

# **Sector Fund Performance**

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## **ABSTRACT**

Sector funds have grown into a nearly quarter-trillion dollar industry. This paper analyzes the performance of 607 actively managed stock sector funds listed on the CRSP Survivor-Bias Free US Mutual Fund Database during 1990-2000. We use a five-factor model and a portfolio regression technique to control for the look-ahead bias in performance measurement. We document three main results. First, sector funds as a group neither outperform nor underperform their benchmarks. Second, there is no evidence of persistence in sector fund performance. Third, sector fund investors as a group do not possess the ability to pick the winning sector funds or the winning sectors of the stock market.

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## Sector Fund Performance

Sector funds are an important segment of the mutual fund industry. The Investment Company Institute Fact Book reports that stock sector funds had total net assets (TNA) of \$235 billion at the end of 2000. This represents 5.9 percent of all stock fund assets on this date. By some other criteria, sector funds may be an even bigger business for the mutual fund industry. They charge higher expenses and loads than diversified stock funds, and thus generate a higher percentage of the mutual fund revenues. The Fact Book also reports that they attracted \$62 billion of new cash flow during 2000, which represents 20.1 percent of all stock fund new cash flow during the year.

Despite the obvious importance of a quarter-trillion dollar industry, there is little evidence on the performance of sector fund managers or sector fund investors in the academic finance literature. Most mutual fund studies focus on diversified stock funds and specifically exclude sector funds along with bond funds and international funds. These studies typically find either that the diversified stock funds underperform the benchmarks after paying for the fund expenses and transaction costs, or that they outperform by just enough to pay for the fund expenses and transaction costs.<sup>1</sup>

To our knowledge, there is no comprehensive study of stock sector funds. However, there are a few studies of other types of specialized funds. Elton, Gruber, and Rentzler (1987) analyze commodity funds, Cumby and Glen (1990) analyze international funds, and Elton, Gruber, and Blake (1993) analyze bond funds. All three studies find that the specialized funds underperform their benchmarks. Kallberg, Liu, and Trzcinka (2000) provide the only evidence of superior performance in specialized funds. They analyze mutual funds that invest in real estate investment trusts (REITs), and find that these funds

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<sup>1</sup> In a seminal paper, Jensen (1968) examined the performance of mutual funds by using a one-factor model that regresses the excess fund returns on the excess market returns. He found that the performance as measured by the intercept term (Jensen's alpha) is significantly negative. More recently, Gruber (1996) uses a four-factor model that includes excess returns on the market, size, book-to-market, and bond portfolios. He finds that actively managed mutual funds earn negative alphas that are about the same order as expenses charged by index funds. Carhart (1997) uses a four-factor model that includes excess returns on the market, size, book-to-market, and momentum portfolios. He examines ten decile portfolios based on lagged one-year returns, and finds that their alphas are significantly negative. Grinblatt and Titman (1989 and 1993) and Wermers (2000) follow a different approach that analyzes the stock holdings of mutual funds instead of their net returns. They generally conclude that the stock holdings outperform the benchmarks by about enough to pay for the fund expenses and transaction costs.

outperform their benchmarks by an average of two percent a year after paying for the fund expenses and transaction costs. Their evidence is interesting, because real estate funds are stock funds, and perhaps the only kind of stock funds for which superior returns of this magnitude have been documented.

Proponents of sector funds advance many arguments in favor of sector funds. First, some sectors are characterized by a greater degree of information asymmetry between insiders and outsiders. Superior skill, if it exists, should be more valuable for picking stocks in such sectors. Kallberg, Liu, and Trzcinka argue that the cost of information is higher for evaluating REITs than for typical stocks, which gives the real estate fund managers a greater advantage over small investors. The information asymmetry argument may be even more valid for technology funds. In recent years, the technology sector has been dominated by companies whose stock price depends on the uncertain future potential of new technologies. It is possible that managers of technology funds are in a better position to evaluate such potential compared to small investors. Second, it is possible that there are gains to specializing in one sector of the stock market instead of the entire stock market. Most analysts focus on one industry, which presumably gives them a greater ability to value stocks in that industry. It is possible that fund managers can similarly benefit from focusing on one sector containing one or a few industries. Third, it is sometimes argued that money is smart. This can mean that investors are smart at picking the winning sector funds, or that they are smart at sector timing (i.e., picking the right sector at the right time). The smart money effect finds support in recent papers by Gruber (1996) and Zheng (1999), who document that diversified stock funds that realize positive cash flow outperform the funds that realize negative cash flow. It also finds support in Wermers (2000), who documents that the managers of diversified stock funds have market timing ability. Belief in the smart money effect may also explain why many sector funds, such as those offered by Fidelity Investments, are bought and sold at prices determined every hour rather than once at the end of the day. All these reasons point to the need for a comprehensive study of sector funds.

In this paper we analyze the performance of stock sector funds during an eleven-year period, from 1990 to 2000, by using the CRSP Survivor-Bias Free US Mutual Fund Database. Our investigation begins in 1990, because this is when many sector indexes become available, and because some required data on sector funds are not available before 1990. We identify 607 sector funds that existed at some time during

the study period. Most sector funds belong to one of the seven large sectors of the economy, which we define as energy, financials, health care, precious metals, real estate, technology, and utilities. However, a few funds are tied to smaller sectors of the economy, such as air transportation, leisure, and retailing. We include these in one miscellaneous category. We report the summary statistics for this category, but our return analysis is focused on the other seven categories for which we can find data on sector indexes.

On average, sector funds charge annual expenses of 1.30 percent, higher than 0.96 percent charged by diversified stock funds. The difference in expenses cannot be explained by the differences in fund size or turnover. Sector funds also charge higher loads in the form of rear-end fees. It is not obvious that the higher loads and expenses of sector funds arise from higher operating costs. So we examine whether these are justified by their strong performance.

We measure performance by using variations of Carhart (1997) methodology, which controls for the survivorship and look-ahead biases. Each month we calculate returns on a TNA-weighted portfolio of all sector funds within each category. These portfolio returns are then analyzed by using the growth of a dollar value, Sharpe ratio, and a factor model. In four cases out of seven, the growth of a dollar invested in the sector fund portfolio over the entire study period exceeds the growth of a dollar invested in the sector index. Surprisingly, the poorest growth of a dollar value occurs in the case of technology funds. A dollar invested in the technology fund portfolio on April 1, 1990, would have grown to \$5.826 by December 31, 2000. That is a great return in absolute terms, but in relative terms the same dollar invested in the S&P 500 Technology Index would have grown to \$7.591. One may argue that the technology funds also hold cash, bonds, and non-technology stocks, which ex-post reduced their returns during this period. However, we note that the Sharpe ratio calculated by using monthly returns equals 0.168 for the technology fund portfolio, which is still less than 0.202 for the index. In fact, the Sharpe ratios of sector fund portfolios are also higher than the Sharpe ratios of sector indexes in four cases (although not the same four cases as with the first measure).

Growth of a dollar value and Sharpe ratio are popular measures of fund performance in the mutual fund industry. However, the academic finance literature relies heavily on Jensen's alpha, or the intercept term in a factor model. We report our results based on a five-factor model that regresses the

excess returns on the sector fund portfolio against the excess returns on the market, size, book-to-market, momentum, and sector index portfolios. In three cases the five-factor alpha is positive, and in four cases it is negative. The highest t-statistic is less than one. Once again, the evidence on fund performance is split in the middle. As a robustness check, we show that forming equally-weighted portfolios of sector funds or using conditional alphas suggested by Ferson and Schadt (1996) makes no difference to the results.

The above tests show that as a group the sector fund managers earn fair returns. However, these tests leave open the possibility that a subset of managers persistently outperform the benchmarks, while another subset of managers persistently underperform the benchmarks. Persistence in fund performance is an important and sometimes contentious issue in the mutual fund literature. In the case of diversified stock funds, Hendricks, Patel, and Zeckhauser (1993) show that funds appearing in the top octile of all funds during the last year outperform funds appearing in the bottom octile by as much as six to eight percent over the next year. However, Carhart (1997) shows that the difference in returns becomes insignificant after the inclusion of momentum as a factor in stock returns. In our sample of sector funds, we find no evidence of persistence with five-factor alphas. The variation in a sector fund's performance over time that is not explained by changes in factor returns is explained by chance rather than the stock picking skills of the fund manager.

We next examine whether sector fund investors have fund picking or sector timing abilities. Each quarter we form two portfolios within each sector fund category. The first portfolio includes all funds that realize positive net cash flow during the last quarter, and the second portfolio includes all funds that realize negative net cash flow. Unlike Zheng (1999), we find that the difference between alphas of these two portfolios is insignificant. This evidence shows that sector fund investors cannot pick the winning funds within a sector fund category. To test whether they can pick the winning sectors, we regress the quarterly sector index return net of the riskfree return or the market return on lagged values of quarterly net cash flow for all funds in that sector. None of the lagged cash flow values are significant.

The combined evidence of this paper shows that sector funds neither outperform nor underperform the relevant benchmarks, that there is no persistence in sector fund returns, and that sector fund investors have no ability to pick the winning funds or the winning sectors. Our evidence is consistent

with market efficiency. However, we would also like to caution that sector funds are relatively new and our test period may be considered to be short for measuring fund performance.

So what explains the popularity of actively managed sector funds? Apart from providing account maintenance and tax computation service, they allow investors to pick a portfolio of several stocks within a sector of the stock market at a short notice and with limited capital. Regardless of the merits of sector investing, there are many investors who value this service. We note that during the period of our study there were few alternatives to sector funds. Sector index funds were scarce then and are scarce now. However, in recent years some alternatives have emerged in the form of exchange traded funds (ETFs) on sector indexes. For example, the American Stock Exchange lists the Select Sector SPDR Funds.<sup>2</sup> The SPDR Funds are designed to track the S&P 500 sector indexes that we use as benchmarks and charge annual expenses of 0.28 percent. Assuming that the return on a SPDR equals the index return minus expenses, we compare the growth of a dollar in sector funds with hypothetical SPDR Funds during the period of our study. The results are marginally improved in favor of sector funds, but remain neutral on performance. Sector funds continue to be fair but not index or ETF beating investments.

The paper proceeds as follows. Section I describes the data and methods. Section II presents the tests of fund performance and persistence, and Section III presents the tests of investor abilities. Section IV presents miscellaneous results, and Section V presents robustness checks. Section VI concludes.

## I. Data and methods

### *A. Sample description*

Our primary data source is the CRSP survivor bias-free mutual fund database.<sup>3,4</sup> The initial sample consists of all equity sector funds that existed at any time during 1990–1999. We identify sector

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<sup>2</sup> SPDR is the acronym for Standard & Poor's Depository Receipts.

<sup>3</sup> See Carhart (1995, 1997) for details of the database construction.

<sup>4</sup> Elton, Gruber, and Blake (2000) point out that the CRSP database is well constructed, but has a slight upward bias in net returns during months when a fund declared multiple distributions. To illustrate this bias, they cite the Windsor II fund, which declared a dividend of \$0.24 per share and a capital gains of \$0.86 per share on December 14, 1994. The fund had NAV (net asset value) of \$13.71 as of November end, \$12.59 as of December end, and \$12.53 as of distribution date. CRSP calculates the net return as  $(12.59/13.71) \times (1 + 0.24/12.53) \times (1 + 0.86/12.53)$ , or 0.000133, whereas the correct return should be  $(12.59/13.71) \times (1 + 1.10/12.53)$ , or -0.001075. We applied the needed correction to remove this bias.

funds using the ICDI fund objective code, the Strategic Insight fund objective code, the Weisenberger Fund Type code, and a policy variable provided by CRSP. Besides general diversified stock funds, we exclude sector index funds, international funds, bond funds, and money market funds. This results in a sample of 607 stock sector funds. We classify all sector funds into eight categories: energy, financials, health care, precious metals, real estate, technology, utilities, and a miscellaneous category (acronyms EN, FN, HL, PM, RE, TC, UT, and MS). We confirm the accuracy of our classification by examining each fund's investment objective and description from internet sources. The miscellaneous category includes sector funds that are hard to classify and for which performance benchmarks are not available. For this reason, we restrict our detailed analysis to the first seven categories of sector funds.

Our initial sample period, from 1990 to 1999, is characterized by a generally strong performance of the U.S. stock market. To include a period of relative market distress, we supplement our data by adding monthly returns and TNA values for 2000 from the Morningstar Principia Pro mutual fund database. We can find 2000 data for 455 funds out of a total of 500 sector funds in existence on the CRSP database at the end of 1999.<sup>5</sup> The final dataset spans an eleven year period, from 1990 to 2000.

Table I describes the sample. Panel A shows that the number of sector funds increased from 143 in 1990 to 530 in 1999, representing 8.1 and 10.3 percent of all stock funds (which includes both sector and non-sector funds). The aggregate TNA of sector funds increased from \$16 billion to \$158 billion during the same period, representing 5.1 and 5.7 percent of the TNA of all stock funds.<sup>6</sup> Although not directly shown, it can be inferred that the average TNA for a sector fund fluctuates between one-half and two-thirds of the average TNA for all stock funds.

Panel B of Table I shows the distribution of sector funds by category. Real estate funds are the most numerous, at 122, followed by technology funds, at 114. However, measured by TNA at the end of 1999, technology funds are dominant, accounting for \$72.4 billion, or 45.9 percent of all sector fund assets. Next in size are the utilities funds, at \$24.6 billion, and health care funds, at \$23.4 billion. At the

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<sup>5</sup> The 45 funds for which we do not have year 2000 data, continue to be represented in our sample for the period 1990-1999, thereby minimizing any concerns about survivorship bias.

<sup>6</sup> TNA information is missing for 7 percent of sector funds and 13 percent of stock funds, so the actual fund assets may be higher than reported here.

other end of the spectrum, precious metals funds have only \$1.9 billion in assets, even though there are 66 funds in this category. Since our sample includes many cases of two or more funds that differ mainly in their marketing to different types of investors (e.g., institutional shares vs. advisor shares), we further identify a sub-sample of 371 unique funds. This sub-sample includes the oldest of each group of two or more clone funds, or the biggest in case two or more clone funds start in the same year.

Panel C of Table I shows the largest fund within each category. The largest sector fund across all categories is the Vanguard Specialized – Health Care fund. It had \$10.6 billion in assets as of December 1999, which represents 45.5 percent of all assets in the health care sector. The largest funds in other sectors manage between 11.2 and 27.8 percent of total assets in that sector.

Table II shows the summary statistics. Panel A compares the statistics for all sector funds as a group with all stock funds as a group, and Panel B compares the statistics across sectors. For each data item, we first calculate the TNA-weighted average across all funds each year from 1990 to 1999, and then report a simple time-series average of the cross-sectional averages.

Panel A of Table II shows that the stock holdings of sector funds and all stock funds are quite similar at 87.1 and 86.0 percent. The annual turnover is exactly the same at 74.1 percent for both groups. However, the loads and expenses are another matter. On average, sector funds charge 1.9 percent in front-end loads and 1.1 percent in other load. Front-end load represents the maximum percentage expense incurred at the time of purchase of fund shares, and other load usually represents the maximum percentage expense incurred at the time of sale. The total load at 3.0 percent for sector funds is greater than 2.4 percent for all stock funds. One may argue that the difference is not a big problem as loads are one-time charges and other load is often waived for investors who hold the fund shares for a sufficiently long period of time. However, we note that the difference in expense ratio, defined as the percentage of total investment that investors pay in fund operating expenses every year, is also quite large. The expense ratio equals 1.30 percent for sector funds and 0.96 percent for all stock funds. The difference in expense ratios is not explained by the difference in fund turnover and fund size. A cross-sectional regression that includes log transforms of both these variables shows that the sector dummy continues to be significantly positive. Such analysis shows that sector funds charged an additional 0.38 percent in 1990 and 0.14

percent in 1999. The reasons behind the additional charge are not obvious. It is not clear that running a sector fund is more expensive than running a diversified stock fund. Our subsequent analysis explores whether the higher expense ratios can be justified by the superior performance of sector funds.

Panel B of Table II reports summary statistics for the different categories of sector funds. The average stock holding ranges from 83.5 percent for utilities funds to 92.2 percent for energy funds. Utilities funds have the lowest annual turnover of 40.7 percent, while technology funds have the highest turnover of 132.8 percent. The expense ratios vary between 1.04 percent for energy funds and 1.63 percent for miscellaneous funds.

### *B. Performance evaluation model*

We examine sector fund performance by using a five-factor model. This includes the four broad-market factors employed by Carhart (1997) and a fifth factor that captures the return on a passive sector index as follows:

$$r_{p,t} = \alpha_p^5 + \beta_{1,p} RMRF_t + \beta_{2,p} SMB_t + \beta_{3,p} HML_t + \beta_{4,p} UMD_t + \beta_{5,p} INDRET_t + e_{p,t} \quad (1)$$

Here,  $r_{p,t}$  is the monthly return on a portfolio of sector funds in excess of the one month T-bill return; RMRF is the excess return on a value-weighted market portfolio; and SMB, HML, and UMD are returns on factor-mimicking portfolios for the size, book-to-market, and one-year momentum in stock returns.<sup>7</sup> The use of RMRF, SMB, and HML factors is inspired by Fama-French's (1993) 3-factor model. The use of momentum factor is inspired by Carhart (1997), who shows that it makes a large difference to the analysis of mutual fund performance. The role of momentum factor in stock returns was first documented by Jegadeesh and Titman (1993). Since then, it has been shown to be robust across time periods by Jegadeesh and Titman (2000), and across countries by Asness, Liew, and Stevens (1996). We later show that the momentum factor accounts for a substantial portion of the variation in sector fund returns.

The fifth factor, INDRET, equals the excess return on a passive sector index. The choice of sector indexes is described in the following section. A passive sector index represents a natural benchmark for sector fund performance. Since sector funds make concentrated bets within industry segments, broad-

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<sup>7</sup> We wish to thank Ken French for making available the data on RMRF, SMB, HML, and UMD.

market factors alone are not sufficient to explain the performance of sector funds. In this sense, our five-factor model can be interpreted as a performance attribution model.

We evaluate the performance of sector fund portfolios based on their five-factor alpha,  $\alpha_p^5$ , estimated by using equation (1). The five-factor alpha represents a multi-factor generalization of the well-known Jensen's alpha. As shown in equation (1), we conduct inference using a portfolio regression approach. In contrast to the fund regression approach, the portfolio regression approach is devoid of any look-ahead bias.<sup>8</sup> Each month we form TNA-weighted portfolios of all live funds within a sector, regardless of their history, and compute the portfolio returns. The TNA values used in this approach are as of the end of month t-1. As a robustness check we also examine the performance of equally-weighted sector fund portfolios. Whereas the TNA-weighted approach includes all 607 unique and clone funds, the equally-weighted approach uses only the 371 unique funds.

We use many other performance evaluation criteria in addition to the five-factor model shown in equation (1). We use a one-factor model that contains only INDRET, growth of a dollar invested in a portfolio, and the Sharpe ratio. We also use a conditional performance evaluation version of equation (1), which is based on Ferson and Schadt (1996). These techniques are described along with the results.

### *C. Sector index description*

The choice of sector indexes is guided by two considerations. First, we desire value-weighted indexes that are relatively passive and require minimum rebalancing. Second, we desire broad-based indexes that account for a large part of the investment in the corresponding sectors. With this in mind, we use the S&P 500 sector indexes for energy, financials, health care, technology, and utilities. The S&P 500 sector indexes represent value-weighted portfolios of the S&P 500 stocks that belong to each of these sectors. Both the S&P 500 index and the S&P 500 sector indexes are popular benchmarks and viable investment portfolios. The S&P 500 index funds have existed for a long time, and recently it has become possible to invest in the S&P 500 sector indexes by purchasing the sector SPDR funds.

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<sup>8</sup> A fund regression approach requires the estimation of fund specific alphas. Since a minimum return history is needed for estimation (say, 36 months), funds with fewer observations have to be dropped from the sample. This forces the researcher to look ahead over the length of the sample period to screen out funds with short life spans.

Unfortunately, there are no S&P 500 sector indexes for the precious metals and the real estate sectors. For the precious metals sector, we use the Philadelphia Exchanges's Gold/Silver index (XAU). This is a value-weighted index of nine stocks in the precious metals sector. For the real estate sector, we use the Wilshire Real Estate Securities index (WRES). This is a value-weighted index of real estate investment trusts and real estate operating companies. Kallberg, Liu, and Trzcinka (2000) argue that WRES is the preferred benchmark for the real estate sector as it is broad-based and includes relatively liquid securities. We obtain the data on S&P 500 sector indexes from Bridge Telerate Inc., the XAU index from the Philadelphia Exchange, and the WRES index from the Wilshire Associates.

Table III describes the sector indexes. Panel A reports the starting date and the ending date for each index and the correlation between the index and a portfolio of the corresponding sector funds. Monthly returns on the sector indexes for financials, precious metals, real estate, and utilities are available for the entire eleven-year period, from January 1990 to December 2000. The sector indexes for energy and technology are available from April 1990 to December 2000, and for health care from January 1995 to December 2000. Our analysis of sector fund performance is restricted to the time period for which the corresponding sector index data are available.

The correlations between the monthly returns on sector indexes and sector fund portfolios are quite high. With TNA-weighted portfolios, the correlations range from 0.618 for the health care sector to 0.957 for the financials sector, with a median of 0.864. With equally-weighted portfolios, the results are similar for each sector, except the health care sector, for which the correlation falls to 0.303. Overall, the chosen indexes seem to be appropriate benchmarks for analyzing the performance of sector fund portfolios.

To further explore the characteristics of sector indexes, we conduct a regression of the monthly index excess returns on the four broad-market factors RMRF, SMB, HML, and UMD. The results are reported in Panel B of Table III. As expected, the market factor is positive and significant for all indexes. Five of the seven indexes (energy, financials, health care, technology, and utilities) have a negative loading on the SMB factor, indicating that these indexes are dominated by larger capitalization stocks. The health care and technology indexes have negative loadings on the HML factors, reflecting that these

sectors are dominated by growth stocks. Somewhat surprisingly, the utilities sector has the only index with a positive momentum loading.<sup>9</sup> The adjusted R-square values of regressions range between 0.061 for the precious metals sector index and 0.817 for the financials sector index. The intercept terms are significant at the minimum 10 percent level in two cases, namely, the health care and the technology indexes. Overall, the four factors explain a large part of the variation in index returns.

## II. Do sector fund managers outperform the benchmarks?

### *A. Do sector fund managers as a group outperform the benchmarks?*

We begin our analysis by comparing the growth of a dollar invested in sector fund portfolios, sector indexes, and the market index. Panel A of Table IV shows that a dollar invested in the market index on January 1, 1990, would have grown to \$4.439 on December 31, 2000. This implies a geometric average market return of 14.51 percent a year. The financials, health care, and technology sectors did better than market during this period, while the energy, precious metals, real estate, and utilities sectors did worse. All sector indexes except precious metals realized positive returns during the study period. Although not reported in the table, the geometric average sector index return ranges between -7.41 percent during 1990-2000 for precious metals and 30.52 percent during 1995-2000 for health care.

Looking across fund categories, growth of a dollar invested in the TNA-weighted portfolio of sector funds exceeds the corresponding sector index in four cases out of seven. Managers of energy, precious metals, real estate, and utilities funds beat the indexes, while managers of financials, health care, and technology are beaten. The ratio of growth of a dollar in the sector fund portfolio to the growth of a dollar in the sector index ranges between 0.767 for technology and 1.273 for precious metals. Figure 1 shows the time trend in growth of a dollar across sector fund portfolios, sector indexes, and the market. It is interesting to see that the ratio is less than one for the three sectors that outperform the market, and vice

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<sup>9</sup> This may seem odd, but can be explained. The univariate correlations between the EN, FN, HL, PM, RE, TC, and UT index returns and the UMD returns equal -0.061, -0.196, 0.370, 0.004, -0.072, 0.422, and 0.152. However, due to correlations between RMRF, SMB, HML, and UMD, most momentum loadings of sector indexes in a four-factor model are negative.

versa. This may be the result of cash and non-sector stock holdings of sector funds and shows one limitation of the growth of a dollar as a measure of fund performance. It ignores risk altogether.

Panel B of Table IV shows the Sharpe ratios, calculated as the average excess return divided by the standard deviation of returns with monthly data. The Sharpe ratio of the market index equals 0.198 during 1990-2000 and 0.264 during 1995-2000. Sector funds and indexes have higher risk due to lower diversification. Still, the Sharpe ratios of financials and health care fund portfolios and indexes are higher than of the market index. Comparing sector funds with sector indexes, the Sharpe ratios of fund portfolios are higher in the case of financials, health care, real estate, and utilities, and the Sharpe ratios of indexes are higher in the case of energy, precious metals, and technology. The difference between ratios ranges between -0.034 for technology and 0.068 for utilities. Notice there is practically no correspondence between which sector funds are stronger based on the growth of a dollar and which are stronger based on the Sharpe ratio.<sup>10</sup>

The growth of a dollar and Sharpe ratio do not control for the multiple factors that affect risk and return. These factors may be outside the control of fund managers and may reflect style preference rather than performance. In comparison, factor models measure the average excess return after subtracting the return earned as a result of exposure to risk factors. Table V shows the average excess returns, or alphas, from one-factor and five-factor models described before. These are denoted by  $\alpha^1$  and  $\alpha^5$ . The subscript  $p$  is dropped for easier exposition.

Panel A of Table V shows the results for the TNA-weighted portfolios of sector funds. The  $\alpha^1$  is generally insignificant, except for utilities, where it equals 0.278 percent (t-statistic 1.69), significant at the 10 percent level. Looking further, we find that the coefficient of INDRET for utilities is a low 0.512. If the stock holdings of utilities funds were exactly similar to the index, the coefficient would be around 0.835, same as the percentage stock holding of utilities funds shown in Table II. Apparently, this is not the case. A similar result occurs for health care, where  $\alpha^1$  is a rather large 0.724 percent (t-statistic 1.63).

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<sup>10</sup> A problem arises in the interpretation of negative Sharpe ratios in the case of precious metals sector fund portfolio and sector index. Panel B of Table IV shows that the fund portfolio has average excess return of -0.54 percent and a standard deviation of returns of 8.24 percent. This is better than the sector index, which has the same average excess return and a higher standard deviation of 10.26 percent.

The health care sector had strong returns, but the risk is not captured adequately by INDRET, which has a coefficient of 0.524. Only for the technology fund portfolio we find that the coefficient of INDRET is slightly larger than the stock holding. It appears that the one-factor model is not adequate to analyze the performance of sector funds. This may be due to non-sector stock holdings, or due to differences in the size, book-to-market, and momentum characteristics of sector stock holdings of the funds and the indexes.

We next analyze the five-factor results for the TNA-weighted portfolios of sector funds, also shown in Panel A of Table V. As expected, all seven portfolios have positive coefficients of RMRF and INDRET. Energy, financials, health care, and real estate funds hold small value stocks relative to the market and indexes as shown by the positive coefficients of SMB and HML. Precious metals and technology funds tilt in favor of small growth stocks, and utilities funds tilt in favor of large value stocks. However, the coefficients of SMB and HML used to make such inferences are not always significant. On average, sector funds hold positive momentum stocks relative to the market and indexes, as shown by the significantly positive coefficients of UMD for health care, technology, and utilities. In the remaining cases, the coefficients of UMD are split between positive and negative and are statistically insignificant. The adjusted-Rsquare of all regressions lies between 0.745 and 0.936, with a median of 0.840.

The central result concerns  $\alpha^5$ , which lies between -0.210 percent for energy and 0.204 percent for health care. It is negative in four cases and positive in three cases. The associated t-statistics are all less than one. This shows that after accounting for style differences the sector fund managers as a group earn a fair return. The simple average of the seven  $\alpha^5$  values equals -0.038 percent, which implies an annual excess return of -0.46 percent. This excess return is computed after subtracting the average fund expenses of 1.30 percent, but before subtracting the fund loads. Not subtracting fund expenses would give an annual excess return of 0.86 percent, which would remain insignificant, judged by the precision of estimates in Table V.

Panel B of Table V reports the same statistics as Panel A, but with equally-weighted portfolios of sector funds within each category. The  $\alpha^1$  remains weakly significant for utilities, but becomes very significant for real estate, where it has a value of 0.346 percent (t-statistic 2.85). The remaining  $\alpha^1$  values are all insignificant. Looking further,  $\alpha^5$  is insignificant for both real estate and utilities, and all other

categories, except technology, where it has a value of 0.350 percent (t-statistic 1.96). In the case of technology,  $\alpha^1$  and  $\alpha^5$  are positive with equally-weighted portfolios, but negative with TNA-weighted portfolios.

Overall, there is no clear evidence that sector funds earn positive or negative excess returns after accounting for the systematic factors in stock returns. Tables IV and V present three different criteria of fund performance: growth of a dollar, Sharpe ratio, and five-factor alphas. Keeping aside the issue of statistical significance, even the direction of results is not the same with different criteria for six out of seven fund categories. Only for real estate the direction of results with the three different criteria is the same, although the all important five-factor alphas are statistically insignificant.

We compare our results with Kallberg, Liu, and Trzcinka (2000). They find that real estate funds earn significantly positive excess returns of two percent a year, while we find insignificant results. There are many differences between the two studies. First, the time periods are different. They use March 1987 to June 1998, and we use January 1990 to December 2000. Second, they use the fund regression approach, while we use the portfolio regression approach. The fund regression approach suffers from a look-ahead bias that can overstate the excess returns. Third, they use a five-factor model that includes a bond factor, but does not include the momentum factor. Fourth, their results are based on an equally-weighted average of fund alphas. Our five-factor alpha with equally-weighted portfolio of real estate returns equals 0.209 percent (t-statistic 1.59). This implies an annual excess return of 2.51 percent, with a p-value of 0.114. however, we prefer to base our primary inferences on TNA-weighted portfolios of sector funds.

Our evidence thus far is consistent with market efficiency. As a group, sector fund managers neither outperform nor underperform the benchmarks. However, this evidence leaves open the possibility that there is a subset of sector fund managers who persistently outperform the benchmarks. Their superior performance may not show up in the aggregate portfolio returns if there is another subset of sector fund managers who persistently underperform the benchmarks, due to poor stock selection skills, or due to high fund expenses and transaction costs. We address this question below.

*B. Do some sector fund managers persistently outperform the benchmarks while others persistently underperform?*

We test whether fund managers who earn superior returns in one year continue to earn superior returns in the next year as follows. In the beginning of each calendar year from 1991 to 2000, we form quintile portfolios of unique funds within each sector fund category based on their one-year net returns.<sup>11</sup> For health care funds, we use the period 1995 to 2000. Funds that are not listed for the entire length of the previous year are excluded. We calculate the portfolio monthly returns during the next year as the equally-weighted average of monthly returns of all funds with the same quintile ranking for that year. This procedure gives a time series of 120 monthly returns for each quintile portfolio of energy, financials, precious metals, real estate, technology, and utilities funds, and 72 monthly returns for each quintile portfolio of health care funds. We now calculate the five-factor alphas for each quintile portfolio.

Table VI shows the net returns and the five-factor alphas of each quintile portfolio within each sector fund category. The last row of this table shows the Spearman rank correlations between the rank of quintile portfolio, which is based on the past one-year performance, and the rank of net return or alpha, which are based on the next one-year performance. With five observations, the Spearman rank correlation must be greater than or equal to +0.90 (or less than or equal to -0.90) to be significant at the minimum 10 percent level in two-tailed tests. Looking across sector fund categories, we find that all seven rank correlations with net return are positive, but individually only one correlation is significant at the minimum 10 percent level. The unanimous evidence on sign has a binomial significance level of less than 5 percent. Looking further, we find that only two of the rank correlations with alphas are positive, while four are negative, one is zero, and none is significant.

These results show that there is some persistence in net returns. On average, poor past performers are likely to be poor future performers, and strong past performers are likely to be strong future performers. However, it appears that the persistence in net returns is explained by the persistence in fund characteristics. Once we control for the fund characteristics in a five-factor model, there is no remaining

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<sup>11</sup> Using net returns to form quintile portfolios is better than using alphas. Carhart (1997) explains that using alphas to form quintile portfolios would subject them to a model specification error. This error could induce a spurious positive correlation between alphas based on the past one-year returns and alphas based on the next one-year returns.

evidence of persistence in alphas, which may be thought of as the characteristics-adjusted excess returns. We conclude that the year-to-year variation in a sector fund's return is explained by fund characteristics and forces of luck, but not by the persistent stock picking skills of the fund manager. Our earlier finding that the sector fund managers as a group neither outperform nor underperform the benchmarks is the likely result of market efficiency, and not the likely result of some managers who persistently outperform grouped together with some others who persistently underperform.

### III. Do sector fund investors possess fund selection or sector timing abilities?

Recent evidence suggests that at least some mutual fund investors have the ability to detect funds with superior future performance.<sup>12</sup> Gruber (1996) and Zheng (2000) provide evidence in support of a smart-money effect in diversified stock funds. It is possible that sector fund investors possess similar fund selection ability. This would explain the popularity of sector funds. Another argument in favor of sector funds is based on sector timing or rotation ability. It is possible that sector fund investors are able to pick the right sector at the right time. This would also explain the popularity of sector funds, especially since low-cost indexing alternatives tied to sector indexes did not exist until the late 1990s. Below we test both of these possibilities with cash flow and returns data.

We analyze the fund selection ability of sector fund investors by examining the performance of new-money portfolios formed on the basis of the net cash flow realized by funds within each sector. In the beginning of each quarter, we group all funds within a sector into two portfolios. The positive cash flow portfolio includes all funds with positive net cash flow during the previous quarter, and the negative cash flow portfolio includes all funds with negative net cash flow during the previous quarter. The net cash flow to fund  $i$  during quarter  $t$  is measured as follows:

$$TNA_{i,t} - TNA_{i,t-1} \times (1 + r_{i,t}) - MGTNA_{i,t} .$$

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<sup>12</sup> This is the central message of Gruber's (1996) presidential address to the American Finance Association. He argues that it is not irrational for investors to choose actively managed open-end mutual funds, even though collectively they underperform the indexes. He suggests that since managerial ability is not reflected in the prices of open-end funds, mutual fund performance may be predictable. This would enable some investors to direct their investments to managers with superior ability and away from those with inferior ability. Hence, the return on new cash flow should be superior to the average return on all funds.

Here  $TNA_{i,t}$  refers to the total net assets at the end of quarter  $t$ ,  $r_{i,t}$  is the fund's return for quarter  $t$ , and  $MGTNA_{i,t}$  is the increase in the total net assets due to mergers during quarter  $t$ .<sup>13</sup> We compute monthly returns for the two sets of new-money portfolios within each sector by using two weighting techniques. First, we compute cash-flow-weighted returns over all funds included in a portfolio. Second, we compute equally-weighted returns over all unique funds included in a portfolio. The cash-flow-weighted returns really use the net cash flow during the previous quarter as defined above.

We use the five-factor model to compare the performance of the positive cash flow and the negative cash flow portfolios. If sector fund investors have fund selection ability, then we would expect the difference between the two alphas to be positive. Panel A of Table VII presents the evidence on cash-flow-weighted portfolios. The difference between alphas is positive in four cases (energy, financials, real estate, and technology), negative in three cases (health care, precious metals, and utilities), and insignificant in all seven cases. The evidence on cash-flow-weighted new-money portfolios is inconsistent with fund selection ability on part of the sector fund investors.

Panel B of Table VII presents the evidence on equally-weighted portfolios. The difference between alphas of the positive cash flow and the negative cash flow portfolios is now negative in all seven cases, although individually insignificant in each case. It appears that it is even more difficult to predict performance among smaller sector funds than among larger sector funds. Once again, the evidence is inconsistent with fund selection ability on part of the sector fund investors. This is perhaps not surprising in view of our earlier results on the lack of persistence in sector fund performance.

We next examine the question of sector timing or rotation ability. Analogous to market timing, we define sector timing as successful shifting of funds between sector stocks and cash. We define sector rotation as successful shifting of funds between one sector and the remaining sectors. The first definition suggests that the dependent variable should be the difference between the sector index return and the riskfree return. The second definition suggests that it should be the difference between the sector index return and the market return. In both cases we use quarterly returns. The independent variable is the last

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<sup>13</sup> Elton, Gruber, and Blake (2001) point out that the merger dates provided on the CRSP database can sometimes be inaccurate. We therefore checked the merger dates reported by CRSP for possible errors. We found one case where the merger date appeared to be off by a quarter, and made the appropriate correction.

quarter's aggregate cash flow to all funds within that sector, normalized by the aggregate TNA at the beginning of that quarter. A significantly positive coefficient of the independent variable will indicate that sector fund investors directed excess cash flow to those sectors that realized greater subsequent returns, which can be interpreted as evidence in favor of sector timing or rotation ability.

Panel A of Table VIII reports the tests of sector timing ability. In four cases (energy, financials, health care, and real estate) the relation between the sector index return minus the riskfree return and the aggregate cash flow of the last quarter is positive. In three cases (precious metals, technology, and utilities), the relation is negative. None of the slope coefficients are significantly different from zero. Panel B presents similar evidence on sector rotation ability. In four cases the relation between the sector index return minus the market return and the aggregate cash flow of the last quarter is positive, and in three cases it is negative. Only one slope coefficient is positive and significantly different from zero at the five percent level. In unreported results, we also investigated the possibility of longer horizon sector timing or rotation ability by including four lagged values of the aggregate cash flow. The results were quite similar. The combined analytical evidence on sector returns vs. sector cash flow is inconsistent with the notion of sector timing or rotation ability on part of sector fund investors that is sometimes suggested by the existence of active trading in sector funds.

#### **IV. Miscellaneous results**

##### *A. Cross-sectional determinants of fund performance*

Fund managers often argue that investors should not worry about fund expenses and turnover, which are a by-product of superior investment decisions based on changing circumstances. However, Carhart (1997) shows that fund expenses and turnover have a negative effect on the performance of diversified stock funds as measured by their fund alphas. This issue is more important in the present context since sector funds charge significantly higher expenses than diversified stock funds. In addition, sector funds belonging to certain sector fund categories, such as technology, maintain a high turnover. We now examine the relation between fund performance and fund characteristics.

Following Carhart (1997), we use the Fama and MacBeth (1973) methodology. This requires estimating the cross-sectional relation between fund performance and fund characteristics each month, and then averaging the monthly coefficient estimates over the complete sample period. Our sample period begins in January 1993 and ends in December 1999. We do not include the period from 1990 to 1992, because we first compute the factor loadings for each sector fund by using the prior 36 monthly returns. We do not include 2000, because we have the fund characteristics data from CRSP up to 1999. We pool together the sector funds from all different categories. The dependent variable in each monthly cross-sectional regression is the sum of intercept and monthly residual (both expressed in percentage terms), which may also be thought of as the difference between the fund's return and the product of factor loadings and factor returns for that month. This variable is sometimes called the monthly alpha in mutual fund literature. The independent variables are as follows. EXPENSE is the annual expense ratio in percent divided by 12, TNA is the market value of fund assets in millions of dollars, TURNOVER is the annual turnover (minimum of aggregate purchases of securities and aggregate sales of securities divided by the average TNA of the fund) divided by 12, and MAX\_LOAD is the maximum front-end load in percent. We use the log-transform of TNA.

Table IX shows the time-series averages of coefficient estimates from monthly regressions. The univariate regressions show that EXPENSE has a nearly one-for-one negative effect on alphas. However, the associated t-statistic of -1.50 is not significant at the 10 percent level. TURNOVER and MAX\_LOAD have an insignificant effect on alphas, but TNA has a mildly significant effect. On average, a doubling of fund assets increases the fund alpha by 2.7 basis points per month. The multivariate regression shows that all four characteristics have an insignificant effect of fund alphas.

The insignificant relation between fund alphas and fund characteristics is surprising in view of previous results documented by Carhart (1997). However, it is consistent with our earlier results on the lack of persistence in fund returns. Most fund characteristics show persistence over time, and a significant relation would induce some persistence in fund alphas. One constraint may be that we have 84 months of data, whereas Carhart had 330 months of data.

*B. Comparing growth of a dollar in sector fund portfolios with Select Sector SPDR funds*

All our tests of sector fund performance are based on passive benchmark returns. One may argue that this is not a fair comparison as there is no easy way to earn the benchmark returns. In practice, any portfolio strategy would incur expenses that reduce returns. Unfortunately, there is no obvious way to adjust for expenses related to managing the five factor portfolios used in our analysis. In fact, during most of the time period of our study, even sector index funds that can replicate the most important of the five factor returns did not exist. Fortunately, this has changed in recent years, with the introduction of iShares funds, Select Sector SPDR funds, streetTRACKS funds, and many other exchange traded funds. The most relevant of these are the Select Sector SPDR funds, which started trading on December 22, 1998, and are designed to track the S&P 500 sector indexes used in this paper. These are also the most cost-efficient sector index funds. At present, they charge fund expenses of 0.28 percent. In the context of SPY, the ticker symbol for the most popular SPDR fund that is designed to track the S&P 500 index, Elton, Gruber, Comer, and Li (2000) show that its returns closely track the index returns minus the fund expenses. We assume that a similar result would hold for the Select Sector SPDR funds.

We compare the growth of a dollar in sector funds with hypothetical Select Sector SPDR funds during the period of our study. We construct the hypothetical SPDR fund returns by subtracting 0.28/12 percent from each month's return on the sector index. We recall that there are no S&P 500 sector indexes or SPDR funds for real estate or precious metals. For the remaining five categories of energy, financials, health care, technology, and utilities, Table III earlier showed that a dollar invested in a TNA-weighted portfolio of sector funds from the beginning to the end of the study period would have grown to 3.223, 6.120, 4.394, 5.826, and 3.274 dollars. The same dollar invested in the sector indexes would have grown to 3.152, 7.019, 4.943, 7.591, and 2.951 dollars. For the hypothetical SPDR funds, the corresponding growth of a dollar values are estimated to equal 3.060, 6.809, 4.862, 7.369, and 2.862 dollars. None of the comparisons changes.

## V. Robustness tests

Ferson and Schadt (1996) propose a conditional performance evaluation model based on pre-determined conditioning variables to account for time-varying expectations in returns. They show that conditional alphas can differ significantly from unconditional alphas. We now implement their model to see how it affects our results. We measure conditional five-factor alphas with the following regression of excess returns on a sector fund portfolio:

$$r_{p,t} - r_{f,t} = \alpha_p^{5c} + \beta_{1,p} RMRF_t + \beta_{2,p} SMB_t + \beta_{3,p} HML_t + \beta_{4,p} UMD_t + \beta_{5,p} INDRET_t + \delta_{1,p} (z_{t-1} * RMRF_t) + \delta_{2,p} (z_{t-1} * SMB_t) + \delta_{3,p} (z_{t-1} * HML_t) + \delta_{4,p} (z_{t-1} * UMD_t) + \delta_{5,p} (z_{t-1} * INDRET_t) + \varepsilon_{p,t} \quad (2)$$

In this equation, the vector  $z_{t-1}$  consists of pre-determined instruments. We use the lagged values of the dividend yield on the market portfolio, the default spread (difference between yields on Moody's BAA-rated and AAA-rated bonds), and the term spread (difference between yields on 10-year and 3-month treasury securities) as instruments.<sup>14</sup> We calculate the dividend yield as the total dividend paid by the CRSP value-weighted market portfolio during the last 12 months divided by the current market level. We obtain the default spread and the term spread data from the website maintained by the Federal Reserve Board.

The terms representing the product of the vector of lagged information variables,  $z_{t-1}$ , and the five factors in the conditioning model can be interpreted as the return to a dynamic strategy that invests  $z_{t-1}$  units in each factor. In this sense, the conditional alpha can be viewed as the average difference between the excess return on a sector fund portfolio and the return to a dynamic strategy that is based on publicly available information and replicates its time-varying risk exposure.<sup>15</sup>

Table X presents the conditional alphas of the sector fund portfolios. For ease of comparison, we also report the unconditional alphas from Table V. Panel A of Table X shows the results for the TNA-weighted portfolios. None of our earlier inferences are changed by the inclusion of conditioning variables.

<sup>14</sup> The variables are mean-centered by subtracting the respective sample means.

<sup>15</sup> The implicit assumption underlying such a conditional performance measure is that investors can replicate that part of an active manager's portfolio strategy which is based on publicly available information.

Four sector fund portfolios (energy, precious metals, real estate, and utilities) have negative conditional alphas, and three (financials, health care, and technology) have positive conditional alphas. The signs of conditional and unconditional alphas are the same in five cases and different in two cases. The t-statistics of both conditional and unconditional alphas are insignificant.

Panel B of Table X shows the results for the equally-weighted portfolios. Once again, the conditional alphas are similar to the unconditional alphas. The signs are never different. In six cases, the t-statistics of both conditional and unconditional alphas are insignificant. In one case (technology), the t-statistic of conditional alpha is significant at the 10 percent level, while the t-statistic of unconditional alpha is significant at the 5 percent level. Overall, our results are robust to the use of a conditional performance evaluation model.

## VI. Conclusions

This paper analyzes the performance of stock sector funds. We classify the sector funds listed on the CRSP Survivor-Bias Free US Mutual Fund Database during 1990-2000 into seven categories (besides one miscellaneous category). We use a five-factor model to account for the common factors in stock returns and the sector index returns. We use a portfolio regression technique to control for the look-ahead bias in mutual fund performance, and we examine both TNA-weighted and equally-weighted portfolios of sector funds. We examine both the conditional and unconditional measures of excess returns.

Sector funds charge higher expenses than diversified stock funds. However, their net returns after expenses and transaction costs are not superior to their benchmarks. This evidence is based on Jensen's alphas commonly used in the mutual fund literature. However, alternate measures of performance more commonly used by the mutual fund industry, such as the growth of a dollar value and the Sharpe ratio, give similar results. Sector fund managers as a group do not outperform or underperform the benchmarks. Given the precision of our estimates, the inference would be unchanged if we computed fund returns after adding back the fund expenses to the net fund returns.

We examine whether the overall neutral performance is a result of mixing up two sets of sector funds. Based on the previous literature, there is some possibility that a set of sector funds persistently

outperforms the benchmarks while another set of sector funds persistently underperforms the benchmarks. However, we find no linkage between past and future performance, which discounts the possibility of persistence in sector fund returns. We finally examine whether mutual fund investors as a group possess the ability to pick the winning sector funds or the winning sectors of the stock market. We find an insignificant difference between the performance of sector funds that realize positive new cash flow during the last quarter and sector funds that realize negative new cash flow, which suggests that sector fund investors cannot pick the winning sector funds. We also find that future sector index returns are not related to past values of aggregate cash flow to the corresponding sector funds, which suggests that sector fund investors cannot pick the winning sectors of the stock market. We conclude that sector fund investors earn fair returns, but not market-beating or sector-beating returns.

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**Table I**  
**Sample of Sector Funds**

The sample of 607 sector funds is obtained from the CRSP Survivor-Bias Free US Mutual Fund Database. It includes all sector funds that existed at any time during 1990-1999. We use the ICDI's fund objective code, Strategic Insight's fund objective code, Wiesenberger fund type code, and policy variables to identify sector funds from the universe of all US mutual funds. We exclude bond funds, money market funds, sector index funds, and international funds. The resulting sample of sector funds is divided into eight categories based on the fund specialization. Since this sample includes many cases of two or more funds that differ mainly in their marketing to different types of investors (e.g., institutional shares vs. advisor shares), we further identify a sub-sample of unique funds, which includes the oldest of these clone funds, or the biggest in case two or more clone funds start in the same year. TNA (total net assets) refers to the year-end market value of fund assets and is shown in billions of dollars. TNA information is missing for approximately 7 percent of the sector funds and 13 percent of all stock funds, so the actual fund assets may be somewhat higher. All stock funds includes both sector and non-sector funds.

<i>Panel A: Sector vs. non-sector funds during 1990-1999</i>										
Item	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Number of all stock funds	1,755	2,205	1,713	2,465	3,424	3,669	4,321	4,827	5,663	5,152
Number of sector funds	143	148	175	211	293	304	360	437	515	530
Percent	8.1	6.7	10.2	8.6	8.6	8.3	8.3	9.1	9.1	10.3
TNA of all stock funds	311	503	373	679	740	1,044	1,379	1,843	2,335	2,770
TNA of sector funds	16	24	28	46	43	60	71	96	116	158
Percent	5.1	4.8	7.4	6.8	5.8	5.7	5.1	5.2	5.0	5.7

<i>Panel B: Different categories of sector funds in existence at any time during 1990-1999</i>					
Category acronym	Category name	Number of all funds	Number of unique funds	TNA as of December 1999	Percent of all sector funds
EN	Energy	43	30	5.6	3.5
FN	Financials	59	38	14.6	9.3
HL	Health care	42	25	23.4	14.8
MS	Miscellaneous	58	41	8.6	5.5
PM	Precious metals	66	49	1.9	1.2
RE	Real estate	122	65	6.5	4.1
TC	Technology	114	66	72.4	45.9
UT	Utilities	103	57	24.6	15.6
Total		607	371	157.6	100.0

<i>Panel C: Biggest fund in each sector fund category in 1999</i>			
Category	Fund name	Fund TNA as of December 1999	Percent of TNA for category
EN	Neuberger Berman Sel Sector – Energy	1.5	27.8
FN	Freedom Inv Trust I – Regional Bank B	3.4	22.9
HL	Vanguard Specialized – Health Care	10.6	45.5
MS	Flag Investors – Telephone Income Shares/A	2.0	22.6
PM	Vanguard Specialized – Gold	0.4	18.9
RE	Cohen & Steers Realty Shares	1.4	21.8
TC	Price (T. Rowe) Sci & Tech	10.0	13.8
UT	Fidelity Utilities Income Fund	2.8	11.2

**Table II**  
**Summary Statistics of Sector Funds**

The sample of sector funds is described in Table I. Turnover is the minimum of aggregate purchases or sales of securities during the year, divided by the average TNA, front-end load is the maximum percent charges applied at the time of purchase, other load is the maximum deferred or rear-end charges, and expense ratio is the percentage of total investment that shareholders pay for the fund's operating expenses. For each data item, we first calculate the TNA-weighted average across all funds each year from 1990 and 1999, and then report a simple time-series average of the cross-sectional averages. All stock funds includes both sector and non-sector funds.

<i>Panel A: Characteristics of sector funds vs. all stock funds</i>								
Item	Sector funds		All stock funds			Difference		
Percent stock holding	87.1		86.0			1.1		
Percent cash holding	6.8		6.0			0.8		
Percent other securities	6.1		8.0			-1.9		
Turnover	74.1		74.1			0.0		
Front-end load	1.9		2.0			-0.1		
Other load	1.1		0.4			0.7		
Expense ratio	1.30		0.96			0.34		

<i>Panel B: Characteristics of different categories of sector funds</i>								
Item	EN	FN	HL	MS	PM	RE	TC	UT
Percent stock holding	92.2	88.9	89.3	89.0	90.1	90.6	87.0	83.5
Percent cash holding	5.9	8.8	9.5	7.1	6.7	4.7	6.7	5.0
Percent other securities	1.9	2.3	1.2	3.9	3.2	4.7	6.3	11.5
Turnover	57.7	68.2	74.4	123.0	56.6	51.4	132.8	40.7
Front-end load	0.7	1.7	2.1	2.6	2.1	0.7	2.5	2.0
Other load	0.6	1.3	0.8	1.1	0.6	0.2	1.0	1.6
Expense ratio	1.04	1.49	1.14	1.63	1.50	1.32	1.40	1.19

**Table III**  
**Sector Index Description**

This table describes the sector indexes that are used as benchmarks in assessing the performance of sector funds. Panel A describes the indexes and their correlations with TNA-weighted portfolios of all funds and equally-weighted portfolios of unique funds by using monthly returns. (The sub-sample of unique funds excludes all clone funds that differ from the included funds only in their marketing to a different investor group.) Panel B presents the intercept term,  $\alpha^4$ , and the regression coefficients from a four-factor model. The factors in this returns model are explained as follows. RMRF is Fama and French's (1993) excess return on the market portfolio, and SMB, HML, and UMD are the returns on the mimicking portfolios for the common size, book-to-market, and momentum factors in stock returns. The alphas are expressed in percentage terms. The t-statistics are shown in parentheses. The notations \*, \*\*, and \*\*\* represent statistical significance levels of 10 percent, 5 percent, and 1 percent in two-tailed tests. To avoid clutter, the significance levels are shown only for alphas.

<i>Panel A: Index description</i>						
Category	Description	Start date	End date	Correlation between sector index and		
				TNA-weighted sector fund portfolio	Equally-weighted sector fund portfolio	
EN	S&P 500 Energy Index	Apr-1990	Dec-2000	0.814	0.835	
FN	S&P 500 Financials Index	Jan-1990	Dec-2000	0.957	0.958	
HL	S&P 500 Health Care Index	Jan-1995	Dec-2000	0.618	0.303	
PM	Philadelphia Exchange Gold/Silver Sector Index	Jan-1990	Dec-2000	0.941	0.951	
RE	Wilshire Real Estate Securities Index	Jan-1990	Dec-2000	0.864	0.914	
TC	S&P 500 Technology Index	Apr-1990	Dec-2000	0.896	0.888	
UT	S&P 500 Utility Index	Jan-1990	Dec-2000	0.754	0.712	

<i>Panel B: Regression estimates from a regression of index returns against four factors</i>						
Category	$\alpha^4$	RMRF	SMB	HML	UMD	Adj-Rsq
EN	-0.016 (-0.04)	0.785 (8.42)	-0.153 (-1.61)	0.351 (2.72)	-0.136 (-1.52)	0.390
FN	0.003 (0.01)	1.550 (22.84)	-0.283 (-4.00)	0.688 (7.25)	-0.133 (-2.01)	0.817
HL	1.131 (1.89) *	0.585 (3.79)	-0.457 (-3.19)	-0.009 (-0.04)	0.000 (0.00)	0.312
PM	-0.686 (-0.72)	0.617 (2.45)	0.588 (2.24)	0.272 (0.77)	-0.298 (-1.21)	0.061
RE	-0.447 (-1.61)	0.755 (10.37)	0.488 (6.43)	0.827 (8.12)	-0.086 (-1.20)	0.509
TC	0.690 (1.91) *	1.059 (11.17)	-0.080 (-0.83)	-0.752 (-5.74)	-0.019 (-0.21)	0.732
UT	-0.373 (-1.12)	0.579 (6.63)	-0.161 (-1.76)	0.661 (5.41)	0.211 (2.46)	0.321

Table IV

**Performance of Sector Funds vs. Sector Indexes**

This table presents raw performance measures for the sector funds and the sector indexes. The sample of sector funds is described in Table I. The corresponding sector indexes are described in Table III. Panel A compares the growth of a dollar invested in the TNA-weighted portfolio of all sector funds with the sector index. This equals the market value on the end date of one dollar invested on the start date. Panel B compares the mean excess monthly returns, standard deviation of monthly returns, and the resulting Sharpe ratios computed over the same period. Both the mean and the standard deviation are expressed in percentage terms. For comparison, the growth of a dollar value and the Sharpe ratio are also reported for the market index over the same period as the sector funds and sector index.

<i>Panel A: Growth of a dollar values for sector fund portfolios and sector indexes</i>							
Category	Start date	End date	Growth of a dollar value				Market index
			Sector			Ratio	
			Sector funds	Sector index	Difference		
EN	Apr-1990	Dec-2000	3.223	3.152	0.071	1.022	4.592
FN	Jan-1990	Dec-2000	6.120	7.019	-0.899	0.872	4.439
HL	Jan-1995	Dec-2000	4.394	4.943	-0.549	0.889	2.927
PM	Jan-1990	Dec-2000	0.546	0.429	0.117	1.273	4.439
RE	Jan-1990	Dec-2000	2.351	1.957	0.394	1.201	4.439
TC	Apr-1990	Dec-2000	5.826	7.591	-1.766	0.767	4.592
UT	Jan-1990	Dec-2000	3.274	2.951	0.324	1.110	4.439

<i>Panel B: Average monthly returns, standard deviations, and Sharpe ratios over the same periods as above</i>								
Category	Sector fund returns			Sector index returns			Difference in Sharpe ratios of sector funds vs. index	Sharpe ratio of market index
	Mean excess returns	Standard deviation of returns	Sharpe ratio	Mean excess returns	Standard deviation of returns	Sharpe ratio		
EN	0.63	4.97	0.127	0.60	4.62	0.129	-0.002	0.213
FN	1.10	5.05	0.219	1.28	6.28	0.203	0.015	0.198
HL	1.75	4.45	0.393	1.96	5.26	0.372	0.021	0.264
PM	-0.54	8.24	-0.065	-0.54	10.26	-0.053	-0.012	0.198
RE	0.30	3.48	0.087	0.19	4.10	0.045	0.042	0.198
TC	1.25	7.41	0.168	1.43	7.07	0.202	-0.034	0.213
UT	0.54	2.85	0.188	0.50	4.20	0.120	0.068	0.198

**Table V**  
**Jensen's Alphas of a Portfolio of Sector Funds**

The sample of sector funds is described in Table I. This table analyzes whether an investor can earn abnormal returns by investing in a portfolio of sector funds and as measured by Jensen's alphas in one-factor and five-factor models. Jensen's alphas are the intercepts in regressions, denoted by  $\alpha^1$  and  $\alpha^5$  for the one-factor and five-factor models. The dependent variable is the portfolio return, calculated as the TNA-weighted average of monthly returns of all funds belonging to a category in Panel A and the equally-weighted average of unique funds belonging to a category in Panel B. (The sub-sample of unique funds excludes all clone funds that differ from the included funds only in their marketing to a different investor group.) The five factors in return models are explained as follows. RMRF is Fama and French's (1993) excess returns on the market portfolio, SMB, HML, and UMD are the returns on the mimicking portfolios for the common size, book-to-market, and momentum factors in stock returns, and INDRET is the excess return on the sector index for a category. The FN, PM, RE, and UT regressions include 132 monthly observations from January 1990 to December 2000, the EN and UT regressions include 129 monthly observations from April 1990 to December 2000, and the HL regressions include 72 monthly observations from January 1995 to December 2000. Alphas are expressed in percentage terms. The t-statistics are shown in parentheses. The notations \*, \*\*, and \*\*\* represent statistical significance levels of 10 percent, 5 percent, and 1 percent in two-tailed tests. To avoid clutter, the significance levels are shown only for alphas.

<i>Panel A: Portfolio returns calculated as the TNA-weighted average of all fund returns</i>										
Category	One-factor model			Five-factor model						
	$\alpha^1$	INDRET	Adj-Rsq	$\alpha^5$	RMRF	SMB	HML	UMD	INDRET	Adj-Rsq
EN	0.109 (0.43)	0.877 (15.82)	0.661	-0.210 (-0.98)	0.542 (7.68)	0.230 (3.97)	0.177 (2.21)	-0.031 (-0.57)	0.664 (12.23)	0.808
FN	0.121 (0.92)	0.769 (37.45)	0.915	0.047 (0.38)	0.279 (3.82)	0.110 (3.08)	0.330 (6.14)	-0.042 (-1.29)	0.643 (15.22)	0.936
HL	0.724 (1.63)	0.524 (6.58)	0.373	0.204 (0.81)	0.332 (4.76)	0.462 (7.36)	0.075 (0.86)	0.131 (2.29)	0.563 (11.27)	0.840
PM	-0.125 (-0.51)	0.756 (31.59)	0.884	-0.206 (-0.76)	0.050 (0.68)	0.063 (0.84)	-0.021 (-0.21)	0.039 (0.56)	0.747 (29.76)	0.884
RE	0.166 (1.08)	0.733 (19.60)	0.745	0.037 (0.21)	0.105 (1.74)	0.060 (1.13)	0.126 (1.65)	0.030 (0.70)	0.665 (12.26)	0.745
TC	-0.096 (-0.32)	0.939 (22.75)	0.801	-0.049 (-0.25)	0.569 (7.77)	0.299 (5.65)	-0.385 (-4.78)	0.209 (4.19)	0.464 (9.46)	0.927
UT	0.278 (1.69) *	0.512 (13.07)	0.565	-0.091 (-0.78)	0.394 (11.13)	-0.006 (-0.19)	0.082 (1.72)	0.079 (2.59)	0.387 (12.48)	0.821

*Panel B: Portfolio returns calculated as the equally-weighted average of unique fund returns*

Category	One-factor model			Five-factor model						
	$\alpha^1$	INDRET	Adj-Rsq	$\alpha^5$	RMRF	SMB	HML	UMD	INDRET	Adj-Rsq
EN	-0.099 (-0.37)	0.978 (17.11)	0.695	-0.247 (-0.99)	0.314 (3.83)	0.365 (5.42)	0.177 (1.90)	-0.055 (-0.87)	0.888 (14.09)	0.782
FN	0.201 (1.60)	0.751 (38.24)	0.918	0.113 (1.05)	0.300 (4.72)	0.185 (5.97)	0.339 (7.25)	-0.040 (-1.43)	0.626 (17.06)	0.949
HL	1.070 (1.47)	0.348 (2.66)	0.079	0.365 (0.95)	0.385 (3.62)	0.816 (8.53)	0.000 (0.00)	0.176 (2.03)	0.481 (6.31)	0.798
PM	-0.198 (-0.95)	0.711 (35.11)	0.904	-0.303 (-1.34)	0.069 (1.14)	0.083 (1.31)	0.000 (0.00)	0.043 (0.74)	0.700 (33.36)	0.906
RE	0.346 (2.85) ***	0.758 (25.61)	0.833	0.209 (1.59)	0.158 (3.42)	0.057 (1.39)	0.106 (1.81)	0.007 (0.22)	0.667 (16.07)	0.844
TC	0.243 (0.76)	0.967 (21.79)	0.787	0.350 (1.96)*	0.713 (10.94)	0.427 (9.06)	-0.388 (-5.42)	0.165 (3.71)	0.412 (9.44)	0.947
UT	0.298 (1.72) *	0.474 (11.56)	0.503	-0.073 (-0.61)	0.396 (10.92)	0.001 (0.03)	0.048 (1.00)	0.082 (2.62)	0.358 (11.27)	0.804

Table VI

**Persistence in Returns: The Performance of Portfolios of Sector Funds Formed by Quintile Ranks of Past One-Year Net Returns**

The sample of sector funds is described in Table I. In the beginning of each calendar year from 1991 to 2000, we form quintile portfolios of unique funds within each sector fund category based on their one-year net returns. For health care funds, we use the period 1995 to 2000. Funds that are not listed for the entire length of the previous year are excluded. This table analyzes whether an investor can earn abnormal returns by choosing higher quintile portfolios, and as measured by Jensen's alphas in a five-factor model. The portfolio returns are calculated as the equally-weighted average of monthly returns of all funds with the same quintile ranking for that year. The five factors in return models are explained as follows. RMRF is Fama and French's (1993) excess returns on the market portfolio, SMB, HML, and UMD are the returns on the mimicking portfolios for the common size, book-to-market, and momentum factors in stock returns, and INDRET is the excess return on the sector index for a category. The EN, FN, PM, RE, TC, and UT regressions include 120 monthly observations from January 1991 to December 2000, and the HL regressions include 72 monthly observations from January 1995 to December 2000. All returns and alphas are expressed in percentage terms. The rank correlation measures the correlation between the rank of the quintile portfolio and the rank of the net return or the alpha. With 5 observations, this Spearman rank correlation must be greater than or equal to +0.90 (or less than or equal to -0.90) to be significant at the minimum 10 percent confidence level in two-tailed tests.

Quintile portfolio of past returns	EN		FN		HL		PM		RE		TC		UT	
	Net return	$\alpha^5$	Net return	$\alpha^5$	Net return	$\alpha^5$	Net return	$\alpha^5$	Net return	$\alpha^5$	Net return	$\alpha^5$	Net return	$\alpha^5$
Worst	0.541	-0.308	1.363	0.201	0.869	-0.184	-0.669	-0.499	0.500	-0.056	1.779	0.623	0.606	-0.090
2	0.551	-0.343	1.399	0.065	1.959	0.827	-0.294	-0.041	0.825	0.415	1.398	0.008	0.638	-0.049
3	0.781	-0.188	1.592	0.141	2.132	0.548	-0.410	-0.195	0.692	0.031	1.686	0.166	0.620	-0.137
4	0.634	-0.240	1.628	0.119	2.002	0.549	-0.283	-0.080	0.726	0.121	1.899	0.453	0.646	-0.143
Best	0.749	-0.381	1.413	-0.176	1.280	-0.453	-0.451	-0.372	0.593	-0.332	2.094	0.535	0.833	-0.004
Rank correlation	0.700	-0.200	0.700	-0.700	0.300	-0.300	0.300	0.100	0.100	-0.300	0.700	0.000	0.900	0.100

Table VII

## Performance of New-Money Portfolios

This table reports the performance of sector fund portfolios formed on the basis of net cash flow realized during the previous quarter. The sample of sector funds is described in Table I. Each quarter, funds within a category are grouped into either the positive cash flow portfolio or the negative cash flow portfolio. The cash-flow-weighted and equally-weighted monthly returns are computed for each of these portfolios. Performance is measured by using Jensen's alphas in a five-factor model, denoted by  $\alpha^5$ . The five factors are explained as follows. RMRF is Fama and French's (1993) excess returns on the market portfolio, SMB, HML, and UMD are the returns on the mimicking portfolios for the common size, book-to-market, and momentum factors in stock returns, and INDRET is the excess return on the sector index for a category. The cash-flow-weighted portfolios in Panel A include all funds belonging to a category, but the equally-weighted portfolios in Panel B include only unique funds. (The sub-sample of unique funds excludes all clone funds that differ from the included funds only in their marketing to a different investor group.) To avoid clutter, both panels present only the alphas and the differences in alphas between positive and negative cash-flow portfolios, and the t-statistics. The differences in alphas are a measure of excess returns earned by the new money flow into sector funds. Both alphas and differences in alphas are expressed in percentage terms. The EN, FN, PM, RE, TC, and UT regressions include 129 monthly observations from April 1990 to December 2000, and the HL regressions include 72 monthly observations from January 1995 to December 2000.

*A: Cash-flow-weighted portfolios*

Category	Five-factor alphas ( $\alpha^5$ )		Difference in alphas	t-statistic
	Positive cash flow portfolio	Negative cash flow portfolio		
EN	0.003	-0.224	0.227	0.46
FN	0.212	0.098	0.114	0.49
HL	0.102	0.410	-0.308	-0.43
PM	-0.309	0.130	-0.439	-1.01
RE	0.228	0.219	0.009	0.02
TC	0.043	-0.046	0.089	0.23
UT	-0.153	-0.034	-0.119	-0.62

*B: Equally-weighted portfolios*

Category	Five-factor alphas ( $\alpha^5$ )		Difference in alphas	t-statistic
	Positive cash flow portfolio	Negative cash flow portfolio		
EN	-0.323	-0.118	-0.205	-0.49
FN	0.076	0.110	-0.034	-0.18
HL	0.209	0.358	-0.149	-0.22
PM	-0.272	-0.248	-0.024	-0.07
RE	0.231	0.288	-0.057	-0.18
TC	0.000	0.383	-0.383	-1.37
UT	-0.085	-0.071	-0.014	-0.07

Table VIII

## Sector Timing and Rotation Abilities of Sector Fund Investors

The sample of sector funds is described in Table I. This table presents parameter estimates from regressions of sector fund returns on cash flows. The sector indexes are described in Table III. The dependent variable in Panel A is the quarterly sector index return minus the riskfree return. The dependent variable in Panel B is the quarterly sector index return minus the market return. The independent variable in both panels is Qcf1, which is the last quarter's cash flow to all funds within a sector fund category. Qcf1 is computed as the aggregate net cash flow to all funds during the last quarter divided by the aggregate TNA in the beginning of the quarter. The EN, FN, PM, RE, TC, and UT regressions include 43 quarterly observations from April 1990 to December 2000, and the HL regressions include 24 quarterly observations from January 1995 to December 2000. The intercept term is expressed in percentage terms. The t-statistics are reported in parenthesis. The notations \*, \*\*, and \*\*\* represent statistical significance levels of 10 percent, 5 percent, and 1 percent in two-tailed tests.

*Panel A: Sector timing: Regression of sector index return minus risk-free return on last quarter's cash flow*

Category	Intercept	Qcf1	Adj-Rsq
EN	1.603 (1.87) *	0.104 (0.77)	-0.010
FN	3.812 (2.26) **	0.084 (0.64)	-0.014
HL	4.755 (2.60) **	0.281 (1.36)	0.036
PM	-1.712 (-0.81)	-0.352 (-1.18)	0.009
RE	0.537 (0.37)	0.041 (0.48)	-0.019
TC	5.800 (2.79) ***	-0.265 (-1.56)	0.033
UT	2.061 (1.67)	-0.238 (-0.99)	0.000

*Panel B: Sector rotation: Regression of sector index return minus market return on last quarter's cash flow*

Category	Intercept	Qcf1	Adj-Rsq
EN	-0.600 (-0.51)	0.084 (0.45)	-0.019
FN	1.405 (1.31)	0.008 (0.09)	-0.024
HL	0.651 (0.31)	0.517 (2.21) **	0.144
PM	-3.659 (-1.45)	-0.255 (-0.71)	-0.012
RE	-1.637 (-1.18)	0.016 (0.19)	-0.023
TC	2.416 (1.88) *	-0.170 (-1.63)	0.038
UT	-0.228 (-0.15)	-0.125 (-0.41)	-0.020

Table IX

**Cross-Sectional Determinants of Fund Alphas**

The sample of sector funds is described in Table I. This table presents the parameter estimates from cross-sectional regressions for each month from January 1993 to December 1999. The dependent variable is the sum of intercept and monthly residual (both expressed in percentage terms) from a five-factor model described in Table V. For each unique sector fund, we first compute the factor loadings by using the prior 36 monthly returns. We then compute the dependent variable as the difference between the fund return for the current month and the summed product of factor loading and factor returns. The independent variables are described as follows. EXPENSE is the annual expense ratio in percent divided by 12, TNA is the market value of fund assets in millions of dollars, TURNOVER is the annual turnover (minimum of aggregate purchases of securities and aggregate sales of securities divided by the average TNA of the fund) divided by 12, and MAX\_LOAD is the maximum front-end load in percent. Every regression also includes dummy variables to capture different returns for different fund categories (EN, FN, HL, PM, RE, TC, and UT). The reported estimates are the time series averages and t-statistics of the monthly cross-sectional regression coefficients. The notations \*, \*\*, and \*\*\* represent statistical significance levels of 10 percent, 5 percent, and 1 percent in two-tailed tests.

Independent variable	Univariate regressions		Multivariate regression	
	Estimate	t-statistic	Estimate	t-statistic
EXPENSE	-1.048	-1.50	-0.669	-0.82
LOG(TNA)	0.039	1.89 *	0.036	1.62
TURNOVER	-0.077	-0.18	0.362	0.86
MAX_LOAD	0.001	0.15	0.006	0.60

Table X

**Conditional Jensen's Alphas of a Portfolio of Sector Funds**

This table presents estimates of conditional alphas for portfolios of sector funds. The sample of sector funds is described in Table I. The portfolio returns are calculated as the TNA-weighted average of monthly returns of all funds belonging to a category in Panel A, and the equally-weighted average of unique funds belonging to a category in Panel B. The sub-sample of unique funds excludes all clone funds that differ from the included funds only in their marketing to a different investor group. The conditional alphas are the intercepts from time-series regressions involving the monthly excess return on a portfolio of sector funds as follows:

$$r_{p,t} - r_{f,t} = \alpha_p^{5c} + \beta_{1,p}RMRF_t + \beta_{2,p}SMB_t + \beta_{3,p}HML_t + \beta_{4,p}UMD_t + \beta_{5,p}INDRET_t + \delta_{1,p}(z_{t-1} * RMRF_t) + \delta_{2,p}(z_{t-1} * SMB_t) + \delta_{3,p}(z_{t-1} * HML_t) + \delta_{4,p}(z_{t-1} * UMD_t) + \delta_{5,p}(z_{t-1} * INDRET_t) + \varepsilon_{p,t}$$

In this equation,  $r_{p,t}$  is the fund portfolio return and  $r_{f,t}$  is the risk-free return. RMRF is Fama and French's (1993) excess returns on the market portfolio, SMB, HML, and UMD are the returns on the mimicking portfolios for the common size, book-to-market, and momentum factors in stock returns, and INDRET is the excess return on the sector index for a category. The elements of vector  $z$  are pre-determined instruments. These include lagged values of the dividend yield on the value-weighted market portfolio, the default spread (difference between yields on Moody's BAA-rated and AAA-rated bonds), and the term spread (difference between yields on 10-year and 3-month treasury securities). These variables are mean-centered by subtracting the respective sample means. For ease of comparison, the panels also report the unconditional alphas from Table V. The FN, PM, RE, and UT regressions include 132 monthly observations from January 1990 to December 2000, the EN and UT regressions include 129 monthly observations from April 1990 to December 2000, and the HL regressions include 72 monthly observations from January 1995 to December 2000. Alphas are expressed in percentage terms. The t-statistics are shown next to the alpha estimates. The notations \*, \*\*, and \*\*\* represent statistical significance levels of 10 percent, 5 percent, and 1 percent in two-tailed tests.

*Panel A: Conditional and unconditional alphas for TNA-weighted fund portfolios*

Category	Conditional estimates			Unconditional estimates		
	Alpha	t-statistic	Adj-Rsq	Alpha	t-statistic	Adj-Rsq
EN	-0.131	-0.66	0.856	-0.210	-0.98	0.795
FN	0.090	0.75	0.949	0.047	0.38	0.934
HL	0.121	0.43	0.878	0.204	0.81	0.838
PM	-0.171	-0.57	0.879	-0.206	-0.76	0.890
RE	-0.013	-0.08	0.806	0.037	0.21	0.745
TC	0.050	0.25	0.938	-0.049	-0.25	0.925
UT	-0.022	-0.18	0.837	-0.091	-0.78	0.825

*Panel B: Conditional and unconditional alphas for equally-weighted fund portfolios*

Category	Conditional estimates			Unconditional estimates		
	Alpha	t-statistic	Adj-Rsq	Alpha	t-statistic	Adj-Rsq
EN	-0.305	-1.27	0.825	-0.247	-0.99	0.782
FN	0.121	1.16	0.960	0.113	1.05	0.949
HL	0.008	0.02	0.832	0.365	0.95	0.798
PM	-0.244	-0.98	0.902	-0.303	-1.34	0.906
RE	0.086	0.68	0.885	0.209	1.59	0.844
TC	0.367	2.06 **	0.955	0.350	1.96 *	0.947
UT	-0.006	-0.05	0.825	-0.073	-0.61	0.804

**Figure 1: Growth of \$1 invested in the indicated sector fund portfolio vs. a sector/market index.**

Each panel depicts the growth in the value of one dollar invested in a value-weighted portfolio of sector funds within a particular category for the period indicated within each panel. The panels also show the growth of one dollar invested in the corresponding sector index and the value-weighted market index over the same time period.

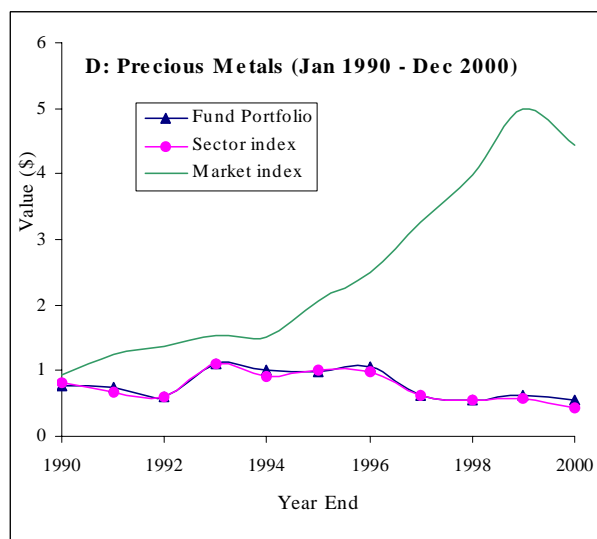
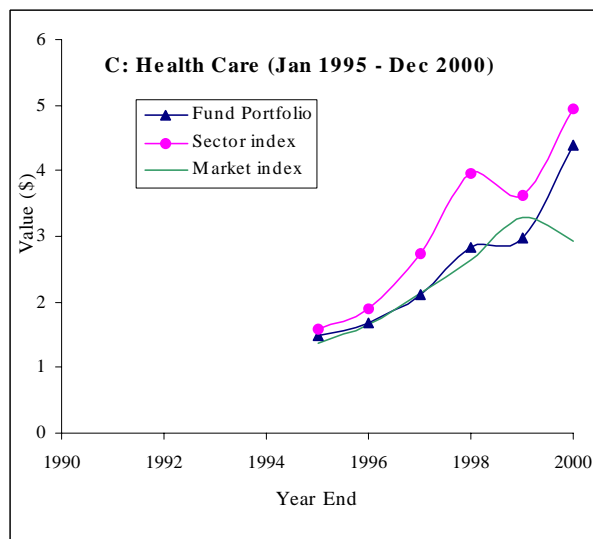
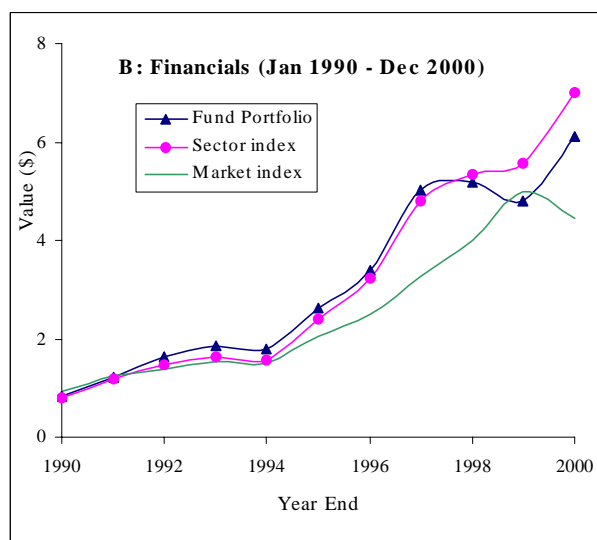
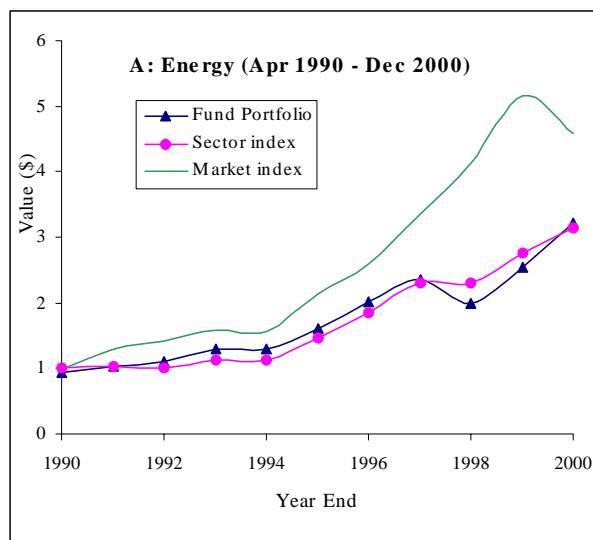


Figure 1 (continued)

