Performance of the Pension Fund Companies: Evidence from Turkey[5]

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Abstract

The individual pension funds not only complementary to public pension systems but also an important tool in order to meet the long-term funding needs of economies. Although not having a long history, the individual pension fund system, which has been practiced in various countries around the world for many years, has become one of the important elements of the economy in Turkey since October 27, 2003. The individual pension fund system is managed by private insurance companies and monitored by government authorities in Turkey. Therefore, these funds must be well managed and their performances should be closely monitored by either investors or governments in terms of contribution to economic progress.

In this paper, the performance ratios of each individual pension funds and the pension fund companies' performances were analyzed for the 2010-2016 period. Due to the new individual pension funds are comprised of different research periods, we created 4 different research sample windows (2010-2016; 2011-2016; 2012-2016; 2013-2016), in order to understand the performance of the pension fund companies. In the analyses, Sharpe, Sortino ratios, Treynor, Jensen indexes, and M2 performance measure are calculated for each individual pension fund based on research sample windows. In order to comprehend performances of the companies, the performance ratios of funds are clustered into two groups as positive and negative, and then the averages of both clusters are calculated for 11 different private pension fund companies. Within the scope of this study, 146 individual pension funds held by 11 pension fund companies were used and the pension funds daily return

data gathered from The Capital Markets Board's database. The daily risk-free rate and market return data obtained from Bloomberg data terminal.

The conclusion of the study reveals that all techniques illustrate similar results according to averaged positive and averaged negative performance ratios for each research sample window. The results of positive averages show that AVIVA and VAKIF outperformed other companies.

Keywords: Pension Funds, Portfolio Performance, Performance Ratios

Introduction

There is no doubt that the retirement period is one of the important parts of the human life cycle. Therefore, the income level during the retirement period is an important issue for the pensioners' life quality and to satisfy their all needs. Retirement income is a very important subject for every person in the world and it can be provided from four different sources: unfunded state pensions, funded private pensions, direct private savings, and post-retirement work (Blake, 2003: 1).

In recent years, all social security regimes and most of the social insurance institutions, whether developed or developing countries, have crises and in a trouble for many reasons such as aging of the population, deterioration of the asset-liability balance, increases in the costs of health services, unnecessary interventions of the political authorities in the health insurance, economic fluctuations, inflation, unemployment and the tendency to employ unemployed workers (Tuncay, 2000: 4). As a result of these problems, government authorities were insufficient to manage various risks and the necessity for private insurance companies has been increasing all over the world.

The first individual pension system was applied in Chile in 1981 (Korkmaz et. al, 2007: 65). Although the number of countries implementing the private pension system in the 1980s was less than five, this number increased significantly in the 2000s (Demirpehlevan, 2010: 12). According to the increase in the number of countries that have been implemented the system, the total amount of funds has increased considerably. Private pension assets are worth more than USD 38 trillion worldwide in 2015 and the largest values of invested assets in USD values are located in North America (United States, Canada), Western Europe (United Kingdom, Netherlands, Switzerland), Australia and Japan (OECD, 2016: 5). Table 1 presents the pension funds ratio to GDP and it is helpful to understand the situation. Such as in Netherlands, Iceland, and Switzerland, where they accounted for 178.4%, 149.2% and 124.7% of GDP in 2015, respectively.

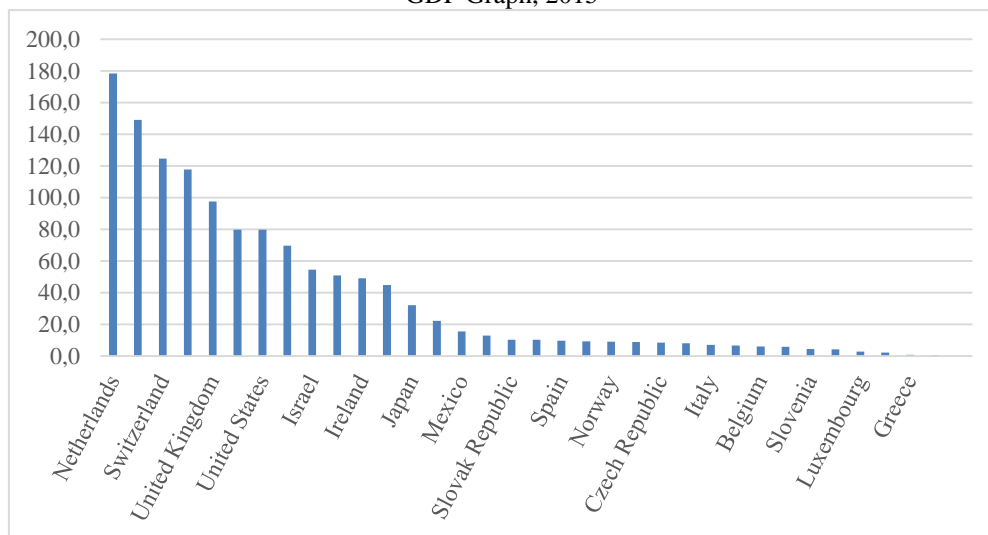Table 1: Total Investment of Pension Funds and All Retirement Vehicles, 2015

Pension funds			
Countries	Millions of national currency	Millions of USD	% of GDP	% of all retirement vehicles
Australia	1,894,431	1,454,923	117.7	97.1
Austria	19,646	21,389	5.8	..
Belgium	24,117	27,018	5.9	..
Canada	1,583,494	1,182,241	79.8	50.8
Chile	109,433,421	154,711	69.6	100.0
Czech Republic	373,069	15,029	8.3	100.0
Denmark	888,707	130,118	44.8	22.0
Estonia	2,613	2,844	12.8	88.2
Finland	105,258	114,594	50.8	..
France	12,200	13,282	0.6	5.6
Germany	199,197	216,865	6.6	..
Greece	1,135	1,236	0.6	..
Hungary	1,381,292	4,819	4.1	72.3
Iceland	3,266,214	25,204	149.2	94.8
Ireland	105,400	114,749	49.1	91.2
Israel	627,569	160,833	54.5	..
Italy	114,600	124,765	7.0	79.5
Japan	159,757,300	1,325,787	32.0	100.0
Korea	136,427,700	116,356	8.8	30.2

Table 1: Total Investment of Pension Funds and All Retirement Vehicles, 2015 (Continued)

Luxembourg	1,444	1,572	2.8	..
Mexico	2,789,870	162,140	15.4	93.0
Netherlands	1,210,321	1,317,676	178.4	..
New Zealand	53,235	36,317	22.2	100.0
Norway	283,126	32,137	9.0	..
Poland	142,810	36,608	8.0	94.0
Portugal	18,164	19,775	10.1	..
Slovak Republic	8,037	8,750	10.3	100.0
Slovenia	1,641	1,786	4.3	61.0
Spain	103,862	113,074	9.6	66.2
Sweden	380,000	45,019	9.1	13.6
Switzerland	797,648	804,000	124.7	..
Turkey	42,959	14,762	2.2	..
United Kingdom	1,818,507	2,694,846	97.5	..
United States	14,299,033	14,299,033	79.7	59.9
OECD		**24,794,259**	**84.5**	

Source: oecd.org

Figure 1. Total Investment of Pension Funds and All Retirement Vehicles as a percentage of GDP Graph, 2015

Source: oecd.org

It is obvious that the weight of pension funds has a major role in all retirement vehicles. Figure 1 illustrates the total investment of pension funds and other retirement vehicles as a percentage of countries' GDP. The highest scores belong to Netherlands, Iceland, Switzerland and Austria which are greater than %100 percent of their GDP. The least percentages belong to France, Greece, Turkey and Luxemburg which are 0.6, 0.6, 2.2 and 2.8 percent respectively.

Although, there was a single type of pension system that could only be carried out by the state before 2003, with a significant reform diversity of the pension system has increased in Turkey. According to the "The Individual Pension Savings and Investment System Act" Individual pension system has begun its operation on 27th October 2003. As of April 15, 2017, there are 18 private pension companies, 6,750,489 participants and 252 different funds, which the total worth of these funds is 57,640.1 million Turkish Lira, in the system.

In addition to the social security role of individual pension system, it also has an important role for the financial systems and financial markets. When the small amounts of premiums paid by the participants are gathered together, it creates large amounts of funds which should not be underestimated. When these funds are involved in financial markets, they can contribute to economic development by creating long-term resources and enlarging the borrowing opportunities of the public and private sectors. It also have positive effects on development of the capital markets' efficiencies by providing new resources (Uyar, 2012: 73). For economic stability, capital

markets' efficiencies and participants' benefits individual pension system should be monitored carefully and closely. The funds' risks and returns, and also funds managers' performance should be observed and the participants, government and also the fund managers should make their decisions and plan the necessary steps accordingly.

Fund performance studies began in the 1960s. (Especially studies by Sharpe, Jensen, Treynor) (Altıntaş, 2008: 88). Although fund performance has different meanings for different interest groups, it has a special importance for the investors. Because, current participants make their decision to change funds and make their portfolio according to funds performances and potential investors decide whether to participate or not by looking at performances. The aim of this study is to examine the performances of pension fund companies in Turkey. For this purpose in the analyses, Sharpe, Sortino ratios, Treynor, Jensen indexes, and M^2 performance measure are calculated for each individual pension fund for 2010-2016 period.

The remainder of this paper is organized as follows: In the next section, there is an investigation of the related literature on the fund performance. Section 3 describes the dataset used in the analyses and methodology. Section 4 presents the findings and discusses their results. Section 5 concludes.

Literature Review

Studies on portfolio and fund performance began in the 1960s and since then several articles have been written on portfolio management, portfolio selection, asset allocation, performance and market timing etc. The first study was done by Friend, et.al in 1962 (Ippolito, 1993: 43). 152 mutual funds analysed with annual data for the 1953-58 period. They created a performance index as a ratio with using net assets, dividend and distributed profit per share data (Shapiro, 1964: 201). While Standard & Poor, as a benchmark, had an average return of 12.6%, the mutual funds had a 12.4% average annual return, which was 20 basis points lower than the benchmark (Ippolito, 1993: 43). They explained the differences in portfolio structure of the funds; the division of their portfolios among common stock, preferred stock, corporate bonds, government securities and another asset (Shapiro, 1964: 201).

Treynor (1965) developed a measure for rating fund-management performance. The study refers to the relationship between systematic and unsystematic risks, and the model based on two important problems; one of these problems is that "the rate of return on investments made in any one period is usually swamped by fluctuations in the general market" and the other one is that, "measures of average return make no allowance for

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investors' aversions to risk". Treynor's model consists of the difference between the expected return of the fund which estimated at a particular market rate of return and the return of a fixed-income security divided by a measure of volatility. In 1966, there was another study which belongs to Treynor and Mazuy, and their research question was "Is there evidence that the volatility of the fund was higher in years when the market did well than in years when the market did badly?" at this time. They analysed 57 open-ended mutual funds' yearly data and Dow-Jones Industrials for 1952-63 period with least-square regression technique to answer the research question. They concluded that "…no investor-professional or amateur-can outguess the market". In 1965 McCandlish, discussed three basic methods which are: (1) compound or discounted rate of return, (2) average return, and (3) trend of value in his article to decide which method is most suitable to measure of pension fund performance. He concluded that "…the compound rate of return is probably the best expression of performance because it indicates the one important thing the employer wants to determine: whether and to what extent his fund is outperforming its own actuarial assumptions."

Dietz (1966) examined each of these three methods to see the most suitable measure of return. He compares the results with two hypothetical portfolios (A and B) in two distinct market periods (X and Y). As a conclusion, because of the compound method's erroneous results, he recommends that using average return method is more suitable rather than the compound rate of return in order to measure performance. Polakoff (1966) concerned with the types of assets held by state and local pension funds for the years 1957-64 in U.S. He calculated the total assets of corporate and state and local pension funds both in terms of book and market values over the period. He indicated that, while the absolute amounts of all assets increased for corporate pension funds during the period, their relative importance has changed in terms of both book value and market value. The author stated that, while the proportion of corporate bonds was 53.8% of the total book value of the portfolio in 1957, declined to 41.1% in 1964. But the proportion of common stocks rose over the same period from 24.7% to 41.6%. According to market value, corporate bonds proportion was 50.2% in 1957 and it fell to 32.4% in 1964, while common stocks weight rose from 30.2% to 53.4%. He also indicated that while the state and local pension funds' annual average gain was 0.7%, corporate pension funds' annual gain was 2.8%. Thus, the annual difference between corporate pension funds and state and local pension funds was 2.1 %. Sharpe (1966) analysed the annual rates of return for thirty-four open-ended mutual funds and he calculated reward-to-volatility-ratios (Sharpe Ratio) for each fund during the period 1954-1963. Author calculated the annual rate of return based on sum of dividend payments, capital gains distributions, and changes in net asset value

for each fund and then compared these ratios with performance of Dow-Jones Index, its return average 16.3 per cent during the period with a variability of 19.94 percent and R/ V ratio of 0.667 and the average R/ V ratio for the funds in his sample was 0.633, he concludes that there are only eleven funds were successful than the Dow Jones index, while twenty-three funds did worse.

Jensen (1968) investigated 115 open end mutual funds' annual data, which 59 of them had 10 years data between 1955 and 1964, and 56 of them had 20 years data between 1945 and 1964. Jensen used market equation and calculated alphas for each fund. He calculated that the average value of alpha was -0.011 and 76 funds had negative alphas, while 39 funds had positive. As a result of the study, he concluded that the funds didn't have performance well enough. Carlson (1970) examined the relationship between annual risk and return of 82 mutual fund portfolios for the 20-year period 1948-67. In contrast to Jensen, Carlson found a positive 60 basis point average alpha for the sample. McDonald (1974) analysed 123 American mutual funds' performance with monthly returns in the period 1960-1969 and he found, a contradicted results with Sharpe and Jensen studies, an average alpha of 62 basis points using CAPM model and NYSE index. Mains (1977) re-analysed Jensen's study with monthly rates of return of 70 open end mutual funds for the same period. All of these 70 funds were selected from Jensen's study. Mains thought that monthly data (120 monthly observation) were better than yearly data (10 observation) to understand funds' risk and return behavior. He reported -0.62 annual average return and +0.09 alpha for his sample where 40 mutual funds were positive and 30 of them were negative alpha.

Ippolito and Turner (1987) evaluated approximately 1500 pension plans' performances with CAPM model and calculated the alphas of each pension plans over the 1977-1983 period. They reported that "private pension plans underperformed the S&P 500 by approximately 44 basis points per year but outperformed a weighted stock-bond index by approximately 38 basis points".

Keith Ambachtsheer, Ronald Capelle, and Tom Scheibelhut (1998) studied with 80 U.S. and Canadian pension funds for the 1993-96 period to explore the relationship between pension funds' performance and how they are organized. They analysed these funds according to "fund size, proportion of assets passively managed, and quality of the fund's organization design" with regression analysis. They indicated that "bigger is better" in pension fund management because of the economies of scale and there was a positive relationship between performance, fund asset size, and proportion passively managed and organisation design and the sample 60 basis points underperformed a year over the 1993-96 period. Mark Griffin (1998) examined the pension funds asset allocation with a global perspective. He

analysed all components of pension funds such as cash, real estates, equities and bonds and legislative regulations. The author explored that equities had much greater weights than bonds and regulatory differences have a strong impact on the pension funds asset allocations.

Moy (2002) made a comparison between Sharpe ratio and Jensen's alpha using actual mutual fund data gathered from Morningstar Web site and briefly illustrates the differences between these measures. Tonks (2005) analysed 2175 pension funds with quarterly return, "whether fund managers consistently add value to the performance of the funds under their management" between 1987-97 periods in the United Kingdom. Using regression analysis he found that in the long position (over 12 months), fund managers performance were better than a short position in terms of adding value to the pension funds. Korkmaz and Uygurturk (2007) studied 46 Turkish pension funds performances with regression analysis for the 2004-2006 period. They reported that there was an inverse relation between a number of independent variables and pension funds performances; "pension funds' performance level decrease when variable numbers increase".

Altintas (2008) investigated management performance of Turkish private pension funds for the 2004-2006 period and in order to understand managers' performance he applied the traditional performance evaluation techniques and regression models. According to the results, however, there were significant differences between the results of regression models and traditional performance evaluation techniques, in general, the pension fund managers had not adequate selectivity and timing capability. Dagli, Bank and Er (2008) tried to explore the performance of ten private pension fund companies which operates in Turkey for the 2003-2007 period. They studied with weekly data and used IMKB 100 index as a benchmark. Sharpe, Treynor and Jensen performance indexes were used to evaluate performances over the period. They concluded that pension funds managers were not successful to outguess to the market developments.

Omag (2010), using annual data, measured Sharpe ratio, Treynor ratio and Jensen performance index for the performance of A type and B type mutual funds for the 2000-2008 period and he highlighted that the performance of the funds were lower than the market. Ege, Topaloglu and Coskun (2011) evaluated 80 Turkish pension funds performances with Sharpe Ratios and Modigliani performance criteria for 2008-2010 period. Authors reported that all of the pension funds had lower performance than their benchmark over the period. Uyar (2012) examined the macroeconomic effects of the private pension system in Turkey. She studied with monthly data for the 2004-2009 period and explored that the number of certificates and interest rates have a significant effect on basic economic indicators of Turkey.

Ayaydin (2013) measured Sharpe, Modigliani, Sortino Ratio, Treynor, T2, Jensen Index for. 34 flexible and balanced pension funds which operating in Turkey between 2010-2013 periods. The aim of the study was to examine whether pension funds' managers were able to become successful in the market process. As a result of the study, the low performance of the funds were connected to portfolio managers' understanding of the changes in market conditions.

Torresa, Figueroa, Encisob, Montoya (2014) examined the performance of pension funds in Mexico with daily data from January 2002 to May 2013. They use three discrete event simulations of the three indexes or benchmarks (Min variance, Max Sharpe and MV-Max Sharpe) for pension fund performance and they found that the min variance is preferable for the publicly traded Mexican defined contribution pension funds. Selim and Celik (2014) examined the determinants of individual pension funds for 32 OECD countries using panel data regression model for the 2005-2011 period. According to their findings while household consumption expenditure, gross domestic product per capita and the average retirement age of men had significant negative effect; population, health expenditures and employment had a positive effect on pension funds. Filip, Pece and Lacatus (2015) analyzed Romanian mutual funds 2007-2009 period focusing on risk-adjusted performance using both the Romanian market index BET and the ROBOR 12-M series as benchmarks. They estimated Treynor Ratio, Sharpe Ratio, and Jensen's Alpha and as conclusion, they indicate that "during the crisis, Romanian bond funds managed to attain positive HPR and positive risk-adjusted performance". Lippi (2015) investigated the presence of Italian home bias in asset allocation choices made by professional managers in the field of 35 Italian occupational pension funds existing at the end of 2007. He concludes that when the asset manager is Italian, the choice falls on Italian asset classes and, the home bias phenomenon could be considered an element for containing volatility in the prices of government securities, corporate bonds, and equities because of the constant demand created on the market by the asset managers affected by this bias.

Data and Methodology

Within the scope of this paper, 146 individual pension funds, which held by 11 private pension companies were analyzed, existing between 2010-2016 periods in Turkey. The database used in the analyses was gathered from The Capital Markets Board's database. The daily risk-free rate and market return data obtained from Bloomberg data terminal.

In order to understand the changes in performance of the pension fund companies when newly funds added to the existing sample over the period, we created four different research windows (2010-2016; 2011-2016;

2012-2016; 2013-2016). In this way, we have included as much as possible pension funds to the study. Another aim of the study is to evaluate the performance of each individual fund companies over different window sizes, in order to see the changes in ranking positions them. The number of funds for each company and descriptive statistics for different research windows are shown in Table 2.

Table 2. Descriptive Statistics of Different Windows

Pension Fund Companies	Sample Windows	2010 - 2016	2011 - 2016	2012 - 2016	2013 - 2016
AEGON EMEKLILIK VE HAYAT A.S. (AEGON)	Mean	0.0003	0.0002	0.0003	0.0002
	STD	0.0047	0.0048	0.0047	0.0050
	Max	0.0235	0.0234	0.0234	0.0234
	Min	-0.0384	-0.0384	-0.0384	-0.0384
	Number of Funds	6	6	6	6
ALLIANZ HAYAT VE EMEKLILIK A.S. (ALLIA)	Mean	0.0003	0.0003	0.0004	0.0004
	STD	0.0041	0.0042	0.0053	0.0059
	Max	0.0229	0.0229	0.0462	0.0456
	Min	-0.0295	-0.0295	-0.0540	-0.0551
	Number of Funds	9	9	27	29

Table 2. Descriptive Statistics of Different Windows (Continued)

ANADOLU HAYAT A.S. (ANADO)	Mean	0.0003	0.0003	0.0004	0.0003
	STD	0.0047	0.0052	0.0052	0.0055
	Max	0.0249	0.0260	0.0256	0.0254
	Min	-0.0323	-0.0342	-0.0345	-0.0345
	Number of Funds	16	18	21	21
AVIVASA EMEKLILIK VE HAYAT A.S. (AVIVA)	Mean	0.0003	0.0003	0.0004	0.0003
	STD	0.0050	0.0050	0.0049	0.0052
	Max	0.0248	0.0246	0.0243	0.0243
	Min	-0.0368	-0.0367	-0.0355	-0.0354
	Number of Funds	16	17	18	18
BNP PARIBAS CARDIF EMEKLILIK A.S. (BNP P)	Mean	0.0003	0.0003	0.0004	0.0003
	STD	0.0028	0.0028	0.0041	0.0044
	Max	0.0154	0.0153	0.0208	0.0205
	Min	-0.0192	-0.0192	-0.0276	-0.0276
	Number of Funds	7	7	8	8
CIGNA FINANS EMEKLILIK VE HAYAT A.S. (CIGNA)	Mean	0.0003	0.0002	0.0003	0.0002
	STD	0.0134	0.0136	0.0047	0.0050
	Max	0.0612	0.0612	0.0282	0.0282
	Min	-0.1036	-0.1036	-0.0380	-0.0380
	Number of Funds	1	1	7	7
FIBA EMEKLILIK VE HAYAT A.S. (FIBA)	Mean	0.0003	0.0003	0.0004	0.0003
	STD	0.0053	0.0050	0.0050	0.0054
	Max	0.0266	0.0251	0.0251	0.0251
	Min	-0.0373	-0.0350	-0.0349	-0.0349
	Number of Funds	7	8	8	8
GARANTI	Mean	0.0003	0.0003	0.0004	0.0003

EMEKLILIK VE HAYAT A.S. (GARAN)	STD	0.0042	0.0046	0.0052	0.0053
	Max	0.0232	0.0243	0.0263	0.0251
	Min	-0.0317	-0.0333	-0.0371	-0.0352
	Number of Funds	12	15	16	17
GROUPAMA EMEKLILIK A.S. (GROUP)	Mean	0.0003	0.0003	0.0004	0.0003
	STD	0.0044	0.0045	0.0054	0.0058
	Max	0.0228	0.0223	0.0266	0.0266
	Min	-0.0304	-0.0304	-0.0366	-0.0366
	Number of Funds	8	8	9	9
NN HAYAT VE EMEKLILIK A.S. (NN HA)	Mean	0.0003	0.0003	0.0003	0.0003
	STD	0.0034	0.0035	0.0031	0.0034
	Max	0.0183	0.0183	0.0159	0.0159
	Min	-0.0277	-0.0277	-0.0237	-0.0237
	Number of Funds	6	6	7	7
VAKIF EMEKLILIK A.S. (VAKIF)	Mean	0.0003	0.0003	0.0003	0.0003
	STD	0.0042	0.0047	0.0038	0.0040
	Max	0.0256	0.0257	0.0218	0.0214
	Min	-0.0277	-0.0333	-0.0271	-0.0271
	Number of Funds	10	12	16	16

It is widely accepted that performance evaluation should consist of two components: risk and return. In constructing a measure of performance, determination of risk is the first important issue; either the total risk or the systematic risk. The second issue is how to combine risk and return to construct the portfolio performance measure (Moy, 2002: 226). There are three general classes of performance measures dependent on the utilization of risk. The first performance measures based on the total (standard deviation) risk of return. The second class is comprised of systematic (beta or covariance) risk of return. The third class does not require a risk pricing model (Jobson and Korkie, 1981: 890).

In this paper, we applied five different performance measurements, which based on both standard deviation and return (Sharpe and Sortino Ratios, M^2 performance measure) and systematic risk and return (Treynor Index and Jensen Alpha) for each individual pension fund based on four different research sample windows. Definition of each performance measurement ratios are shown in Table 3.

Table 3. Performance Measurement Techniques

Based on standard deviation and return	Sharpe Ratio	$\dfrac{r_i - r_f}{\sigma_{r_i}}$	ri: return of fund i rf: risk free rate σ_{ri} :standard deviation of i
	Sortino Ratio	$\dfrac{r_i - MAR}{\sigma_{MAR}}$	ri: return of fund i MAR: min. acceptable rate of return σ_{MAR} : standard deviation of MAR
	M^2 performance measure	$r_f + Sharpe\ Ratio * \sigma_{rm}$	rf: risk free rate σ_{rm}: standard deviation of benchmark
Based on systematic risk and return	Treynor Index	$\dfrac{r_i - r_f}{\beta_i}$	ri: return of fund i rf: risk free rate β_i:Beta of fund i
	Jensen Alpha	$r_i - r_f = \alpha_i + \beta_i(r_m - r_f) + e_i$	ri: return of fund i rf: risk free rate β_i:Beta of fund i e_i:error term of i

Source: Korkmaz and Uygurtürk (2007)

In order to examine the funds' performance, the daily return of each individual pension fund calculated as follows;

$$r_{it} = ln_{V{i_t}} - ln_{V{i_{t-1}}} \qquad (1)$$

where r_{it} represents the daily return of fund *i*, $ln_{V{i_t}}$ is the value of fund *i* at time *t* and $ln_{V{i_{t-1}}}$ is value of fund *i* time *t-1*.

According to the different techniques, each company's funds have both positive and negative performance ratios. In order to comprehend performances of the companies, the performance ratios of funds are clustered into two groups as positive and negative, and then the averages of both clusters are calculated for each company. In this way, the average performance ratios are created for each sample windows. To evaluate the relative performances of each company scattered graphs are prepared with respect to a number of funds and the average performance ratios. In such a way, a number of positive funds and the average positive performance ratios, as well as a number of negative funds and the average negative performance ratios for each company, are illustrated. Finally, we tried to explore the performance behavior of each private pension fund companies over the sample windows.

Findings

We have calculated five different performance measurement ratios as mentioned above -Sharpe Ratio, Sortino Ratio, Treynor Index, M square, Jensen Alpha- for 146 Turkish individual pension funds which managed by 11 different companies between 2010-2016 period.

The performances of individual pension funds measured for different time horizon and then these measured ratios clustered into two groups: average positive performance ratios and averaged negative performance ratios. All techniques reveal similar performance patterns. For a sample illustration, Sharpe Ratio performance results are indicated in Table 4 and scattered graphs are presented in Figure 2.

The results of positive averages show that AVIVA and VAKIF outperformed other companies in almost all performance measurement techniques whereas, NN HA has the lowest averaged positive fund performance for the first two sample windows (2010–2016 & 2011–2016), FIBA has the lowest averaged positive fund performance for the last two sample windows (2012–2016 & 2013–2016).

In contrast, negative performance values of all companies are varying. While BNB P has the lowest averaged negative fund performance for 2010 – 2016 sample window, CIGNA has the lowest averaged negative fund performance for 2011 – 2016 sample window. ALLIA has the lowest averaged negative fund performance for 2012 – 2016 sample window. ANADO has the lowest averaged negative fund performance for 2013 – 2016 sample window. On the other hand, NN HA has the best average performance ratios in the average negative performance ratios cluster in all sample windows except 2012-2016.

In the study, interestingly, the results of analysis do not illustrate any negative Jensens' Alpha parameter. Jensens' Alpha performance measurement deserves special evaluation, because it has a peculiar framework, such that market indexes are considered as the benchmark to calculate the parameter alpha in the model. We believe that for the performance measures of individual funds, an appropriate index should be formed involving all pension funds outstanding. If it would be applicable, most probably we would have had negative alpha parameters. But this is not an important aspect because the same benchmark index is applied for all calculations in this study in terms performance measurement. When we focused on Jensens' Alpha performance measurement, we are interested in relative performances among the individual pension fund companies. The analysis illustrates almost the same patterns with the other techniques.

Table 4. Sharpe Ratios of Pension Fund Companies

| Companies	Sample Windows	2010 - 2016	2011 - 2016	2012 - 2016	2013 - 2016
AEGON	# of positive funds	3	3	3	3
	Average Sharpe Ratio of positive funds	0.0529	0.0733	0.0929	0.1007
	# of negative funds	3	3	3	3
	Average Sharpe Ratio of negative funds	-0.0186	-0.0267	-0.0144	-0.0402
ALLIA	# of positive funds	5	6	21	19
	Average Sharpe Ratio of positive funds	0.0584	0.0605	0.0809	0.0924
	# of negative funds	4	3	6	10
	Average Sharpe Ratio of negative funds	-0.0178	-0.0199	-0.0285	-0.0476
ANADO	# of positive funds	11	11	13	12
	Average Sharpe Ratio of positive funds	0.0592	0.0694	0.0838	0.0785
	# of negative funds	5	7	8	9
	Average Sharpe Ratio of negative funds	-0.0259	-0.0340	-0.0229	-0.0538
AVIVA	# of positive funds	10	10	12	10
	Average Sharpe Ratio of positive funds	0.0946	0.1096	0.1225	0.1473
	# of negative funds	6	7	6	8
	Average Sharpe Ratio of negative funds	-0.0188	-0.0278	-0.0144	-0.0440
BNP P	# of positive funds	5	5	7	6
	Average Sharpe Ratio of positive funds	0.0736	0.0852	0.0857	0.1143
	# of negative funds	2	2	1	2
	Average Sharpe Ratio of negative funds	-0.0642	-0.0202	-0.0178	-0.0370
CIGNA	# of positive funds	0	0	3	3
	Average Sharpe Ratio of positive funds	-	-	0.0926	0.0915
	# of negative funds	1	1	4	4
	Average Sharpe Ratio of negative funds	-0.0221	-0.0349	-0.0258	-0.0493
FIBA	# of positive funds	4	4	5	4
	Average Sharpe Ratio of positive funds	0.0480	0.0650	0.0695	0.0915
	# of negative funds	3	4	3	4
	Average Sharpe Ratio of negative funds	-0.0122	-0.0271	-0.0107	-0.0426
GARAN	# of positive funds	9	8	10	8
	Average Sharpe Ratio of positive funds	0.0599	0.0785	0.0748	0.0941
	# of negative funds	3	7	6	9
	Average Sharpe Ratio of negative funds	-0.0270	-0.0227	-0.0165	-0.0369
GROUP	# of positive funds	5	5	5	5
	Average Sharpe Ratio of positive funds	0.0679	0.0862	0.1102	0.1116
	# of negative funds	3	3	4	4
	Average Sharpe Ratio of negative funds	-0.0196	-0.0279	-0.0147	-0.0377
NN HA	# of positive funds	2	2	4	3
	Average Sharpe Ratio of positive funds	0.0213	0.0194	0.0851	0.1048
	# of negative funds	4	4	3	4
	Average Sharpe Ratio of negative funds	-0.0107	-0.0132	-0.0128	-0.0302
VAKIF	# of positive funds	6	7	10	8
	Average Sharpe Ratio of positive funds	0.0904	0.0942	0.0798	0.1054
	# of negative funds	4	5	6	8
	Average Sharpe Ratio of negative funds	-0.0155	-0.0237	-0.0218	-0.0368
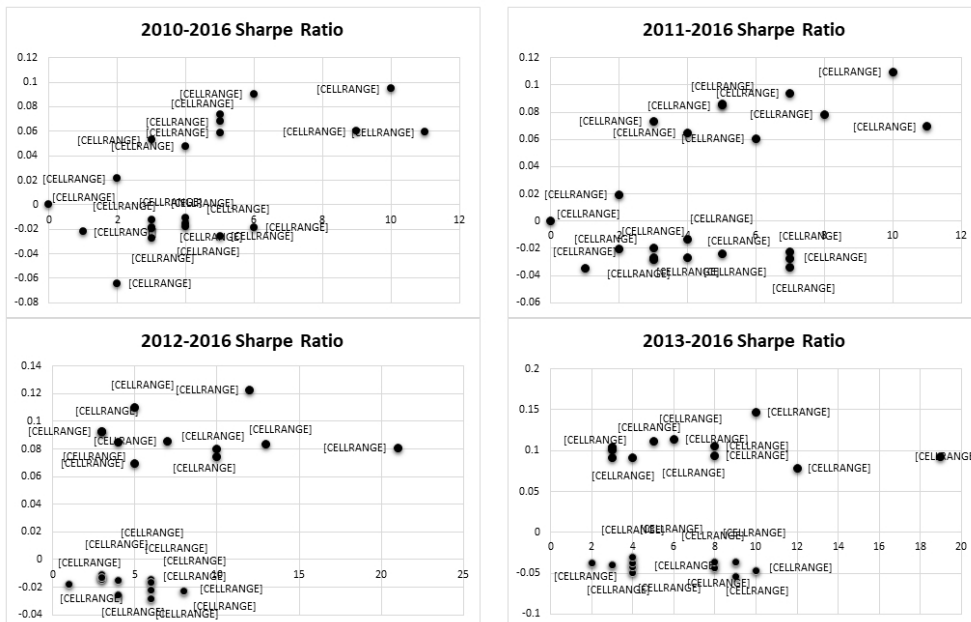
Figure 2. The Average Positive and Averaged Negative Sharpe Ratios for Different Sample Windows

Conclusion

The individual pension funds not only complementary to public pension systems but also an important tool in order to meet the long-term funding needs of economies. The individual pension fund system is managed by private insurance companies and monitored by government authorities in Turkey.

In this paper, the performance ratios of each individual pension funds and the pension fund companies' performances were analyzed for the 2010-2016 period. Due to the new individual pension funds are comprised of different research periods, we create 4 different research sample windows (2010-2016; 2011-2016; 2012-2016; 2013-2016), in order to understand the performance of the pension fund companies.

It is a significant aspect that all individual or institutional investors are interested in selecting the best-performed pension fund company in their investment decisions. Especially, individual investors may have difficulties in distributing their savings into individual pension funds of different companies. This study sheds light on the selection of the best performed private pension fund company by comparing their positive and negative average performance ratios. Therefore, the proposed way of analysis will ease the selection of companies for individual investors. Another contrition of the study is that individual, as well as institutional investors, can benefit to

explore the behavior of companies' performances for different time horizons for a sustainable investment.

In finance literature, almost all studies focus on individual pension fund performances. However, a new methodology is needed to measure the whole body of pension fund companies. For instance, by using risk and return of pension funds of each company an efficient frontier can be created as a new performance benchmark.

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