Analyzing the Mutual Fund Investment Behavior of Investment-Linked Insurance Policyholders: A Case Study of Life Insurance Company K

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Abstract

The investment targets linked to the investment-linked insurance policies sold by life insurance companies play a pivotal role in the mutual funds market. In this study, we investigated the relationship between fund flows and returns for various investment targets with varying degrees of risk and for various purchase and redemption methods and examined whether trade asymmetry existed in the relationship between fund returns in the domestic funds market and investment behavior. This study used the investment-linked insurance policyholders of Life Insurance Company K as observation samples. The results indicated that in the Taiwanese domestic funds market, the investment behavior of investors who purchased funds through investment-linked products differed from that of investors who purchased funds through general methods; however, the behavior of the first type of investor was similar to overall investor behavior. The portfolio-conversion purchases of the policyholders of Life Insurance Company K was positively affected by fund returns. When mutual fund performance was excellent, the policyholders tended to increase their investments through single additional purchases. This study investigated whether a difference existed between policyholders and other investors in the overall fund market regarding the influence of purchase and redemption decisions on mutual fund performance.

Keywords: investment-linked insurance policy, mutual funds, investment method, life insurance companies, purchase and redemption

1. Introduction

Investment-linked insurance products are financial instruments designed by life insurance companies to evade inflation risk (Dutton, 1965). According to the Central Bank of the Republic of China (Taiwan), from January 2000 to December 2011, the market interest rate (i.e., the average deposit interest rate of five major banks in Taiwan) decreased from 4.470% to 1.355%. In addition, the interest rates between January 2009 and May 2010 were lower than 0.5%. In the last 10 years, because of low interest rates in Taiwan, life insurance companies encountered a spread of negative interest rates. Therefore, investment-linked insurance policies were developed during the era of low interest rates to evade the aforementioned spread of negative interest rates, which may be encountered by a life insurance company because of the difference between real interest rates and insurance-policy interest rates, and to provide consumers with both basic insurance protection and a higher rate of return than real interest rates through portfolio performance.

Regarding investment targets that can link to investment-linked insurance policies, according to Regulations Governing Investment of Investment-linked Insurance Article 11, the use of investment targets and account assets that link to investment-linked insurance policies includes beneficiary certificates of securities investment trust funds. According to the statistical information provided by the Securities Investment Trust & Consulting Association of the R.O.C, domestic funds were divided into three types in late July 2000: equity, balanced, and bond funds. In late July 2000, 278 funds worth NT$1 trillion and 324.3 billion existed; in late November 2011, the number of funds increased to 599 and the 599 funds were worth NT$1 trillion and 736 billion, which accounted for half the total investment in Taiwan's mutual funds. Therefore, domestic funds are extremely

crucial for Taiwan's mutual funds.

The relationship between mutual fund performance and flow in Taiwan is a crucial research topic for numerous researchers (Wang & Hsu Ku, 2004; Kuo & Li, 2006; Chih, Lin, & Chou, 2007; Wang & Chen, 2009). Lin and Hsu (2010) investigated mutual fund persistence in Taiwan and found that the performance of mutual funds in Taiwan persisted to a certain degree. Several studies have investigated the influences of various determinants on the relationship between mutual fund return and flow. For example, the impact of various determinants on mutual funds was investigated based on manager ability (Chiu & Lin, 1999; Shu, Chen, & Huang, 2005), idiosyncratic risks (Lin & Hung, 2005), investor ability (Chih et al., 2007), investment decisions (Liu, Chen, & Liu, 2008; Hsu, 2010), interest rates (Chou, Yu, & Chang, 2009), technical analysis (Lee & Wu, 2009), and the effectiveness of advertising (Wei, Chen, & Pong, 2011).

Although numerous studies on fund flow and return have been conducted in Taiwan, limited studies on the relationship between fund flow and return from a life-insurance-company perspective have been conducted. Regarding studies on investment-linked insurance policies, researchers in Taiwan have mostly focused on interest rate change, value at risk, death benefits, pricing for investment-linked insurance policies according to legal requirements, and the impact of legal requirements on investment-linked insurance policies. Few studies have explored mutual fund markets from an investment-linked insurance policy perspective. According to the statistical information provided by Taiwan Insurance Institute, the funds flowing into the mutual fund market through investment-linked insurance policies increased by 63.241% from NT$352 million in 2006 to NT$575 million in 2010, indicating that investors considered investment-linked insurance policies as one crucial method for entering the mutual fund market.

Chen, Wu and Wang (2008) first analyzed the relationship between fund flows caused by various subscription and redemption methods and fund returns based on mutual funds linked to investment-linked insurance policies of life insurance companies. Chen, Wu and Wang (2008) also used a Granger causality test to examine whether policyholders responded asymmetrically regarding purchase and redemption when they found that their investment-linked funds yielded positive (or negative) returns. Although a Granger causality test considers the influence of two consecutive returns on fund flow, the test does not examine the impact of a return rate on current fund flow. Therefore, this study employed a seemingly unrelated regression (SUR) model to investigate the impact of current and deferred returns on fund flow, thereby preventing biased results typically caused by residual errors in a regression model.

Fama and Jensen (1983) assumed that mutual fund investors obtained excess returns by actively managing mutual fund portfolios. Because of this active behavior, investors purchased funds when fund returns were high but did not consider return factors when selling a portfolio. This investment behavior is called trade asymmetry. In this study, Taiwanese domestic funds were used as the research target to investigate whether a difference existed between general fund purchase behavior and the investment behavior of policyholders whose investment-linked insurance policies were linked to mutual funds. According to the data provided by Life Insurance Company K, this study examined the relationship between mutual fund flow and return from an insurance-policyholder perspective and the influence of this relationship on the investment behavior of policyholders.

Warther (1995) and Fant (1999) have investigated the relationship between U.S. mutual fund flows and returns in the U.S. mutual funds market. Warther (1995) and Fant (1999) decomposed mutual fund flows into four types (new purchases, redemption, portfolio-conversion purchase, and portfolio-conversion redemption). Because of the particularity of investment-linked insurance policies, this study included various purchase and redemption methods to investigate whether policyholders who used various purchase and redemption methods held various views regarding investment returns. In addition, various sales channels had various influences on mutual fund customers. Therefore, this study investigated the relationship between mutual fund performance and flows separately for general mutual fund customers who purchased and redeemed funds through investment trusts and consulting companies and for investment-linked insurance policyholders who purchased and redeemed funds through insurance companies; however, previous studies considered only one type of investor and did not show the differences in investment behavior between different types of investors who received identical information. In addition to domestic fund investors, this study divided investors into investors who held insurance-linked funds and investors who held funds that were not linked to insurance to investigate the differences between different types of investors regarding the relationship between mutual fund flows and returns.

To understand whether the degree of an investor's preference for investment risk affected their investment decisions, according to the Bankers Association of the Republic of China, this study divided the research

samples into three groups (i.e., equity-fund, balanced-fund, and bond-fund holders, in decreasing order of price fluctuation risk) to investigate whether return rates influenced the three groups of investors and to what degree. This study also investigated whether various purchase and redemption methods affected various risk groups of policyholders at varying degrees.

This article includes five chapters. In the first chapter, an introduction is provided. In the second chapter, a literature review is provided. In the third chapter, research samples, research periods and scope, and statistical models are described. In the fourth chapter, the relationship between fund flows and returns linked to various types of domestic fund investors is explored; the question whether trade asymmetry exists in the relationship between fund returns in the domestic fund market and investment behavior is examined; the question whether policyholders who used various purchase and redemption methods held various views about return signals is investigated; and the question whether the investment behaviors of policyholders in various risk groups influenced return factors at varying degrees is analyzed. Empirical results related to the aforementioned questions are also discussed. In the fifth chapter, conclusions and suggestions are provided.

2. Research Purposes

According to the research background and motivation, the research purposes of this study are as follows:

(a) To explore the relationship between fund flows and returns linked to various types of domestic fund investors;(b) To examine whether trade asymmetry existed in the relationship between fund returns in the domestic fund market and investment behavior;(c) To analyze whether the investment behaviors of policyholders in various risk groups influenced return factors at varying degrees;(d) To investigate whether policyholders who used various purchase and redemption methods held varying views regarding return signals.

3. Methods

This study investigated the relationship between fund flows and returns for various types of investors, various investment targets with varying degrees of risk, and various purchase and redemption methods and examined whether trade asymmetry existed in the relationship between fund returns in the domestic fund market and investment behavior. This study used policyholders who purchased investment-linked insurance policies from Life Insurance Company K as research samples to investigate whether a difference existed between the policyholders and other investors in the overall mutual fund market regarding the influence of purchase and redemption methods on mutual fund performance.

3.1 Research Samples

Until December 31, 2011, the total domestic funds were worth NT$1 trillion and 736 billion and accounted for 43.85% of the total mutual funds in Taiwan. This amount of domestic funds approximated a half of the total mutual funds market in Taiwan. Therefore, domestic funds are crucial for the overall mutual funds in Taiwan. In this study, domestic funds were used as the research target, and research samples were drawn from the Taiwan Economic Journal database and the database of Life Insurance Company K in Taiwan; the research period was from May 1, 2007 to December 31, 2011. The data drawn from the Taiwan Economic Journal database included all types of domestic funds in Taiwan, monthly fund flows, the purchase prices of monthly funds, the redemption prices of monthly funds, the net value of funds at the end of each month, and the net asset value of funds. The data drawn from the database of Life Insurance Company K included types of mutual funds linked to various investment-linked insurance policies, fund flows, fund purchase prices, fund redemption prices, and fund purchase methods.

In this study, domestic funds were classified into four types according to whether investment targets were linked to life insurance companies. Group A was overall domestic funds, Group B was domestic funds that were not linked to life insurance companies, and Group C was domestic funds that were linked to Taiwanese life insurance companies. In other words, in this study, according to whether investment funds were linked to life insurance companies, the overall funds market was divided into overall investors (Group A), general mutual funds customers (Group B), policyholder investors (Group C), and investment-linked insurance policyholders of Life Insurance Company K (Group D). Furthermore, domestic funds were divided into equity, balanced, and bond funds.

Life Insurance Company K offers investment-linked insurance policies linked to mutual funds. Because of the particularity of insurance, numerous purchase and redemption methods exist. Purchase methods include (a) new contracts, (b) renewal premiums, (c) portfolio conversion, (d) single purchases, (e) and other purchase methods (special purchases, reinstatement purchases, rider premium purchases, and fixed-term purchases). Redemption methods include (a) contract termination, (b) partial contract termination, (c) portfolio conversion, and (e) other

redemption methods (special redemption, risk premium redemption, rider premium redemption, claims redemption, management fee redemption, contract withdrawals, fixed-term contracts, and the redemption of striking a balance).

3.2 Research Methods

This study investigated whether fund inflows and outflows were affected by return factors. Warther (1995) and Edwards and Zhang (1998) have defined fund flows as the difference between the amount of purchases and the amount of redemptions (i.e., the value obtained by subtracting the amount of redemptions from the amount of purchases). By referring to Johnson (2010), the flow of fund holders was calculated in this study. Because the total net assets of funds affect fund flows, the flow of fund holders is equal to the sum of the fund level and net assets during the entire research period. The calculation formula is $Flow_{i,t} = \sum_2^i Dollar_{i,t} / TNA_{i,t-1}$, where *flow* denotes fund flows, *dollar* denotes the total mutual funds at the tth phase, *TNA* denotes the total net assets of funds, *i* denotes the ith fund, and *t* denotes time. As indicated by previous studies, this definition considers the influence of asset size on total fund investment. Therefore, this definition is suitable for this study. Original return is the difference between the per-unit net value on a current day and the per-unit net value on a previous day. Because this study considered the influence of cash dividends on original returns, the rate of return is $Return_{i,t} = (v_{i,t} * Adj_{i,t} - v_{i,t-1}) / v_{i,t-1}$, where $Adj_{i,t} = v_{i,t-1} / (v_{i,t-1} - Div_{i,t})$, *Return* denotes the rate of fund return, *V* denotes fund net value, *Adj* denotes adjustment factor, *Div* denotes cash dividend, *i* denotes the ith fund, and *t* denotes time. The adjustment factor that includes cash dividends can reflect the rate of actual return.

This study adopted a SUR model to investigate the relationship between fund flows and returns for various types of investors, various investment targets, and various purchase and redemption methods. In this study, net flows were decomposed into purchase inflows and redemption outflows to examine whether the relationship between purchases and sales by investors was a symmetric relationship. In this study, the relationship between fund flows and returns under various conditions was investigated by using the SUR model proposed by Zellner (1962) to replace a typical regression model and by using an ordinal least squares (OLS) method to estimate parameters. The SUR equation is as follows: $y_{\mu t} = \chi y_{\mu t} + \varepsilon_{\mu t}$, $\mu=1, \ldots, N$; $t=1, \ldots, T$; that is, $y_{\mu t} = \chi \beta_\mu + \varepsilon_{\mu t}, \mu = 1, \ldots, N$, where y_μ denotes the vector of (T × 1), x_μ denotes (T × β_μ), and ε_μ denotes the model parameter for (β_μ × 1). The SUR equation can be expressed by using the following matrices:

$$\begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_N \end{bmatrix} = \begin{bmatrix} x_1 & 0 & \cdots & 0 \\ 0 & x_2 & \cdots & 0 \\ \vdots & \vdots & & \vdots \\ 0 & 0 & \cdots & x_N \end{bmatrix} \begin{bmatrix} \beta_1 \\ \beta_2 \\ \vdots \\ \beta_N \end{bmatrix} + \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_N \end{bmatrix}$$

In a SUR model, the variables used in this study can be expressed as follows: $Flow_{i,t} = (Return_{i,t} Return_{i,t-1})$, where *Flow* denotes fund flow, *Return* denotes fund return, *i* denotes the ith fund, and *t* denotes time. This formula can be used to examine the impact of current and deferred returns on current fund flow and to investigate the investment behaviors of various types of investors in the Taiwanese mutual funds market.

Zellner (1962) assumed that residual errors varied heterogeneously and were cross-sectional correlated errors; that is, a correlation existed among error terms. Therefore, the error terms of a regression model probably included some determinants that had the same effects as a dependent variable and further affected the error terms to some degree; thus the variance of error terms was a nondiagonal matrix. An OLS model was not an adequate method for estimating coefficients. The reason for using a SUR model to replace an OLS model is that although these two models yield similar results, the structure of a SUR model is conducive for explaining cross-sectional factors. In addition, for identical parameters, the estimated coefficients and standard deviation of a SUR model is 25% of the estimated coefficients and standard deviation of an OLS model, indicating that the SUR model can more accurately estimate model parameters (Lee & Forbes, 1980; Bolton, 1989).

This study adopted a SUR model to examine the relationship between investment flows and returns caused by the purchase of domestic funds through investment-linked products and to investigate whether a difference existed in investment behavior between policyholders who purchased funds through investment-linked insurance policies and investors who purchased funds through investment trust and consulting companies or banks. In other words, this study investigated whether the investment behaviors of fund investors who adopted various investment methods were similar.

4. Results

This study mainly investigated the Taiwanese domestic funds market to determine whether fund purchase behavior through investment-linked products differed from fund purchase behavior through other methods and

whether trade asymmetry proposed by Fama et al. (1983) existed in the investment behavior of various groups of investors. This study also investigated the relationship between investment flows and returns for policyholders who purchased various investment-linked products with varying degrees of risk and for policyholders who adopted various purchase and redemption methods. This study examined whether return rates affected fund investors' purchase and redemption decisions and whether a difference in investment behavior existed between investment-linked insurance policyholders and general mutual funds customers. According to the degrees of risk, research samples were classified into equity, balanced, and bond funds. In addition to the investment behavior of insurance policyholders, this study further examined the investment tendency of insurance policyholders with various risk preferences. Table 1 shows the relationship between fund flows (i.e., net flows, the amount of purchases, and the amount of redemptions) and fund returns for the various groups (i.e., A, B, C, and D). Model variables included current and deferred (i.e., last month) returns, fund dummy variables, and a constant term. The estimation results multiplied by 100 can be used to intuitively explain the influence of the change of the dependent variable by 1% on a fund benchmark.

As shown in Table 1, for the overall domestic funds, equity funds, and bond funds, a positive correlation existed between net flows and current returns for Groups A, B, and C. In addition, previous overall domestic fund returns positively affected the current net flows of Groups A and B; however, this phenomenon did not exist for Group C. Investment-linked insurance policy rates probably influenced investors' decisions (e.g., previous contract termination fees, additional terms, and death benefits). Furthermore, net flows were decomposed into the amount of purchases and the amount of redemptions. Previous returns for Groups A and C significantly positively affected the amount of current purchases; current returns for Groups A, B, and C significantly negatively affected the amount of redemptions. The results suggested that the relationship between net flows and returns for Taiwanese domestic fund investors was similar to that for general mutual fund customers who purchased mutual funds through investment trust and consulting companies. By decomposing net flows into the amount of purchases and the amount of redemptions, the relationship between flows and returns for Group A (i.e., overall funds) was similar to that for Group C, which is linked to life insurance companies; that is, the amount of purchases increased as previous returns increased and the amount of redemptions increased as current returns decreased. Therefore, no trade asymmetry existed in Groups A, B, and C for overall domestic, equity, and bond funds. This conclusion differed from the views of O'Neal (2004) and Johnson (2010). O'Neal (2004) and Johnson (2010) have considered that the change of net flows was caused by purchases (inflows) but not by redemptions (outflows).

Regarding equity funds, the relationship between flows and returns for Group A was similar to that for Group B. Significantly positive correlations existed between net flows and current returns and between purchases, redemptions, and previous returns. These results differed from those from a study by Shu (2001). Shu (2001) indicated that trade asymmetry existed in Taiwan equity fund performance and flows. For the balanced funds of Groups A, B, and C, the amount of purchases was significantly positively correlated with previous returns but not correlated with the amount of redemptions; trade asymmetry existed among investors (Fama & Jensen, 1983; O'Neal, 2004; Johnson, 2010). For the bond funds of Group A (i.e., overall domestic funds), a significantly positive correlation existed between the amount of purchases and current returns and a significantly negative correlation existed between the amount of redemptions and current returns. The results accord with those in the study by Chen, Huang, Wang, and Chang (2007) regarding the relationship between performance and flows for general bond fund investors.

Table 1. A SUR model for the net flows and returns of Taiwanese overall domestic funds

Period of returns	Group A			Group B			Group C		
	Net flow	Purchase amount	Redemption amount	Net flow	Purchase amount	Redemption amount	Net flow	Purchase amount	Redemption amount
Panel A: Domestic funds									
Current phase	17.73***	0.68	-17.04**	12.48***	-0.16	-12.65**	5.84***	0.77	-5.07**
	(5.287)	(3.416)	(6.698)	(4.640)	(1.907)	(5.455)	(1.867)	(1.572)	(2.244)
Previous phase	14.06**	7.73**	-6.33	12.71***	2.79	-9.91	2.62	4.83***	2.20
	(5.287)	(3.416)	(6.698)	(4.640)	(1.906)	(5.454)	(1.867)	(1.572)	(2.244)
R^2	0.269	0.087	0.125	0.230	0.037	0.149	0.187	0.153	0.092
Panel B: Equity funds									
Current phase	1.941**	1.328	-0.613	0.926**	0.466	-0.46	1.014*	0.864	-0.15
	(0.848)	(1.048)	(0.809)	(0.384)	(0.383)	(0.426)	(0.520)	(0.670)	(0.418)
Previous phase	1.304	3.061***	1.757**	0.488	1.042***	0.554	0.804	2.018**	1.214***
	(0.848)	(1.047)	(0.808)	(0.384)	(0.382)	(0.808)	(0.520)	(0.669)	(0.417)
R^2	0.124	0.158	0.085	0.121	0.141	0.047	0.103	0.165	0.132
Panel C: Balanced funds									
Current phase	0.123	0.597	0.475	-0.381	0.302	0.683	0.274	0.266	-0.007
	(2.941)	(0.586)	(3.060)	(2.666)	(0.374)	(2.743)	(1.138)	(0.230)	(1.144)
Previous phase	1.686	1.213**	-0.473	-0.168	0.651*	0.82	1.724	0.555**	-1.168
	(2.940)	(0.586)	(3.059)	(2.665)	(0.374)	(2.742)	(1.138)	(0.230)	(1.144)
R^2	0.006	0.090	0.001	0.000	0.062	0.003	0.042	0.121	0.018
Panel D: Bond funds									
Current phase	10.69***	1.243	-9447**	4.410	0.442	0.745	4.552***	-3.968	-3.807***
	(3.646)	(1.431)	(3.570)	(2.751)	(0.604)	(0.916)	(0.908)	(2.833)	(1.072)
Previous phase	2.818	2.585**	-0.233	-0.978	0.552	1.767*	2.949***	1.530	-1.182
	(3.649)	(1.432)	(3.572)	(2.754)	(0.604)	(0.916)	(0.908)	(2.836)	(1.072)
R^2	0.141	0.067	0.111	0.045	0.026	0.037	0.366	0.068	0.190

Note. This table shows the relationship between net flows, the amount of purchases, and the amount of redemption and returns for various groups of Taiwanese domestic funds between April 19, 2007 and December 31, 2011. Group A was overall domestic funds; Group B was domestic funds that were not linked to life insurance companies; and Group C was domestic funds linked to the overall Taiwanese life insurance companies. Model variables included current and previous returns, fund dummy variables, and a constant term. The estimation results were multiplied by 100 to explain the influence of the change of the dependent variable by 1% on a fund benchmark. The figures in parentheses refer to standard errors. The significance levels of 10%, 5%, and 1% are signified by one, two, and three asterisks.

Table 2 shows the relationship between the flows and returns of domestic funds linked to the investment-linked insurance policies of Life Insurance Company K. In this study, the fund purchase behavior of policyholders was explored and domestic funds were decomposed into equity, balanced, and bond funds according to the degrees of risk. The results indicated that when the investment-linked insurance policyholders of Life Insurance Company K purchased overall domestic, equity, and balanced funds, they tended to purchase funds whose previous returns were positive. In addition, the flows of equity funds were affected by current returns. The results implied that investor flows for the overall domestic funds, equity funds, and balanced funds in Taiwan increased as return rates increased; that is, high returns induced high flows. However, the amount of redemptions was not significantly correlated with returns. These results accorded with those from studies by Fama and Jensen (1983), Sirri and Tufano (1998), and Johnson (2010). Trade asymmetry existed in the relationship between fund flows and returns; that is, when mutual fund performance was excellent, net flows were high and when mutual fund performance was not excellent, net flows were not low.

Table 2. A SUR model for the net flows and returns of domestic funds for life insurance company K

Period of returns	Overall sample funds			Equity funds			Balanced funds			Bond funds		
	Net flow	Amount of purchase	Amount of redemption	Net flow	Amount of purchase	Amount of redemption	Net flow	Amount of purchase	Amount of redemption	Net flow	Amount of purchase	Amount of redemption
Current phase	2.670 (3.479)	2.942 (1.917)	0.475 (2.881)	3.170 (2.117)	2.403* (1.298)	-0.587 (1.570)	1.436 -2.747	0.378 -0.43	-0.879 -2.683	0.042 -0.027	0.023 -0.023	-0.017 -0.016
Previous phase	2.145 (3.469)	3.534* (1.914)	1.073 (2.875)	3.497 (2.106)	2.698** (1.295)	-0.901 (1.563)	2.953 -2.732	0.730* -0.428	-2.21 -2.668	0.00 -0.027	0.037 -0.023	0.038** -0.016
R^2	0.019	0.094	0.003	0.088	0.132	0.009	0.023	0.054	0.013	0.047	0.063	0.112

Note. This table shows the relationship between the net flows and returns of research samples between April 19, 2007 and December 31, 2011. Model variables included current period and two periods of return deferral, fund dummy variable, and a constant term. The estimation results multiplied by 100 can be used to intuitively explain the influence of the change of the dependent variable by 1% on a fund benchmark. The figures in parentheses refer to standard errors. The significance levels of 10%, 5%, and 1% are signified by *, **, and ***.

The purchase of mutual funds through life insurance companies differs from the purchase and redemption of mutual funds through investment trust and consulting companies. Investment-link insurance policies integrate insurance protection and financial investment and thus entail particularity. Investment-link insurance policies offer various purchase and redemption methods. Purchase methods include (a) portfolio-conversion purchases, (b) new purchases, (c) renewal premiums, and (d) single purchases. Redemption methods include (a) portfolio-conversion redemptions, (b) entire redemption, and (c) the relationship between partial redemption and returns. The question is whether policyholders who adopted various purchase and redemption methods made varying investment decisions.

As shown in Table 3, when the policyholders of Life Insurance Company K purchased overall domestic funds, portfolio-conversion purchases were positively affected by current and previous returns (Warther, 1995). Single additional purchases were affected by current performance; that is, when current performance was excellent, investment-linked insurance policyholders increased their investments through single purchases. Similar results were found for the purchase of equity funds. No significant correlation existed between the new purchases and returns of overall domestic funds, equity bonds, and balanced funds. The results accord with those from the study by Warther (1995). Warther (1995) indicated that the flows and returns of newly purchased mutual funds were not significantly correlated. Fant (1999) used a Granger causality test to investigate U.S. equity funds and proposed similar views. Regarding the purchase of bond funds, the inflows of the purchase of new contracts were positively affected by current and previous returns.

Table 3. A SUR model for portfolio-conversion purchases and returns for life insurance company K

Period of returns	Overall samples				Equity funds				Balanced funds				Bond funds			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Current phase	1.25* (-0.66)	-0.24 (-0.59)	0.03 (-0.06)	0.01* (-0.01)	0.81* (-0.47)	0.02 (-0.20)	0.01 (-0.04)	0.01 (-0.01)	-0.05 (-0.08)	0.00 (0.00)	-0.03 (-0.04)	0.03 (-0.03)	0.00 (-0.01)	1.25* (-0.66)	-0.24 (-0.59)	0.03 (-0.06)
Previous phase	1.29* (-0.65)	0.30 (-0.59)	-0.04 (-0.06)	0.01 (-0.01)	0.74 (-0.47)	0.11 (-0.20)	-0.07* (-0.04)	0.01 (-0.01)	0.05 (-0.08)	0.00 (0.00)	0.00 (-0.04)	0.05 (-0.03)	0.01 (-0.01)	1.29* (-0.65)	0.3 (-0.59)	-0.04 (-0.06)
R^2	0.12	0.01	0.01	0.06	0.10	0.01	0.06	0.04	0.02	0.08	0.01	0.57	0.04	0.12	0.01	0.01

Note. This table shows the relationship between the (a) portfolio-conversion purchases, (b) new purchases, (c) renewal premiums, and (d) single purchases and returns of the research samples between April 19, 2007 and December 31, 2011. Model variables included the current period and two periods of return deferral, fund dummy variables, and a constant term. The estimation results multiplied by 100 can be used to intuitively explain the influence of the change of the dependent variable by 1% on a fund benchmark. The figures in parentheses refer to standard errors. The significance levels of 10%, 5%, and 1% are signified by *, **, and ***.

This study explored the relationship between the purchases and returns of the various investment methods adopted by Life Insurance Company K. This study also discussed the relationship between redemptions and mutual fund performance for various investment methods. Previous studies only analyzed portfolio-conversion redemptions. This study further explored the correlation between flows and returns for entire redemption and partial redemption. Table 4 shows the relationship between the amount of redemptions and returns for portfolio conversion, entire redemption, and partial redemption through Life Insurance Company K. The results showed

that for all investment targets with varying degrees of risk, the redemption flows in policyholders did not significantly affect current returns or deferred returns. Therefore, trade asymmetry existed in the investment-linked insurance policyholders of Life Insurance Company K that are linked to the Taiwanese domestic funds market. However, Warther (1995) and Fant (1999) indicated that the flows and returns for portfolio-conversion redemptions were significantly negatively correlated. The results of their studies differed from the results of this study.

Table 4. A SUR model for the amount of redemptions and returns of portfolio conversion for life insurance company K

Period of returns	Overall sample funds			Equity funds			Balanced funds			Bond funds		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Current phase	0.21	0.01	0.04	-0.15	0.02	0.04	0.76	0.01	-0.01	0.00	0.00	0.00
	(-0.94)	(-0.09)	(-0.07)	(-0.60)	(-0.05)	(-0.03)	(-1.33)	(-0.02)	(-0.1)	(0.00)	(0.00)	(0.00)
Previous phase	-0.21	0.10	0.06	-0.61	0.06	0.02	-1.12	0.01	-0.02	0.00	0.00	0.00
	(-0.94)	(-0.09)	(-0.07)	(-0.60)	(-0.05)	(-0.03)	(-1.33)	(-0.02)	(-0.1)	(0.00)	(0.00)	(0.00)
R^2	0.00	0.02	0.02	0.02	0.03	0.04	0.02	0.01	0.00	0.03	0.01	0.01

Note. This table shows the relationship between (a) portfolio-conversion redemptions, (b) entire redemption, and (c) partial redemption and the returns of the research samples between April 19, 2007 and December 31, 2011. Model variables included current period and two periods of return deferral, fund dummy variables, and a constant term. The estimation results multiplied by 100 can be used to intuitively explain the influence of the change of the dependent variable by 1% on a fund benchmark. The figures in parentheses refer to standard errors. The significance levels of 10%, 5%, and 1% are signified by *, **, and ***.

5. Conclusion and Suggestions

This study mainly investigated the Taiwanese domestic funds market to determine whether fund purchase behavior through investment-linked products differed from fund purchase behavior through other methods. Regarding the investment-linked insurance policies offered by Life Insurance Company K, this study investigated whether the trade asymmetry proposed by Fama et al. (1983) existed in various insurance policyholders who purchased investment targets with varying degrees of risk and adopted various purchase and redemption methods. According to whether domestic funds were linked to life insurance companies, domestic fund investors were classified into two types: Groups B and C. For Group B, the domestic funds they purchased were not linked to the investment-linked insurance policies offered by life insurance companies, whereas for Group C, the domestic funds they purchased were not linked to such policies. In addition, the data drawn from the Taiwan Economic Journal database and the database of Life Insurance Company K were adopted to investigate the differences in fund purchase behavior between general mutual fund customers and insurance policyholders who purchased various investment targets and adopted various purchase and redemption methods.

The study findings are as follows: (a) Regarding overall domestic funds, the amounts of fund purchases for Groups A and C were significantly positively affected by previous returns, a significantly negative correlation existed between the amount of redemptions and returns, and no trade asymmetry existed. Regarding the purchase of equity funds, the amounts of fund purchases for Groups A and C were significantly positively affected by previous returns, a significantly positive correlation existed between the amount of redemptions and returns (i.e., if previous returns were excellent, investors tended to earn profits and then terminate their investments). The number of domestic funds linked to the investment-linked insurance policies of life insurance companies accounted for 36.42% of the total number of domestic funds in Taiwan (386/1,060) and the number of equity funds linked to the investment-linked insurance policies of life insurance companies accounted for 40.21% of the total number of equity funds (259/644). However, the purchase and redemption behavior of investment-linked insurance policyholders were more consistent than that of investors who were not investment-linked insurance policyholders. Therefore, investment-linked insurance policies sold by life insurance companies are crucial for the mutual funds market. (b) For all investment targets with varying degrees of risk, the relationships between the current or previous returns and flows for Groups D and C were similar. For overall domestic funds, equity funds, and balanced funds, previous returns and the amount of purchases were significantly positively correlated. For bond funds, previous returns and the amount of redemptions was significantly negatively correlated. Therefore, the fund purchase behavior of the investment-linked insurance policyholders of Life Insurance Company K (Group D) was similar to that of investors who were linked to investment-linked insurance policies of life insurance companies (Group C). (c) No trade asymmetry existed in Groups A and C, who purchased

overall domestic funds, equity funds, and bond funds; that is, investors purchased funds when fund returns were high, and they still considered return factors when selling portfolios. Regarding balanced funds, the amounts of purchases for Groups A, B, and C were significantly positively correlated with previous returns but were not correlated with the amounts of redemptions. In addition, trade asymmetry existed. (d) The investment-linked insurance policyholders of Life Insurance Company K linked to Taiwanese overall domestic funds, equity funds, and balanced funds increased their investments as return rates increased; that is, high returns increased investor flow. However, the amount of redemptions was not significantly correlated with returns. Trade asymmetry existed in the relationship between fund returns and flows; that is, when mutual fund performance was excellent, net flow was high and when mutual fund performance was not excellent, net flow was not low. (e) When the policyholders of Life Insurance Company K purchased overall domestic funds and equity funds, the purchase of portfolio conversions was positively affected by current and previous returns. The amount of single additional purchases was affected by current performance; that is, when current performance was excellent, investment-linked insurance policyholders tended to increase their investments through single purchases. The amounts of new purchases of overall domestic funds, equity funds, and balanced funds were not significantly correlated with returns. Regarding bond fund purchases, the inflow of the purchase of new contracts was positively affected by current and previous returns. The results were first found in this study regarding the relationship between flows and returns for various investment methods offered by life insurance companies. (f) For all investment targets with varying degrees of risk, the redemption flows in the investment-linked insurance policyholders of Life Insurance Company K did not significantly affect current or deferred returns.

In this study, the domestic fund investors in Taiwan were classified into various types to explore the relationship between investor flows and returns for various investment methods with varying degrees of risk. Group C included investment-linked insurance policyholders and investors who made investments through investment trust and consulting companies. In this study, we could not identify the investment method of each investor in the market; therefore, group C could not represent all policyholder investors. This study only described the investment behavior of investors who invested in fund targets linked to investment-linked insurance policies. Group D was the investment-linked insurance policyholders of Life Insurance Company K. Future researchers should include additional life insurance company policyholder information to more accurately understand the investment behavior of policyholders and to compensate for the limitations of this study. We made prudent inferences based on the results.

Regarding the data drawn from the database of Life Insurance Company K, because of the Personal Information Protection Act, the influence of the characteristics of policyholders (e.g., gender, age, income, and education level) on fund flows cannot be examined. Therefore, factors related to policyholder characteristics were considered as errors, and legal regulations limited this study. Future researchers should endeavor to communicate and cooperate with life insurance companies to obtain comprehensive policyholder information.

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