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AN EVALUATION OF TURKISH MUTUAL AND PENSION FUNDS' PERFORMANCES

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ABSTRACT

This study evaluates the performance of Turkish type-A equity mutual funds and growth equity pension funds for the period between 01.01.2009 and 31.12.2015, using the Sharpe, Sortino, Treynor, Jensen, and Information ratio models, followed by the TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) model, which combines the previously mentioned evaluation techniques to reach to a comprehensive ranking of the funds. In addition, the study tests the ability of fund managers to outperform the market using Jensen's alpha and Treynor-Mazuy models. In this study, a total of 15 type-A mutual funds and 10 growth equity pension funds have been evaluated and ranked. After using the Jensen's alpha and Treynor-Muzay models, the results, in general, indicate that the managers of these funds do not possess the ability to outperform the market neither by stock selection nor by market timing. For market timing, only one pension fund has a statistically significant measure implying that its management possesses the ability to time their investments according to their expectations of the future movements of the market. On the other hand, only one mutual fund shows to have outperformed the market by stock selectivity while statistically significant at the 1% level. The study also ranked the mutual and pension funds using the Sharpe, Sortino, Treynor, Information ratio and Jensen models, followed by the TOPSIS model. On the average, pension funds seem to outperform mutual funds when Treynor, Information, and Jensen models are considered. While, when Sharpe and Sortino models are considered, mutual funds seem to outperform pension funds. In addition, it seems that mutual funds outperform pension funds when all measures are combined using the TOPSIS model.

Keywords: TOPSIS method, mutual funds, pension funds, Jensen's Alpha, market timing ability.
JEL Codes: G11, G19, F39

1. INTRODUCTION

One of the most studied topics in finance is the evaluation of investments' performance carried out by investment managers. It is considered as a topic of much importance for both academicians and practitioners. Academicians, in an attempt to test the validity of the market efficiency theory, examine the forecasting abilities of managers, which would enable them to achieve abnormal returns. On the other hand, practitioners use these examinations to guide them in the allocation of funds on different investments. (Henriksson & Merton, 1981)

Mutual and pension funds are particularly considered a popular area for such research as they are operated for the sole purpose of investing. The public invests great sums of money in these mutual funds, which in turn are invested by these funds in various financial instruments, such as; stocks, bonds, real estate, gold and minerals, etc. Similarly, participants contribute their savings to be invested in pension funds, which are managed by asset management companies (Gökçen & Yalçın, 2014). These funds are considered advantageous to investors as their investments are diversified widely, reducing their exposure to risk. In addition, these funds are managed by professionals, which supposedly have more experience than small investors.

In Turkey, mutual funds first appeared in 1987 after the formation of Istanbul Stock Exchange (ISE), now called Borsa Istanbul, in 1985. According to the Capital Markets Board of Turkey, mutual funds are open-end pools with no legal entity but their assets are separated from the founder as a safety mechanism against bankruptcy. In addition, mutual funds are exempt from corporate and income tax. In 1994, mutual funds started to be classified into two types; A and B. Type A mutual funds are obligated to invest 25% of their portfolio in stocks issued by Turkish companies, while Type B funds do not have such obligation and are free to invest without any restrictions. The latest statistics (December 2015) show that there are a total of 363 operating mutual funds, with a total asset value of 37,186,000 thousand Turkish Liras. Since 2004, the total asset value for all mutual funds increased by around 50%. (Capital Markets Board of Turkey, 2015)

On the other hand, the pension fund system in Turkey started on October 27, 2003, which intends to strengthen the public pension system and is part of an initiative to improve the domestic savings rate in Turkey. The contribution to the individual pension system is voluntary and on the basis of defined contribution plans. Within the financial sector, the size of the private pension system has increased; pension companies are now main players in the system (Kurtaran, et. al, 2013). It plays a key role in enhancing the savings rate in the economy and contributes to the inflow of money in the financial system, thus providing an efficient allocation of resources (Acikgöz, et. al, 2015). The most important reform in the pension system was started in 2013, which introduced a 25% state contribution—where the government makes a direct contribution to participants' accounts (EGM, 2014 Report). For example, when 100 TL is deposited as a contribution in an account, the state will contribute 25 TL; increasing savings to a total of 125 TL. The total size of the private pension system was 20.346.290 TL in 2012, increasing a year later to 26.297.484 TL (25.141.718 TL was the amount received from fund participants, and 1.151.766 TL was the state contribution). In 2014, the state contribution was 3.019.076 TL and the fund contribution was 34.793.0777 TL, amounting to a total of 37.812.54 TL. Hence, we can easily say that the state contribution vitally boosts the pension system in Turkey: the total amount almost doubled from approximately 20.36.290 TL to 37.812.154 TL in only two years.

2. LITERATURE REVIEW

One of the first studies that evaluated performance of mutual funds was carried out by Treynor (1965). He developed a risk-adjusted indicator, which examines the quality of returns, rather than the quantity. Sharpe (1966) followed with a study that introduced another measure to evaluate performance. Instead of using the variability of returns as the measure of risk, as Treynor (1965) did using beta, he used the volatility of returns measured by the standard deviation. He evaluated 34 open-end mutual funds using both measures to find evidence that only 11 funds were able to outperform the index.

Jensen (1968) developed a model to examine the ability of stock selectivity by mutual fund managers. Jensen's alpha, the index used to measure stock selectivity, convey the portion of the mean return of the fund that is unexplained by the systematic risk exposure to market variations. By examining 115 mutual funds, he found that managers of mutual funds, generally, do not have selective abilities and funds do not outperform the market.

In an attempt to reap the benefits of the different evaluation measures (Treynor's ratio, Sharpe's ratio, Sortino's ratio, Jensen's Alpha, Information ratio, etc.) which became abundant throughout the years, researchers started using a multi-criteria decision making technique, founded by Hwang and Yoon (1981), called Technique for Order Preference by Similarity to Ideal Solution (TOPSIS, for short) which combines all desired measures into one. (*see:* Hui. et. al. (2010), Jiuan et. al. (2007)

In their efforts to evaluate another aspect of managers' abilities, timing the market, Treynor and Mazuy (1966) developed a measure that indicates excess returns which are not explained by the current risk position of the manager. They examined 57 mutual funds finding only 1 with significant timing abilities.

Several studies after that attempted to evaluate mutual funds' performances using such single-index models, as well as multi factor models; such as Fama-French 3 factor model and Carhart model. These studies in terms of period chosen and sample, however, they unamiously found that funds, on average, are not able to beat the market. (*see:* McDonald (1973), Elton, Gruber, Das, and Hlavka (1993), Malkiel (1995), Blake, Elton, and Gruber (1993), Detzler (1999), and Fama and French (2010))

Turkish case is no different that the findings in above mentioned studies. There is a significant amount of evidence, whether using single-index or multi-factor models, to suggest that funds do not outperform the market and managers do not possess timing and/or selective abilities. (*see:* (Gürsoy and Erzurumlu (2001), Gökçen and Yalçın (2014), Türegün and Kaya (2014)). In an attempt to compare between mutual and pension funds' performances, Akpınar (2014) and Alptekin (2009) find evidence that pension funds outperform mutual funds.

3. DATA AND METHODOLOGY

3.1 Data

This paper evaluates the performance of Turkish Type A Equity mutual funds and Equity growth pension funds with the use of available data from January 2009 till the end of December 2015. Data is acquired from the Thompson-Reuters Database. The paper only considers funds that are heavily invested in equity to evaluate the performance of managers, and evaluate whether the active management of these funds is able to outperform the market. We exclude any funds that are closed, newly established, and merged with other funds during the research period. Our final sample includes 15 type-A equity mutual funds and 10 equity growth pension funds.

3.2. Return on Funds

Logarithmic return of funds is calculated over daily price indices of funds. 1,565 days are analyzed for the study between January 2009 and December 2015.

$$R_p = \ln(\frac{P_t}{P_{t-1}})$$

where

R_p = return on the fund

P_t = price of the fund at day *t*

P_{t-1} = price of the fund at day *t-1*

3.3. Benchmark

BIST100 price index is utilized as the benchmark to assess whether a fund could outperform the market. Logarithmic daily returns of the BIST100 are used in this study.

$$R_m = \ln(\frac{P_{mt}}{P_{mt-1}})$$

where

R_m = returns on the BIST100

P_{mt} = value of the BIST100 Price Index on day t

P_{mt-1} = value of the BIST100 Price Index on day t-1

3.4. Risk-free rate

The risk-free rate is considered as the logarithmic daily returns of the Turkish governmental 3-month Treasury bills.

3.5. Methodology

Adopting methods from earlier research to evaluate the performance of the Turkish Type A equity mutual funds and Growth Equity/ State Borrowing Instrument Pension Funds, the study applies Sharpe, Sortino, and Treynor ratios and Jensen's alpha. Then the TOPSIS method is applied on the measures to reach to a final ranking. In addition, Jensen's alpha is also used to evaluate the managers' ability to pick stocks, while Treynor and Mazuy model is used to evaluate the timing abilities of the managers.

3.5.1. Sharpe Ratio

Sharepe taio is a composite measure to evaluate risk-adjusted performance. It is calculated by deducting the risk-free rate from the rate of return of the fund, divided by the standard deviation of the fund's returns. Higher the value of this ratio, higher the return for each unit of risk, hence, a better quality of returns.

$$S_p = \frac{(R_p - R_f)}{\sigma_p}$$

R_p: Return of the fund

R_f: Risk-free rate

σ_p: Standard deviation of the fund returns

3.5.2. Sortino Ratio

This ratio is very similar to Sharpe ratio, but with one alteration. It uses the downside risk instead of standard deviation as the measure of risk. Standard deviation considers all volatility whether positive or negative. On the other hand, downside risk considers only the negative volatility (downside) and ignores the positive. The interpretation of this measure is identical to Sharpe, therefore the higher the better.

$$So_p = \frac{(R_p - R_f)}{DR_p}$$

R_p: Return of the fund

R_f: Risk-free rate

DR_p: Downside risk of the fund returns

3.5.3. Treynor Ratio

This ratio is considered the first attempt to evaluate performance and is the base for Sharpe and Sortino's ratios. It differs from Sharpe as it uses beta instead of standard deviation as the measure of risk. Beta is concerned with the variability of a fund's returns in respect to the market return. In this measure, only systematic risk is considered as it is assumed that unsystematic risk is diversified away by investing in a multi-asset portfolio.

$$T_p = \frac{(R_p - R_f)}{\beta_p}$$

R_p: Return of the fund

R_f: Risk-free rate

β_p: Variability of the fund returns

3.5.4. Jensen's Alpha

This measure assumes that the Capital Asset Pricing Model (CAPM) is valid. Alpha is the measure of excess return that is unexplained by the systematic risk, which indicates a manager's predictive ability. The sign of the alpha measure indicates the stock picking ability while its value indicates the performance of the fund.

$$R_p - R_f = \alpha_p + \beta_p(R_m - R_f)$$

R_p: Return of the fund

R_f: Risk-free rate

β_p: Variability of the fund returns

R_m: Return of the market

3.5.5. Treynor & Mazuy Model

This quadratic model measures the ability of managers to time their investments according to their expectations about the direction of the market. If managers possess this ability, they should be able to beat the market. A positive β_1 (timing

parameter) shows that managers are able to time their investments to beat the benchmark, while a negative one implies an absence of such ability.

$$R_p - R_f = \alpha_p + \beta_{p0}(R_m - R_f) + \beta_{p1}(R_m - R_f)^2$$

R_p: Return of the fund

R_f: Risk-free rate

β_{po}: Slope of the portfolio return

R_m: Return of the market

3.5.6. Information Ratio

This ratio is also similar to the Sharpe ratio, but uses the return of the market instead of the risk-free rate to calculate the excess of returns. It is calculated by deducting the rate of return of the market from the rate of return of the fund, divided by the standard deviation of the fund's returns. Higher the value of this ratio, higher the return for each unit of risk, hence, a better quality of returns.

$$IR_p = \frac{(R_p - R_m)}{\sigma_p}$$

R_p: Return of the fund

R_m: Return of the market

σ_p: Standard deviation of the fund returns

3.5.7. TOPSIS Method

This technique is a multi-criteria decision analysis method which primarily is utilized to solve decision making problems, more specifically; multi-attribute decision problems. The TOPSIS method basically identifies the "ideal" and "anti-ideal" solutions (which are hypothesized by the decision maker), then measures the relative distances away from the ideal and anti-ideal solutions for each alternative. The best solution should be as close as possible to the ideal solution, and as far as possible from the anti-ideal solution. To apply this method, different weights should be assigned for each criterion. This study uses the coefficient of variation (CV) as the objective weight after normalizing for unity using the following equation:

$$CV_j / \sum_{k=1}^{m} CV_k$$

j = 1, 2, …, m, where CV_j is the sample coefficient of variation under criterion j.

The following steps are applied in this technique:

Step1: A normalized matrix is constructed.

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_i x_{ij}^2}}$$

i : alternative, *j* : criterion

Step 2: A weighted normalized matrix is constructed. $v_{ij} = w_i * r_{ij}$

Step 3: The ideal and non-ideal solutions are set for each criterion.

$I^+ = (v_1^+, v_2^+, \dots, v_m^+)$, maximum values.

$AI^- = (v_1^-, v_2^-, \dots, v_m^-)$, minimum values.

Step 4: The distance of each alternative to the ideal and anti-ideal solutions is calculated.

$$d_i^+ = \sqrt{\sum_j^m (v_{ij} - v_j^+)^2}$$

$$d_i^- = \sqrt{\sum_j^m (v_{ij} - v_j^-)^2}$$

Step 5: Coefficient of closeness is calculated.

$$CC_i = \frac{d_i^-}{d_i^+ + d_i^-}$$

4. FINDINGS AND DISCUSSIONS

4.1. Descriptive Statistics

Descriptive statistics of Type-A Equity Mutual and Growth Equity Pension funds, **(see Appendix A)** as well as of the benchmark, are shown in tables (1) and (2). Mean statistics show that 7 mutual funds and 7 pension funds have surpassed the BIST 100 benchmark during the period of the study. According to the standard deviation statistics, none of the funds in the study's population show more volatility than the benchmark, indicating that none of the funds is riskier than BIST 100. The statistics also show that all funds have a negative skewness measure, while the benchmark shows a positive one. In addition, all funds and the benchmark show a positive kurtosis measure, which indicates heavy tailed return distributions.

Table 1: Descriptive Statistics of Type-A Equity Mutual Funds

Mutual Funds	Mean	Std. Dev.	Kurtosis	Skewness	Min.	Max.	Beta	R^2
BIST100	0.00054	0.01517	3.3606	2.25907	-0.11064	0.06895	0.943	0.80
MF1	0.00048	0.01230	4.5842	-0.6517	-0.10196	0.05353	0.928	0.95
MF2	0.00064	0.00952	8.1735	-1.1224	-0.08755	0.04735	0.846	0.86
MF3	0.00057	0.01053	6.2598	-0.9737	-0.07766	0.04959	0.855	0.89
MF4	0.00041	0.01182	5.1770	-0.6294	-0.09829	0.05854	0.911	0.93
MF5	0.00044	0.01082	4.2488	-0.4647	-0.08771	0.05437	0.897	0.94
MF6	0.00070	0.01343	3.6447	-0.4744	-0.09905	0.06179	0.945	0.94
MF7	0.00042	0.01287	4.4977	-0.5542	-0.1029	0.06644	0.938	0.95
MF8	0.00061	0.01091	6.4792	-0.9496	-0.08926	0.04632	0.887	0.91
MF9	0.00054	0.01116	5.0370	-0.5808	-0.09077	0.05515	0.898	0.93
MF10	0.00038	0.01208	3.6960	-0.4944	-0.08989	0.05863	0.924	0.95
MF11	0.00026	0.00962	5.5485	-0.7526	-0.07266	0.04877	0.869	0.92
MF12	0.00105	0.01409	5.76477	-0.90255	-0.11645	0.062173	0.933	0.9
MF13	0.00056	0.01385	3.74901	-0.50604	-0.10406	0.063328	0.956	0.95
MF14	0.00053	0.01069	7.54789	-0.64781	-0.09012	0.075762	0.834	0.84
MF15	0.00053	0.01209	4.18048	-0.47533	-0.09538	0.057499	0.924	0.95

Table 2: Descriptive Statistics of Growth Equity Pension Funds

Pension Funds	Mean	Std. Dev.	Kurtosis	Skewness	Min.	Max.	Beta	R^2
BIST100	0.00054	0.0151	33.606	22.590	-0.1106	0.0689	0.943	0.80
PF1	0.00059	0.0132	29.863	-0.3833	-0.0923	0.0584	0.945	0.82
PF2	0.00053	0.0133	32.942	-0.4644	-0.0865	0.0616	0.943	0.79
PF3	0.00058	0.0132	39.823	-0.5843	-0.1036	0.0568	0.943	0.80
PF4	0.00061	0.0133	39.990	-0.4696	-0.1043	0.0635	0.945	0.80
PF5	0.00069	0.0132	37.604	-0.4929	-0.0980	0.0596	0.941	0.77
PF6	0.00072	0.0136	44.143	-0.6407	-0.1035	0.0609	0.944	0.76
PF7	0.00051	0.0127	39.538	-0.6543	-0.1011	0.0499	0.932	0.79

PF8	0.00062	0.0128	37.672	-0.4841	-0.0960	0.0574	0.930	0.78
PF9	0.00046	0.01314	36.069	-0.4867	-0.0899	0.0680	0.940	0.78
PF10	0.00058	0.0130	35.030	-0.5283	-0.0956	0.0565	0.941	0.81

4.2. Ranking of Funds

After the application of Sharpe, Sortino, Treynor, Information, and Jensen models, the rankings for Type-A equity mutual and Growth equity pension funds are shown in tables (3) & (4). On average, pension funds outperform mutual funds when Treynor, Information, and Jensen models are considered. While, when Sharpe and Sortino models are considered, mutual funds outperform pension funds.

Table 3: Rankings of Type-A Equity Mutual Funds

Mutual Funds	Sharpe	Rank	Sortino	Rank	Treynor	Rank	Information	Rank
MF1	0.0604	10	0.094	10	0.0008	10	-0.0043	10
MF2	0.0949	1	0.142	2	0.0010	2	0.0112	3
MF3	0.0794	4	0.119	4	0.0009	5	0.0038	5
MF4	0.0574	12	0.089	12	0.0007	12	-0.0100	13
MF5	0.0654	9	0.105	8	0.0007	11	-0.0082	11
MF6	0.0717	7	0.115	6	0.0010	3	0.0123	2
MF7	0.0531	15	0.084	14	0.0007	13	-0.0087	12
MF8	0.0803	3	0.122	3	0.0009	4	0.0073	4
MF9	0.0723	6	0.114	7	0.0009	7	0.0008	7
MF10	0.0533	14	0.084	13	0.0007	14	-0.0126	14
MF11	0.0544	13	0.083	15	0.0006	15	-0.0283	15
MF12	0.0931	2	0.143	1	0.0014	1	0.0366	1
MF13	0.0594	11	0.094	11	0.0008	8	0.0018	6
MF14	0.0741	5	0.115	5	0.0009	6	-0.0004	9
MF15	0.0655	8	0.105	9	0.0008	9	-0.0003	8

Table 4: Rankings of Growth Equity Pension Funds

Pension Funds	Sharpe	Rank	Sortino	Rank	Treynor	Rank	Information	Rank
PF1	0.0639	6	0.06392	10	0.00089	6	0.0036	5
PF2	0.0595	9	0.00215	4	0.00084	8	-0.0002	8
PF3	0.0632	7	0.00228	5	0.00089	7	0.0031	7
PF4	0.0651	4	0.00236	7	0.00092	4	0.0055	4
PF5	0.0721	1	0.00259	9	0.00101	2	0.0118	2
PF6	0.0719	2	0.00023	1	0.00104	1	0.0133	1
PF7	0.0646	5	0.00230	6	0.0009	5	0.0034	6
PF8	0.0608	8	0.00213	3	0.00083	9	-0.0019	9
PF9	0.0686	3	0.00243	8	0.00094	3	0.00631	3
PF10	0.0549	10	0.00195	2	0.00077	10	-0.0057	10

After applying the TOPSIS technique on a decision matrix of five criteria, Sharpe, Sortino, Treynor, information and Jensen models, for each of the mutual and pension funds in the study's sample, the following rankings resulted as shown in tables (5) and (6). On average, it seems that mutual funds outperform pension funds when all measures are combined.

Table 5: Rankings of Type-A Equity Mutual Funds (TOPSIS)

Mutual Funds	CC	Rank
MF1	0.367300	10
MF2	0.608880	3
MF3	0.495100	5
MF4	0.280311	13
MF5	0.308739	11
MF6	0.624417	2
MF7	0.298935	12
MF8	0.547361	4
MF9	0.448492	7
MF10	0.239639	14
MF11	0.000451	15
MF12	0.995830	1
MF13	0.4628235	6
MF14	0.4297074	8
MF15	0.4281291	9

Table 6: Rankings of Growth Equity Pension Funds (TOPSIS)

Pension Funds	CC	Rank
PF1	0.6031748	1
PF2	0.3328161	3
PF3	0.3321031	5
PF4	0.3321262	4
PF5	0.331631	6
PF6	0.3380201	2
PF7	0.3311111	7
PF8	0.3296999	10
PF9	0.3308752	8
PF10	0.3307344	9

4.3. Stock-Picking Ability

Tables (7) and (8) below show the values of Jensen's alpha which indicates the stock picking ability by managers. A positive sign indicates that managers have the ability to select stocks that enables them to outperform the market. In addition, the value of the alpha indicates the performance of the fund. According to the results, only MF12 has a positive sign, which is significant at the 1% level. All the other values are not significant even at the 10% level.

Table 2: Stock-Picking ability of Type-A Equity Mutual Funds

Mutual Funds	Jensen's Alpha	t Stat
MF1	0.00000	0.027
MF2	0.00023	0.988
MF3	0.00016	0.738
MF4	-0.00005	-0.28
MF5	-0.00007	-0.04
MF6	0.00021	1.278
MF7	0.00006	-0.41
MF8	0.00017	0.888
MF9	0.00009	0.518
MF10	-0.00009	-0.66
MF11	-0.0002	-0.95
MF12	0.00057*	2.696
MF13	0.00006	0.402
MF14	0.00013	0.5
MF15	0.00005	0.376

,,*** indicates significance level at %1, %5, %10 respectively.*

Table 8: Stock-Picking ability of Growth Equity Pension Funds

Pension Funds	Jensen's Alpha	t Stat
PF1	0.00009	0,62
PF2	0.00004	0,27
PF3	0.0001	0,56
PF4	0.00012	0,76
PF5	0.0002	1,23
PF6	0.00023	1,33
PF7	0.00009	0,61
PF8	0.00003	0,19
PF9	0.00014	0,86
PF10	-0.00003	-0,17

, **, * indicates significance level at %1, %5, %10 respectively.*

4.4.Market-Timing Ability

The Treynor-Muzay model market timing parameter is shown in tables (9) & (10). According to this model, a positive β_1 would indicate that managers have the ability to time their investments according to their expectations of the future movement of the market. Through the analysis of the study's sample, it shows that only PF6 have a positive β_1; significant at the 1% level, which indicates that its management possesses the timing ability. All other fund managers do not have this timing ability, as all β_1s are either negative and significant, or insignificant at the 1%, 5%, and 10% levels.

Table 3: Market Timing Ability of Type-A Equity Mutual Funds

Mutual Funds	Treynor Mazuy	t Stat
MF1	-0.1304*	-2.85
MF2	-0.3006*	-4.21
MF3	-0.2487*	-3.83
MF4	-0.1905*	-3.69
MF5	-0.1211*	-2.53
MF6	-0.0768	-1.52
MF7	-0.0747	-1.58
MF8	-0.2112*	-3.59
MF9	-0.1822*	-3.38
MF10	-0.0948**	-2.2
MF11	-0.2514*	-4.62
MF12	-0.2013*	-3.1
MF13	-0.0796***	-1.7
MF14	-0.3286*	-4.19
MF15	-0.1168*	-2.54

,,*** indicates significance level at %1, %5, %10 respectively.*

Table 10: Market Timing ability of Growth Equity Pension I

Pension Funds	Treynor Mazuy	t Stat
PF1	-0,0559	-1,25
PF2	-0,0948**	-2,006
PF3	-0,1010**	-2,16
PF4	-0,0876***	-1,866
PF5	-0,06413	-1,29
PF6	0,5908*	3,567
PF7	-0,1119**	-2,35
PF8	-0,1244*	-2,59
PF9	-0,1183**	-2,46
PF10	-0,09411**	-2,07

,,*** indicates significance level at %1, %5, %10 respectively.*

5. CONCLUSION

After the analysis of 15 Turkish type-A equity mutual funds and 10 Turkish growth equity pension funds between 1.1.2009 and 31.12.2015 using the Jensen's alpha and Treynor-Muzay model, the results, in general, indicate that the managers of these funds do not possess the ability to outperform the market either by stock selectivity nor by market timing. For market timing, only one pension fund has a statistically significant measure implying that its management possesses the ability to time their investments according to their expectations of the future movement of the market. On the other hand, only one mutual fund shows to have outperformed the market by stock selectivity, while statistically significant at the 1% level.

The study also ranked the mutual and pension funds using the Sharpe, Sortino, Treynor, Information and Jensen models, followed by the TOPSIS model. On average, pension funds seem to outperform mutual funds when Treynor, Information, and Jensen models are considered. While, when Sharpe and Sortino models are considered, mutual funds seem outperform pension funds. In addition, it seems that mutual funds outperform pension funds when all measures are combined using the TOPSIS method.

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Appendix A

#	Fund's Name	Code
1	AKBANK	MF1
2	ALTERNATIF BANK	MF2
3	BMD	MF3
4	DENIZ BANK	MF4
5	ECZACIBASI	MF5
6	FINANS BANK	MF6
7	GARANTI BANK	MF7
8	GEDIK	MF8
9	ING BANK	MF9
10	IS BANK	MF10
11	SEKER BANK	MF11
12	STRATEJI EQUITIES	MF12
13	TED BANK	MF13
14	TEKSTIL BANK	MF14
15	YAPI KREDI	MF15
16	ALLIANZ LP	PF1
17	ANADOLU	PF2
18	AVIVASA	PF3
19	BNPP CARDIF	PF4
20	CIGNA FINANS	PF5
21	ERGO	PF6
22	GARANTI	PF7
23	GROUPAMA	PF8
24	ING	PF9
25	VAKIFBANK	PF10