mutual Fund Database includes information on fund returns, total net assets, different types of fees, investment objectives, and other fund

characteristics. CDA/Spectrum database provides detailed information about fund holdings. Global Insight provides marco-level data about the US economy such as Industrial Production.

Our final sample spans the period between Apirl 1980 and September 2008. We eliminate balanced, bond, index, international, and sector funds, and focus our analysis on actively managed diversified US equity funds. In addition, we include funds with multiple share classes only once. We also eliminate all observations where fewer than 11 stock holdings could be identified and observations before the reported starting dates of the funds. Finally, we exclude all fund observations where the size of the fund in the previous quarter does not exceed $1 million. With all the exclusions, our final sample includes 2856 actively managed diversified equity funds.

[Table 1]

3.2 Empirical proxies for performance

We use various measures to gauge each fund's performance. First, we directly look at the net-of-fee return. Although it does not adjust for any systematic risk exposures, mutual fund investors are interested in it because it reflects how much money they can ultimately put into their pockets. Second, to account for the systematic risk exposures, we look at the Carhart four-factor adjusted abnormal returns. Finally, we use Sharpe Ratio to capture the risk-return trade off.

When estimating the betas in the Carhar four-factor model, it is important to allow betas to be time varying, as many active funds dynamically manage their portfolios. An

early contribution to the time-varying beta estimation for portfolios is Ferson and Schadt (1996), where the conditional betas change over time, but the conditional alpha is assumed fixed. In this paper, we use a different approach by taking advantage of the holding information and high frequency stock returns. In particular, for each mutual fund at each time point, we construct a "holdings beta" by aggregating the betas of individual stocks held in the portfolio at the time.

$$\beta_t^f = \sum_i w_{i,t} \hat{\beta}_{i,t}^f \tag{1}$$

where $w_{i,t}$ is the portfolio weight for stock i held by the fund at time t, and $\hat{\beta}_{i,t}^f$ is loading for stock i on factor f at time t, estimated using high frequency stock returns.

There are several advantages to the holding beta. First, it is not obtained from a linear regression of mutual fund returns on factors, so it does not require the conditional alpha to be constant. Second, it does not need specific instruments to identify the time-varying beta. Third, it does not need a long history of fund returns, which mitigates the survivorship bias problem.

To obtain the betas for individual stocks, we use weekly stock returns. We choose weekly instead of monthly returns due to the gained accuracy in estimating the short-term beta (Merton, 1980). Also, we do not use daily returns to avoid the potential bias in beta estimation due to microstructure effects. In our paper, we use stock returns during the most recent 12 months before the performance evaluation month t.

Although the beta is estimated more accurately using weekly data, some stocks may still have large estimation errors and take extremely large positive or negative values. To further reduce the beta estimation errors in individual stocks, we use the Vasicek (1973) beta shrinking method, recommended in Elton, Gruber, Brown, and Goetzmann (2003, p.145). It is computed as

$$\hat{\beta}_{i,t}^{f} = \omega_{i,t}\beta_{i,t}^{f} + (1-\omega_{i,t})\mu_{XS,t}^{f} \tag{2}$$

$$\omega_{i,t} = 1 - \frac{\hat{\sigma}_{i,t}^{f\,2}}{\hat{\sigma}_{i,t}^{f\,2} + \hat{\sigma}_{XS,t}^{f\,2}} \tag{3}$$

where β_i is the ordinary OLS time-series beta for each firm with associated standard error of the estimated beta $\hat{\sigma}_i^2$， and μ_{XS} and $\hat{\sigma}_{XS}^2$ are the mean and variance of all betas across firms. This shrinkage estimator places less weight on the individual beta estimate if the estimated stock-specific beta has a large standard error relative to the cross-sectional heterogeneity of betas among stocks.

Finally, as a robustness check, we also use the regular fund beta for the Carhart four-factor model, where the four-factor betas are obtained using a linear regression of monthly mutual fund returns over the three years before month t.

3.3 Empirical proxies for fund activeness

In this paper, we look at active management from two dimensions: 1. deviation from passive benchmark index, 2. deviation from peer groups. Deviation from bench mark index as a way to detect skills is quite intuitive: given that performance evaluation of the mutual fund industry is based on comparing fund returns relative to a benchmark,

funds have incentives to not to deviate from the benchmark by too much[6]. However, when a manager has better information about certain stocks, they may deviate from the benchmark and appear to be active.

Deviation from peer groups may help us to detect outperformance especially during the down market for at least two reasons: first, it has been argued that mangers' concerns about labor-market reputation lead to herding investment behaviors.(Scharfstein and Stein (1990)). Managers who do not have skills may want to herd so that the blame on bad investment decision will be shared by a number of their peers. The herding incentive by the unskilled manager may be especially strong during the down market because the likelihood of failure is high. In contrast, a truly skilled manager would be able to perform well even during the recession, and therefore will stand out from the peers. Second, by investing differently from everybody else, the distinct funds can also avoid the price impact induced by the common liquidation of similar funds[7].

To gauge the deviation from the passive benchmark index, we use the Active Share measure proposed by Cremers and Petajisto(2008)[8]. The measure looks at how the equity holdings of a mutual fund differ from stock composition of the index to which the mutual fund benchmarks itself. Using US mutual fund data from 1990 to 2003, the paper

[6] See Basak (1995), Grossman and Zhou (1996), Tepla (2001) and Basak, Shapiro and Tepla (2006) for portfolio strategies that fix the minimal benchmark-linked return, which leads to mutual funds return not deviating from bench mark by too much.
[7] Coval and Stafford (2007), Sun(2008)
[8] We thank the authors for making their measure available on their website. The Active Share data is only available until year 2006, so we extrapolate the measure for 2007 and 2008 by using the last observation available in 2006. This inevitably leaves out all the funds that start after 2006. To study whether it induces any bias to our results, we also exclude observations for 2007 and 2008. The results are qualitatively similar.

finds a substantial cross-sectional variation in the active share index. Moreover, they find that more active funds perform better after adjusting for risk and fund characteristics. One key advantage of the measure is that rather than using one universal index for all funds, the authors match each mutual fund to one of the nineteen indexes that is the most similar to the holdings of the fund, and compare the holdings of the fund to its matched index.

$$\text{Active Share} = \frac{1}{2}\sum_{i=1}^{N} | w_{fund,i} - w_{index,i} | \tag{4}$$

where $w_{fund,i}$ and $w_{index,i}$ are the portfolio weights of stock i in the fund and in the index, and the sum is taken over the universe of all stocks.

To quantify the deviation of a fund from its peer group, we use the Strategy Distinctiveness Index (SDI) measure proposed by Sun, Wang and Zheng (2009) based on fund returns. Specifically, they examine the sample correlation of individual hedge fund returns with the average returns of peer funds in the same style category, and use (1-correlation) to measure the extent to which a fund's returns differ from those of its peers. The higher the SDI, the more distinctive is the fund's investment strategy.

$$SDI = 1 - corr(r_{fund}, r_{peers}) \tag{5}$$

where r_{peers} is the average return of all funds belonging to the same style as the fund.

To identify groups of funds that use similar strategies, we follow Brown and Goetzmann(1997, 2003) to classify funds by clustering historic returns. At the beginning of each quarter, for funds with more than 12 monthly returns over the preceding 24-

month period, we group them into K clusters, i.e. K styles, based on the correlation of fund returns. The goal of the procedure is to find a locally optimized partition among funds so that it minimizes the sum of the distance of all funds to the corresponding clusters. We use classify funds into six to nine clusters, and the results are qualitatively similar. We report the results for SDI using eight cluster styles, which is the same number of clusters picked by Brown and Goetzmann (1997).

Table 1 presents summary statistics of the data during the whole sample period as well as the contraction and expansion sub-period. As can been expected, funds on average earn a higher net-of-fee return during the expansion period than during the recession period. In terms of fund characteristics, we see similar fund age, size and expenses for funds that exist during the contraction and expansion periods. However active mutual funds exhibit higher turnover during the down market. The higher turnover may be either due to funds actively trading stocks, or trading for liquidity needs.

[Table 1]

We also report the summary statistics of the two activeness measures in Table 1. We see a large cross-sectional variation of both measures. On average, funds' portfolios deviate from their benchmark index by 78 percent, with a standard deviation of 16 percent. Although all of the funds included in the sample claim themselves to be active, there are some funds with an Active Share measure lower than 1 percent, which means they hold almost identical positions to the passive index funds. The SDI measure averages 6 percent, with a standard deviation of similar magnitude. Sun, Wang and

Zheng (2009) compute the SDI for hedge funds, and find an average of 31 percent. Thus, mutual funds are more homogeneous than hedge funds. However, we see some funds with extremely large SDIs. The maximum value is as high as 151 percent.

The two activeness measures capture different but related dimensions of fund activeness. On the one hand, a fund can be very different from its benchmark index, but very similar to its peers if all its peers happen to deviate from the index in a similar way. The commonality in deviation may be due to a correlated signal received by a group of funds. On the other hand, a fund can have a high loading on the benchmark index and therefore be similar to the index, but be different from its peers if its peers deviate from the index in a different fashion. The fund who trade differently from its peers may be driven either by over-confidence or private information not shared by its peers.

In Table 2, we study how Active Share and SDI index are related. For each quarter, we independently sort all funds into quintile portfolios along the dimension of Active Share and SDI. We can count the number of funds for different combinations of the two measures. We see a strong positive association between the two measures when either of the measures takes an extreme value. The combinations with the largest number of funds is low Active Share/low SDI quintile (114 funds) and high Active Share/high SDI quintile (100 funds), and the combinations with fewest number of funds are high Active Share/low SDI (5 funds) and low Active Share/high SDI (9 funds). On the other hand, the two measures are not perfectly correlated. When one of the measures is at an

intermediate level at quintile 3, the other measure can take a value anywhere from lowest to the highest quintile.

When other measures of activeness are considered, we find that both Active Share and SDI are positively correlated with trade size, measured as the absolute change of weight for each trade within 6 months. This is consistent with the notion that high Active Share and SDI funds are more informative and are likely to trade by large quantities based on the information. However, we don't see a relation with the number of stocks traded for each Active Share or SDI. The average percentage of stocks traded out of the total number of stocks held is flat for both measures, which suggests that the two activeness proxies we use do not simply measures how frequent a fund trades. Rather it focuses on how a fund's portfolio deviates from the benchmark or its peers, which may be due to its special information on certain stocks.

[Table 2]

4 Active versus passive mutual funds' performance over business cycle

Investors are always interested in knowing whether it is better invest in actively managed mutual funds, or to simply put their money into passive index funds. Therefore, we start our analysis by comparing the performance of active mutual funds and passive index funds.

The existing studies find that despite the general underperformance by active funds, investors still show favors to it by investing about 80 percent of the wealth into active funds[9]. One reason why investors may favor active funds is their flexibility in portfolio selection, which may be especially important during the down market. While index funds face the rigid requirement of holding on to a certain portfolio (eg. S&P 500 index) even when it suffers dramatic down turn, active funds can avoid further losses by cutting their positions in the losing stocks. Therefore, active funds are more likely to beat the passive index funds during the down market. In this section, we compare the performance of the active funds and passive index funds over the business cycle.

To determine the state of the economy, we the definition provided by NBER. NBER specifies the month in which the economy reach to a peak or trough point. Based on these turning points, a month is attributed as a contracting month if it is after a peak point and before a trough point. Conversely, a month is attributed as a expansion month if it is after a trough and before a peak. A quarter is considered as an economy contraction quarter if all three months during the quarter are contracting months, and economy expansion quarter otherwise. Throughout the paper, we use "Down-market" and "Up-market" as equivalent terms to "contraction period" and "expansion period".

We compare the performance of active funds with index funds. We look at the performance of index funds rather than the actual market index to account for the fees charged by the index funds. However, an investor has a wide spectrum of index funds to choose from. Morning star lists over 100 index funds. Elton and Gruber et. al (2002)

[9] ICI Investment Companies Fact Book 2008

finds little difference in tracking errors among various S&P index funds, but index funds do deliver different returns due to differences in expense ratios. They find that larger index funds tend to be managed better and charge lower fees. Therefore, we follow Elton and Gruber et. al(2002) to choose the Vanguard 500 Index Fund (VFINX) as the representative for the passive index funds, because of its large size and low management fees.

We first compare the performance of Vanguard Index Fund with all active mutual funds. As can be seen in Table 3, the average quarterly net-fee returns for all active funds is not significantly different from the index fund, during either up or down market. Returns for both active and passive funds decrease significantly as the economy migrates from expansion to contraction, and the magnitude of performance drop is similar for both types of funds. The results are disappointing for mutual investors who want to use a random active fund to hedge against the market downturn. The results also does not justify why investors show strong favor to active funds.

To address the puzzle, we consider the cross-sectional difference among active funds. The existing literature documented a large cross-sectional variation in fund activeness even within the active funds group, and find that more active funds deliver better performance and exhibit better stock selection abilities. So can the subset of most active funds deliver better performance during the down market, even though the whole universe of the active funds do not outperform the index funds,?

To gauge the relative performance of funds with different degrees of activeness, at the beginning of each quarter, we sort all active funds into decile/quintile/halves portfolios according to their lagged Active Share and SDI measures. We then take the most active portfolio (ie. decile ten, quintile five, second half), and compute the equally weighted average buy-and-hold performance for the subsequent quarter. We then compare the portfolio's return with Vanguard index fund's return during the contraction and the expansion period. As can be seen in Table 3, although most active funds still do not outperform the passive fund during the expansion period, they significantly outperform the index fund during the contraction period. For example, the decile ten portfolio sorted by the Active Share measure beats Vanguard Index Fund by 3.1 percent during the down market, and slightly underperform the index by .09 percent during the up market. The difference in differences is 3.18 percent which is both economical and statistical significant. Similarly, the decile ten portfolio sorted according to SDI delivers an additional return of 2.26 percent during the down market, and the difference in differences between the down and the up market is 2.73 percent. Therefore, it is more attractive to invest in the most active mutual funds than index funds as they provide a better hedge against the down market.

[Table 3]

To further examine active funds' ability in hedging against the business cycle, we directly link fund performance to macro variables. Although NBER's determination of the business cycle is also based on a combination of macro variables, it only provides a dichotomy of the economy. Also, the peak and trough points are determined based on

exposed information, which may not be very helpful for investors from a portfolio selection point of view. Therefore, we look at how fund performance varies with the fluctuations of actual macro variables. In particular, we consider the Industrial Production as a proxy for systematic production risk. Chen, Roll and Ross(1986) show that innovations in industrial production is a risk that is rewarded in the individual stocks. In Table 4, we regress the difference in monthly returns between active and index funds on the quarterly growth rate of industrial production.

$$R_{a,t} - R_{i,t} = \alpha + \Delta IP_{t-3,t} + \text{Carhart four factors} \quad (6)$$

Where $R_{a,t}$ and $R_{i,t}$ are net-of-fee returns at month t for active funds and the Vanguard Index Fund, respectively. $\Delta IP_{t-3,t}$ is the growth rate of Industrial Production from month t-3 to month t.

When comparing the performance between active and passive funds, we not only treat all active funds as one group, but also consider the various active portfolios obtained as in Table 3. The regression coefficient on the innovation of Industrial Production is negative across all specifications, suggesting that active funds deliver better performance than index funds when the industrial production is lower. For the sample period from 1990-2008, the coefficient is negative but insignificant if all active funds are included in the analysis. However, when the most active mutual funds are considered, the coefficient becomes highly statistical significant, with a T-statistics of 2.92. On average, if the growth rate of Industrial Production decreases by 1 percent, the most active portfolio outperform the index funds by 12.7 basis points more per month, after control for Carhart(1997) four-factor model.

[Table 4]

5 Fund activeness and down-market performance

The previous section points to the value of targeting at the most active funds rather than an average fund to identify hedging benefits, in this section, we formally test whether there is a cross-sectional variation in the cyclicality of fund performance.

5.1 Portfolio Sorting

To gauge the relative performance of funds with different degrees of activeness over business cycles, we sort all mutual funds into 10 portfolios according to their Active Share or SDI at the beginning of each quarter. For each decile portfolio, we compute the equally weighted average return during the quarter. We then calculate the average performance for each decile portfolio over the expanding and the contracting quarters, respectively.

We consider various performance measures for each decile portfolio including the returns after expenses, Sharpe ratios, Carhart four-factor alphas computed based on holdings beta as in equation (1), and Carhart four-factor alphas computed based on the standard regression beta. Table 5 summarizes the time-series average of these performance measures for each decile portfolio during the contraction and expansion quarters, the difference in performance between the high and low Active Share/SDI portfolios during the contraction and expansion quarters, as well as the difference in differences between the contraction and expansion quarters.

[Table 5]

We find a positive association between return counter-cyclicality and fund activeness. During the contracting quarters, the net-of-fee returns increase almost monotonically with the past quarter Active Share and SDI measures. Funds in the lowest Active Share decile earn a quarterly return of -3.35 percent during the down market, versus a quarterly return of 0.42 percent earned by funds in the highest Active Share decile. The performance difference between the top and bottom decile is 3.77 percent per quarter, with a t-statistics of 2.62. In contrast to the outperformance by active funds in the down market, we do not find a significant difference in performance across portfolios in the up market. The difference between the highest and lowest Active Share decile is statistically insignificant at 0.09 percent per quarter. Finally, the difference of the two differences between top and bottom deciles is 3.68 percent, which is both economically large and statistically significant. Using SDI as a proxy for fund activeness yields similar results. High SDI decile beats low SDI decile by 2.49 percent during the contracting quarters, but it slightly underperform low SDI decile by 0.21 percent during the expansion quarters. The difference in differences is 2.70 percent, with a t-statistics of 3.66.

To ensure that the difference in performance is not due to risks that vary over the business cycles, we consider risk adjusted performance. The difference in abnormal return based on holdings beta between the low and high Active Share decile is 1.10 percent and -0.01 percent in the down and up market, respectively. And the difference in

differences is 1.12 percent, with a T-statistics of 1.98. The corresponding difference in differences for SDI decile portfolios is 1.52 percent, with a T-statistics of 2.85. When standard regression beta is used to calculate the abnormal return, the high Active Share decile beats the lown Active Share decile by 0.97 percent per quarter more in the down market than in the up market, and the high SDI decile outperform the low SDI decile by 0.90 percent more in the down market than in the up market.

To ensure that our portfolio sorting results are not specific to the Carhart four-factor model and the beta estimation methods, we also consider Sharpe ratio that is based on the quarterly net-of-fee returns in excess of risk free rate[10]. The equally weighted portfolio Sharpe ratio increases monotonically from the lowest Active Share/SDI decile to the highest one when the economy is contracting, but Sharpe ratio either slightly decreases or remains flat with Active Share/SDI decile in the up market. In particular, the high Active Share portfolio outperforms the low one by 0.44 percent in the contraction quarters, yet it underperforms by 0.14 percent in the expansion quarters. Similarly, the high SDI portfolio beats the low SDI portfolio by 0.32 percent in the contraction quarters, but only by 0.01 percent in the expansion quarters. The differences in spreads between the down quarters and up quarters ranges from 0.29 percent to 0.58 percent, and are significant at the 1 percent level.

Overall, the results suggest that active mutual funds perform better when the economy is slowing down, which provide a good hedge against the down market when investors need the money most.

[10] Results based on the raw Sharpe ratios yield similar findings, and are available upon request.

5.2 Multivariate Predictive Regression Analysis

In this section, we further extend our analysis using a multivariate regression approach. First, the decile portfolio analysis does not control for mutual fund characteristics that may affect fund performance differently in the up and down market. For example, funds with higher Active Share or SDI may also hold more cash as a buffer for the potentially more volatile strategy. Funds with high cash holdings will outperform the market when the market return is low, which often overlaps with the economy contraction period. Thus, our previous findings that more active funds perform better in the down market may be driven by the difference in cash holdings in their portfolios. A multivariate regression framework can control for these factors. Second, the portfolio approach aggregates mutual funds of a similar level of activeness into one group. In the multivariate regression, we take advantage of the rich panel of individual mutual funds. Third, in additional to the dichotomy of the contraction and expansion periods, we interact fund activeness with macro variables in the regression to provide a more direct test of the hedging hypothesis.

To investigate whether more active funds yields better performance during the contraction period, after controlling for other fund-specific characteristics, we estimate the following:

$$AbnormalPerformance_{i,t} = c + Active_{i,t-1} + Active_{i,t-1} \times Down_t + Control_{i,t-1} + e_{i,t} \qquad (7)$$

where abnormal performance are the risk-adjusted fund performance during month t. Active are proxies of fund activeness measured at the beginning of the calendar quarter. Down takes a value of 1 if the economy is contracting in month t according to NBER definition, and 0 otherwise.

We use the lagged control variables to mitigate potential endogeneity problems. The control variables consist of expense ratio, turnover, log(age), log(assets), new money growth, log(family assets), and percentages of stock/cash/bond holdings. We lagged all control variables by one quarter, except for expenses and turnover, which are lagged by one year due to data availability. We do not include the Down dummy by itself since time fixed-effect is included to control for the time series variation in the average performance. The standard errors are clustered at the time and fund level. Table 6 reports the regression results.

[Table 6]

Column one shows the regression results using Sharpe ratio and Column two and three report the results for Cahart alphas based on holdings beta and regression beta, respectively. We find that funds with higher levels of Active Share outperform those with lower levels throughout the entire sample period, which is consistent with the original findings in Cremers and Petajisto(2007). However, the outperformance by active funds is much higher during the down market than the up market. For the holdings beta adjusted alphas, the estimated coefficient for Active Share itself is 0.16, but the coefficient for the interaction term of the Active Share and Down market dummy is 0.56, with a T-statistics

of 7.98. This implies that a one standard deviation increase in the Active Share Index predicts an increase in the abnormal returns of 11.2 basis points (=15.57×(0.56+0.16)=11.2) in the subsequent month, when the economy is contracting, which is 8.7 basis points higher than the effect when the economy if expanding . Using SDI as a proxy yields a slightly stronger results on the interaction term. The coefficient for SDI itself is negative and insignificant for Sharpe ratio and holdings beta adjusted alpha, suggesting that high SDI funds do not outperform low SDI funds during the up market. However the interaction term of SDI with the Down market dummy is positive and highly statistically significant. An increase in the SDI Index by 6 percent(corresponding to one standard deviation of the SDI Index) increases the monthly abnormal return of a mutual fund by 19.5 basis points((=6×(3.48+(-0.23))=19.5) during the down market, while a similar increase of SDI in the up market will lead to a slight decrease in abnormal performance of 1 basis point.

We are interested in not only how fund performance vary with the direction of the economy, but also whether the performance is related to the magnitude of economy growth. Thus we also conduct panel regression analysis by interacting proxies of fund activeness with the quarterly growth rate of Industrial Production. We estimate the following model:

$$AbnormalPerformance_{i,t} = c + Active_{i,t-1} + Active_{i,t-1} \times \Delta IP_{t-3,t} + Control_{i,t-1} + e_{i,t} \qquad (8)$$

where $\Delta IP_{t-3,t}$ is the change of Industrial Production from month t-3 to month t, divided by the level of Industrial Production in month t-3. Table 7 reports the results.

We find that active funds' performance is not only related to the sign but also magnitude of economy growth. The interaction term of Active Share and the innovation of Industrial Production is negative and significant, while the Active Share variable itself is positive and significant. This suggests that funds with a high level of Active Share earns better returns unconditionally, but its outperformance decreases as the growth rate of industrial production increases. We see a similar but weaker results using SDI as a proxy for fund activeness. The interaction term is negative throughout the specifications, but only marginally significant.

[Table 7]

6 Sources of down-market outperformance by active mutual funds

Active mutual funds' outperformance can be driven by various aspects of skills. Understanding which aspect of skills contributes more to the down market outperformance may help to identify reasons why they outperform. In this section, we study two main aspects of manager skills: stock selection ability and market timing ability.

6.1 Stock selection ability

To measure the stock selection ability, we construct the Characteristic Selection (CS) measure introduced by DGTW(1997), and the Industry-adjusted stock Selection (IS) measure following Kacperczyk, Sialm and Zheng(2005). The CS measure adjusts for a funds' performance for characteristic selection and timing, and the IS measure adjusts for industry returns.

The CS measure of a fund is computed using the returns of stocks held by the fund, adjusted by the returns of each stock's benchmark portfolio that is matched to the stock along the dimensions of size, book-to-market ratio, and momentum.

$$CS_t = \sum_j w_{j,t-1}[R_{j,t} - BR_t(j,t-1)] \tag{9}$$

where $R_{j,t}$ is the return on stock j during period t; $BR_t(j,t-k)$ is the return on a benchmark portfolio during period t to which stock j was allocated during period t-k according to its size, value and momentum characteristics; and $w_{j,t-k}$ is the relative weight of stock j at the end of period t-k in the mutual fund.

The IS measure is computed using returns of the 48 industries:

$$IS_t = \sum_j w_{j,t-1}[R_{j,t} - IR_t(j,t-1)] \tag{10}$$

where $IR_t(j,t-k)$ is the return on an industry portfolio during period t, to which stock j was allocated during period t-k. The variables R and w are the same as defined previously.

Table 8 summarizes the results for how funds' stock selection ability relates to fund activeness in different stages of the economy. Consistent with the literature, we find evidence that both Active Share and SDI are positively and significantly associated with funds' stock selection ability unconditionally. Moreover, we find that active funds' superior stock selection ability pays off much higher during the down market than a normal time. For example, a one standard deviation increase in Active Share during the down market increases the CS measure by 11 basis points per month ((0.13+0.54)×17.07), much higher than the 2 basis point increase in the up market. (0.13×15.19). Similarly,

when a fund's SDI index increases by 6.95 percent (one standard deviation of SDI during the NBER contraction period), funds CS measure increases by 12 basis points ((0.45+1.29)×6.95), four times higher than the 3 basis points increase in the up market(0.45×5.81).

The additional pay off for active funds' stock selection ability during the down market sheds some lights on potential sources of active funds performance. As CS and IS focuses on firm specific returns rather than market wide factor returns or industry returns, it suggests it pays off higher for digging out firm specific information during the down market. This is consistent with the notion that firms tend to be more informational opaque during the recession, as managers like to disclose good news sooner than bad news. Therefore, the payoff for digging out firm specific information is higher during the down market.

[Table 8]

6.2 Timing ability

Another potential source of outperformance during the down market is market timing skills. We use three measures for a fund's timing ability. First, we construct the Characteristic Timing (CT) measure following DGTW(1997) to capture a fund's style timing skill. Second, we calculate the Industry Timing (IT) measure following Kacperczyk, Sialm and Zheng(2005), to measure a manager's ability to select superior

industries. Third, we develop a Market Timing (MT) measure to gauge a fund's ability in timing the stock market returns[11].

The CT measures examines whether fund managers can generate additional performance by exploiting time-varying expected returns of the size, book-to-market, or momentum benchmark portfolios:

$$CT_t = \sum_j [w_{j,t-1} BR_t(j,t-1) - w_{j,t-5} BR_t(j,t-5)] \tag{11}$$

where the variables BR and w are the same as defined previously.

The IT measure examines whether managers tilt the portfolio weights to an industry if the payoff of the industry increases, and it is calculated as:

$$IT_t = \sum_j [w_{j,t-1} IR_t(j,t-1) - w_{j,t-5} IR_t(j,t-5)] \tag{12}$$

Finally, the MT variable measures whether a fund manager increases/decreases the portfolio beta when future stock market return is high/low.

$$MT_t = \sum_j (w_{j,t-1} \hat{\beta}_{j,t-1} - w_{j,t-5} \hat{\beta}_{j,t-5}) MR_t \tag{13}$$

[11] The three timing skill measures considered here only consider funds' stock holdings. This is likely underestimating the timing skills if funds use asset allocations to time the macro factors. Having a more complete understanding of the market timing skills requires high frequency asset composition data, which is not available for our analysis.

where MR_t is CRSP value weighted return (VWRET) for period t, and $\hat{\beta}_{j,t}$ is stock j's beta loading on market factor in period t, estimated as equation (2).

Table 9 summarizes the results for the three timing skills. First, we find mixed results of whether more active funds are able to time market wide factors better than less active funds. Active Share is negatively related to CT and MT measures during the normal time, but positively associated with IT. The worse CT and MT skills by active funds appear puzzling, but may be due to how Active Share measures fund activeness. The measure looks at how a fund's stock holdings deviate from the index holdings, so it implicitly emphasizes more on firm specific news. Conversely, a fund with good market timing skill may choose to load more on market-wide factors, and hence it appears less deviated from the index. Moreover, we see that the mean of Active Share index decreases from the up market to the down market, which is consistent with the finding by Kacperczyk, van Nieuwerburgh, and Veldkamp(2009) that mutual funds on average pay more attention to market wide factors during the down market. The SDI index is subject to the same issue but to a less degree as we do not directly compare SDI with the indexes. In Panel B, we see that SDI is actually positively related to CT and insignificantly related to IT and MT during normal time.

When managers' timing skills in the down market is considered, we do not find more active funds better able to time market-wide factors than less active ones. In general, we find a negative association between fund activeness and timing ability during the down market, except the MT measure for Active Share. Moreover, active funds timing

ability gets even worse during the down market. Overall, the evidence suggests that market timing skills is not the main driving force for the down market outperformance by active funds.

[Table 9]

7 Fund before-fee performance and management fees

In the previous sections, we find that the superior stock selection ability earns additional payoffs for active funds during the economic recession, and the counter-cyclical performance provides a good hedge for mutual fund investors against the down market. In this section, we study whether investors value such a hedging advantage by paying high fees to more active mutual funds.

First, to net out the effect of fees on performance and further establish the evidence of active funds' counter-cyclical performance, we add back to the returns the expenses. We use funds' holdings betas to adjust for the systematic risk[12]. We then conduct portfolio sorting analysis as in Section 4.1. Column 1 of Table 10 summarizes the results. We find a very similar pattern as the portfolio sorting analysis based on returns before expenses. The Carhart alphas increase almost monotonically from the lowest Active Share/SDI decile to the highest decile when in the economic contraction. In

[12] We also consider the beta based on rolling regression of fund returns on factors, and the results are similar.

contrast, the there is not significant performance variation across different deciles when in the economic expansion. The difference in differences between the top and bottom decile and between the contraction and expansion period is 1.13 percent per quarter, sorted by Active Share, both economical and statistical significant. The corresponding difference in differences for portfolio sorted by SDI is 1.5 percent per quarter. The results further confirm the advantage of active funds to hedge the down side risk.

Finally, we study whether investors value active funds' hedging capabilities by paying high fees to them. Column 4-6 of Table 10 report the average quarterly expense ratios for each decile portfolio sorted by Active Share and SDI. We separately compute the average expenses for contraction and expansion quarters, to allow fees charged by funds to vary with business cycles.

We find that more active funds charge significantly higher fees than less active funds. On average, high Active Share/SDI decile portfolio over charge the low decile one by 12 to 14 basis points during the contraction quarter, which is economically large, considering the magnitude of 32 basis points in fees for an average fund. In contrast to the large cross-sectional variation, we find only small time-series variation. Most of the decile portfolios' fees are stale over time. Moreover, despite the flat structure in performance over different decile portfolios in the expansion quarter, investors are still willing to pay significantly higher fees to active funds. The average additional fees paid to the high decile portfolio than the low decile one is 11 to 18 basis points. The staleness in management fees may reflect the stronger bargaining power of fund managers, as

suggested by Berk and Green (2004). It may also be due to the difficulty in forecasting economic conditions, so investors are willing to pay high premiums during a normal time for active funds' ability to hedge against economic downturns.

[Table 10]

8 Conclusion

The simultaneous existence of active funds' underperformance and their fast growth consistent an important major puzzle in the mutual fund literature. In this paper, we examine a potential explanation to the puzzle: whether active mutual funds earn better performance during the down market, which provide a hedge for mutual fund investors against economic recessions.

When testing the hypothesis, we exploit a large panel of mutual fund data, and combine the time-series and cross-sectional analysis. Our main empirical methodology involves a difference- in-differences approach: first differentiating among fund by their activeness, then considering the change of the difference over business cycles.

We find that most active funds outperform least active funds by 4.5 to 6.1 percent per year in the down market, after adjusting for fees and risks. But they do not outperform during the up market. An interaction of fund activeness and Industrial Production finds similar results. Funds with higher degree of activeness have stronger counter-cyclical performance.

Also, a study of the sources of the down market performance suggests that more active funds show better stock picking ability but no superior timing ability during the down market.

Finally, we find that fund managers charge fees that are stale over time, and investors pay significantly higher fees to more active funds during both up and down market.

Overall, our results suggest that active management adds value by providing higher returns during the down market, the time when investors' marginal utility for money is higher. To obtain such a hedging ability, investors are willing to pay higher fees, which render a slight underperformance by active funds during a normal time.

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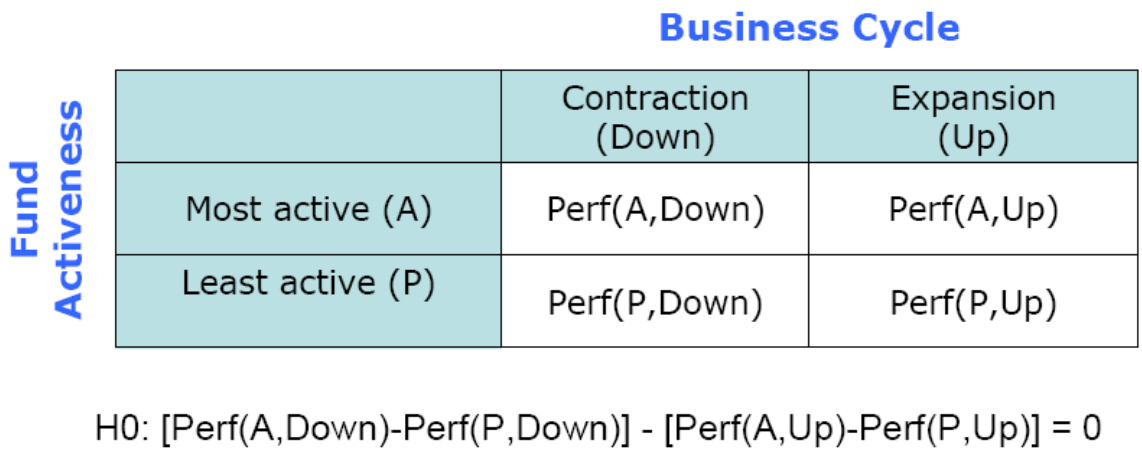
Figure 1: Difference-in-Differences Approach



H0: [Perf(A,Down)-Perf(P,Down)] - [Perf(A,Up)-Perf(P,Up)] = 0

Table 1: Summary Statistics

Panel A of Table 1 presents the summary statistics of the main variables, for the full sample, and for NBER contraction and expansion sub-samples. Variables considered are number of unique funds, number of months, number of stocks held by a fund, total assets under management, fund family size, fund age in the unit of years, annual expense ratio, annual turnover ratio, quarterly new money growth, Active Share measure, the Strategy Distinctiveness Index (SDI) and quarterly net of fee returns. The sample period spans from April 1980 to September, 2008. The NBER contraction period is defined as the period from peak month to the immediate following trough month, and the expansion period is defined as from trough month to the next peak month. We exclude all the balance, bond, index, sector and international funds, and focus our analysis on actively managed diversified US equity funds. In addition, we include funds with multiple share classes only once. We also eliminate all observations where fewer than 11 stock holdings could be identified and observations before the reported starting dates of the funds. Finally, we exclude all fund observations where the size of the fund in the previous quarter does not exceed $1 million. Panel B reports the pair-wise correlation between these variables. Active Share is defined the same as Cremers and Petajisto(2008) - the percentage of a fund's portfolio holdings that differ from the fund's benchmark index. The SDI is measured as 1-correlation of a funds' return from the average return of its peer group, where the peer group is obtained using the clustering procedure.

Panel A: Fund characteristics

	Whole Sample					NBER contraction period					NBER expansion period				
	Mean	Median	Min	Max	Std.Dev	Mean	Median	Min	Max	Std.Dev	Mean	Median	Min	Max	Std.Dev
Total number of funds	2856					2367					2824				
Number of months	342					57					285				
Number of stocks held by fund	164	91	11	13107	328	172	90	11	9474	342	162	91	11	13107	326
TNA (in millions)	1068	158	1	669595	5190	1334	183	1	197110	5583	1015	154	1	669595	5107
Family size (in millions)	18116	2172	1	671349	57605	23438	2528	1	644131	71070	17076	2129	1	671349	54528
Age (years)	13.49	8.50	0.00	92.92	13.80	13.70	8.75	0.00	78.83	13.41	13.45	8.42	0.00	92.92	13.88
Expenses (%)	1.31	1.23	0.01	28.00	0.60	1.30	1.23	0.02	11.53	0.55	1.32	1.24	0.01	28.00	0.61
Turnover (%)	92.33	66.00	0.04	4262.60	121.00	99.34	71.00	0.20	3390.00	126.62	90.92	65.00	0.04	4262.60	119.78
New money growth (%)	3.51	-0.33	-100.00	100.00	18.49	4.44	-0.59	-100.00	100.00	21.43	3.33	-0.27	-100.00	100.00	17.85
Active Share (%)	78.43	81.47	0.05	100.00	15.57	75.83	78.72	0.32	99.90	17.07	78.96	82.00	0.05	100.00	15.19
SDI (%)	6.06	4.44	0.00	150.95	6.02	6.66	4.80	0.19	150.95	6.95	5.94	4.37	0.00	147.35	5.81
Quarterly return (%)	2.45	2.73	-61.93	223.92	10.03	-2.32	-2.16	-61.93	128.18	12.73	3.39	3.21	-54.12	223.92	9.12

(*continued*)

Table 1 - *continued*

Panel B: Sample correlation

Variables	TNA	Family size	Age	Expenses	Turnover	New money growth	Active Share	SDI
TNA	1.00							
Family size	0.39	1.00						
Age	0.19	0.07	1.00					
Expenses	-0.11	-0.13	-0.16	1.00				
Turnover	-0.05	0.01	-0.09	0.20	1.00			
New money growth	-0.02	0.01	-0.15	0.02	0.02	1.00		
Active Share	-0.13	-0.14	-0.12	0.24	0.09	0.05	1.00	
SDI	-0.06	-0.07	-0.07	0.26	0.13	0.05	0.36	1.00

Table 2: Fund Activeness and Trading

In Table 2, for each quarter, all funds are independently sorted into quintile portfolios along the dimension of Active Share and SDI. Panel A reports time-series average of the number of funds for different combinations of Active Share and SDI quintiles. Panel B computes the average annual turnover ratio for all funds in each cell. Panel C reports the average trade size, which is defined as the absolute change of portfolio weight on a single stock within 6 months. Panel D calculates the percentage of stocks traded by a fund for every 6 months.

Panel A: Number of mutual funds

	SDI quintile					
Active Share quintile	1 (low)	2	3	4	5 (high)	All
1 (low)	114	51	29	15	9	218
2	49	62	52	36	20	218
3	28	47	53	52	38	218
4	23	42	49	54	51	218
5 (high)	5	17	36	61	100	218
All	218	218	218	218	218	1091

Panel B: Turnover ratio (%)

	SDI quintile					
Active Share quintile	1 (low)	2	3	4	5 (high)	All
1 (low)	67.80	73.98	78.48	79.82	100.85	72.72
2	70.65	77.64	86.13	90.49	100.71	81.56
3	81.98	82.24	84.33	89.68	110.24	87.91
4	90.48	96.26	99.18	94.89	118.24	101.35
5 (high)	103.37	93.19	86.93	88.08	93.87	91.86
All	73.27	82.11	87.69	89.47	102.74	87.08

Panel C: Trade size (%)

	SDI quintile					
Active Share quintile	1 (low)	2	3	4	5 (high)	All
1 (low)	0.35	0.48	0.54	0.58	0.55	0.43
2	0.49	0.62	0.75	0.78	0.95	0.67
3	0.49	0.66	0.75	0.87	1.09	0.78
4	0.47	0.60	0.73	0.82	1.11	0.79
5 (high)	0.74	0.71	0.79	0.89	1.23	1.02
All	0.43	0.60	0.72	0.83	1.12	0.74

Panel D: Percentage of stocks traded (%)

	SDI quintile					
Active Share quintile	1 (low)	2	3	4	5 (high)	All
1 (low)	80.65	80.05	80.43	79.15	82.16	80.40
2	79.10	80.44	82.11	80.94	79.75	80.51
3	81.38	81.57	80.36	78.73	77.61	79.79
4	84.96	84.64	83.15	79.04	80.09	81.93
5 (high)	87.76	84.06	82.97	81.07	79.58	81.06
All	81.01	81.66	81.73	79.91	79.33	80.73

Table 3: Portfolio Performance for Active and Passive Funds Over Business Cycle

The table presents reports the time series means and t-statistics of the post formation quarterly net fee returns for Vanguard 500 Index Fund (VFINX) and active funds over the NBER contraction and expansion periods. The active funds sample selection procedure is described in table 1. The performance measures are based on the equally weighted buy-and-hold portfolios sorted every quarter according to the beginning quarter ActiveShare or SDI. The table includes the differences in the performance between the top deciles/quintile/halves portfolios and the index fund, and the difference in differences between the contraction and expansion period. The t-statistics reported below is in italics. *** 1 percent significance, ** 5 percent significance, * 10 percent significance.

	Sorted on ActiveShare (1990-2008)			Sorted on SDI (1980-2008)		
	Contraction	Expansion	Difference	Contraction	Expansion	Difference
Vanguard Index	-2.67	3.36 ***	-6.03 **	-1.27	3.63 ***	-4.91 **
	-0.97	*3.87*	*-2.55*	*-0.55*	*4.81*	*-2.31*
All funds	-2.05	3.32 **	-5.37 **	-0.57	3.31 ***	-3.87 *
	-0.61	*3.40*	*-1.98*	*-0.22*	*3.98*	*-1.66*
10th decile	0.42	3.28 ***	-2.85	0.98	3.12 ***	-2.14
	0.11	*2.81*	*-0.89*	*0.46*	*4.04*	*-1.01*
5th quintile	-0.03	3.49 ***	-3.52	0.67	3.17 ***	-2.50
	-0.01	*3.01*	*-1.10*	*0.30*	*3.92*	*-1.12*
2nd half	-1.19	3.47 ***	-4.66	0.17	3.26 ***	-3.09
	-0.33	*3.20*	*-1.56*	*0.07*	*3.92*	*-1.34*
All funds - index	0.62	-0.04	0.66	0.71	-0.29	1.00
	0.81	*-0.13*	*0.78*	*0.52*	*0.23*	*0.62*
10th decile - index	3.10 **	-0.09	3.18 *	2.26 ***	-0.48	2.73 ***
	2.11	*-0.14*	*1.94*	*2.86*	*-1.62*	*3.39*
5th quintile - index	2.64 *	0.12	2.52	1.95 ***	-0.43	2.37 ***
	1.91	*0.20*	*1.61*	*2.84*	*-1.52*	*3.13*
2nd half-index	1.48	0.10	1.38	1.44 **	-0.34	1.78 **
	1.34	*0.20*	*1.08*	*2.50*	*-1.28*	*2.51*

Table 4: Performance Difference Between Active and Passive Funds Against Macro Factors

In this table, we regress difference in returns (bpts. per month) between active funds and index funds on growth rate of industrial production (percent) over the previous quarter. We divide the sample into deciles/quintiles/halves based on the lagged Active Share and SDI. We then take the most active portfolio, and compute the equally weighted monthly returns. The returns are expressed in basis point, and the portfolio is rebalanced quarterly. The dependent variable is the difference between the most active portfolio return and Vanguard 500 Index Fund return. The growth rate of industrial production is measured from month t-3 to month t. The t-statistics reported below is in italics. *** 1 percent significance, ** 5 percent significance, * 10 percent significance.

	Active Share (1990 - 2008)				SDI (1980 - 2008)			
	All funds	Decile 10	Quintile 5	Second half	All funds	Decile 10	Quintile 5	Second half
Intercept	-11.20 *	-3.44	-2.82	-9.16	-7.91 *	-8.24	-8.90 *	-7.64
	-1.94	*-0.36*	*-0.30*	*-1.12*	*-1.82*	*-1.54*	*-1.75*	*-1.61*
ΔIndustrial Production (%)	-2.88	-12.67 ***	-10.21 **	-6.10	-4.12 **	-4.39 *	-4.30 *	-5.25 **
	-1.09	*-2.92*	*-2.35*	*-1.62*	*-2.15*	*-1.86*	*-1.92*	*-2.51*
Mkt-rf	0.03 *	0.03	0.05 **	0.06 ***	-0.02 **	-0.15 ***	-0.09 ***	-0.05 ***
	1.81	*1.03*	*2.17*	*2.62*	*-2.31*	*-11.00*	*-7.32*	*-3.99*
SMB	0.38 ***	0.77 ***	0.73 ***	0.59 ***	0.38 ***	0.49 ***	0.49 ***	0.45 ***
	23.69	*29.60*	*27.96*	*26.12*	*28.55*	*29.98*	*31.20*	*30.63*
HML	0.03 *	0.25 ***	0.17 ***	0.09 ***	-0.01	0.09 ***	0.08 ***	0.04 **
	1.70	*7.77*	*5.42*	*3.32*	*-0.37*	*4.49*	*4.12*	*2.44*
UMD	0.05 ***	-0.02	0.02	0.06 ***	0.04 ***	0.07 ***	0.06 ***	0.05 ***
	4.61	*-1.03*	*1.21*	*3.62*	*4.05*	*6.23*	*5.37*	*4.56*
Obs.	220	220	220	220	340	340	340	340
Adj. R-squared	76.62%	80.60%	79.80%	79.00%	74.62%	76.63%	76.64%	75.92%

Table 5: Fund Activeness and Performance Over Business Cycle: Portfolio Approach

This table reports the time series means and t-statistics of the post-formation performance for the decile portfolios sorted on ActiveShare and SDI. The performance measures include returns after expenses, Sharpe ratios, Carhart four-factor alphas computed based on holdings beta, and Carhart four-factor alphas computed based on regression beta. The Sharpe ratio is computed as the quarterly net fee return in access to the risk free rate divided by $\sqrt{3}$ times standard deviations of monthly access returns, computed using the most recent twelve months data. The holdings beta is computed as $\beta_{,t}=\sum w_{i,t}\beta_{i,t}$, where $w_{i,t}$ is the portfolio weight for stock i held by the fund at time t, and $\beta_{i,t}$ is the Carhart four-factor beta estimated for stock i using weekly return data from month t-12 to t-1. The fund beta is computed based on linear regression of monthly after-expense fund returns in access of the risk free rate against the Carhart four factors, using data from month t-36 to month t-1. We divide the sample into deciles/quintiles/halves based on the lagged Active Share and SDI. We then compute the equally weighted average performance for each portfolio. The returns are expressed at a quarterly frequency and the portfolio is rebalanced quarterly. The table includes the differences in the performance between the top and the bottom deciles, the top and the bottom quintiles, and the top, the bottom halves of the active mutual funds, as well as the difference in differences between the contraction and expansion period. The t-statistics reported below is in italics. *** 1 percent significance, ** 5 percent significance, * 10 percent significance.

Panel A: Portfolio returns based on Active Share (1990-2008)												
	Quarterly Net-Fee Return			Sharpe Ratio			Carhart Alpha (holdings beta)			Carhart Alpha (regression beta)		
	Contraction	Expansion	Difference	Contraction	Expansion	Difference	Contraction	Expansion	Difference	Contraction	Expansion	Difference
All funds	-2.05	3.32 ***	-5.37 **	-0.22	0.52 ***	-0.73 **	-0.56	-0.19 *	-0.37	-0.09	-0.35 ***	0.26
	-0.61	*3.40*	*-1.98*	*-0.64*	*4.21*	*-2.23*	*-0.73*	*-1.74*	*-0.90*	*-0.16*	*-3.97*	*0.86*
Active Share Decile												
1 (low)	-3.35	3.19 ***	-6.53 ***	-0.42	0.58 ***	-1.00 ***	-0.96 *	-0.28 **	-0.68 *	-0.45	-0.32 ***	-0.13
	-1.14	*3.63*	*-2.70*	*-1.23*	*4.55*	*-2.95*	*-1.66*	*-2.46*	*-1.88*	*-1.47*	*-3.70*	*-0.53*
2	-3.01	3.12 ***	-6.14 **	-0.38	0.57 ***	-0.95 ***	-0.69	-0.30 ***	-0.39	-0.37	-0.33 ***	-0.05
	-1.01	*3.55*	*-2.52*	*-1.08*	*4.54*	*-2.84*	*-1.07*	*-2.83*	*-1.06*	*-1.03*	*-3.94*	*-0.20*
3	-2.91	3.19 ***	-6.11 **	-0.33	0.56 ***	-0.88 ***	-0.84	-0.22 *	-0.62	-0.33	-0.35 ***	0.03
	-0.88	*3.59*	*-2.42*	*-0.89*	*4.58*	*-2.66*	*-1.06*	*-1.82*	*-1.44*	*-0.75*	*-2.89*	*0.08*
4	-2.61	3.21 ***	-5.82 **	-0.31	0.54 ***	-0.84 **	-0.70	-0.23 **	-0.47	-0.28	-0.37 ***	0.09
	-0.85	*3.51*	*-2.30*	*-0.90*	*4.40*	*-2.56*	*-0.94*	*-2.08*	*-1.17*	*-0.52*	*-4.16*	*0.28*
5	-2.68	3.19 ***	-5.87 **	-0.26	0.53 ***	-0.79 **	-0.69	-0.16	-0.53	-0.26	-0.28 ***	0.03
	-0.83	*3.48*	*-2.29*	*-0.75*	*4.36*	*-2.43*	*-0.82*	*-1.44*	*-1.23*	*-0.38*	*-2.74*	*0.08*
6	-2.03	3.22 ***	-5.25 *	-0.20	0.49 ***	-0.69 **	-0.47	-0.15	-0.32	0.05	-0.36 ***	0.41
	-0.61	*3.33*	*-1.95*	*-0.60*	*4.10*	*-2.15*	*-0.52*	*-1.11*	*-0.66*	*0.06*	*-2.78*	*0.90*
7	-2.00	3.50 ***	-5.50 *	-0.15	0.49 ***	-0.64 *	-0.49	-0.12	-0.37	-0.08	-0.32 **	0.23
	-0.57	*3.36*	*-1.91*	*-0.46*	*3.96*	*-1.96*	*-0.45*	*-0.69*	*-0.61*	*-0.11*	*-2.48*	*0.53*
8	-1.87	3.63 ***	-5.50 *	-0.10	0.48 ***	-0.57 *	-0.70	-0.09	-0.61	0.00	-0.37 **	0.37
	-0.51	*3.23*	*-1.78*	*-0.29*	*3.79*	*-1.70*	*-0.66*	*-0.43*	*-0.92*	*0.00*	*-2.57*	*0.74*
9	-0.48	3.70 ***	-4.18	-0.05	0.48 ***	-0.52	-0.15	-0.06	-0.09	0.51	-0.33 **	0.84 *
	-0.12	*3.18*	*-1.30*	*-0.14*	*3.67*	*-1.52*	*-0.15*	*-0.31*	*-0.14*	*0.63*	*-2.18*	*1.72*
10 (high)	0.42	3.28 ***	-2.85	0.02	0.44 ***	-0.42	0.15	-0.29 *	0.44	0.35	-0.49 ***	0.84 *
	0.11	*2.81*	*-0.89*	*0.05*	*3.38*	*-1.21*	*0.20*	*-1.87*	*0.92*	*0.52*	*-3.22*	*1.85*
10th decile- 1st decile	3.77 ***	0.09	3.68 **	0.44 ***	-0.14 **	0.58 ***	1.10	-0.01	1.12 **	0.80	-0.17	0.97 **
	2.62	*0.15*	*2.34*	*3.22*	*-2.04*	*3.25*	*1.33*	*-0.07*	*1.98*	*1.10*	*-1.09*	*2.04*
5th quintile - 1st quintile	3.15 **	0.33	2.82 **	0.38 ***	-0.12 *	0.50 ***	0.84	0.12	0.72	0.85	-0.08	0.94 **
	2.54	*0.61*	*2.01*	*3.46*	*-1.89*	*3.19*	*1.22*	*0.62*	*1.33*	*1.25*	*-0.58*	*2.13*
2nd half -1st half	1.72 **	0.29	1.43	0.24 ***	-0.08 *	0.32 ***	0.45	0.10	0.35	0.50	-0.04	0.54 *
	2.32	*0.80*	*1.58*	*3.49*	*-1.96*	*3.15*	*0.93*	*0.68*	*0.88*	*1.02*	*-0.36*	*1.67*

(*continued*)

Table 5 – *continued*

Panel B: Portfolio returns based on SDI (1980-2008)												
	Quarterly Net-Fee Return			Sharpe Ratio			Carhart Alpha (holdings beta)			Carhart Alpha (regression beta)		
	Contraction	Expansion	Difference	Contraction	Expansion	Difference	Contraction	Expansion	Difference	Contraction	Expansion	Difference
All funds	-0.57	3.31 ***	-3.87 *	-0.03	0.50 ***	-0.53 *	-0.39	-0.09	-0.31	0.26	-0.28 ***	0.55 **
	-0.22	*3.98*	*-1.66*	*-0.11*	*4.68*	*-1.82*	*-0.74*	*-0.91*	*-0.97*	*0.61*	*-3.93*	*2.22*
SDI Decile												
1 (low)	-1.51	3.33 ***	-4.84 **	-0.14	0.51 ***	-0.65 **	-0.91	-0.14	-0.77 **	0.02	-0.26 ***	0.28
	-0.54	*4.06*	*-2.07*	*-0.48*	*4.76*	*-2.22*	*-1.32*	*-1.39*	*-2.08*	*0.05*	*-3.48*	*1.12*
2	-1.47	3.33 ***	-4.80 **	-0.12	0.51 ***	-0.62 **	-0.82	-0.11	-0.71 *	0.06	-0.25 **	0.31
	-0.52	*4.00*	*-2.02*	*-0.41*	*4.81*	*-2.14*	*-1.12*	*-1.09*	*-1.86*	*0.13*	*-2.50*	*1.00*
3	-1.53	3.40 ***	-4.93 **	-0.12	0.50 ***	-0.62 **	-0.94	-0.06	-0.88 **	-0.15	-0.23 ***	0.07
	-0.56	*4.02*	*-2.07*	*-0.44*	*4.74*	*-2.14*	*-1.43*	*-0.56*	*-2.40*	*-0.34*	*-2.67*	*0.26*
4	-1.13	3.38 ***	-4.51 *	-0.09	0.50 ***	-0.58 **	-0.75	-0.12	-0.63 *	0.22	-0.26 ***	0.49 *
	-0.41	*3.98*	*-1.88*	*-0.30*	*4.65*	*-1.98*	*-1.10*	*-1.11*	*-1.66*	*0.44*	*-3.11*	*1.67*
5	-0.87	3.32 ***	-4.19 *	-0.08	0.50 ***	-0.57 *	-0.62	-0.12	-0.50	0.19	-0.24 ***	0.43
	-0.31	*3.96*	*-1.75*	*-0.27*	*4.68*	*-1.95*	*-1.11*	*-1.06*	*-1.39*	*0.43*	*-2.76*	*1.55*
6	-0.38	3.36 ***	-3.74	-0.02	0.49 ***	-0.51 *	-0.42	-0.06	-0.37	0.25	-0.28 ***	0.53 *
	-0.14	*3.95*	*-1.56*	*-0.06*	*4.61*	*-1.73*	*-0.68*	*-0.49*	*-0.98*	*0.53*	*-2.81*	*1.70*
7	-0.17	3.24 ***	-3.41	0.00	0.48 ***	-0.48	-0.21	-0.10	-0.11	0.32	-0.33 ***	0.65 *
	-0.06	*3.80*	*-1.42*	*0.01*	*4.46*	*-1.62*	*-0.34*	*-0.88*	*-0.29*	*0.69*	*-2.85*	*1.89*
8	0.04	3.35 ***	-3.31	0.02	0.50 ***	-0.48	0.02	0.02	0.00	0.46	-0.27 ***	0.73 **
	0.02	*3.95*	*-1.42*	*0.07*	*4.56*	*-1.61*	*0.05*	*0.18*	*0.01*	*1.01*	*-2.92*	*2.48*
9	0.37	3.23 ***	-2.86	0.05	0.49 ***	-0.44	0.27	-0.05	0.32	0.52	-0.36 ***	0.88 ***
	0.15	*3.79*	*-1.22*	*0.16*	*4.53*	*-1.49*	*0.52*	*-0.38*	*0.86*	*0.95*	*-4.10*	*2.88*
10 (high)	0.98	3.12 ***	-2.14	0.18	0.52 ***	-0.36	0.65	-0.10	0.75 *	0.79 *	-0.39 ***	1.18 ***
	0.46	*4.04*	*-1.01*	*0.64*	*4.80*	*-1.21*	*1.45*	*-0.67*	*1.75*	*1.71*	*-3.53*	*3.58*
10th decile- 1st decile	2.49 **	-0.21	2.70 ***	0.32 ***	0.01	0.29 ***	1.56 **	0.04	1.52 ***	0.77 *	-0.13	0.90 **
	2.26	*-0.87*	*3.66*	*4.24*	*0.35*	*3.80*	*2.11*	*0.20*	*2.85*	*1.84*	*-0.97*	*2.46*
5th quintile - 1st quintile	2.16 **	-0.16	2.32 ***	0.24 ***	0.00	0.24 ***	1.32 **	0.05	1.27 ***	0.61	-0.11	0.73 ***
	2.18	*-0.84*	*3.83*	*3.55*	*-0.17*	*3.92*	*2.03*	*0.43*	*3.13*	*1.64*	*-1.23*	*2.65*
2nd half -1st half	1.47 **	-0.09	1.56 ***	0.16 ***	-0.01	0.16 ***	0.86 **	0.06	0.80 ***	0.40 *	-0.07	0.47 ***
	2.49	*-0.84*	*4.30*	*3.86*	*-0.52*	*4.41*	*2.26*	*0.78*	*3.40*	*1.92*	*-1.47*	*3.19*

Table 6: Fund Activeness and Performance Over Business Cycle: Panel Regression

This table reports the panel regression results for mutual fund performance on fund activeness*down market and other fund characteristics at the monthly frequency as the following: $abnormalperformance_{i,t} = c + Active_{i,t-1} + Active_{i,t-1} * Down_t + Control_{i,t-1} + e_{i,t}$, where Down takes a value of 1 if the economy is contracting during month t according to NBER, and 0 otherwise. Panel A reports the results using ActiveShare as a proxy for fund activeness, and Panel B reports the results using SDI as the proxy for fund activeness. The performance measures include Sharpe ratios, Carhart four-factor alphas computed based on holdings beta, and Carhart four-factor alphas computed based on regression beta. The Sharpe ratio is computed as the monthly net-of-fee return in access to the risk free rate divided by the standard deviations of monthly access returns, computed using the data from month t-12 to month t-1. The holdings beta is computed as $\beta_{,t}=\sum w_{i,t}\beta_{i,t}$, where $w_{i,t}$ is the portfolio weight for stock i held by the fund at time t, and $\beta_{i,t}$ is the Carhart four-factor beta estimated for stock i using weekly return data from month t-12 to t-1. The fund beta is computed based on linear regression of monthly after-expense fund returns in access of the risk free rate against the Carhart four factors, using data from month t-36 to month t-1. The control variables include expense ratio, turnover, log(age), new money growth, log(family assets), and percentages of stock/cash/bond in the portfolio. We lagged all control variables by one quarter, except for expenses and turnover, which are lagged by one year due to data availability. Time fixed effect is included in all regressions, and the standard errors are clustered at the time and fund level. The t-statistics reported below is in italics. *** 1 percent significance, ** 5 percent significance, * 10 percent significance.

Panel A: Active Share as proxy for fund activeness (1990.Q2 - 2008.Q3)			
	Sharpe Ratio (%)	Carhart Alpha (%, holdings beta)	Carhart Alpha (%, regression beta)
Intercept	-95.26 ***	-0.26	-0.04
	-22.10	*-1.20*	*-0.28*
Active Share	3.26 ***	0.16 ***	0.08 **
	3.21	*4.83*	*2.50*
Active Share*Down market	40.12 ***	0.56 ***	0.39 ***
	22.10	*7.98*	*5.43*
Expense ratio	-377.23 ***	-11.83 ***	-12.59 ***
	-9.32	*-6.23*	*-6.36*
Turnover	0.05 ***	-0.01	-0.04 ***
	0.27	*-0.92*	*-4.07*
Log(age)	0.20	0.00	-0.01
	1.00	*0.65*	*-1.56*
Log(assets)	-0.84 ***	-0.04 ***	-0.03 ***
	-7.22	*-8.61*	*-6.08*
New money growth	7.25 ***	0.21 ***	0.14 ***
	7.34	*5.17*	*3.06*
Log(family assets)	0.51 ***	0.02 ***	0.01 ***
	6.03	*5.96*	*4.66*
Common stock	-4.75 ***	-0.48 **	-0.10
	-1.33	*-2.54*	*-0.96*
Cash	-3.41	-0.23	0.03
	-0.74	*-1.07*	*0.21*
Bond	9.17	-0.26	0.32
	1.37	*-0.74*	*1.08*
Time fixed effect	Yes	Yes	Yes
N	200114	200007	182099

(*continued*)

Table 6 - *continued*

Panel B: SDI as proxy for fund activeness (1981.Q1-2008.Q3)			
	Sharpe Ratio (%)	Carhart Alpha (%, holdings beta)	Carhart Alpha (%, regression beta)
Intercept	-71.00 ***	0.11	0.22
	-24.25	*0.54*	*1.40*
SDI	-7.02	-0.23	0.38 ***
	-1.39	*-1.41*	*2.63*
SDI*Down market	106.98 ***	3.48 ***	0.86 **
	13.18	*7.76*	*1.99*
Expense ratio	-351.87 ***	-14.65 ***	-13.68 ***
	-10.18	*-6.13*	*-6.12*
Turnover	-0.16	-0.01	-0.03 ***
	-1.23	*-1.42*	*-4.05*
Log(age)	0.00	-0.01	-0.02 **
	0.02	*-0.68*	*-2.20*
Log(assets)	-0.77 ***	-0.04 ***	-0.03 ***
	-7.19	*-8.38*	*-5.74*
New money growth	7.09 ***	0.16 ***	0.15 ***
	7.86	*3.99*	*3.92*
Log(family assets)	0.49 ***	0.02 ***	0.01 ***
	6.28	*5.77*	*4.04*
Common stock	0.51	-0.41 **	-0.04
	0.23	*-2.47*	*-0.33*
Cash	12.08 **	0.01	0.16
	3.12	*0.03*	*0.92*
Bond	14.92 ***	0.05	0.41 **
	3.50	*0.21*	*2.12*
Time fixed effect	Yes	Yes	Yes
N	255325	254941	231538

Table 7: Fund Activeness and Performance Over Business Cycle: Macro Regression

This table reports the panel regression results for mutual fund performance on fund activeness interacting with change of industry production, and other fund characteristics at the monthly frequency: $abnormalperformance_{i,t} = c + Active_{i,t-1} + Active_{i,t-1} * \Delta IP_t + Control_{i,t-1} + e_{i,t}$, where ΔIP is the percentage change of industry production from month t-3 to t. Panel A reports the results using ActiveShare as a proxy for fund activeness, and Panel B reports the results using SDI as the proxy for fund activeness. The performance measures include Sharpe ratios, Carhart four-factor alphas computed based on holdings beta, and Carhart four-factor alphas computed based on regression beta. The Sharpe ratio is computed as the monthly net-of-fee return in access to the risk free rate divided by the standard deviations of monthly access returns, computed using the data from month t-12 to month t-1. The holdings beta is computed as $\beta_{,t}=\sum w_{i,t}\beta_{i,t}$, where $w_{i,t}$ is the portfolio weight for stock i held by the fund at time t, and $\beta_{i,t}$ is the Carhart four-factor beta estimated for stock i using weekly return data from month t-12 to t-1. The fund beta is computed based on linear regression of monthly after-expense fund returns in access of the risk free rate against the Carhart four factors, using data from month t-36 to month t-1. The control variables include expense ratio, turnover, log(age), new money growth, log(family assets), and percentages of stock/cash/bond in the portfolio. We lagged all control variables by one quarter, except for expenses and turnover, which are lagged by one year due to data availability. Time fixed effect is included in all regressions, and the standard errors are clustered at the time and fund level. The t-statistics reported below is in italics. *** 1 percent significance, ** 5 percent significance, * 10 percent significance.

Panel A: Active Share as proxy for fund activeness (1990.Q2 - 2008.Q3)			
	Sharpe Ratio (%)	Carhart Alpha (%, holdings beta)	Carhart Alpha (%, regression beta)
Intercept	-30.62 ***	0.17	0.13
	-7.04	*0.79*	*0.85*
Active Share	13.70 ***	0.32 ***	0.19 ***
	13.91	*8.35*	*4.80*
Active Share*ΔIndustrial production	-399.14 ***	-3.49 ***	-2.47 ***
	-22.40	*-7.27*	*-4.72*
Expense ratio	-384.32 ***	-11.76 ***	-12.72 ***
	-9.15	*-4.77*	*-5.36*
Turnover	0.15	0.00	-0.04 **
	0.75	*-0.29*	*-2.74*
Log(age)	0.28	0.01	-0.01
	1.38	*0.75*	*-1.39*
Log(assets)	-0.88 ***	-0.04 ***	-0.03 ***
	-7.39	*-7.55*	*-5.22*
New money growth	7.88 ***	0.23 ***	0.16 ***
	7.86	*5.52*	*3.52*
Log(family assets)	0.54 ***	0.02 ***	0.02 ***
	6.28	*5.38*	*3.91*
Common stock	-5.06	-0.51 ***	-0.11
	-1.40	*-2.71*	*-0.94*
Cash	-4.15	-0.26	0.02
	-0.89	*-1.17*	*0.15*
Bond	8.88	-0.28	0.31
	1.33	*-0.89*	*1.13*
Time fixed effect	Yes	Yes	Yes
N	198304	198197	180291

(*continued)*

Table 7 - *continued*

Panel B: SDI as proxy for fund activeness (1981.Q1-2008.Q3)			
	Sharpe Ratio (%)	Carhart Alpha (%, holdings beta)	Carhart Alpha (%, regression beta)
Intercept	-19.67 **	0.36 *	0.22
	-6.38	*1.79*	*1.38*
SDI	20.72 ***	0.69 ***	0.65 ***
	4.65	*3.39*	*4.13*
SDI*ΔIndustrial production	-274.90 *	-10.27 *	-5.94
	-1.84	*-1.73*	*-1.12*
Expense ratio	-369.33 ***	-14.94 ***	-13.74 ***
	-9.98	*-6.16*	*-6.11*
Turnover	-0.16	-0.01	-0.03 ***
	-1.15	*-1.29*	*-3.94*
Log(age)	0.05	0.00	-0.02 **
	0.28	*-0.53*	*-2.25*
Log(assets)	-0.79 ***	-0.04 ***	-0.02 ***
	-7.34	*-8.69*	*-5.56*
New money growth	7.48 ***	0.18 ***	0.17 ***
	7.97	*4.33*	*4.24*
Log(family assets)	0.54 ***	0.02 ***	0.01 ***
	6.75	*6.38*	*4.17*
Common stock	0.97	-0.40 **	-0.05
	0.42	*-2.47*	*-0.39*
Cash	12.13 ***	0.01	0.15
	3.08	*0.04*	*0.86*
Bond	14.66 ***	0.03	0.40 **
	3.42	*0.13*	*2.08*
Time fixed effect	Yes	Yes	Yes
N	253179	252795	229394

Table 8: Fund Activeness and Stock Selection Ability Over Business Cycle

This table reports the results of fund stock selection ability as a function of fund activeness and economy condition. The following panel regression is estimated at a monthly frequency: $Selection\ ability_{i,t} = c + Active_{i,t-1} + Active_{i,t-1} * Down_t + Control_{i,t-1} + e_{i,t}$ where the Down variable takes a value of 1 if the economy is contracting during month t according to NBER, and 0 otherwise. We consider funds' Characteristics-adjusted stock Selection (CS) ability as in DGTW(1997) and Industry-adjusted stock Selection (IS) ability as in Kacperczyk, Sialm and Zheng(2005). Panel A reports the results using ActiveShare as a proxy for fund activeness, and Panel B reports the results using SDI as the proxy for fund activeness. We lagged all control variables by one quarter, except for expenses and turnover, which are lagged by one year due to data availability. Time fixed effect is included in all regressions, and the standard errors are clustered at the time and fund level. The t-statistics reported below is in italics. *** 1 percent significance, ** 5 percent significance, * 10 percent significance.

Panel A: Active Share as proxy for fund activeness (1990.Q2 - 2008.Q3)		
	CS (%)	IS (%)
Intercept	-0.64 ***	-0.22
	-5.09	*-1.39*
Active Share	0.13 ***	0.72 ***
	4.00	*17.70*
Active Share*Down market	0.54 ***	0.08
	7.74	*0.99*
Expense ratio	-2.18	-4.37 **
	-1.41	*-2.22*
Turnover	0.03 ***	0.03 ***
	3.89	*3.06*
Log(age)	0.02 ***	0.02 ***
	3.02	*2.61*
Log(assets)	-0.01 ***	-0.02 ***
	-2.88	*-4.44*
New money growth	0.39 ***	0.36 ***
	9.70	*7.47*
Log(family assets)	0.01 **	0.01 ***
	2.46	*3.15*
Common stock	0.07	-0.06
	0.79	*-0.48*
Cash	0.01	-0.18
	0.04	*-1.10*
Bond	0.39 *	0.14
	1.77	*0.45*
Time fixed effect	Yes	Yes
N	200949	200949

(*continued)*

Table 8 - *continued*

Panel B: SDI as proxy for fund activeness (1981.Q1-2008.Q3)		
	CS (%)	IS (%)
Intercept	-0.16	0.31
	-1.02	*1.59*
SDI	0.45 **	1.04 ***
	2.25	*6.05*
SDI*Down market	1.29 **	1.46 *
	2.15	*1.68*
Expense ratio	-3.39 **	-4.81 **
	-2.21	*-2.18*
Turnover	0.01	0.01
	1.12	*0.93*
Log(age)	0.00	0.00
	0.59	*0.23*
Log(assets)	-0.01 ***	-0.02 ***
	-3.40	*-4.89*
New money growth	0.34 ***	0.32 ***
	8.63	*7.49*
Log(family assets)	0.01 ***	0.01 ***
	2.74	*3.26*
Common stock	0.13	-0.01
	1.06	*-0.06*
Cash	0.25 *	0.11
	1.82	*0.69*
Bond	0.31	0.07
	1.51	*0.27*
Time fixed effect	Yes	Yes
N	256107	256189

Table 9: Fund Activeness and Timing Ability Over Business Cycle

This table reports the results of fund stock selection ability as a function of fund activeness and economy condition. The following panel regression is estimated at a monthly frequency: $Timing\ ability_{i,t} = c + Active_{i,t-1} + Active_{i,t-1} * Down_t + Control_{i,t-1} + e_{i,t}$ where the Down variable takes a value of 1 if the economy is contracting during month t according to NBER, and 0 otherwise. We consider Characteristics Timing (CT) ability as in DGTW(1997), and Industry Timing (IS) ability as in Kacperczyk, Sialm and Zheng(2005), and Market Timing ability(MT) as defined by equation (13). Panel A reports the results using ActiveShare as a proxy for fund activeness, and Panel B reports the results using SDI as the proxy for fund activeness. The control variables include expense ratio, turnover, log(age), new money growth, log(family assets), and percentages of stock/cash/bond in the portfolio. We lagged all control variables by one quarter, except for expenses and turnover, which are lagged by one year due to data availability. Time fixed effect is included in all regressions, and the standard errors are clustered at the time and fund level. The t-statistics reported below is in italics. *** 1 percent significance, ** 5 percent significance, * 10 percent significance.

Panel A: Active Share as proxy for fund activeness (1990.Q2 - 2008.Q3)			
	CT (%)	IT (%)	MT (%)
Intercept	0.64 ***	-0.38 ***	-0.10
	7.66	*-7.40*	*-2.90*
Active Share	-0.16 ***	0.08 ***	-0.02 **
	-9.60	*7.97*	*-3.61*
Active Share*Down market	-0.56 ***	-0.16 ***	0.09 ***
	-10.48	*-4.46*	*5.59*
Expense ratio	-2.18 ***	-0.10	-0.14
	-3.05	*-0.24*	*-0.57*
Turnover	-0.01	0.02 ***	0.00 *
	-1.18	*6.12*	*1.08*
Log(age)	0.00	-0.01 ***	0.00 ***
	-0.08	*-2.76*	*-0.99*
Log(assets)	0.00	0.00 ***	0.00 ***
	0.31	*2.59*	*0.25*
New money growth	0.07 ***	0.00	-0.02
	3.29	*-0.34*	*-2.23*
Log(family assets)	0.00 **	0.00	0.00 ***
	-2.10	*-0.97*	*0.65*
Common stock	-0.07	0.02	0.03 **
	-1.33	*0.44*	*1.07*
Cash	-0.17 **	0.03	0.03
	-2.22	*0.55*	*0.98*
Bond	0.40 *	0.22 **	0.02
	1.96	*1.96*	*0.32*
Time fixed effect	Yes	Yes	Yes
N	199082	199088	200795

(*continued*)

Table 9 - *continued*

Panel B: SDI as proxy for fund activeness (1981.Q1-2008.Q3)			
	CT (%)	IT (%)	MT (%)
Intercept	0.05	-0.42	-0.02
	0.91	*-10.93*	*-0.77*
SDI	0.51 ***	0.00	-0.02 ***
	8.07	*0.02*	*-0.76*
SDI*Down market	-0.99 ***	-0.15	-0.29 ***
	-4.29	*-0.86*	*-5.34*
Expense ratio	-2.82 ***	0.24	0.00
	-4.07	*0.65*	*-0.01*
Turnover	0.00	0.01 ***	0.00 ***
	-1.04	*3.16*	*-0.18*
Log(age)	0.00	-0.01 ***	0.00 ***
	0.72	*-3.30*	*-0.14*
Log(assets)	0.00	0.00 ***	0.00 ***
	0.99	*2.92*	*-1.20*
New money growth	0.06 ***	0.00	-0.01 *
	3.50	*-0.25*	*-1.39*
Log(family assets)	0.00	0.00	0.00 **
	-1.25	*-0.87*	*0.95*
Common stock	-0.08 **	0.02	0.02 ***
	-2.12	*0.68*	*0.93*
Cash	-0.17 ***	0.05	0.01
	-3.15	*1.34*	*0.52*
Bond	0.22	0.01	-0.02 *
	1.59	*0.09*	*-0.42*
Time fixed effect	Yes	Yes	Yes
N	252760	252869	255882

Table 10: Before-Fee-Performance and Management Fees Over Business Cycle

This table reports the time series means and t-statistics of the post-formation risk adjusted abnormal returns before expenses for the decile portfolios sorted on ActiveShare and SDI. The holdings beta is used to adjust the systematic risk. We divide the sample into deciles/quintiles/halves based on the lagged Active Share and SDI. We then compute the equally weighted average performance for each portfolio. The returns are expressed at a quarterly frequency and the portfolio is rebalanced quarterly. The table includes the differences in performance between the top and the bottom deciles, the top and the bottom quintiles, and the top, the bottom halves of the active mutual funds, as well as the difference in differences between the contraction and expansion period. The t-statistics reported below is in italics. *** 1 percent significance, ** 5 percent significance, * 10 percent significance.

Panel A: Portfolio returns based on Active Share (1990-2008)						
	Carhart alpha before fee (% holdings beta)			Quarterly Expenses (%)		
	Contraction	Expansion	Difference	Contraction	Expansion	Difference
All funds	-0.24	0.12	-0.37	0.32 ***	0.32 ***	0.00
	-0.32	*1.14*	*-0.91*	*103.62*	*179.86*	*-0.29*
Decile 1	-0.70	-0.01	-0.68 *	0.27 ***	0.27 ***	0.00
	-1.21	*-0.13*	*-1.91*	*95.16*	*104.59*	*-0.19*
2	-0.42	-0.03	-0.39	0.28 ***	0.28 ***	0.00
	-0.65	*-0.26*	*-1.07*	*57.16*	*121.23*	*-0.17*
3	-0.56	0.07	-0.63	0.29 ***	0.29 ***	0.00
	-0.70	*0.56*	*-1.45*	*37.44*	*153.49*	*-0.67*
4	-0.40	0.08	-0.48	0.30 ***	0.31 ***	-0.01
	-0.54	*0.69*	*-1.20*	*46.67*	*149.25*	*-1.15*
5	-0.36	0.15	-0.51	0.32 ***	0.31 ***	0.00
	-0.43	*1.36*	*-1.19*	*85.46*	*148.68*	*0.59*
6	-0.16	0.17	-0.32	0.32 ***	0.32 ***	0.00
	-0.17	*1.26*	*-0.66*	*75.84*	*117.33*	*0.58*
7	-0.17	0.21	-0.38	0.32 ***	0.33 ***	-0.01
	-0.16	*1.18*	*-0.63*	*56.40*	*123.48*	*-1.41*
8	-0.37	0.25	-0.62	0.34 ***	0.34 ***	0.00
	-0.34	*1.20*	*-0.93*	*113.63*	*130.62*	*-0.43*
9	0.20	0.29	-0.09	0.35 ***	0.35 ***	-0.01 *
	0.20	*1.50*	*-0.15*	*92.49*	*263.99*	*-1.94*
10	0.53	0.08	0.45	0.39 ***	0.38 ***	0.01 *
	0.74	*0.51*	*0.95*	*65.52*	*150.78*	*1.82*
10th decile- 1st decile	1.23	0.09	1.13 **	0.12 ***	0.11 ***	0.01 *
	1.48	*0.50*	*2.02*	*19.54*	*41.98*	*1.93*
5th quintile - 1st quintile	0.94	0.21	0.73	0.10 ***	0.09 ***	0.00
	1.36	*1.08*	*1.34*	*25.02*	*48.36*	*0.71*
2nd half -1st half	0.50	0.15	0.35	0.06 ***	0.05 ***	0.00
	1.04	*1.04*	*0.87*	*21.05*	*74.52*	*0.57*

(*continued*)

Table 10 - *continued*

Panel B: Portfolio returns based on SDI (1980-2008)

	Carhart alpha before fee (% holdings beta)			Quarterly Expenses (%)		
	Contraction	Expansion	Difference	Contraction	Expansion	Difference
All funds	-0.10	0.21 **	-0.31	0.31 ***	0.32 ***	0.00
	-0.18	*2.26*	*-0.98*	*42.05*	*100.89*	*-0.50*
Decile 1	-0.66	0.11	-0.77 **	0.25 ***	0.25 ***	0.00
	-0.96	*1.05*	*-2.08*	*37.86*	*84.64*	*0.40*
2	-0.55	0.16	-0.71 *	0.27 ***	0.27 ***	0.00
	-0.76	*1.56*	*-1.87*	*32.90*	*79.83*	*0.16*
3	-0.66	0.22 **	-0.88 **	0.28 ***	0.28 ***	0.00
	-1.01	*2.11*	*-2.42*	*29.22*	*84.27*	*-0.38*
4	-0.46	0.16	-0.62	0.29 ***	0.29 ***	0.00
	-0.67	*1.52*	*-1.64*	*33.80*	*86.88*	*0.28*
5	-0.34	0.17	-0.51	0.30 ***	0.30 ***	0.00
	-0.60	*1.50*	*-1.40*	*36.33*	*83.63*	*-0.14*
6	-0.12	0.24 **	-0.36	0.31 ***	0.31 ***	0.00
	-0.19	*2.17*	*-0.98*	*35.47*	*86.18*	*-0.18*
7	0.10	0.21 *	-0.11	0.32 ***	0.32 ***	0.00
	0.16	*1.86*	*-0.30*	*55.86*	*86.42*	*-0.18*
8	0.35	0.34 ***	0.00	0.34 ***	0.34 ***	0.00
	0.77	*2.84*	*0.00*	*38.80*	*91.45*	*-0.28*
9	0.60	0.29 **	0.31	0.36 ***	0.35 ***	0.00
	1.16	*2.33*	*0.85*	*25.96*	*85.49*	*0.27*
10	1.00 **	0.27 *	0.73 *	0.39 ***	0.43 ***	-0.04 ***
	2.25	*1.72*	*1.70*	*41.30*	*76.00*	*-2.74*
10th decile- 1st decile	1.66 **	0.16	1.50 ***	0.14 ***	0.18 ***	-0.04 ***
	2.25	*0.90*	*2.79*	*14.13*	*33.19*	*-3.08*
5th quintile - 1st quintile	1.40 **	0.15	1.26 ***	0.11 ***	0.13 ***	-0.02
	2.17	*1.18*	*3.10*	*11.12*	*33.92*	*-1.99*
2nd half -1st half	0.91 **	0.11	0.80 ***	0.06 ***	0.07 ***	-0.01
	2.39	*1.49*	*3.38*	*10.21*	*31.86*	*-1.46*