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Mutual Fund Size and Investible Decisions of Variable Life Insurance

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Abstract

We tested the relationship between flow-return and flow-fund characteristics relationship under different fund sizes by using quantile regression. We found that insured investors' purchase-performance is better than non-insured investors. We found that the relationship between fund inflows and fund performance was stronger among the insured investors of both large-scale and small-scale funds than it was among the noninsured investors. In addition, deferred compensation rates also influenced the purchases and redemptions of the

insured investors of large-scale funds. The relationship with performance was enhanced as purchase amounts increased.

Keywords: Mutual Funds, Fund Performance, Fund Size, Investment Behavior, Quantile Regression

1. Introduction

Large-scale funds can achieve the effects of economies of scale; that is, size can reduce management costs and increase profits, causing large-scale funds to generate fund flows greater than those of small-scale funds. Huang, Wei, and Hong (2007) stated that economies of scale increase fund visibility, which provides services and reduces barriers to investment because when funds are linked with large fund families, they attract an increased amount of net flow. The relationship between performance and flow also intensifies. Jank and Michael (2013) found that fund family scale influences the relationship between flow and performance; that is, large-scale fund families are accompanied by relatively high redemption and subscription rates. Sirri and Tufano (1998) used fund portfolio size and hypothesized that large-scale funds have higher visibility and brand awareness than small-scale funds do. This study examined whether large-scale funds grow at a large rate and exhibit superior performance. Li and Lai (2009) stated that fund scale influences investment performance. High total value of net assets in a fund results in a great probability of economies of scale. This can save transaction costs for the fund. In addition, the managers of large-scale funds are highly likely to possess sufficient funding for establishing superior portfolios. Chiu (2011) presented relatively weak evidence that indicated that large scales and high turnover rates in funds were associated with superior fund performance. As funds increase in size, their likelihood to attract professional talent and enjoy economies of scale increases, which can reduce transaction costs and relatively increase fund performance.

Shu et al. (2002) indicated that fund flows and performance during the previous period are positively correlated in large-scale funds. Large-scale funds with excellent investor redemption performance exhibited more prominently positive correlations compared with large-scale funds with dismal redemption performance. These results indicate that the investors of large-scale funds prefer to purchase funds for short-term profit and sell funds that do achieve short-term profit. In addition, the fund inflows and outflows of large-scale fund investors respond to past returns. This indicates that investors strive to duplicate previous performance. However, investors of small-scale funds behave differently. The fund outflows of small-scale fund investors do not respond to past performance. However, when recent fund performance improves, investors redeem a small number of shares from the fund. This indicates that investors do not seek short-term returns but instead hold funds with superior performance.

A number of scholars have also held that large-scale funds do not exhibit a strong relationship between fund performance and flow. Banz (1981) and Reinganum (1981) were the first to propose size effects. They found that small-scale investment portfolios have risk-adjusted returns that are significantly higher than those of large-scale investment portfolios. Zheng (1999) indicated that small-scale funds that use flow information have the chance to achieve positive excess returns. Pollet and Wilson (2008) indicated that small-scale funds are more likely to achieve excess returns than large-scale funds are. Kao, Chen, Tang, and Tsao (2005) used simulation analysis to investigate the correctness of mutual fund performance indicators and to test equity funds in the Taiwanese fund market. They found that because the Taiwanese fund market is small, funds should focus on small caps as investment targets, and the

subsequent scale effects will result in enhanced investment performance. Chen, Hung, and Lee (2001) found a negative correlation between fund scale and performance. However, they also indicated that the scale of asset management companies is positively associated with performance. This implies that managers find large-scale funds to have decreased operating flexibility, leading to inefficiency, which results in unsatisfactory performance. Therefore, in this study, we used fund scale to analyze the fund subscription and redemption behavior of investors. We further explored fund flow and fund performance by dividing funds into large-scale and small-scale funds.

In this study, we used the TEJ database to seek explanatory variables for exploring whether the characteristics of multiple groups of domestic stock funds resulted in various investment behaviors because of varying levels of risk. We divided investors into overall stock fund investors (Group A), insured investors (Group B), and noninsured investors (Group C). This paper is divided into five sections. In addition to the introduction, we define variable definitions and introduce the research sample, research period and range, and our methodology. We then explore the responses of various groups of domestic stock fund investors with investment-linked insurance policies toward varying levels of fund risk. Finally, we present our conclusion.

2. Variable definitions & Research Purposes

We used net inflows and net outflows as dependent variables. The $\text{inflow}_{i,t}$ is equal $\text{purchase}_{i,t}$ divided by $\text{total net assets}_{i,t-1}$ and $\text{outflow}_{i,t}$ is equal $\text{redemption}_{i,t}$ divided by $\text{total net assets}_{i,t-1}$. $\text{Inflow}_{i,t}$ expresses the inflow of fund i during month t. $\text{Outflow}_{i,t}$ expresses the outflow of fund i during month t. $Purchase_{i,t}$ is the subscription amount of fund i during month t. $Redemption_{i,t}$ is the redemption amount of fund i during month t. $\text{Total Net Assets}_{i,t-1}$ is the fund assets of fund i during month $t-1$. The calculation for this was $SIZE_{i.t}$ = ln (net asset value of fund i during period t).

According to the research background and motivation, the research purposes of this study are as follows: (a) To explore the relationship between fund inflows and the relationship between flow-return and flow-fund characteristics relationship under different fund sizes; (b) to explore the relationship between fund outflows and the relationship between flow-return and flow-fund characteristics relationship under different fund sizes.

3. Methodology

3.1 Quantile regression

Quantile regression (QR) is a type of regression analysis used in econometrics. Whereas the ordinary least squares (OLS) results in estimates that approximate the conditional mean of the response variable given certain values of the predictor variables, QR aims at estimating either the conditional median or other quantiles of the response variable (Koenker and Bassett, 1978). QR is also known as percentile regression because it can be used to estimate the percentile of the independent variable Y based on the dependent variable X. Based on the given percentiles, the estimated parameter values of various groups can be obtained.

The QR estimates are more robust against outliers in the response measurements. However, the main attraction of QR goes beyond that. In practice we often prefer using different measures of central tendency and statistical dispersion to obtain a more comprehensive analysis of the relationship between variables. Koenker and Bassett (1982) concluded that QR possesses robustness because under given regression parameters, the signs of the residuals remain unchanged during estimation, suppressing the influence on estimated values when extrema occur in the samples. Lee and Saltoglu (2001) considered the primary advantage of QR to be its ability to yield superior statistics using empirical quantiles.

The concept of QR proposed by Koenker and Bassett (1978) was based on least absolute deviation (LAD). An increasing number of scholars have recently adopted QR models to analyze financial data. Chen and Huang (2011) used QR to examine the relationship between fund governance and performance. The explained variable was defined as y_t, which can include fund flow, inflow, outflow, and fund performance, x_t was defined as the vectors of the explanatory variables, and t was defined as the number of sample observations (Kuan, 2003).

In a linear model for a given weight of θ $(0 < \theta < 1)$, the objective function of the θ^{th} quantile regression is estimated to be the weighted average absolute error.$V_T(\beta;\theta) = \frac{1}{T}\left[\sum_{t:y_t \geq x_t'\beta} \theta|y_t - x_t'\beta| + (1-\theta)\sum_{t:y_t < x_t'\beta}|y_t - x_t'\beta|\right]$.When θ is smaller (greater) than 0.5, the weight of the positive error of the objective function is smaller (greater), whereas that of the negative error is comparatively greater (smaller). Therefore, this quantile is located in the left (right) portion of the distribution. When θ = 0.5, the weights of the positive and negative errors are equal. Consequently, The equation is essentially identical to the objective function of the least absolute error method, and the estimated regression model is a 0.5 quantile (i.e., median) regression. The first-order condition for minimizing (1) is $\frac{1}{T}\sum_{t=1}^{T} X_t\left(\theta - 1_{\{y_t - x_t'\beta < 0\}}\right) = 0$. Where I_{A} is the indicator function for Incident A, and the optimal solution is the function of the θ^{th} quantile regression in the distribution under condition y_t.

3.2 Sample Description

We use the database for TEJ and life insurance companies in Taiwan. The research period was from January 1, 2001 to December 31, 2012. The data frequency is monthly data. The sample contained 143 months-worth of data. The variables are the names, fund sizes, Jensen's alphas, fund turnover rates, fund risks, and fund expense ratios for all of the domestic equity funds in Taiwan.

4. Results

4.1 Descriptive Statistics

Table 1 indicates that fund sizes shrank after 2008. Although the number of funds without investment-linked insurance policies decreased, their scale increased substantially. Despite the financial tsunami, they did not shrink substantially.

Table1. Descriptive statistics for fund size

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
A	1323.41	1432.28	1316.82	1466.73	1500.6	1607.94	2439	2377.38	2114.04	2139.56	2056.55	1886.14
B	1504.22	1548.52	1405.31	1480.94	1409.47	1485.93	2319.49	2253.63	1985.33	2003.02	1794.72	1619.77
C	460.01	639.24	655.39	1369.53	2335.04	4151.1	6091.45	5531.89	4143.24	4251.04	6206.27	6486.85

Note: We obtained our samples from the TEJ database. The sample data were from January 1, 2001 to December 31, 2012. Group A comprised overall domestic stock fund investors, Group B comprised insured investors, and Group C comprised noninsured investors. Variable definition: fund size is the net asset value per month during the study period, we get the log value of net asset value for mutual fund. The unit is million.

4.2 Statistical Analysis

To analyze the influence of various fund sizes on flow and performance, we separately performed quantile regression analysis on the large-scale and small-scale funds. Fund scale is a common research topic. Zheng (1999) indicated that small-scale funds that use flow information have the chance to achieve positive excess returns. Pollet and Wilson (2008) indicated that small-scale funds are more likely to achieve excess returns than large-scale funds are. In this study, we used a quantile regression model to cut fund flows into 10 equal quantiles and observed the relationships between quantiles, subscriptions, redemptions, and other fund characteristics. Tables 2 and 3 show the relationships between flows and performance in large- and small-scale funds.

4.2.1 The Relationship between Fund Inflows and Performance in Large-Scale Funds

Table 2 shows Group B's quantile regression analysis, which indicates a positive association between fund inflows and fund performance in large-scale funds. In addition, quantiles 0.1 to 0.9 were significant at a 1% level of significance. This indicates that fund inflows and performance had an intense and sensitive relationship for the insured investors. Performance was excellent when subscription amounts were high. These results are consistent with those of Shu et al. (2002) and Jank and Michael (2013). Shu et al. (2002) found that the inflows and outflows of large-scale fund investors respond to past returns. This indicates that investors seek to duplicate previous performance. The quantile estimation results for Group C indicate that none of the quantile results were significant for fund inflows. This indicates that the investors of Group C did not seek to duplicate past fund performance. These results differ from those of Group B.

The quantile results for both Group B and Group C indicate a positive association between fund inflows and fund expense ratios. In addition, this relationship was statistically

significant with weak fund inflows and typical fund inflows. This indicates that both insured and noninsured investors preferred to purchase funds with high subscription expense ratios. Although Sirri and Tufano (1998), Barber et al. (2005), and Jank and Michael (2013) did not analyze funds classified by size, they all found that high expense ratios promote high subscription rates in funds. Although this finding initially appears to be contrary to common sense, this positive association can be interpreted as a cause of expense ratios that act as a proxy variable for marketing expenses. Thus, high expenses increase the visibility of a fund and encourage more people to purchase the fund.

In the quantile regression for Group B, quantiles 0.1 to 0.9 were not significant. This indicates that investors did not consider risk when purchasing large-scale funds. The quantile regression for Group C revealed a significant and positive association during ordinary fund inflows and strong fund inflows. This indicates that high fund risk was associated with high fund inflows. This is consistent with the results of Jank and Michael (2013). Although investors redeem funds that are at high risk, after adjusting for risk in performance, fund risk and fund inflows are positively correlated. This indicates that although risk-averse investors redeem funds when fund risks increase, risk-loving investors replace them. Fund inflows and turnover were positively correlated for Group B. In addition, quantiles 0.1 to 0.9 were statistically significant. This indicates that turnover rates increased when the insured investors actively purchased funds. The analysis for Group C indicates that although fund inflows and turnover were positively correlated, this correlation was not significant under any of the conditional quantiles. Thus, insured investors influenced fund turnover when purchasing funds more than noninsured investors did.

4.2.2 The Relationship between Fund Inflows and Performance in Small-Scale Funds

Table 2 shows the quantile regression estimation results for Group B. Quantiles 0.1 to 0.9 were significant, with fund inflows positively correlated with performance. This indicates that when purchasing small funds, the protected investors purchased substantial amounts when performance was excellent. The quantile results for Group C indicate that the fund inflows and performance of small-scale funds were significantly positively correlated when fund inflows were strong. This indicates that investors purchased vigorously when performance was strong. Zheng (1999) indicated that small funds can use flow information to earn positive excess returns. The quantile regression results for Group B and Group C were not significant under any of the conditional quantiles. These results are consistent with those of Fu et al. (2010). Although Fu et al. did not analyze fund size, they found that fund risk was not significant when subscription and redemption rates were response variables. This indicates that investors do not thoroughly consider risk factors when purchasing and redeeming funds with advertisements. Thus, fund advertisements alter the risk attitudes of investors.

Table 2. Fund Inflows and Operating characteristics sensitivity of fund size for Group B and C.

Inflows	Quantiles	Large Group B		Large Group C		Small Group B		Small Group C	
		estimated coefficients	T value	estimated coefficients	T value	estimated coefficients	T value	estimated coefficients	T value
Jensen	0.1	0.012***	3.98	0.003-	0.78	0.013***	3.67	0.002-	0.77
	0.2	0.018***	4.99	0.001-	0.19	0.016***	6.35	0.01**	2.20
	0.3	0.022***	5.45	0.003-	0.73	0.016***	4.66	0.005-	1.02
	0.4	0.022***	5.96	0.004-	0.90	0.018***	3.97	0.009-	1.49
	0.5	0.022***	5.20	0.009-	1.64	0.024***	5.10	0.013**	2.13
	0.6	0.026***	5.04	0.012-	1.44	0.028***	6.05	0.016***	2.81
	0.7	0.033***	6.10	0.012-	0.94	0.031***	6.87	0.017**	2.53
	0.8	0.037***	7.26	0.01-	0.64	0.032***	4.01	0.023***	2.77
	0.9	0.04***	4.49	-0.009-	-0.21	0.038***	4.34	0.021-	1.37
Exp.	0.1	0.113***	3.51	0.029-	0.32	0.05*	1.90	0.033-	0.90
	0.2	0.089***	3.04	0.2**	2.45	0.083***	3.22	0.073-	1.51
	0.3	0.106***	3.04	0.179**	2.58	0.079***	2.68	0.091-	1.57
	0.4	0.117***	2.92	0.163**	2.15	0.094**	2.60	0.107-	1.42
	0.5	0.159***	2.88	0.169*	1.86	0.101**	2.00	0.058-	0.79
	0.6	0.221***	2.73	0.229*	1.94	0.105-	1.56	0.107-	1.58
	0.7	0.14-	1.55	0.139-	0.77	0.061-	0.68	0.108-	1.20
	0.8	0.092-	0.94	0.166-	0.62	0.11-	0.81	0.114-	0.70
	0.9	0.1-	0.63	0.524-	0.99	0.222-	1.39	0.286-	0.75
Risk	0.1	0.000	-0.94	0.001-	1.59	0.000	0.12	0.000	-0.02
	0.2	0.000	-0.79	0.000	0.58	0.000	-1.13	0.000	-0.14
	0.3	0.000	-1.01	0.001-	1.64	0.000	-0.96	0.000	-0.16
	0.4	0.000	-0.68	0.001**	2.05	0.000	-1.35	0.000	-0.01
	0.5	0.000	-0.73	0.001***	3.04	0.000	-1.27	0.000	0.98
	0.6	0.000	-1.00	0.001**	2.43	0.000	-0.59	0.000	1.15
	0.7	0.000	-0.49	0.002**	2.52	0.000	0.52	0.001-	1.56
	0.8	0.000	-0.91	0.003**	2.33	0.000	0.36	0.001*	1.83
	0.9	0.000	-0.44	0.004-	1.05	0.000	-0.13	0.001-	0.86
Turnover	0.1	0.001**	2.49	0.000	0.74	0.001***	3.73	0***	3.51
	0.2	0.001***	3.59	0.000	0.45	0.001***	3.78	0.001***	2.92
	0.3	0.001***	3.75	0.000	0.24	0.001***	3.97	0.001***	3.63
	0.4	0.001***	3.75	0.000	-0.06	0.001***	4.28	0.001***	3.63
	0.5	0.001***	3.01	-0.001-	-1.19	0.001***	4.23	0.001***	3.85
	0.6	0.001**	2.53	-0.001-	-1.24	0.001***	4.16	0.001***	2.85
	0.7	0.002***	2.82	-0.001-	-0.71	0.001***	2.88	0.001**	2.26
	0.8	0.003***	4.59	-0.001-	-0.54	0.001*	1.75	0.001**	2.36
	0.9	0.003***	3.78	0.000	-0.09	0.002*	1.71	0.001-	1.31
R-square		0.192		0.006		0.168		0.119	

Note: We obtained our samples from the TEJ database. The sample data were from January 1, 2001 to December 31, 2012. Group A comprised overall domestic stock fund investors, Group B comprised insured investors, and Group C comprised noninsured investors. The variables include Jensen, Exp., Risk, and Turnover. The significance levels of 10%, 5%, and 1% are signified by *, **, and ***.

4.2.3. The Relationship between Fund Outflows and Performance in Large-Scale Funds

Table 3 indicates that the fund outflows and fund performance of Group B were positively correlated. In addition, quantiles 0.1 to 0.9 were statistically significant. This indicates that investors did not redeem funds only when performance was unsatisfactory. When performance was strong, the investors of large-scale funds also took profits from the funds. These results are consistent with those of Ippolito (1992), Jank and Michael (2013), and Shu et al. (2002). Shu et al. (2002) stated that the majority of large-scale fund investors are small investors. Large-scale fund investors prefer to purchase funds for short-term profit and sell funds after obtaining this short-term profit. They also found that the fund inflows and outflows of large-scale fund investors respond to previous returns, which indicates that investors seek to duplicate past performance. Fund outflows and fund performance were positively correlated in Group C. This was significant for typical fund outflows (quantiles 0.4 to 0.6). In contrast to Group B, in which fund inflows responded strongly to performance, when the large-scale fund investors of Group C redeemed funds, the strength of fund inflows did not influence fund performance.

Fund outflows and fund risk were positively associated in Group B. However, this was statistically significant only at times of weak fund outflows. In addition, the relationship between fund risk and fund outflows did not change substantially. The relationship between fund outflows and fund risk in Group C was not significant under any of the conditional quantiles. Fu et al. (2010) held that investors do not thoroughly consider risk factors when purchasing and redeeming funds with advertisements because fund advertisements alter investors' attitudes toward risk. Although we did not analyze fund advertisements, the majority of sales of investment-linked insurance policies is communicated to consumers through high-volume DM or channel marketing tactics. Therefore, our results for Group B and Group C are consistent with those of Fu et al. (2010). The results for Group B indicate a positive association between fund outflows and fund turnover. This was statistically significant for quantiles 0.1 to 0.9. However, fund turnover did not change when fund outflows increased. Fund outflows and fund turnover were positively correlated for Group C. However, this correlation was not significant under any of the conditional quantiles. This indicates that fund turnover does not influence fund outflows.

4.2.4. The Relationship between Fund Outflows and Performance in Small-Scale Funds

Table 3 indicates that the regression results for Group B show a significant and positive correlation for quantiles 0.1 to 0.9. This indicates that when insured investors redeemed funds, they not only redeemed funds with unsatisfactory performance, but they also took profit from funds with superior performance. The redemption amounts of Group C were significant for quantiles 0.2 to 0.9 under every conditional distribution. This indicates that fund investors tended to redeem funds with strong performance vigorously. Quantiles 0.1 to 0.9 were statistically significant for the fund outflows and fund expense ratios of Group B. This indicates that the insured investors of small-scale funds preferred funds with high expenses ratios when redeeming funds. The fund outflows and fund expense ratios of Group C were statistically significant at quantiles 0.2 to 0.9. This indicates that investors preferred to

redeem funds with high expense ratios when redeeming funds. These results are identical to those of Group B, indicating that regardless of whether investors were insured, their redemptions influenced fund expense ratios. In Group B, fund outflows and fund turnover were statistically significant for quantiles 0.1 and 0.3 to 0.8. Increased turnover was associated with increased fund outflows. This indicates that insured investors vigorously converted their portfolios of investment targets. In Group C, fund outflows and fund turnover were statistically significant only when fund outflows were weak (quantiles 0.1 to 0.3). In addition, increases in fund outflow did not influence the sensitivity of flows and turnover.

Table 3. Fund Outflows and Operating characteristics sensitivity of fund size for Group B and C.

Outflows	Quantiles	Large Group B		Large Group C		Small Group B		Small Group C	
		estimated coefficients	T value	estimated coefficients	T value	estimated coefficients	T value	estimated coefficients	T value
Jensen	0.1	0.009*	1.95	0.002-	0.54	0.012***	3.19	0.008-	1.31
	0.2	0.016***	2.77	0.006-	1.49	0.014***	2.63	0.009*	1.69
	0.3	0.019***	4.26	0.01**	2.11	0.019***	3.46	0.012**	2.35
	0.4	0.022***	4.91	0.014**	2.44	0.023***	4.33	0.014**	2.10
	0.5	0.028***	6.31	0.013*	1.96	0.027***	4.70	0.017**	2.02
	0.6	0.028***	7.14	0.015**	2.14	0.025***	3.51	0.022**	2.10
	0.7	0.029***	6.81	0.018**	2.14	0.034***	4.44	0.023**	2.08
	0.8	0.032***	5.16	0.019-	1.32	0.039***	6.28	0.033***	2.96
	0.9	0.045***	5.44	0.02-	0.86	0.034***	3.87	0.044***	4.25
Exp.	0.1	0.173***	4.82	0.122-	1.46	0.156***	6.69	0.112-	1.42
	0.2	0.173***	4.22	0.239**	2.60	0.18***	4.86	0.235***	2.74
	0.3	0.204***	4.90	0.282***	3.14	0.254***	4.96	0.309***	3.89
	0.4	0.225***	4.07	0.376***	4.39	0.274***	4.90	0.325***	3.81
	0.5	0.228***	3.07	0.414***	4.11	0.216***	3.04	0.485***	5.31
	0.6	0.265***	2.65	0.451***	3.50	0.263***	2.88	0.574***	5.16
	0.7	0.274**	2.14	0.4***	2.62	0.266**	2.57	0.729***	6.26
	0.8	0.395***	3.07	0.565***	2.68	0.328**	2.35	0.623***	4.10
	0.9	0.372***	2.72	0.66*	1.77	0.494**	2.57	0.695***	4.12
Risk	0.1	-0.001**	-2.18	0.000	0.83	0.000	-1.33	0.000	-0.19
	0.2	-0.001*	-1.83	0.000	0.72	0.000	-0.65	-0.001-	-1.44
	0.3	-0.001-	-1.42	0.000	0.72	-0.001-	-1.20	-0.001-	-1.45
	0.4	0.000	-0.93	0.000	0.50	-0.001-	-1.24	0.000	-0.47
	0.5	0.000	-0.80	0.000	0.83	0.000	-0.35	-0.001-	-1.56
	0.6	0.000	-0.51	0.001-	0.93	0.000	-0.67	-0.001**	-2.10
	0.7	0.000	-0.57	0.001-	1.51	-0.001-	-1.10	-0.001**	-2.20
	0.8	-0.001-	-1.17	0.001-	1.15	0.000	-0.45	-0.001-	-1.45
	0.9	-0.001-	-1.52	0.002-	1.65	0.000	-0.39	0.000	0.26
Turnover	0.1	0.001**	2.28	0.000	0.32	0.001**	2.49	0.000*	1.88
	0.2	0.001**	2.24	0.000	-0.60	0.000	1.64	0.001***	3.02
	0.3	0.001**	2.33	0.000	-0.52	0.001*	1.69	0.000*	1.92
	0.4	0.001**	1.98	0.000	-0.76	0.001**	1.99	0.000	1.38

0.5	0.001***	2.67	0.000	-0.60	0.001**	2.38	0.000	1.25
0.6	0.001**	2.19	-0.001-	-0.65	0.001**	2.26	0.001-	1.49
0.7	0.001**	2.58	0.000	-0.19	0.002***	3.28	0.000	0.52
0.8	0.001*	1.67	-0.001-	-0.60	0.001**	2.16	0.002**	2.00
0.9	0.002**	2.03	0.000	0.16	0.001-	1.17	0.001-	1.63
R-square	0.168		0.044		0.125		0.059	

Note: We obtained our samples from the TEJ database. The sample data were from January 1, 2001 to December 31, 2012. Group A comprised overall domestic stock fund investors, Group B comprised insured investors, and Group C comprised noninsured investors. The variables include Jensen, Exp., Risk, and Turnover. The significance levels of 10%, 5%, and 1% are signified by *, **, and ***.

5. Conclusion

The relationship between insured investors and fund scale was also stronger than the relationship between noninsured investors and fund scale. This is consistent with the results of Huang et al. (2007) and Jank and Michael (2013), who held that the size of fund families influences the relationship between fund flows and funds. When such relationship is linked with large-scale fund families, an increased number of net flows are attracted.

Because fund size clearly has a varied influence on the relationship between flows and performance, we categorized the samples to analyze whether fund inflows and fund outflows varied in different fund types among different groups of investors. We found that the relationship between fund inflows and fund performance was stronger among the insured investors of both large-scale and small-scale funds than it was among the noninsured investors. In addition, deferred compensation rates also influenced the purchases and redemptions of the insured investors of large-scale funds. The relationship with performance was enhanced as purchase amounts increased. Shu et al. (2002) held that the majority of large-scale fund investors are small investors, investors who prefer to purchase funds and sell them quickly for profit to realize short-term gains.

The empirical results of this study also indicate that both insured and noninsured investors of large-scale funds preferred to purchase funds with high expense ratios and turnover. Expense ratios include advertising expenses. Thus, high expense ratios may increase the visibility of funds and encourage an increased number of people to purchase funds. These results are consistent with those of Jank and Michael (2013).

References

Banz, R. W. (1981). The Relationship Between Return and Market Value of Common Stocks. *Journal of Financial Economics*, *9*(1), 3-18. http://dx.doi.org/10.1016/0304-405X(81)90018-0

Barber, B. M., Odean, T., and Lu, Z. (2005). Out of Sight, Out of Mind: The Effects of Expenses on Mutual Fund Flows. *The Journal of Business*, *78*(6), 2095-2119. http://dx.doi.org/10.1086/497042

Chen, A. L., Hung, C. L., and Lee, W. C. (2001). The Properties of Mutual Fund Management Teams and Fund Performance. *Review of Securities and Futures Markets, 13*(3),

1-28. http://dx.doi.org/10.1111/j.1467-8683.2011.00858.x

Chen, C. R. and Huang, Y. (2011). Mutual Fund Governance and Performance: A Quantile Regression Analysis of Morningstar's Stewardship Grade. *Corporate Governance : An International Review*, *19*(4), 311-333.

Chiu, L. C. (2011). Fund Governance of Investment Trust Companies and Mutual Fund Performance. *Review of Securities and Futures Markets, 23*(2), 225-266.

Edelen, R. M. (1999). Investor flows and the assessed performance of open-end mutual funds. *Journal of Financial Economics*, *53*(3), 439-466. http://dx.doi.org/10.1016/S0304-405X(99)00028-8

Fu, Y.F., Kang, H.H., and Liu, H. C. (2010). Fund Advertising Effectiveness—Subscription and Redemption. *Taiwan Economic Review, 38*(3), 459-502.

Huang, J., Wei, K. D., and Hong, Y. (2007). Participation Costs and the Sensitivity of Fund Flows to Past Performance. *The Journal of Finance*, *62*(3), 1273-1311. http://dx.doi.org/10.1111/j.1540-6261.2007.01236.x

Ippolito, R. A. (1992). Consumer Reaction to Measures of Poor Quality: Evidence from the Mutual Fund Industry. *Journal of Law and Economics*, *35*(1), 45-70. http://dx.doi.org/10.1086/467244

Jank, S. and Wedow, M. (2013). Purchase and Redemption Decisions of Mutual Fund Investors and the Role of Fund Families. *The European Journal of Finance*, *19*(2), 127-144. http://dx.doi.org/10.1080/1351847X.2012.662908

Kao, L. F., Chen, A. L., Tang, H. W., and Tsao, M. L. (2005). Performance Measures for Mutual Funds: A Simulation Approach. *Sun Yat-Sen Management Review, 13*(3), 667-694.

Koenker, R. and Bassett, G. (1978). Regression Quantiles. *Econometrica*, *46*, 33-50. http://dx.doi.org/10.2307/1913643

Koenker, R. and Bassett, G. (1982). Tests of linear hypotheses and l1 estimation, *Econometrica*, *50*, 1577-1584. http://dx.doi.org/10.2307/1913398

Kuan, C. M. (2003). An introduction to quantile regression, lecture notes, Institute of Economics, Academia Sinica, http://www.sinica.edu.tw/~ckuan, (Oct.5, 2006).

Li, C. A. and Lai, H. C. (2009). The Effect of the Frequency of Mutual Fund Portfolio Disclosure on Fund Managers' Behavior. *Review of Securities and Futures Markets, 21*(3), 143-178.

Pollet, J. M. and Wilson, M. (2008). How Does Size Affect Mutual Fund Behavior? *The Journal of Finance, 63*(6), 2941-2969. http://dx.doi.org/10.1111/j.1540-6261.2008.01417.x

Reinganum, M. R. (1981). A New Empirical Perspective on the CAPM. *Journal of Financial and Quantitative Analysis*, *16*(4), 439-462. http://dx.doi.org/10.2307/2330365

Shu, P. G., Yeh, Y. H., and Yamada, T. (2002). The behavior of Taiwan mutual fund

investors—performance and fund flows. *Pacific-Basin Finance Journal*, *10*(5), 583-600. http://dx.doi.org/10.1016/S0927-538X(02)00070-7

Sirri, E. R. and Tufano, P. (1998). Costly search and mutual fund flows. *The Journal of Finance*, *53*(5), 1589-1622. http://dx.doi.org/10.1111/0022-1082.00066

Zheng, L**.** **(**1999**).** Is Money Smart? A Study of Mutual Fund Investors' Fund Selection Ability, *Journal of Finance*, *54*, 901-933. http://dx.doi.org/10.1111/0022-1082.00131