

**THE BEHAVIOR OF PENSION PLAN INVESTORS UNDER  
REGULATORY CHANGE - PERFORMANCE, COST AND FUND  
FLOWS: TURKEY CASE**

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**ABSTRACT**

*We study the behavior of pension plan investors in Turkey regarding fund allocation and withdrawal with respect to return, risk and management fee. We find that investors avoid risk and there is a convex and positive relationship between risk-adjusted return and fund flows. Investors display the disposition effect regarding nominal monthly returns. Cost is a factor only for equity/foreign/gold funds groups and present before the introduction of government contribution plan. Large funds experience net fund inflow while old funds experience net fund outflow, indicating market competition forces pension plan managers to reach a certain size within a period. Plans offset fund outflow if they are able to keep mature investors.*

**Keywords:** Pension plans, fund flow, return, Jensen's Alpha, management fee

**1. INTRODUCTION AND LITERATURE REVIEW**

Pension plans are long term investments. Reward to risk as well as cost are crucial factors worth to monitor for pension plans as any for any long term investments. Therefore, a rational investor is expected to consider these factors while making pension plan and mutual fund choices. There is a rich literature document return and flow relationship on mutual funds. Studies document that investors reward good performance with fund inflow in the U.S. The relationship is investor type specific and stronger for retail funds [19]. Although, U.S. investor behavior could not be generalized to all markets [13] or is not present at the same degree for some Asian markets [23], similar relationship is valid for Brazil [5], Japan [26] and China [21]. Yet, investors do not punish bad performance to the same degree [24], [26]. Moreover, in some mutual fund markets, such as Portugal [1] and Greece [15], investors do not follow past performance.

Despite well documented behavior between mutual fund return and flow, studies on “pension plan flow” remain rather limited. Del Guercio and Tkac (2002) show that U.S. pension plan investors display similar performance chasing behavior like mutual fund investors. Ballester (2014) finds a similar performance-flow relationship for Spanish pension plan investors. If performance is arguably the primary factor that affects the wealth of pension plan investors, the fees they incur over the long investment period could be the next. There is a large body of literature documenting that mutual funds fail to provide positive return net of their fees. ([23]; [7]; [11]; [6]; [22]; and [25]). Excessive fees in the form of a total fee [30] or management fee [10], [12] are also a sign of governance inefficiency and could be detrimental to portfolio performance. Gökçen and Yalçın (2015) show that pension plans in Turkey fail to beat their benchmark net of fees.

Analyzing the complete universe of Turkish pension plans between 2011 and 2016, we document that investors realize gains but not their losses. Risk plays a significant role in the overall structure of fund flows. Pension plans with higher monthly return volatility experience outflow and there is a convex relationship between the risk adjusted return and fund flow.

## 2. DATA AND METHODOLOGY

The daily participation share value, total net asset value, fund-inception date and management fee data are provided by Rasyonet Data Vendor, which collects, verifies and compiles mutual fund and pension plan data from the Istanbul Clearing House, Settlement and Custody Bank (ICSC), Capital Markets Board of Turkey (CMB) and fund management companies. The data is therefore completely free of reporting bias and survivorship bias. ‘Number of participants’ data were obtained directly from ICSC. The final dataset covers the period between January 2011 and July 2016, contains 217 pension plans covering all pension plans in Turkey. 8 pension plans are excluded due to insufficient number of observation. The number of plans excluded due to termination is small and potential survivorship bias does not affect the relationship between flow and performance [8], [16] and [30]. Three performance ranks of pension plans are constructed for a comparative analysis following [2]. Plans with the highest quintiles of return and Jensen alpha are grouped as Hreturn and Hjensen, respectively. The lowest quintiles of return and Jensen alpha are grouped as Lreturn and Ljensen, respectively. Return and Jensen alpha of the remaining three quintiles of plans (60% of the plans) are grouped as Mreturn and Mjensen, respectively.

*Table 1 List of Variables*

Variable	Description
FLOW	Change in asset size adjusted for annual return
HRET	Annual return of the plan if the plan belongs to the top quintile, 0 otherwise
MRET	Annual return of the plan if the plan does not belong to the high or low quintile, 0 otherwise
LRET	Annual return of the plan if the plan belongs to the bottom quintile, 0 otherwise
HJEN	Annual Jensen alpha of the plan if the plan belongs to the top quintile, 0 otherwise
MJEN	Annual Jensen alpha of the plan if the plan does not belong to the high or low quintile, 0 otherwise
LJEN	Annual Jensen alpha of the plan if the plan belongs to the bottom quintile, 0 otherwise
RISK	Standard deviation of last 12 month plan returns
LSIZE	Natural log of total net assets of the plan
LOGAGE	Natural log of the years since inception of plan
DEC	Equals 1 if the plan belongs to the month of December
MNGFEE	Annual management fee reported to settlement and custody bank
LINVEST	Log of total asset size divided by the number of accounts

## 3. METHODOLOGY AND RESULTS

The general model we propose to analyze the relationship between pension plan flow and cost and performance along with other determinants is as follows.

$$\begin{aligned} \text{Flow}_{i,t} = & \beta_0 + \beta_1 \text{HRET}_{i,t-1} + \beta_2 \text{MRET}_{i,t-1} + \beta_3 \text{LRET}_{i,t-1} + \beta_4 \text{HJEN}_{i,t-1} + \beta_5 \text{MJEN}_{i,t-1} \\ & + \beta_6 \text{LJEN}_{i,t-1} + \beta_7 \text{Risk}_{i,t-1} + \beta_8 \text{LSize}_{i,t-1} + \beta_9 \text{LogAge}_{i,t-1} + \beta_{10} \text{MngFee}_{i,t-1} \\ & + \beta_{11} \text{Dec}_{i,t} + \beta_{12} \text{Linv}_{i,t-1} + \beta_{13} \text{BigFam}_{i,t} + \beta_{14} \text{Grp}_{i,t} + \beta_{15} \text{EFG}_{i,t} + \epsilon_{i,t} \end{aligned}$$

In order to test whether there are plan specific fixed effects, we performed the Hausman test. The test statistic (Chi-Sq. = 163,8, p = 0.000) favors the Fixed Effect model over the Random Effect model. Results indicate a relationship between fund flows and only the highest quintile performing plans. This negative relationship suggests investors realize their gains from best performers but do not withdraw their assets from the pension plans of mid and low performance quintiles. This phenomenon is well documented in the literature ([30], [18] and [14]), especially in behavioral finance [3]. Five starred mutual funds do not enjoy fund inflow for good performance [26]. The absence of a significant relationship between flow and poor return could be due to "the existence of a disposition effect whereby investors do not sell funds that perform poorly, staying invested in the hope that the fund

price returns to the original purchase price as pointed out by [29]. On the other hand, pension plans' lack of challenging long-term performance targets [27] could urge the investors to realize significant positive returns as they are achieved.

*Table 2 Panel Data Analysis of Pension Plan Flows*

	Fixed Effect	Random Effect	Reduced Model I	Reduced Model II
HRET	-0.1583**	-0.1041		-0.0221
MRET	-0.0695	-0.0799		0.0464*
LRET	-0.1141	-0.0946		0.0369
HJEN	0.0251***	0.0260***	0.0088**	
MJEN	0.0155**	0.0213***	0.0077***	
LJEN	0.0068	0.0049	-0.0049	
RISK	-0.8122***	-0.6737***	-0.5799**	-0.6406**
LSIZE	0.0180***	0.0017	0.0165***	0.0181***
LOGAGE	-0.1955***	-0.0879***	-0.1981***	-0.2049***
MNGFEE	-0.0034	-0.0047	-0.0039	-0.0037
DEC	-0.0027	-0.0025	-0.0019	-0.0016
LINVEST	0.0487**	0.0064	0.0457**	0.0490**
C	-0.2735**	0.0736	-0.2459**	-0.2776**
Observation	11224	11224	11224	11224
Number plans	217	217	217	217
Adjusted R <sup>2</sup>	8,51%	2,86%	8,36%	8,33%

\*, \*\*, \*\*\* significant at 10%, 5%, 1% respectively

On the other hand, results suggest a strong negative relationship between portfolio risk and fund flow indicating that Turkish pension plan investors are sensitive to return volatility. This investor characteristic reveals itself more through the relationship between flow and risk-adjusted returns. Investors reward plans if they provide sufficient risk-adjusted return. They increase fund allocation to the pension plans in the high and middle Jensen alpha quintiles, quantitatively more to the high Jensen quintile. The relationship is robust to time and model specifications. We find a positive relationship between plan size and fund flow. Larger plans attract higher fund flows. This result is consistent with the argument that the visibility of the fund and the fund family increases with the fund size [20], [28] and [1]. Investors could also be choosing large plans for risk reduction through better diversification. However, plan age is detrimental to the fund flow. Investors withdraw assets from older plans, suggesting management companies promote advertising in young plans. This result is consistent with [2], [1] and [18]. We believe results about size and age together imply that industry dynamics push the pension plans to reach a certain size within a period of time. While large pension plans enjoy fund inflows, they arguably lose some of the clients to new entrants

#### 4. CONCLUSION

We find a strong relationship between fund flows and portfolio risk-adjusted return and monthly return volatility. Investors avoid portfolios with volatile returns and favor funds with high risk-adjusted returns. The relationship has a convex nature, confirming findings of [2] for Spanish pension plans and [30] for mutual funds. It is stronger for the highest risk-adjusted return quintile and absent for the lowest risk adjusted return quintile. We find an only marginally significant negative relationship between monthly return and fund flows, suggesting revenue realization and possible disposition effect.

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