

# SECTOR FUNDS PERFORMANCE AND DEGREE OF INDUSTRY SPECIALISATION

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## ABSTRACT

This paper studies the link between the degree of sector-concentration and the selectivity performance for 102 sector funds and 408 diversified equity funds between January 1980 and December 2002 on the American market. The sample includes funds for which ten years of monthly returns are available. Our main result is that narrow-defined sector funds perform significantly better than wide-spectrum ones. This result is not driven by specific categories of sector funds and is robust to the benchmark/model specification. Sector expertise allows thus private information acquisition and significant value creation for sector funds. For equity funds, the relation is rather opposite: the best performers are funds diversifying the most across sectors. In other words, there is no middle way between diversification and specialisation. The cross-sectional analysis for sector funds indicates that the best stock-pickers are recent, small, highly concentrated funds with low expense ratios. For equity funds, the best stock-pickers are rather large, diversified funds. In addition, we document a strong negative market-timing performance for sector funds. The market-timing activity is not deliberate but rather implied by high-unexpected cash flows at the fund. Our results are free of the survivorship bias to the extent that we use all funds (dead and alive) in the period of analysis. The survivorship bias does change our results fundamentally.

**Key-words:** Sector funds, Selectivity, Market-timing, Sector Specialisation, Information Asymmetry, Survivorship Bias

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## INTRODUCTION

Sector funds, also called “industry-specific” funds, specialise in firms of the same industrial or economic sector<sup>2</sup>. Sector investing is thus an intermediate between placing in individual stocks of specific economic sectors and in diversified equity portfolios. This placement is ideal for investors having a certain vision about some sectors and seeking some diversification inside sectors. When index funds were bringing double-digit returns, sector funds were considered as needlessly volatile. Now investors are turning toward sector investing for two main reasons. The first is that, in a world of increasing globalisation, the industry may outperform the geography as a driver of fund performance. The second is that sector placement may be used in order to counter bad market conditions. These two conditions undoubtedly meet together from some years and explain the rapid development of sector funds.

Despite the popularity of sector funds, the financial literature in this field is poor. The arguments explaining their role are often conflicting, undoubtedly because these funds are among the best but also among the worst performers. The popular press generally states that the role of sector funds is to improve the performance of an already diversified portfolio but they should not occupy more than 10% of a client’s total portfolio because they have much higher risk than a diversified fund. Some planners declare that sector funds are sold through intelligent marketing and by young managers looking for career changes and having little experience. It is even stated that sector funds are a way for inexperienced managers to develop their skills and get a diversified perspective in the market<sup>3</sup>. Other planners declare that many sector fund managers have a lot of history in the field. These managers have been analysing companies of a certain sector for more than 15 years and declare that they would not manage other funds. Another conflicting debate concerns the way planners define sector funds: should these funds be narrowly or widely focused? Investment companies’ officials generally declare that the success of sector funds is based on defining them on a wide spectrum in order to counter the effect of bad macroeconomic conditions. However, there exist many narrowly focused funds investing, for example, in natural gas, precious metals or Internet companies. These funds may perform well in right circumstances. Their managers combine a specific target for which they have good expertise with a long investment horizon in order to obtain superior performance.

The academic literature says little about sector funds and provides somewhat conflicting results. Khorana and Nelling (1997) analyze the performance of 147 sector funds on the period 1976-1992. Sector funds perform better than sector indexes but less well than diversified indexes. They exhibit high idiosyncratic and low systematic risk. The comparison with equity funds is confusing. If the benchmark is the S&P 500, sector funds underperform equity funds but results change if the benchmark is a sector index. The authors conclude that sector funds perform globally as well as equity funds on a risk-adjusted basis. Dellva and al. (2001) study the selectivity and the market timing performance for 35 Fidelity sector funds on

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<sup>2</sup> We have included in the same category “global sector funds” specialising in several lowly correlated economic sectors for diversification purposes. A more general group is “specialty funds” or “theme-funds” specialising in specific market instruments or defined sections of the market. These funds specialise indirectly in economic sectors.

<sup>3</sup> Some anonymous managers declare that sector fund managers would “run a sector fund for a few years, then they’re moving on to something else, something better. They are not interested in running sector funds” (Gregory Bresiger, *Straight talk about sectors*, Financial planning, January 2000).

the period 1989-1998. They use several benchmark/model/period specifications in order to assess the selectivity and the market-timing performance of sector funds. Whichever the specification, sector funds exhibit positive stock picking and negative market-timing abilities. These results contradict Khorana and Nelling (1997) who find no significant selectivity performance and claim that sector funds do not provide market-timing opportunities to the extent that they have narrow investment objectives. Evidence of negative market-timing abilities for actively managed funds is recurrent in the academic literature and remains a topic of debate. Thus, if sector funds do not time the market, the finding of perverse market-timing abilities by Dellva and al. (2001) deserves closer attention.

Our paper makes several important contributions to the literature on sector funds. We provide a more comprehensive analysis of sector funds by taking into account their main specificity: these funds are less diversified than equity funds and occupy a large scale from narrow-defined to wide-spectrum funds. Sector funds are thus a breeding ground for analysing the tradeoffs between the benefits coming from sector expertise and risk diversification<sup>4</sup>. We claim that the possibility to acquire superior private information is higher for sector funds than for equity funds because the former have narrower investment objectives. If we continue this line of reasoning, narrow-defined sector funds should exhibit higher selectivity abilities than wide-spectrum ones. Based on this, we define the following research question: *should sector fund managers narrow as much as possible their investment objective in order to create value or should they cover a wide spectrum?*

As far as we know, our study is the first addressing the impact of the degree of sector concentration on fund performance<sup>5</sup>. We measure the degree of sector concentration of a fund by using the Herfindhal index. This index sums the squares of the percentages invested by the fund in each sector and divides it by 10 000. A higher value of the index means a higher degree of sector concentration for the fund. We have also used the amount invested in the economic group (determined by the first digit of the SIC classification) in which the fund invests the most as an alternative measure for the degree of sector concentration. The two measures give similar results and reveal a strong positive relationship between sector fund performance and the degree of sector concentration. Small, concentrated sector funds perform better than large, diversified ones, on a risk-adjusted basis. This result contradicts the popular view that sector funds should have a wide spectrum in terms of investment objectives and supports the sector expertise hypothesis. Interestingly, the opposite applies for equity funds: the higher the degree of sector concentration, the lower the performance. In this group, the winners are rather large, diversified funds. It seems therefore that the specialisation is the key performance driver for sector funds. For equity funds, the performance driver is rather diversification. A “mix” strategy of specialisation/diversification is, on average, poorer than a “pure” one.

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<sup>4</sup> Take the example of leisure funds. According to the fund prospectuses, they invest in companies engaged in promoting leisure goods and activities. Even if these funds are billed as sector funds, they may invest in more than 15 industries within the leisure sector and are therefore considered as “broad” portfolios. Their managers gain the advantage of the diversification inside/across sectors but this may be detrimental to the sector expertise. Take now the example of natural gas funds. Such funds may invest in one or two industries and have very few companies to choose from. This may be problematic if things go wrong for these sectors, but such investing can work under the right circumstances.

<sup>5</sup> The results and debates from the academic literature and the popular press show that the existence of sector funds is based on their possibility to gain superior performance by judiciously selecting undervalued stocks. “Investing in sector funds is the easiest way to engage in a value play; to put money in an area where stocks are undervalued” declares Rick Adkins, president of the Arkansas Financial Group in Little Rock, Arkansas.

Another major contribution of our paper is the extensive analysis of sector funds performance. We decompose it into selectivity and market-timing performance<sup>6</sup> and bring an important piece to the sector funds market-timing puzzle. The issue of market timing is crucial for accurate performance analysis, particularly for actively managed funds. Traditional selectivity performance measures are biased if managers time the market: the traditional CAPM is no more relevant because fund returns exhibit nonlinear characteristics<sup>7</sup>. There is not yet a consensus in the academic literature on the existence of market timing activities for sector funds. Sector fund managers declare that they *do not* voluntarily time the market but the fact that they make only a “few bets” makes sector funds a form of market timing<sup>8</sup>. Some financial planners argue that sector funds make basically a few number of big bets, which “makes sector funds a form of market-timing, which nearly all financial planners say is a futile strategy”. We document a strong negative market-timing performance for sector funds whichever the period/model/benchmark specification. Our results resemble those obtained by Dellva et al. (2001) on sector funds and by a large number of empirical studies on actively managed equity funds<sup>9</sup>.

The finding of negative market-timing performance for actively managed is the object of intriguing debates in the academic literature. Ferson and Warther (1996) argue that a recurrent negative performance is not rational because astute managers may inverse their strategies in order to obtain superior performance. They specify a conditional version of the Treynor and Mazuy (1966) model, hereafter TM, and find *non-significant* market-timing performance for equity funds. This result is different from those obtained by traditional empirical studies. We have estimated the extended TM model proposed by Ferson and Warther (1996) for sector funds but the market-timing performance still remains significantly negative for any the period/benchmark specification. We have further investigated the market timing performance of sector funds by studying the effect of cash flows at the funds. A significant body of the academic literature shows that the flow-induced trading activity biases the inferences regarding the managers’ stock picking and market timing activity<sup>10</sup>. The popular press argue that sector fund clients have a pronounced speculative behaviour, getting frequently in/out the fund when sectors are hot/cold. This implies high turnover rates<sup>11</sup>, roughly three times higher than for equity funds. Some managers declare that the high turnover is responsible for the poor performance of sector funds and even for their disappearance.

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<sup>6</sup> Stock-picking consists of buying (selling) undervalued (overvalued) securities when the manager has superior private information on individual stocks. Market-timing represents the dynamic allocation of capital among broad portfolios, most frequently the market portfolio. Superior market-timers have private information on this portfolio and increase/decrease its weight in the fund prior to a rise/fall in the market.

<sup>7</sup> See Admati and Ross (1985), Dybvig and Ross (1985), Henriksson and Merton (1981). Some authors show that traditional performance measures are downward biased if timing is ignored (Grant, 1977, Chang and Lewellen, 1984, Henriksson, 1984). Dybvig and Ross (1985) show that bad-performing portfolios may situate above the market line (positive alpha) when portfolio managers time the market.

<sup>8</sup> To the extent that sector funds invest in a limited number of securities/industries, a selectivity signal (which is a signal about one or more securities) is also a signal on the managed portfolio as a whole and it is difficult to distinguish between selectivity and market-timing. See Admati et al. (1986) for a rigorous definition of selectivity and timing information.

<sup>9</sup> See Treynor and Mazuy (1966), Kon (1983), Henriksson (1984), Chang et Levellen (1984), Lee and Rahman (1990), Elton et al. (1993).

<sup>10</sup> Warther (1995), Grinblat and Titman (1995), Edelen (1999), Ferson and Schadt (1996), Ferson and Warther (1996), Edelen and Warner (2001).

<sup>11</sup> The turnover is provoked concurrently by (1) investors’ inflows (sales) or outflows (withdrawals), which may be considered as a liquidity service provided by the fund manager, and (2) by the discretionary purchase/sale trading activity of fund managers.

In line with this, our findings show that the “perverse” market timing for sector funds is not deliberate but rather driven by unexpected cash flows at the fund. Once we control for unexpected flows, sector funds exhibit better market-timing performance. This finding is consistent with asymmetric information models initiated by Grossman and Stiglitz (1980). This model considers a market with two categories of investors: informed and uninformed ones. Informed investor’s optimal portfolio over-performs the uninformed investors’ one and this performance in excess is compensated by the cost for becoming informed. Unexpected fund flows make informed managers deviate from their informationally-efficient portfolio and behave like uninformed investors. This explains why open-end actively managed funds exhibit recurrent negative performance. Ferson and Schadt (1996) argue that unexpected fund flows affect the funds’ beta at the wrong time because flow is positively correlated with liquidity-motivated demands. This induces positive correlation between securities expected returns and fund flows, implying negative market-timing performance. Warther (1995) explains this positive correlation by the information embedded in flows, the price pressure hypothesis and the investor sentiment hypothesis. According to the information hypothesis, mutual fund investors trade according to their private information and security prices reveal part of this information. Therefore, security returns and fund flows are positively correlated. According to the price pressure/investor sentiment hypothesis, mutual fund investors behave like unsophisticated, partially irrational noise traders. Their trades are important and affect temporarily security returns. This induces positive correlation between fund flows and security returns. Once the pressure/sentiment waves have passed, prices return to their fundamental values. The price pressure/investor sentiment is less supported by empirical studies than the information hypothesis. Edelen (1999) tests the information hypothesis and shows that the traditional pessimistic results on fund performance change when liquidity services are addressed. He finds non-significant selectivity and market-timing performance for equity funds after controlling for the effect of unexpected funds flows<sup>12</sup>.

An important issue for sector funds is the survivorship bias. Our results are free of this bias to the extent that we use data from the *CRSP Survivorship Bias Free Mutual Fund Database*, which contains data for existing and dead funds. As far as we know, existent studies on sector funds are affected by the survivorship bias because only surviving funds (having higher performance than dead ones) are considered. The survivorship bias overestimates the fund’s performance and induces performance persistence. Some studies circumvent the problems associated with the survivorship bias by comparing their results with those obtained on a control sample of equity funds, which are supposed to be affected by the survivorship bias too<sup>13</sup>. In our view, such a comparison is misleading because sector funds are more volatile than equity funds. Consequently, sector funds are expected to have a higher probability of disappearance and, consequently, to be affected to a higher extent by the survivorship bias than equity funds<sup>14</sup>. The comparison of fund performance across sectors may also be affected

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<sup>12</sup> Wermers (2000) argues that funds hold liquid assets in order to face uncertain inflows and redemptions from the fund investor. These uncertain flows are responsible for the negative fund performance evaluated at the global fund level. At the funds’ stock level, Wermers (2000) shows that fund managers hold stocks that beat the market portfolio by 1.3% per year covering expenses and transaction costs (1.6%). This is consistent with the Grossman and Stiglitz (1980) model of asymmetric information. Hence, the difference in performance calculated at the global fund level by traditional studies and at the stock holdings level by recent studies is attributable to holdings of cash and bonds (see also Grinblatt and Titman, 1989, 1993, Daniel et al., 1997, Wermers, 2000).

<sup>13</sup> Existing studies document a survivorship bias between 0.5% and 1.4% for equity funds on the American market (Grinblatt et Titman, 1989, Malkiel, 1999). Ackerman et al. (1999) show that this bias is attenuated to a certain extent by the “self-selection bias” coming from performing funds that are retired from databases because their managers are not motivated to provide data after the fund has achieved a certain level of maturity.

<sup>14</sup> A similar result has been found by Ackerman et al. (1999). These authors showed that hedge funds, which are riskier than equity funds, have a higher survivorship bias than equity funds.

by the survivorship bias. Narrowly defined sector funds are riskier; hence, they are more affected by the survivorship bias than widely defined sector funds.

Our study uses a large database and a sufficient number of years for assessing the performance of sector funds. Khorana and Nellling (1997) use 3 years of monthly returns for their sample of 147 sector funds on the American market. Dellva and al. (2001) use a sample of 35 Fidelity sector funds and the number of monthly returns corresponds to the period from the fund's inception date, situated after 1989, until 1998. Our study uses a sample of 159 sector funds for which the CRSP database provides complete monthly returns for a period of minimum 10 years between 1980 and 2002 and sufficient data for cross-sectional analysis.

The paper is structured as follows. The next section describes the sector funds sample and the control sample of equity funds. The third section analyses the selectivity and market-timing performance of these two categories of funds. The fourth section considers the relationship between performance and degree of sector specialization for sector funds and for the control sample of equity funds. We conclude in the fifth section.

## 1 DATA

We obtained our data from several sources. The “CRSP Survivorship-Bias Free Mutual Fund Database” provides time-series and cross-sectional data for 1413 sector funds, dead and surviving, on the period from the funds' inception date until 31/12/2002. We have included funds designated as “sector funds” by at least one of the three investment strategy classifications provided by the CRSP database: the Wiesenberger, the ICDI and the Strategic Insight Fund Objective classification. For 1262 sector funds, CRSP provides the sector that is the main investment objective of the fund. The sectors are, in alphabetical order: *Environment, Finance, Real Estate, Precious Metals, Energy/Natural Resources, Health, Technology and Utility*. For 151 sector funds, CRSP does not provide this information. Among these 151 funds, 82 are “global sector funds”<sup>15</sup>. The control sample includes 4514 equity funds for which the “Strategic Insight Fund Objective” provided by CRSP is “growth” or “growth and income”. For 1323 sector funds and 4223 equity funds, the CRSP database provides cross-sectional data on management characteristics.

For performance evaluation, we have considered a sample of 85 sector funds and 302 equity funds. The funds in this sample have the following features: (1) available monthly returns for 10 years between 01/01/1980 and 31/12/2002; (2) available data for calculating flows at the fund; (3) available data on their security holdings in order to calculate their degree of sector concentration. Our choice guarantees a sufficiently large sample allowing robust cross-sectional analysis, a sufficiently long period for robust performance evaluation and a sufficient representativeness of dead funds in order to assess the survivorship bias. The percentage of dead funds in the sample intended for the performance analysis is approximately the same as for the entire set of equity and sector funds in the database.

CRSP adjust mutual fund monthly returns for dividend/capital distributions and splits. We use the broad CRSP Value Weighted Market Index as a benchmark<sup>16</sup>. This index is more

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<sup>15</sup> These funds invest in several low-correlated sectors and equity securities of companies that are based in any part of the world for diversification purposes

<sup>16</sup> The CRSP Value-Weighted Index is a Value-Weighted Portfolio built each calendar period using all issues listed on the NYSE/AMEX/NASDAQ exchanges with available shares outstanding and valid prices in the current and previous

representative of the fund's investment universe than the widely used S&P 500 index. Previous papers have shown that market timing performance measures are biased if the benchmark is not sufficiently representative for the fund's investment universe (Elton, 1993, Zakri and Janjigian, 1997). Additionally, we have considered Dow-Jones sector-specific indices corresponding to the industries in which sector funds invest<sup>17</sup>. The Dow Jones sector indices that best match our sample of sector funds are in the following sectors: Finance, Healthcare, Precious metals, Real Estate, Technology and Utility. Monthly returns for the S&P Composite 500 and for Dow-Jones matching sector benchmarks are calculated from total-return indices obtained with Datastream International. Monthly dividend-adjusted returns for the Value-Weighted CRSP Index are obtained from the CRSP US Monthly Stock Database. The risk-free rate of return is measured by the 30 day Treasury-bill rate.

The degree of sector concentration for sector and equity funds has been determined using data from the CRSP US Daily Stocks Database and the CRSP Mutual Funds Database. The mutual fund database gives information (as the amount invested) on the holding companies in which funds invest in 2000 and 2001. The stock database gives the SIC (Standard Industrial Classification) code for each holding company. This allows calculating the degree of sector concentration for each fund at the date at which the data on fund holdings is available in the CRSP Mutual Funds Database. The degree of sector concentration is measured by the Herfindhal index based on the percentages invested by the fund in each sector class. For each security in which the fund invests, the sector class is defined by the corresponding first digit of the SIC classification<sup>18</sup>.

The Herfindhal index may also be calculated based on the sectors or industries in which the fund invests, thus taking into account the first two or three SIC digits. These measures are however less relevant for our study because we are concerned by private information effects. The degree of sector expertise of a fund manager investing 50% in two sectors of the same sector class (say "Services") is higher than that of a fund manager investing 50% in two different sector classes (say "Services" and "Finance"). Using the Herfindhal index based on the first two or three SIC digits would erroneously produce similar degrees of sector concentration for the two funds. In order to assess the robustness of our results, we have used an alternative measure of sector concentration: the percentage invested in the sector class in which the fund invests the most. The results obtained using this measure of sector concentration are similar to those using the Herfindhal index and hence will not be exposed in this paper.

We eliminate funds for which the data on fund holdings are not sufficient. For some funds, the CRSP Mutual Fund database provides the name and the amount invested in the holding company but does not provide the permanent number identifying that company. This is problematic for finding the corresponding SIC code. For the concerned holding companies we have performed a one by one comparison between the company name as in the CRSP Mutual Fund Database and as in the CRSP Stock database. This allowed determining the correspondent SIC code for the holding company in the CRSP Stock database. Moreover, some holding companies were not in the CRSP Stock database because they are foreign companies. The SIC code for most of them has been found in the Disclosure Database on CD-Rom.

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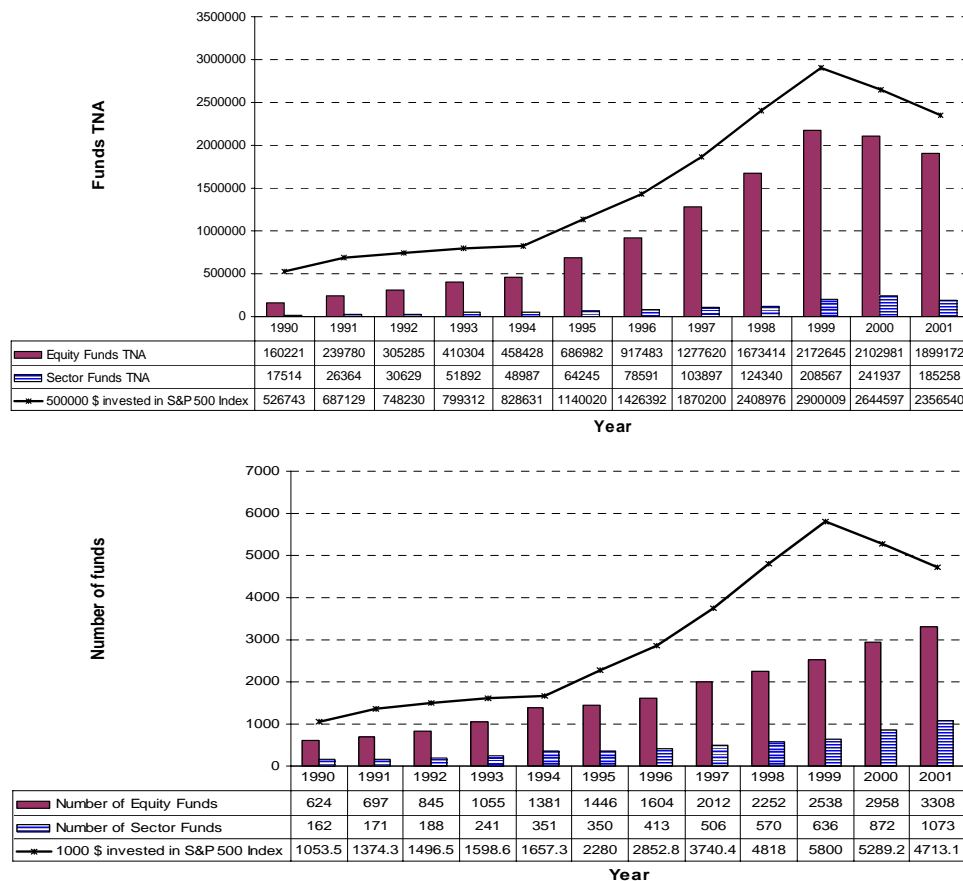
periods, excluding American Depositary Receipts. Issues are weighted by their market capitalization at the end of the previous period. Index levels of CRSP Market Indices are set to 100 on December 29, 1972.

<sup>17</sup> Rennie (1990) shows that benchmarks reflecting the fund's objective are meaningful. Performance measures using such indices indicate the fund's performance relatively to its investment objective.

<sup>18</sup> There are 10 sectors classes corresponding, more or less, to the 11 divisions of the SIC classification system.

## 2 SAMPLE DESCRIPTION

Figure 1 presents the number and total net assets (TNA) for sector funds and diversified equity funds in existence each year between 1990 and 2000 on the American market<sup>19</sup>. The number of sector funds has rapidly increased particularly from 1998 to 2001. The growth rate is 37% in 2000 and 23% in 2001 compared to 16% in 2000 and 11% in 2001 for equity funds in a period in which the S&P 500 has strongly declined. In 2000 and 2001, the number of sector funds represents 29% and respectively 32% of the number of equity funds while sector funds TNA represent about 11% and, respectively, 9% of equity funds' TNA.



**Figure 1. Number and TNA for Sector and Equity funds.** The figure presents the number and TNA of sector funds and equity funds in existence each year from 1990 to 2001 on the American market. The data are from the *CRSP Survivorship-Free Mutual Fund Database*. We have included the S&P 500 Composite level for comparison.

Table 1 presents management characteristics for all sector funds for which sufficient data is available. There are some important differences between equity and sector funds and between sector funds themselves (the table reports the results of the corresponding *t*-tests, *F*-tests and Chi-square tests when it applies). The first column in Table 1 confirms what is generally stated in the popular press: managers run sector funds for fewer years than equity funds. The

<sup>19</sup> Total Net Assets (TNA) are the closing market value of securities owned, plus all assets, minus all liabilities. TNAs are reported in millions of dollars. Equity funds are growth and "growth and income" funds according to the "Strategic Insight Investment Objective" classification provided by the CRSP database.

highest level of manager rotation is for technology funds for which a manager administers the fund approximately 2 years. The system of rotating sector fund managers is considered as an opportunity for them to acquire broad market experience. As it was expected, TNA for equity funds tend to be higher than for sector funds (column 3). This is because equity funds are in longer existence than sector funds (column 2) but another possible explanation is that sector funds have a narrower investment objective.

The most important difference between the two categories of funds comes from fund yields and, above all, from their turnover. Sector funds have higher distribution flows, undoubtedly because these funds are for aggressive, income-seeking investors. Another possible explanation of this is the high level of turnover for sector funds (183% against 88% for equity funds). Any realized capital gains that are not offset with capital losses must be distributed to shareholders. The aggressive active management explains the spectacular turnover rate for sector funds. The frequent unexpected shareholders' redemptions and management changes<sup>20</sup> for these funds may also explain the high turnover rate. Among the economic sectors, the highest turnovers are for natural resources and technology while the lowest are for real estate and utility. These differences may be explained by the nature of the business activity, which is rather homogeneous for real estate and quite heterogeneous, with a more aggressive management, for technology.

**Table 1**  
**Management Characteristics for Equity and Sector Funds**

The table presents the management characteristics for 4223 equity funds and 1323 sector funds on the American market as of 31/12/2002. "Number of Managers" is the ratio between the number of managers administrating the fund and the number of years from the funds' inception. Total Net Assets ("TNA") is the closing market value of securities owned, plus all assets, minus all liabilities. TNA are reported in millions of US dollars. "Yield" (end-of-period) is the total income earned (or lost) in percentages over the calendar year. It is the sum of the income distributions divided by the net asset value on the last trading day in December. This does not include fund maintenance fees. The "Turnover" (over the calendar year) is the minimum of aggregate purchases of securities or aggregate sales of securities, divided by the average Total Net Assets of the fund. Maximum Front-End Load Fees ("Maximum Load") are the maximum sales charges applied at the time of the initial purchase. Maximum deferred sales charges ("Other Load") are the maximum sales charges the investor owes when withdrawing money from an investment. Redemption fees are fees charged to shareholders who sell fund shares within a short period of time. "Expenses" (over the calendar year) designate the percentage of the total investment that shareholders pay for the mutual fund's operating expenses. "Dead" represents the number of dead funds divided by the total number of funds for each category considered.

	Number of Managers per year	Number of years	TNA (M\$)	Yield (%)	Turnover (%)	Maximum Load (%)	Other Load (%)	Expenses (%)	Dead (%)
Equity Funds (4223)	0.34	14.10	346	0.42	0.88	1.29	0.99	1.43	0.22
Sector Funds (1323)	0.41	11.63	137	0.79	1.83	1.39	1.09	1.81	0.24
<i>Finance (103)</i>	0.35	17.79	137	0.27	1.94	1.49	1.30	1.72	0.10
<i>Real Estate (171)</i>	0.40	7.32	76	2.47	0.65	1.13	1.02	1.70	0.23
<i>Precious Metals (66)</i>	0.27	10.61	53	0.77	1.01	1.79	0.90	1.89	0.49
<i>Natural Resources (93)</i>	0.27	10.52	69	0.55	2.63	1.34	1.09	1.87	0.20
<i>Health (147)</i>	0.40	17.20	228	0.05	1.68	1.37	1.15	1.86	0.04
<i>Technology (451)</i>	0.53	7.54	171	0.17	2.10	1.35	1.17	1.91	0.26
<i>Utility (138)</i>	0.31	10.14	193	2.31	0.95	1.52	1.15	1.48	0.32
Test of difference in means between sector/equity funds <sup>1</sup>	8.07***	3.16**	4.68***	-12.40***	-11.67***	-1.35	-1.69*	-16.46***	2.49
Test of difference in means among sectors <sup>1</sup>	18.54***	5.96**	2.37***	154.96***	3.47***	1.43	0.53	5.05***	85.42***

<sup>1</sup> Three, two and one stars correspond respectively to a significance level of 0.01, 0.05 and 0.10. For quantitative variables, the test of differences between means is a *t*-test while the test of differences among sectors is an *F*-test. For the categorical variable "Dead", we provide the Pearson Chi-Square.

<sup>2020</sup> The reason is that each new manager creates a portfolio reflecting his own investment style. This implies the selling and replacement of a certain number of existing securities.

Because sector funds are actively management, their expense ratios are higher than for equity funds. Table 1 shows that this is the case for each sector. Expenses are used for paying high trading costs induced by the aggressive portfolio management. The mean expense ratio for sector funds is 1.81% of the TNA, which is 26% higher than the 1.43% expense ratio for equity funds. Expense ratios are also different across sectors. The aggressiveness of the business activity in sectors like technology or natural resources may explain the high level of expense ratios. Front-end loads for sector funds are also higher than for equity funds. This result may indicate the necessity to recover larger research costs for sector funds (the difference in means for the two categories is, however, not significant at the 5% level).

The last column in Table 1 presents the proportion of dead funds for each fund category and each sector. The survivorship rate is higher for equity funds but the difference with sector funds is not significant. The highest survivorship rates are for finance and health while the lowest are for precious metals, utility and technology. Table 2 presents the differences in management characteristics for dead versus alive funds and for sector versus equity funds. Surviving funds are, naturally, longer in existence and have higher TNA than dead funds. Surviving funds are also affected by a higher number of management changes, distribute higher yields and incur higher expenses, fees and loads. Their turnover is lower but the difference in means between dead and alive funds is not significant.

**Table 2**  
**Differences in Management Characteristics for Dead and Surviving Funds**

The table presents management characteristics for 4223 equity funds and 1323 sector funds on the American market as of 31/12/2002 for the dead and the surviving sample. For each fund category and each characteristic we provide the mean value and the difference in means between the dead and the surviving funds' sample.

	Sector funds			Equity funds		
	Dead	Surviving	<i>t</i> -value for difference in means	Dead	Surviving	<i>t</i> -value for difference in means
Number of years	5.14	13.56	-5.51***	6.30	16.18	-10.59***
Total net assets (TNA)	31.48	169.49	-4.78***	60.01	425.72	-6.10***
Number of managers per year	0.49	0.39	5.04***	0.38	0.33	4.40***
Yield	1.28	0.64	6.49***	0.62	0.37	10.02***
Turnover	1.05	1.51	-1.49	0.39	0.46	-1.45
Maximum loads	1.65	1.31	2.33**	1.48	1.24	2.81***
Other loads	1.13	1.07	0.45	0.90	1.02	-1.69
Expenses	1.93	1.77	3.11***	1.51	1.41	4.06***

### 3 SECTOR FUND PERFORMANCE

In this section we analyse the market timing and the selectivity performance of 159 sector funds and 730 equity funds on the American market. We begin by investigating the existence and the performance of market timing strategies since the existence of such strategies affects the measures for selectivity performance. In order to assess the known issues concerning the model/benchmark misspecification for aggressively managed funds we will consider several models/benchmarks and we will check the sensitivity of our results.

### 3.1 MARKET TIMING MODELS

Market timing represents the dynamic allocation of capital among broad portfolios, generally the market portfolio and cash. Managers with private market timing information change portfolios weights accordingly. Treynor and Mazuy (1966), hereafter TM, suggest the following specification in order to evaluate the manager's market-timing ability:

$$r_{it} - r_{ft} = \alpha_i + \beta_{1i}(r_{mt} - r_{ft}) + \beta_{2i}(r_{mt} - r_{ft})^2 + \varepsilon_{it} \quad (1)$$

In this model,  $r_{ft}$  is the risk-free rate of return,  $r_{it}$  is the return on the portfolio  $i$  at time  $t$ ,  $r_{mt}$  is the return on the market portfolio and  $\beta_{2i}$  measures the market-timing performance. If a manager possesses market-timing talents, his portfolio's return will be a convex function of the market portfolio return implying that the coefficient  $\beta_{2i}$  is positive. Henriksson and Merton (1981), hereafter HM, develop another type of test based on a small number of market exposures. If managers have only two target betas, the coefficient  $\beta_{2i}$  in the following regression is positive:

$$r_{it} - r_{ft} = \alpha_i + \beta_{1i}(r_{mt} - r_{ft}) + \beta_{2i} * D * (r_{mt} - r_{ft}) + \varepsilon_{it} \quad (2)$$

In this model,  $D$  is a dichotomic variable equal to  $-1$  if  $r_{mt} - r_{ft}$  is negative and  $0$  otherwise. The intuition of this model is the same as in the Treynor and Mazuy (1966) model: the term " $\beta_{2i} * D * (r_{mt} - r_{ft})$ " captures the convexity of the portfolios' return as a function of the market portfolio return if the manager is a superior market timer<sup>21</sup>.

Most empirical studies analyzing the market-timing performance of actively managed mutual funds use the two specifications described above. Surprisingly, the great majority of these studies obtain pessimistic results: mutual fund managers seem to perversely time the market. Ferson and Warther (1996) argue that the recurrent perverse market-timing ability documented in existing empirical studies is irrational because "*if the funds have actually superior information about future market moves but systematically get the direction wrong, then astute investors could take the opposite position and profit*". These authors specify a conditional Treynor-Mazuy model that takes account of the public information embedded in market indicators. Using conditional models, empirical results on fund performance become less pessimistic. We have estimated the conditional model of Ferson and Warther (1996) but our results do not change qualitatively relatively to those obtained using unconditional models. For expositional convenience we will expose only results using unconditional models.

### 3.2 MARKET-TIMING PERFORMANCE

We study the market timing for sector funds by using the Jensen, TM and HM specifications and we compare the results to those obtained for the control sample of equity funds. Two benchmark specifications are used: the first considers the diversified CRSP Value-Weighted index for the equity and sector funds sample and the second considers corresponding Dow-Jones sector indices for the sector fund sample. In order to assess the impact of the

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<sup>21</sup>The two methodologies give fundamentally similar results in existing empirical studies. However, the Treynor and Mazuy (1966) specification is more widely used. The forecasters in the Henriksson and Merton (1981) model are less sophisticated: the market timers forecast either that stocks outperform bonds either the vice versa. In the quadratic models, they forecast how much better the superior investment would perform; therefore, managers have a more realistic and richer information structure.

survivorship bias, we provide the results for the restricted sample of surviving funds and for the whole sample (dead and surviving funds). Table 3 presents the results<sup>22</sup>.

**Table 3**  
**Market-Timing Performance for Equity and Sector Funds**

The table presents the market-timing performance for 302 equity funds and 85 sector funds between 01/01/1980 and 31/12/2002 on the American market. The estimated models are given in equations (1) and (2). The benchmark is the CRSP Value-Weighted Index. The following abbreviations are used: HM=Henriksson-Merton model; TM=Treynor-Mazuy model. The number of significant Beta2 coefficients (at the 10% level) is in parentheses. For the HM specification, we have included the mean Beta2 in parentheses and its significance level (three, two and one stars correspond respectively to a significance level of 0.01, 0.05 and respectively 0.10).

Fund category	Model	Beta1	Beta2	Number of positive Beta2	Number of negative Beta2	R <sup>2</sup>
Equity	HM	0.99	0.04**	212 (29)	90 (6)	0.81
	TM	0.97	0.09***	192 (37)	110 (20)	0.81
Sector	HM	0.80	-0.12***	27 (1)	58 (10)	0.47
	TM	0.85	-0.61***	29 (4)	56 (26)	0.47

Sector funds exhibit lower systematic risk (Beta1) and higher specific risk (R<sup>2</sup>) than equity funds. Table 3 shows in addition that sector/equity funds exhibit significant negative/positive market-timing performance whichever the model specification. Indeed, the mean Beta2 is significantly positive/negative for equity/sector funds. In addition, the ratio between the number of positive and negative Beta2 is considerably higher/lower than one for equity/sector funds. This result strengthens those obtained by Dellva and al. (2001) and contradicts the popular belief that sector funds do not time the market<sup>23</sup>.

We have also tested the sensitivity of our results to the model specification by estimating the conditional model of Ferson and Schadt<sup>24</sup>. Results do not change fundamentally: equity funds still exhibit positive market-timing performance with conditional models while sector funds exhibit negative market-timing performance. We have also assessed the impact of the period

<sup>22</sup> The regressions are corrected using the White's (1981) methodology. Chen and Stockum (1986) propose a correction for the heteroskedasticity in a generalised Treynor-Mazuy specification. Their model assesses simultaneously the selectivity, market timing and the random-beta behaviour of mutual funds. Sector funds are affected by important inflows/outflows caused by highly speculative investors, inducing random-beta behaviour for these funds. We have estimated the Treynor-Mazuy model with the Chen and Stockum (1986) correction for heteroscedasticity but the results are not qualitatively different from using the traditional White's correction.

<sup>23</sup> A striking result, not exposed here, is the high sensitivity of the market-timing performance to the benchmark choice for equity funds. With the traditional S&P Composite 500, equity funds exhibit significant negative market-timing performance but they exhibit significant positive market-timing performance with the Value-Weighted CRSP Index. Also, the ratio between the number of funds exhibiting positive/negative Beta2 coefficients changes dramatically when the two alternative benchmarks are used. This shows that much care must be given to the benchmark specification. The CRSP index is more relevant since it is more representative of the funds' investment universe. It has also a higher explanatory power than the S&P 500 index. The perverse market-timing performance for equity funds using the S&P 500 index seems then to be driven just by the benchmark misspecification. Elton and al. (1993) note that mutual funds have historically stocks that are not in the S&P 500 Index. Consequently, performance measures using the S&P 500 index must be corrected by including a complementary equity index. Bello and Janjigian (1997) have extended the TM model by integrating the additional Wilshire 4500 Index, which contains stocks that are not in the S&P 500 Index. Without this accompanying index, they find perverse market-timing performance for equity funds using the S&P 500 index while, with this model extension, equity funds exhibit positive market-timing performance.

<sup>24</sup> For expositional convenience, we will not include these results.

choice on our results by estimating the market-timing models described above on previous non-overlapping, five-year periods. For each period, equity funds exhibit positive or non-significant market-timing performance whichever the model specification while sector funds exhibit negative market-timing performance.

For sector funds, the negative market-timing performance is thus robust to any model/period specification. We investigate further this intriguing result by controlling sector funds market-timing performance for unexpected flows. Following Edelen (1999), we reexamine the HM and TM models by adding a third regressor measuring the interaction between flow and market-timing. Regressions (1) and (2) become:

$$r_{it} - r_{ft} = \alpha_i + \beta_{1i}(r_{mt} - r_{ft}) + \beta_{2i}T_t + \beta_{3i}f_{it}^U T_t \quad (3)$$

where  $f_{it}^U$  is the *unexpected* flow at the fund  $i$  on the period  $t$  and  $T_t$  is the market-timing regressor:  $\tilde{T}_t = (\tilde{r}_{mt} - r_{ft})^2$  for the TM specification and  $\tilde{T}_t = D(\tilde{r}_{mt} - r_{ft})$  for the HM specification. For measuring the unexpected flow  $f_{it}^U$  we first determine the total net flow at the fund, denote it  $f_{it}^T$ , and then we subtract the predictable component. Following Sirri and Tufano (1998), we measure the net flow as the net growth in fund assets beyond reinvested dividends:

$$f_{it}^T = \frac{TNA_{it} - TNA_{i,t-1}(1 + r_{i,t-1})}{TNA_{i,t-1}} \quad (4)$$

where  $f_{it}^T$  is the total net flow at the fund  $i$  on the period  $t$ ,  $TNA_{it}$  is the TNA of fund  $i$  on the period  $t$  and  $r_{i,t-1}$  is the fund's return over the prior period. The total net flow measures the fund growth in excess of the growth that would be attributed exclusively to the return on the period, had no new inflows/outflows occurred and had all dividends been reinvested<sup>25</sup>. The CRSP Mutual Fund database provides data on monthly TNA after 1990. Using these data we have estimated time-series flow data for the sample of 87 sector funds and 302 equity funds. We consider only funds for which more than 8 years of flow data are available. As in Warther (1995), we find a strong autocorrelation between fund flows, implying that they are highly predictable.

For the great majority of funds, the first, the second and the third lags are all statistically significant in predicting the fund flow. We have used standard Box-Jenkins diagnostics to identify the flow time-series properties. Then, we have estimated an AR(3) model as in Warther (1995) in order to separate the expected flow from the unpredictable flow component  $f_{it}^U$ . This latter is the residual from the model and we consider it in the regression (3). We provide only results using the more relevant CRSP Value-Weighted benchmark. These results are presented in Table 4.

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<sup>25</sup> Equation (4) supposes thus that the fund TNA follows a random walk.

**Table 4**

**Market-Timing Performance for Equity and Sector Funds**

The table presents the market-timing performance for 302 equity funds and 85 sector funds between 01/01/1980 and 31/12/2002 on the American market. The following abbreviations are used: HM=Henriksson-Merton model; TM=Treynor-Mazuy model. The models are extended in order to control for the unexpected flow at the fund as in equation (3). The number of significant Beta2 coefficients (at the 10% level) is in parentheses. For the HM specification, we have included the mean Beta2 in parentheses and its significance level (three, two and one stars correspond respectively to a significance level of 0.01, 0.05 and 0.10).

Fund category	Model	Beta1	Beta2	Number of positive Beta2	Number of negative Beta2	R <sup>2</sup>
Equity	HM	1.00	0.05***	215 (25)	87 (3)	0.79
	TM	0.97	0.16***	196 (39)	106 (8)	0.80
Sector	HM	0.79	-0.09*	41 (5)	44 (8)	0.45
	TM	0.82	-0.24	41 (4)	44 (8)	0.47

The results in Table 4 strengthen those obtained by Edelen (1999) on equity funds. A large part of the negative market-timing performance found previously can be attributed to the unexpected flow on the fund. For the two model specifications, the number of sector funds exhibiting positive/negative market-timing performance is approximately the same. In addition, the mean Beta2 is no more significant for the TM specification and is significant at the poor level of 10% for the HM specification. The “perverse” market-timing performance is thus engendered by the negative effect of unexpected flows on the fund performance.

In order to gain supplementary insights on the market-timing performance of sector funds, we have performed a cross-sectional stepwise regression between the market-timing performance as measured by the Beta2 coefficient from the TM model and sector fund management characteristics (see Table 5).

$$\beta_{2i} = \gamma_0 + \gamma_1 TNA_i + \gamma_2 SC_i + \gamma_3 TR_i + \gamma_4 EXP_i + \gamma_5 TL_i + \gamma_6 NY_i + \gamma_7 NM_i + \varepsilon_i \quad (5)$$

where:  $\beta_{2i}$  is the market-timing performance estimated in equations (1) or (2);  $TNA$  are the fund’s total net assets;  $SC$  is the fund’s degree of sector concentration;  $TR$  is the turnover rate;  $EXP$  is the expense ratio;  $TL$  are total loads;  $NY$  is the number of years since the fund inception;  $NM$  is the number of managers per year (see Table 1 for more details). We present results with the TM specification only (those obtained with the HM specification are similar) and we use the more relevant CRSP Index as a benchmark. Independent variables are ordered according to their inclusion in the stepwise regression procedure. We have considered only variables adding a significant 5% explanatory power to the regressions. Results are presented in Table 5.

**Table 5****Market-Timing Performance and Funds' Management Characteristics: Cross-Sectional Regression**

Cross-sectional regression between the market-timing performance of 85 sector funds on the American market between 01/01/1980 - 31/12/2002 and their management characteristics. The regression specification is given in equation (5). The market-timing performance is measured by the Beta2 coefficient from the HM specification. See Table 1 for a description of the explanatory variables. Independent variables are ordered according to their inclusion in the stepwise regression procedure. We include only variables adding a significant 5% explanatory power.

Variable	Intercept	TNA	Concentration	Turnover	Number of years	Expenses
Beta		0.34	-0.25	0.19	0.13	-0.13
<i>t</i> -value	-0.85	3.39	-2.64	1.92	1.41	-1.35
<i>p</i> -value	0.396	0.001	0.009	0.05	0.16	0.17
R <sup>2</sup> (adjusted)		0.16	0.24	0.26	0.28	0.29

The most significant variables are total net assets (TNA), the Herfindhal index measuring the degree of sector concentration and turnover. Small, highly specialized funds are exhibit the poorest market-timing performance. This substantiates the hypothesis that the perverse market timing for sector funds is induced by unexpected cash inflows/outflows from aggressive investors. Unexpected flows at the fund should affect mostly small, concentrated funds. In addition, Table 5 shows a significant positive relationship between market-timing performance and turnover. A positive relationship between turnover and fund performance is a common result in the financial literature (Grinblat and Titman, 1994). The effect of the turnover rate on fund performance is subject of debate. To a certain extent, the turnover reflects the buying and selling in the fund portfolio, which may improve the fund performance if the manager is a good market timer. But there are other factors out of the manager's control, such as unexpected redemptions, money inflows and management changes, lowering the fund's performance. The positive relationship between market-timing performance and turnover for sector funds shows that the expected flow component has a higher impact on the fund performance than the unexpected component.

**3.3 SELECTIVITY PERFORMANCE**

The academic literature on funds selectivity performance is rich and covers several decades. Most of studies show a lack of superior selectivity performance for diversified funds. Concerning sector funds, we have shown previously that existing studies report puzzling results. Table 6 presents our results on the selectivity performance using the traditional Jensen's alpha and the alphas derived from the two market-timing models considered in our study (TM and HM). Our previous section shows that a relevant analysis of the selectivity performance should take great care about the benchmark specification and the existence of market-timing strategies. We perform separate analyses for the complete samples of equity/sector funds and for the surviving-only funds samples in order to assess the importance of the survivorship bias.

**Table 6**

**Selectivity Performance for Equity Funds and Sector Funds**

The table presents the selectivity performance of 302 equity funds and 82 sector funds on the American market between 01/01/1980 - 31/12/2002. Three regression specifications are considered for estimating the funds' alphas: the traditional Jensen specification, TM as in equation (1) and HM as in equation (2). The benchmark is the Weighted-Value CRSP Index. Alphas are in percentage. We provide the *t*-value for the test of alpha mean against zero and for the test of difference in alpha means between equity and sector funds. For the HM and TM models, we provide the mean alphas and the number of positive/negative alphas followed by the number of significant alphas (at the 10% level) in parentheses. Three, two and one stars represent a significance level of 1%, 5% and respectively 10%.

Category	Performance	Model		
		Jensen	HM	TM
Equity Funds	Alpha (%)	-0.01 (-1.27)	<b>-0.09</b> (-5.69) <sup>***</sup>	<b>-0.03</b> (-2.47) <sup>***</sup>
	N. positive alpha	149 (9)	95 (16)	123 (17)
	N. negative alpha	136 (31)	207 (46)	179 (44)
Sector Funds	Alpha (%)	0.05 (1.59)	<b>0.28</b> (4.46) <sup>***</sup>	<b>0.19</b> (4.15) <sup>***</sup>
	N. positive alpha	53 (8)	55 (15)	59 (14)
	N. negative alpha	30 (4)	30 (2)	26 (3)
<i>t</i> -value for difference in alpha means		<b>-2.61</b> <sup>***</sup>	<b>-8.23</b> <sup>***</sup>	<b>-6.47</b> <sup>***</sup>

Table 6 shows that sector funds exhibit superior selectivity performance relatively to equity funds, whichever the model specification (Jensen, HM or TM). Sector/equity funds exhibit significant positive/negative selectivity performance with the HM and TM specifications and non-significant selectivity performance with the Jensen specification. The number of sector funds exhibiting stock-picking abilities is significantly higher than the number of sector funds exhibiting negative market-timing performance. For equity funds the opposite applies. The only particular case in which sector funds exhibit non-significant selectivity performance is when the traditional Jensen's model is used with the CRSP index as a benchmark. But this model is less relevant for sector funds because it does not take into account the bias coming from the market-timing effect related to unexpected fund flows.

We complete our analysis by using matching Dow-Jones sector indices as benchmarks. This allows assessing the managers' selectivity performance inside their investment universe (the sector). A positive alpha means that the sector fund has done better than the corresponding sector index and its over-performance relatively to diversified indices is not driven by the good performance of the corresponding sector index. There are 72 sector funds in the sample for which we have found the matching Dow Jones sector index. Table 7 presents the results.

**Table 7****Sector Funds' Performance using Dow-Jones Industry-Specific Indexes**

The table presents the selectivity performance of 72 sector funds on the American market between 01/01/1980 - 31/12/2002 against matching Dow-Jones sector indexes. Three specifications are considered for estimating the funds' alphas: the traditional Jensen specification, TM as in equation (1) and HM as in equation (2). For each Jensen's alpha, we provide the *t*-value for the test of means against zero and for the test of difference in means between the equity and the sector fund sample. For the HM (Henricksson - Merton) and TM (Treynor - Mazuy) models, we provide the mean alphas and the number of positive/negative alphas followed by the number of significant alphas (at the 10% level) in parentheses.

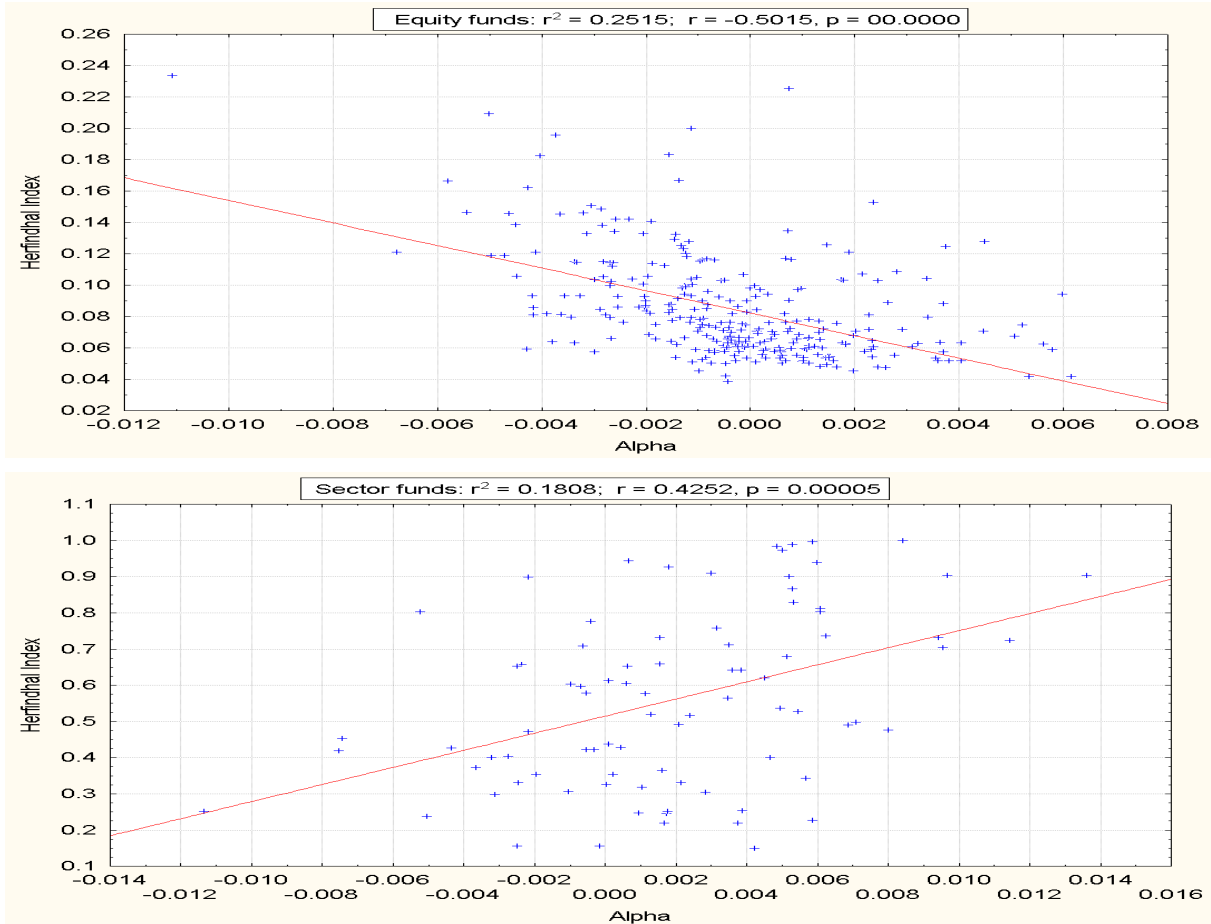
Performance	Model		
	Jensen	HM	TM
Alpha (%)	0.17 (1.91)*	0.77 (6.91)***	0.37 (4.74)***
N. positive alpha	57 (3)	63 (14)	62 (11)
N. negative alpha	17 (1)	11 (1)	12 (1)

The results show significant selectivity abilities for sector fund managers whichever the model specification (Jensen, HM or TM). Mean alphas from the Jensen and market-timing models are all significantly positive and are higher than mean alphas using diversified indices (Table 6). In addition, the number of funds exhibiting positive selectivity performance is to a large extent higher than for funds exhibiting negative selectivity performance.

#### 4 FUND PERFORMANCE AND SECTOR SPECIALISATION

This section analyses the link between the fund performance and its degree of sector specialisation. The degree of sector specialisation is measured by the Herfindhal index associated with the percentages invested by the fund in the 10 major groups of the SIC classification. We have also used alternative measures for approaching the degree of sector concentration: the percentage invested in the sector group in which the funds invest the most and the entropy measure. The resultants do not change fundamentally by using these measures. For expositional convenience, these results will not be included in this paper.

Figure 2 illustrates the link between equity and sector funds' performance as measured by the Jensen's alpha and the degree of sector specialisation. The pattern clearly shows a strong correlation between the two: the higher the sector specialisation, the higher the sector funds performance, while for equity funds the opposite applies.



**Figure 2. Selectivity performance for sector and equity funds and their degree of specialisation in the sector.** The figure presents the link between the selectivity performance and the degree of sector specialisation (Herfindhal index) for 302 equity funds and 85 sector funds on the American market between 01/01/1980 - 31/12/2002. The selectivity performance is measured by the alpha from the HM specifications as in (2).

In order to gain more insights on the link between the fund performance and the degree of sector specialisation, we perform a stepwise regression between the selectivity performance and the management characteristics for equity and sector funds:

$$\alpha_{2i} = \gamma_0 + \gamma_1 TNA_i + \gamma_2 SC_i + \gamma_3 TR_i + \gamma_4 EXP_i + \gamma_5 TL_i + \gamma_6 ML_i + \gamma_7 NY_i + \gamma_8 NM_i + \varepsilon_i \quad (6)$$

where:  $\alpha_{2i}$  is the selectivity performance estimated in the traditional Jensen model or in equations (1) or (2);  $SC$  is the degree of sector concentration;  $TR$  is the turnover rate;  $EXP$  is the expense ratio;  $TL$  are total loads;  $NY$  is the number of years from the fund's inception;  $NM$  is the number of managers per year (see Table 1 for more details). Table 8 presents our results. Independent variables are ordered according to their inclusion in the stepwise regression procedure. We present only variables adding a significant 5% explanatory power to the regression<sup>26</sup>.

<sup>26</sup> We do not include the results obtained with the other model/benchmark specifications or by considering the surviving-only funds sample because the results do not change fundamentally.

**Table 8**

**Selectivity Performance and Degree of Sector Concentration: Cross-Sectional Regression**

The table presents cross-sectional results for stepwise regressions between the selectivity performance and management characteristics for 85 sector funds and 302 equity funds on the American market between 01/01/80-31/12/2002. See equation (6) and Table 1 for more details. The order of the independent variables corresponds to their acceptance in the stepwise regression procedure. Only variables adding an explanatory power significant at 5% are considered. Three models are tested, in which the dependant variable is the traditional Jensen's alpha, the alpha from the TM model as in equation (1) and the alpha from the HM model as in equation (2). The benchmark is the Weighted-Value CRSP Index.

Sector funds (85 funds)					Equity funds (302 funds)				
Variable	Beta	t-value	p-value	R <sup>2</sup> (adj.)	Variable	Beta	t-value	p-value	R <sup>2</sup> (adj.)
<i>Jensen's alpha</i>									
Intercept		1.93	0.06		Intercept		6.01	0.00	
Expenses	-0.40	-4.19	0.00	0.15	Concentration	-0.40	-7.91	0.00	0.17
Concentration	0.34	3.57	0.00	0.25	TNA	0.19	0.05	0.00	0.22
Number of years	-0.11	-1.22	0.22	0.27	Expenses	-0.092	-1.76	0.07	0.23
<i>Alpha from the TM model</i>									
Intercept		1.08	0.27		Intercept		6.4	0.00	
Concentration	0.44	4.68	0.00	0.18	Concentration	-0.48	-9.91	0.00	0.25
TNA	-0.24	-2.44	0.01	0.22	TNA	0.16	3.34	0.00	0.28
Expenses	-0.21	-2.10	0.03	0.25	Expenses	-0.06	-1.29	0.19	0.28
Number of years	-0.14	-1.491	0.13	0.27					
<i>Alpha from the HM model</i>									
Intercept		1.27	0.20		Intercept		4.89	0.00	
Concentration	0.43	4.63	0.00	0.19	Concentration	-0.42	-8.36	0.00	0.19
TNA	-0.30	-3.10	0.00	0.28	TNA	0.15	3.03	0.00	0.22
Number of years	-0.19	-1.99	0.05	0.30	Expenses	-0.073	-1.51	0.13	0.22
Turnover	-0.14	-1.53	0.10	0.33					
Expenses	-0.11	-1.11	0.26	0.34					

The results show that the sector concentration is the most important variable for explaining the fund performance for the two categories of funds. This variable is systematically the first or the second variable accepted by the regression procedure whichever the model specification and fund category (equity or sector). For sector funds, this variable is significantly positively related to the fund's performance while for equity funds the opposite applies. The market-timing models (TM, HM) are more relevant in light of the previous results showing strong (involuntary) market-timing effects for sector funds. The explanatory power for these models is the highest and they consider the variable "concentration" in the first place.

After the sector concentration, the other important explanatory variable is the fund size (TNA). Smaller sector funds exhibit higher selectivity performance while the inverse applies for equity funds: smaller equity funds exhibit lower selectivity performance. The impact of the fund size on the equity fund performance may be related to the possibility of achieving sufficient diversification, whereas this seems not necessary for creating value in the case of sector funds. The variable "Number of years" (since the fund inception) has a negative sign for sector funds, meaning that more recently created sector funds are better performing than sector funds being longer in existence<sup>27</sup>. However, this variable is not significant and does not

<sup>27</sup> Similar results have been obtained by Khorana and Nelling (1997) for sector funds.

explain the selectivity performance for equity funds. The expense ratio does not explain equity funds' selectivity performance<sup>28</sup>. For sector funds, there is a negative significant relationship between expenses and performance. This may indicate that sector funds lower their expense ratios after obtaining superior performance<sup>29</sup>. The loads charged by the fund are negatively related to the equity fund performance<sup>30</sup> but this variable is not significant.

The link between the selectivity performance and the degree of sector concentration is not driven by the good performance of some sectors. We have estimated the traditional Jensen's model with matching Dow Jones sector indices for determining the alpha of the sector funds relatively to the sector in which the funds invests. Alphas are still significantly related to the degree of sector concentration and this last variable is still the first accepted by the stepwise regression procedure. The results are somewhat similar to those obtained using the traditional Jensen's model with diversified indices but less significant, as shown by the following table:

**Table 9**

**Sector Funds' Selectivity Performance using Matching Dow-Jones Indices and Funds' Characteristics**

Cross-sectional stepwise regression between the selectivity performance of 102 sector funds on the American market between 01/01/1980 - 31/12/2002 and their management characteristics. The regression specification is given by equation (6). The selectivity performance is measured by the traditional alpha using matching Dow-Jones indices. See Table 1 for a description of the explanatory variables. Independent variables are ordered according to their inclusion in the stepwise regression procedure. We include only variables adding a significant 5% explanatory power.

Variable	Intercept	Expenses	Concentration	Number of years	Total Loads	Total net assets (TNA)
Beta		-0.29	0.21	-0.14	0.15	-0.12
t-value	1.52	-2.54	1.89	-1.25	1.32	-1.08
p-value	0.13	0.01	0.06	0.21	0.18	0.28
R <sup>2</sup> (adjusted)		0.05	0.08	0.11	0.13	0.15

The positive relationship between sector fund performance and the sector concentration is not driven by particular subsets of sector funds either. Eliminating the funds invested in Finance, which are the most concentrated and the best performing on the period considered in this study, does not change the results of the cross-sectional regression. The same remains true if we eliminate funds invested in Technology, which are the most dispersed in terms of investment objectives and have performed the worst on the period considered in the study. For equity funds, the relation between the performance and the sector concentration is opposite whichever the model specification. As for sector funds, the market-timing models consider the variable "concentration" in the first place. The diversification seems to be the key performance driver for equity funds while for sector funds it seems to be the sector expertise.

<sup>28</sup> Other existing studies obtain similar results (Droms and Walker, 1994, Grinblatt and Titman, 1994).

<sup>29</sup> We would like to thank an anonymous sector fund manager having participated at the AFFI Conference, Paris, December 2002 for this suggestion.

<sup>30</sup> A similar result has been obtained by Droms and Walker (1994).

## CONCLUSION

Sector funds concentrate their investment in a specific economic sector. Their existence makes sense if managers are able to create significant value from the sector expertise. Our paper studies, for the first time, the link between the degree of sector-specialisation and the selectivity performance for sector funds in order to assess the value added by the sector expertise. The degree of sector specialisation is measured by the Herfindhal index based on the percentages invested by the fund in the 10 major sector groupings. For measuring the selectivity performance we have estimated conditional and unconditional model specifications with the Value-Weighted CRSP index and matching Dow-Jones sector indices as benchmarks. We document a strong positive relationship between the selectivity performance and the degree of sector specialisation for sector funds. This result is not driven by the performance of sector indices neither by specific categories of sector funds.

The strong relation between selectivity performance and the degree of sector concentration is robust to any benchmark/model/period specification. For equity funds the opposite applies: the higher their degree of specialisation, the lower their performance. Once again, this result is robust to the benchmark/model/period specification. Our results indicate that there is no "middle way" between diversification and specialisation: specialized equity funds and diversified sector funds seem to be the worst performers. These results contradict the arguments from the financial press stipulating that sector funds should guarantee a certain degree of diversification inside/outside their sector.

Another important conclusion is that one should take care at the model and benchmark specification when measuring performance for sector funds. The traditional performance model of Jensen is not well specified. Sector funds are aggressively managed, with high turnover rates, and exhibit strong market-timing effects. Market-timing models are more relevant for sector funds.

We have estimated traditional market-timing models and their conditional versions in order to take into account the effect of public information. The results show that sector funds exhibit significantly negative market timing performance. These results are stable whichever the period/ benchmark specification and are explained, in a large part, to the typical sector fund investor. We have controlled the market-timing performance for unexpected cash flows at the fund using the methodology proposed by Edelen (1999). This correction consists of adding in the traditional market-timing specifications a third regressor that measures the interactions between market-timing and unexpected cash flows at the funds. After this correction, the number of sector funds exhibiting negative market-timing performance is not significantly different from the number of funds exhibiting positive market-timing performance.

Our results also show that the selectivity performance for sector funds is significantly higher than for equity funds. After controlling for the market-timing effect using the TM and HM model specification, sector funds exhibit a positive mean abnormal annual return of approximately 2.4% relatively to the Value-Weighted CRSP index. The cross-sectional analysis indicates that the best stock-pickers are recent, small, highly concentrated funds having low expense ratios. For equity funds, the best stock-pickers are rather large, diversified funds. The worst market-timers performers are small, highly specialized sector funds with little turnover. Our results show that the negative market-timing performance is induced by funds' unexpected flows. This result relates to the individual sector fund investor

pouring/pulling money during bull/bear markets, implying cash overhang and frequent redemptions.

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