

# The Effect Of Market Structure On Mutual Fund Performance In Taiwan

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## ABSTRACT

*This paper illustrates the relationship between industry concentration and performance in Taiwan's mutual fund industry. Our research mainly focuses on the relation between a fund's average performance and market structure. Typically, a fund's manager who faces price uncertainty will dedicate his efforts to determine the scale and compositions of portfolio to achieve a better performance in the near future. Since mutual funds are price takers, the empirical results for this industry may go beyond the scope of the SCP paradigm.*

*This study focuses on the open-end equity mutual fund in the Taiwan market, which can be viewed as one representative of emerging markets. Employing three measures of market structure, we find that the higher degree of market concentration always associates with poor performance, which contradicts the structure-conduct-performance (SCP) hypothesis. More interestingly, when market shares of mutual funds have been considered, our empirical results show a U-shape structure-performance relation for mutual funds. When a fund's market share becomes larger, the negative influence on fund performance of market concentration will get stronger. Similarly, the smaller a fund's market share the stronger negative impact on fund performance of market concentration, suggesting that mutual funds endowed with too weak or too strong market power can erode their performance. More importantly, these results offer a new thinking toward the mutual fund industry's organization policy for authorities; that is, maintaining a high competitive environment and encouraging mutual funds to keep moderate and efficient scale is a better way to achieve superior fund performance.*

**Keywords:** Market Structure; Mutual Fund Performance; Market Share

## INTRODUCTION

*T*his paper illustrates the relationship between industry concentration and performance in Taiwan's mutual fund industry; a new field of research never explored before. Over decades, financial and economic wisdom mainly focused their attention on the relationship between market structure and firm's performance in banking. The lack of a relationship outside banking permits more space to examine how the degree of competition affects the performance of other financial institutions.

The accepted truth for mutual funds is that fund performance rises under a good market state and declines due to a bad market state, but no matter what record they hit, the only concern of each manager is to improve their rankings and then benefit managers' pecuniary rewards. Many things are interdependent in the mutual fund industry; for instance, a fund with performance improvement could worsen other funds' rankings, because their performance remained unchanged. The growth of one fund's assets size also implies that some other funds' size might shrink relatively even if their size actually keeps constant. In this way, the mutual fund industry can be reasonably regarded as a unique economic sector that might be influenced mostly by market competition. Following this line of thought, the degree of competition might affect the degree of interdependence among mutual funds, suggesting that fund managers are going to suffer losses while competitors advance. When the degree of competition becomes severe, any advancement from rivals will force managers to adopt much riskier decisions to catch up with the group ahead and vice versa. In absence of competition, fund managers who enjoy a monopoly may become complacent, turning more

funds into poor performers. Additionally, funds in different sectors might react differently to pressure stemming from market structure, which could strongly affect their portfolio decisions.

An alternative way to link market structure to fund performance is based on the accepted hypothesis of contemporary financial theory known as the structure-conduct-performance (SCP) hypothesis. The SCP hypothesis views the banking industry as imperfectly competitive and asserts that the performance of banks is closely related to the market structure; that is, higher concentration of bank assets commonly accompanies higher profitability because of increasing monopolistic rent.

Our research mainly focuses on the relation between a fund's average performance and market structure. Typically, a fund's manager who faces price uncertainty will dedicate his efforts to determine the scale and compositions of portfolio to achieve a better performance in the near future. Since mutual funds are price takers, the empirical results for this industry may go beyond the scope of the SCP paradigm.

In some way, funds in the same sector might be endowed with different market power, so it is interesting to investigate an issue where a fund with greater market power under severe competition can reap highly marginal benefits from their monopolistic status. In the same way, it is also worthy to examine whether the leading funds in the specific sector can make more money for their investors than small funds. In sum, the market structure theory gives us a totally new way to study the relation between market structure and fund performance that hasn't been explored, while exposing the root of fund performance.

## **LITERATURE REVIEW**

The analysis of mutual fund performance has received considerable attention, after studies originated by Sharpe (1966) and Jensen (1968). Beyond this strand of literature, the relationship between market structure and fund performance has long been ignored. In fact, researchers have long-standing concerns about the structure-performance relationship for common companies. Conventional wisdom of industrial organizations has by and large considered the industry as a homogeneous unit. From this point of view, companies within the same industry are quite similar. However, a growing body of empirical studies indicates that all firms in a typical industry are apparently not alike. An earlier study conducted by Porter (1979) argues that firms within the same industry, so-called strategic groups, would develop very different competitive strategies and earn considerable varied rates of return on invested capital.

According to Porter's findings, barriers to entry differ among strategic groups, which are primarily caused by a firm's characteristics within them. Additionally, the mutual dependent configuration of strategic groups will determine the degree of competition in the industry. In general, the barrier to entry of strategic groups within an industry makes firms face lower elasticity of demand and enjoy high profits. Hannan (1991) introduces an explicit model of the banking firm to examine the relationship between bank conduct and market structure implied by the SCP hypothesis. With the role of market share and concentration, Hannan's model provides an opportunity for investigating empirical implications of the SCP paradigm in banking.

The link between market concentration and bank performance has received considerable attention. However, very little is known about the structure-performance relation outside of banking. This lack of attention leaves more room for examining the SCP hypothesis outside this arena. Until recently, the related research presented by Hou and Robinson (2006) aimed at the relationship between industry concentration and common stock returns. Although their research is quite different from our goal, it still may provide a new perspective concerning how market structure can play a pivotal role in determining asset returns. Hou and Robinson's (2006) findings point out that due to a lack of innovation caused by a high concentration or insulation from undiversified distress risk, related to barriers of entry, firms in highly concentrated industries appear to earn significantly lower returns. In other words, severe market competition forces firms to engage in riskier decisions compensated by higher returns. Basically, Hou and Robinson (2006) view the degree of industry concentration as a proxy for the risk factor, such that firms with higher innovation/distress risk in competitive industries might carry higher stock returns to make up for risk.

From the perspective of financial theory, finding ways to identify superior mutual funds provides a challenge in testing the hypothesis about efficient markets. In general, finding potential factors that are related to a fund's performance can be separated into two sectors. The first is to investigate if fund managers truly possess timing or selection ability that can turn their funds into subsequent winners. Despite most research and little evidence of timing ability in monthly tests (Henriksson and Merton, 1981; Henriksson, 1984; Graham and Harvey, 1996; Treynor and Mazuy, 1966), Bollen and Busse (2001) show strongly supportive evidences for the ability by using daily data. The second is to examine if some explicit or implicit characteristics of funds could provide clues to help investors look for better performers (Droms and Walker, 1994; Grinblatt and Titman, 1994; Sharpe, 1966; Israelsen, 1998; Apap and Griffith, 1998; Indro, Jiang, Hu and Lee, 1999; Kallberg, Liu and Trzcinka, 2000; Dahlquist, Engstrom and Soderlind, 2000).

In common, fund characteristics can be categorized into two groups - original characteristics and derived characteristics. The former contains establishment scale, investment goals, sales loads, management fee ratio, redemption fee ratio, and fund age, all of which being stated in the prospectus prior to the issue date. Since these natural types of characteristics have been bound by the terms and conditions of a trust contract, these features can't be changed throughout a fund's life time. The latter includes portfolio turnover, past performance, fund size, risk taking, and holdings percentage (Indro, Jiang, Hu and Lee, 1999; Dahlquist, Engstrom and Soderlind, 2000; Chen, Jegadeesh, and Wermers, 2000; Berk and Green, 2004; Chen, Hong, Huang and Kubik, 2004; Kacperczyk, Sialm and Zheng, 2005). These types of characteristics can't be known among investors prior to the establishment date; moreover, they can vary substantially over time.

As stated above, a number of researchers have examined the relationship between fund characteristics and fund performance. However, none have tried to introduce the degree of market competition and the affect market structure can play in explaining fund performance. Thus, some points might need to be modified while SCP hypothesis has been considered.

According to basic tenets of economics, a monopolistic firm is likely to manipulate prices of products to exploit rents. On the contrary, there is no way for a competitive firm to set prices that have been given in both its output and its factor markets. For the mutual fund industry, prices of mutual funds can't be manipulated at will; otherwise any fund can make a windfall from its monopolistic status. As price takers, the market share of mutual funds can induce market power in relation to their quantities, not prices. Under price uncertainty, the only managerial decision is to allocate their fund flows among marketable securities, turning the issue into a quantity allocation decision. Furthermore, in classical economic wisdom, economic efficiency is in direct proportion to the level of the market competitiveness and a perfect competitive market has the highest efficiency. That is, production and resource allocation efficiency are highest under the condition of a perfect competitive market.

The traditional SCP paradigm predicts that higher seller concentration lowers the cost of collusion and breeds tacit or collusive behavior in firms. With monopolistic market power, all firms in the market can earn monopoly rents naturally. However, the traditional SCP hypothesis has been challenged by the efficient structure hypothesis presented by Demsetz (1973). His hypothesis argues that concentration is not a random event but rather the result of superior efficiency of the leading firms. Firms possessing a comparative advantage in production will become large and obtain high market shares; consequently, the market will become more concentrated.

## **BASIC FEATURES OF SAMPLE**

This study focuses on the open-end equity mutual fund in the Taiwan market, which can be viewed as one representative of emerging markets.

The open-end equity mutual funds sample, ranging over the period of April, 1988 to the end of 2003, is provided by Taiwan Economic Journal Data Bank (TEJ). In Taiwan, the number of funds has increased nearly thirty times, from 6 to 187, over the sample period. We first computed the cross-sectional averages of all observations in each year over the sample period and then computed the time series averages of the 183 months for each feature. Since this paper focuses on Taiwan's domestic equity funds, our sample includes common equity funds, technology stock funds, and small-cap stock funds in accordance with TEJ's classifications. Foreign-based funds, Taiwan-based

international funds, fixed income funds, and balanced funds were removed. In table 1, the average net asset value of the funds in this study is approximately 1.8 billion New Taiwan Dollars (NTD). The standard deviation is quite large because of significant dispersion among fund sizes. The mean fund flows either in the form of dollar amount or in the form of percentage, all is slightly negative. Because fund flows can enlarge total asset values directly, not surprisingly, the mean ratio of fund flows relative to fund size shows no dramatic change. However, the standard deviation value of dollar fund flows is also large. Such a strong dispersion in dollar fund flows is virtually due to the big difference among fund sizes. The average monthly turnover ratio of portfolios is nearly 32 in proportion to fund portfolio values, which is significantly larger than the U.S. mutual fund industry reported in Sapp and Tiwari (2004). Since large investors might be more rational than small ones, funds with larger account sizes representing these funds might be comprised by more stable investment, such as horizon investors, than those with smaller account sizes. The account size is defined as net asset value divided by the number of investors. The value is nearly 38 million NTD. To meet legal requirements of either minimum shareholdings percentage or cash-on-hand percentage, the average percentage of holdings largely stretches from 70% to 90% as expected. The maximum expense percentage is the sum of the management fee ratio, maximum front-end fee ratio, and other expenses. The average establishment scale of Taiwan's equity fund is slightly over three billion NTD, which is significantly smaller than the U.S. mutual funds.

Table 1: Description Statistics

	Mean	Median	25th Percentiles	75th Percentiles	Standard Deviation
Net Asset Value (\$ Millions)	1849	2659	2615	3515	1017
Turnover (%)	31.59	38.52	37.94	43.40	9.47
Fund Flow (\$ Millions)	-30.30	-4.38	-4.22	18.14	57.86
Fund Flow (%)	-2.29	-0.89	-0.68	0.41	3.86
Account Size (\$ Millions)	37.67	41.94	55.67	52.93	28.91
Shareholding (%)	75.59	80.89	76.96	84.20	12.45
Management Fee Ratio (%)	1.31	1.37	1.43	1.50	0.10
Maximum Front-end Load Fee (%)	1.32	1.40	1.53	1.71	0.24
Maximum Expense (%)	2.86	3.14	3.13	3.21	0.29
Establishment Scale (\$ Millions)	3240	3182	3034	3402	325
Market Share (%)	4.78	0.70	2.00	10.00	4.99
CR5 (%)	41.91	25.71	14.40	84.33	32.23
HHI (%)	7.57	3.45	1.29	15.26	7.78

## EMPIRICAL RESULTS

### The Influence of Market Concentration on Fund Performance

Despite that SCP hypothesis predicts higher profit of banks within a higher concentration market, Hou and Robinson's (2006) findings argue that the barrier to entry of non-financial industry caused from higher market concentration can lead to poor performers. Obviously, as price takers, to achieve higher future performance, the only choice for mutual funds is to determine their holdings level and its compositions.

A mutual fund's total asset consists of two elements - cash and shareholdings. The former is a risk-free asset and the latter is the risky portfolio. From the view of the quiet life hypothesis, the competitive fund managers will show greater incentive to overweight the risky holdings, while monopolistic fund managers will be inclined to raise their cash level, both of which certainly produce different performance. Briefly, if one would apply the SCP theory to the mutual fund industry, the outcome would result in a quantities allocation decision not prices.

To measure the performance of funds, the Carhart (1997) four-factor benchmarking model is employed. Following Sapp and Tiwari (2004), the alpha is calculated as the intercept from the monthly time series regression of portfolio excess returns on the market excess return (RMRF) and mimicking portfolios for size (SMB), book-to-market (HML), and momentum (WML) factors. The four-factor benchmarking model is given as

$$r_{p,t} = \alpha_p + \beta_{1,p}RMRF_t + \beta_{2,p}SMB_t + \beta_{3,p}HML_t + \beta_{4,p}WML_t \tag{1}$$

where  $r_{p,t}$  is the monthly return on fund  $p$  in excess of the one-month risk-free return at time  $t$ , RMRF is the excess return on a value-weighted market portfolio, and SMB and HML are returns on zero investment factor-mimicking portfolios for size and book-to-market. The WML is the return on the zero-investment factor-mimicking portfolio for one-year momentum in stock returns. With a minimum of 12 monthly return observations being required for estimation, the alpha is estimated for each fund from all available return data over the sample period.

To test the existence of the possible impact of industry concentration on fund performance, we grouped our sample into either one of the positive change in alpha portfolio or the negative change in alpha portfolio for each of three types of market concentration measures, respectively, and then computed the average degree of concentration for each alpha portfolio. In table 2, results showed the positive change in alpha portfolio having lower degrees of concentration than those of the negative change in alpha portfolio. Secondly, we categorized the sample funds in the opposite way by grouping the sample into either the higher concentration portfolio or the lower concentration portfolio and then computed the average change in alpha for each portfolio. This is summarized in the first and second columns of panel B. Panel B also presents the alphas per month of the arbitrage trading strategy by long in the high concentration portfolio and short in the low concentration portfolio. The t-statistics for the zero-investment portfolio indicated all are statistically significant. The results implies that fund managers who face a less competitive environment will be accustomed to quiet life, therefore becoming poor performers.

**Table 2: The Subsequent Performance of Mutual Funds for Different Measures of Market Structure**

<b>Panel A.</b>				
	$\Delta\text{Alpha} > 0$	$\Delta\text{Alpha} \leq 0$	$\Delta\text{Alpha} > 0$ vs. $\Delta\text{Alpha} \leq 0$	t-statistic
Number of Funds	136.17	130.39	5.77	5.86***
CR5 (%)	18.44	20.47	-2.03	-7.53***
HHI (%)	2.15	2.66	-0.51	-8.21***
<b>Panel B.</b>				
	$\Delta\text{Alpha}$		<b>High Concentration</b> vs. <b>Low Concentration</b>	t-statistic
	<b>High Concentration</b>	<b>Low Concentration</b>		
Number of Funds	0.09%	-0.13%	0.21%	1.95**
CR5 (%)	-1.15%	1.14%	-2.29%	-10.28***
HHI (%)	-1.08%	1.03%	-2.10%	-9.40***

\*significant at 10% level. \*\*significant at 5% level. \*\*\*significant at 1% level.

To implement our research, the regression equation was employed to understand the possible relationship between fund performance and market concentration. The equation (2) is specified as follows:

$$Fund\ Performance_{t+1} = \beta_0 + \beta_1(Concentration_t) + \sum_{j=2}^n \beta_j(Control\ Variables_t) \tag{2}$$

where the fund performance is the value of alpha under the four-factor benchmarking. We used three types of measures of industry concentration as major explanatory variables, respectively, including the number of funds, concentration of top-5 funds and HHI. The equation also contains several control variables, including the initial establishment size, fund age, total expense ratio, and fund type.

If the larger initial establishment scale of a mutual fund can benefit fund performance due to economies of scale, then the sign of its coefficient is expected to be significantly positive. However, Becker and Vaughan (2001) display an adverse relation between fund size and subsequent performance, caused by diseconomies of scale. In Table 3, every coefficient of the establishment scale is positive but insignificant, which obscures the evidence for the economies of scale.

As for the fund age, the young funds may be more likely to engage in holding risky assets or more active trading behavior. Blume (1998) documents that the young funds' Morningstar Ratings are more volatile than those of older funds. It is essentially because the young funds tend to tilt toward performance improvement aggressively. In addition to the attitude of risk taking, fund age also can serve as a measure for a fund's longevity or ability to survive in the highly competitive market. The significantly negative coefficients of fund age suggest that relatively poor performance of aging funds may be due to their conservative attitude in portfolio policy.

The last control variable, fund type, is a dummy variable. We set its value to be one for the equity fund and zero for the others. Theoretically, the bigger barriers can actually be within the sectors of industry, such as the investment goal, as well as the major compositions of portfolio. All of these can vary for different types of funds. The coefficients of fund type can be viewed as the relative contribution to fund performance due to the difference in terms of the density of available compositions within their investment goals. Empirically, despite all the coefficients of this dummy variable being positive, only one is marginally significant, which suggests that there is no clear line between equity funds and other funds, say, technology funds or small-cap funds.

Most importantly, the negative coefficients of the number of funds strongly suggest that the degree of market concentration may have a positive effect on a funds' performance. The number of funds has a significantly positive coefficient, which suggests that the more funds in the market, the better its performance. In other words, strong competitive pressure can inspire managers to make good use of their resources to achieve higher alphas.

**Table 3: The Impact of Market Concentration on the Subsequent Performance for Mutual Funds**

	(1) Concentration: No. of Funds	(2) Concentration: CR5	(3) Concentration: HHI
Intercept	-2.51	2.08	1.66
Concentration <sub>t</sub>	0.91***	-4.23***	-17.35***
Ln(Establishment Scale <sub>t</sub> )	0.09	0.01	0.08
Ln(Fund Age <sub>t</sub> )	-0.48***	-0.41***	-0.40***
Total Expense <sub>t</sub> (%)	-23.88	-11.47	-10.09
Fund Type <sub>t</sub>	0.36*	0.28	0.26
R <sup>2</sup>	0.0050	0.0048	0.0048
*significant at 10% level. **significant at 5% level. ***significant at 1% level.			

The same is true for the other two cases under different measures of market concentration. All the coefficients of CR5 and HHI are significantly negative, which demonstrates that lower market concentration puts much higher competitive pressure on fund managers, driving them to bring their skills into full play to achieve better fund performance.

Since the mutual fund industry is a typical competitive market, dropping the barriers to entry to increase the competitive level is a crucial way to maintain the edge in this industry. An easy way to help this industry flourish is to increase the number of funds.

More than a decade after the first steps toward deregulation and globalization, Taiwan's mutual fund market has been breaking down the barriers. Very little permission is granted to a few investment trust companies. In sum, our empirical results discovered that what is true for banking is not true for the mutual fund industry, simply due to substantially different attributes belonging to these two financial institutions.

**Market Share and Fund Performance**

Within the same sector, variation in performance may still remain among mutual funds because of factors related to operational efficiency.

Given a certain degree of concentration, can mutual funds with a larger market share earn far more returns than those with a smaller market share? This paper attempts to introduce more evidence to bear on this question to

investigate the correlation of market share and performance. We first rank the sample by its market share at the end of the month, and then we formed quintile breakpoints for market share based on their rankings. After grouping the sample into five market share quintiles, we again employ equation (2) to examine the relationship between structure and performance for each market share quintile.

Interestingly, in Table 4, in the case of the number of funds, the coefficients of the concentration measures show a strongly U-shape pattern, in which the middle market share has the largest contribution factor, and the value of contribution factor decreases gradually as market share becomes either larger or smaller. According to the empirical evidences, the lowest market share and the largest market share category both have the relative lower coefficients. Given a certain concentration, the lowest market share’s low performance suggests that too many funds flocked in the market could heighten the competitive pressure and cause performance compression. On the contrary, the lower performance of the largest market share quintile suggests that too few funds in the market represents too few choices for the investors, which puts less pressure on fund managers, therefore turning their funds into poor performers.

Not only in the case of the number of funds, the cases of top-5 concentration and HHI concentration both have significant U-shape impacts on the alphas as market share increases or decreases. These results all have the same explanations as the case of using the number of funds as concentration measure.

**Table 4: The Impact of Market Concentration on the Subsequent Performance for Mutual Funds for Market Share Quintiles**

Market Share Quintiles	(1) Concentration: No. of Funds			(2) Concentration: CR5			(3) Concentration: HHI		
	1 (Low)	3 (Middle)	5 (High)	1 (Low)	3 (Middle)	5 (High)	1 (Low)	3 (Middle)	5 (High)
Intercept	-2.06	-4.04	3.80	1.95	1.49	8.54*	1.56	1.34	8.18*
Concentration <sub>t</sub>	0.85***	1.02***	0.75***	-4.39***	-4.00***	-4.06***	-18.73***	-14.93***	-17.78***
Ln(Establishment Scale <sub>t</sub> )	0.12	0.24	-0.26	0.16	0.19	-0.31	0.16	0.16	-0.31
Ln(Fund Age <sub>t</sub> )	-0.29	-0.76***	-0.77***	-0.28	-0.64***	-0.75***	-0.28	-0.60***	-0.76***
Total Expense <sub>t</sub> (%)	-59.68*	-36.92	6.54	-50.97	-24.29	13.95	-51.95	-20.03	16.52
Fund Type <sub>t</sub>	0.52	0.50	-0.07	0.46	0.36	-0.09	0.43	0.33	-0.09
R <sup>2</sup>	0.0055	0.0061	0.0093	0.0058	0.0049	0.0099	0.0054	0.0041	0.0098
*significant at 10% level. **significant at 5% level. ***significant at 1% level.									

In sum, despite the negative effect the degree of concentration has on the subsequent performance of funds, the market share can also have a supplementary impact on fund performance. Our empirical results not only strongly suggest that the openness to competition in the mutual fund industry breeds strong performers, but also documents that such a benefit from competition can be eroded for the extremely large and extremely small funds.

**CONCLUSION**

In this paper, employing Taiwan’s open-end equity mutual fund data over the period 1988 to 2003, we find that deregulation of this emerging market raises demand for mutual funds which prompts the prosperity of the investment trust industry. As a result, this places a much higher competitive pressure on fund managers. Such a growing degree of competition truly benefits performance of mutual funds, which is contradicted by the SCP hypothesis.

Additionally, once the market share has been taken into account, our findings might contribute to the relatively lower performance of the large market share and small market share, which also suggests that keeping the modest scale in proportion to rivals in the mutual fund industry can be an added advantage to fund performance.

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