



## A tournament analysis of mutual funds in Turkey

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### Abstract

This is an analysis of the mutual funds in Turkey with respect to their risk-altering behavior. Using the monthly returns and volatilities of 133 funds from 2002 to 2007, we divide each year in two parts and check whether or not the funds' performance in the first part affects the behavior of mutual fund companies in the second part in terms of risk. We find sufficient evidence that the funds which have lower/higher performance in the first part of the year have higher/lower risk appetite for the second half of the year. The results have stronger significance if the year is divided from June or July. The results from the Turkish mutual funds market are generally in line with previous literature from developed countries.

**Keywords:** Portfolio Risk, Mutual Funds, Emerging Markets.

**JEL Classification:** G11, G15.

### Özet. Türkiye'deki yatırım fonlarının turnuva metoduyla analizi

Bu çalışma Türkiye'deki yatırım fonlarının risk değiştirme davranışlarını incelemeyi amaçlamaktadır. 2002-2007 yılları arasında çalışan 133 fonun aylık getirileri ve oynaklıkları kullanılarak yapılan araştırmada, bir yıl iki yarıya bölünerek, birinci yarıdaki performansın ikinci yarıdaki risk alma davranışını etkileyip etkilemediği kontrol edildi. Yapılan incelemeler ve değerlendirmeler sonucunda yılın birinci yarısında düşük/yüksek performans sergileyen fonların yılın ikinci yarısında daha yüksek/düşük risk alma isteği olduğu yönünde yeterli delille ulaşıldı. Yılın Haziran veya Temmuz ayında ikiye bölünmesi durumunda çok daha anlamlı sonuçlara ulaşıldı. Türkiye'deki yatırım fonları piyasasına ait bu sonuçlar genel olarak literatürdeki gelişmiş ülkelere ait sonuçlarla tutarlılık sergilemektedir.

**Anahtar Kelimeler:** Portföy Riski, Yatırım Fonları, Gelişmekte Olan Piyasalar.

**JEL Sınıflaması:** G11, G15.

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### I. Introduction

There are numerous studies examining mutual funds in developed countries. These studies analyze different aspects of mutual funds including their stock picking ability, cost schemes, inflows and outflows, manager's compensation and risk profiles. In this study we are interested in risk attitudes of mutual fund companies. The managers of these funds are highly interested in acquiring new assets to their funds to improve performance as their compensation is generally linked to the assets under management, which is linked to the performance of the fund.

There are several studies documenting the importance of past performance on explaining the behavior of the investors' future actions. One of the earliest examples of this research belong to Kahneman and Tversky (1979) whose analysis suggests that a person who is not peaceful about his losses would be very likely to gamble that he wouldn't do otherwise. Goetzmann *et al.* (1992), Capon *et al.* (1996) are also some other examples analyzing this behavior. In a later study, Gruber (1996) tries to understand why mutual funds have grown so fast, when performance of mutual funds on average has been inferior to that of index funds. Using a four-index model, he tries to measure the performance of mutual funds, and finds evidence that future performance can partially be predictable from past performance. Therefore on the one hand "the sophisticated investors" as defined by him, direct their money according to this prediction. On the other hand, the "disadvantaged clientele" still keep their money in the funds that are predicted to do poorly because of three reasons each of which explains the type of "disadvantaged clientele": reliance on ads, institutional restrictions, taxes. As a result, he concludes that the aggregate pattern of consumer investing behavior is rational. Shefrin and Statman (1985) put the name "disposition effect" referring to the investors' behavior who are likely to realize their gains when the value of their assets increases but who are not likely to realize (as fast) their losses when the value of their assets decreases.

Various researches have also been interested in the mutual fund managers' risk taking behavior. Concerning that the compensation mechanism works for the one-year performance of the managers, they may have a strong incentive to alter the risk of the portfolio according to the performance in the first part of the year. Even if there is no compensation linked mechanism, the competition in performance may still be present for the mutual fund itself to attract higher level of capital. So it is not certain that the mutual fund managers following a certain risk preference pursue the best strategy for the mutual fund investors.

Brown *et al.* (1996) was the first paper who proposes to model mutual fund market with tournaments in which the funds compete with each other for new assets. The very useful premise of this approach is that fund managers

try to maximize their compensation by taking higher risk depending on their performance in earlier tournaments. Tournament approach is also useful in the sense that benchmark, market-timing, and survivorship bias problems which are common in mutual fund performance analysis are not an issue in this context. Using the monthly returns from more than 330 mutual funds from 1980 to 1991, they show that bad performing managers, (namely “losers”) in the first part of the year take higher risks relative good performing managers (namely “winners”) in the later period in order to reach their benchmark goal. Their study also implies that tournament structure of the mutual fund industry has an adverse incentive effect on the fund managers. That is, in order to have a good annual performance, the fund managers change their managerial objectives from long-term to a short-term which may not be in the interest of investors. Chevalier and Ellison (1997) also provide similar evidence that the mutual fund tournament generates incentives for managers on taking risk in the similar manner. Using 679 mutual funds, Koski and Pontiff (1999) also show that prior performance is strongly correlated with change in risk, and this correlation is less severe for funds that use derivatives. But they explain this relation with alternative hypothesis that is related to managers’ speed in investing. They propose that funds that perform well/poor may experience higher cash inflows/outflows which leads a decrease/increase in funds’ risk, and managers may not be able invest/divest their portfolio immediately.

Sirri and Tufano (1998) analyze the reasons of capital inflows to and outflows from mutual funds. They document that investors decide on investments with respect to past performance of the mutual funds, and even though the high performing funds attract large capital inflows, the lower performing funds do not experience large outflows at the same rate. They also point out to the fee-sensitiveness of these flows. Busse (1999) finds that successful mutual funds decrease exposure at periods of high volatility where he analyzes the daily US data.

An interesting study on mutual fund performance literature belongs to Busse (2001) which presents contradictory results to Brown et al. (1996). Instead of using a monthly data, he uses a daily data and finds that there is no tendency for mid-year “losers” to increase risk relative to mid-year “winners”. He explains this with biases arises in the monthly standard deviation estimates. Even though when he compounds the daily returns into monthly returns, he finds the similar pattern of Brown *et al.* (1996), using unbiased monthly standard deviation estimates he finds that the tournament pattern disappears. Bollen and Busse (2001) examine the market timing ability of fund managers using both daily and monthly data and show that daily data can give different results (i.e. more powerful test results) than monthly data.

Taylor (2003) tries to accord these two seemingly contradictory results by analyzing 660 weekly returns of mutual funds from 1984 to 1996 with a two-period tournament method. He approaches this situation with a game theoretic approach such that when both types of managers (winners and losers) are active and not performing against an index, the “winner” has a tendency to gamble especially when the “loser” is far behind him. This tendency is modeled with a certain probability. The loser guesses this, and chooses the opposite strategy with some probability. Taylor (2003) shows that, in equilibrium the winner is more likely to gamble than loser. Jans and Otten (2008) provide empirical evidence from UK mutual fund industry supporting Taylor (2003).

Elton *et al.* (2003) note that most of the funds in the US market are funds which are not with incentive fees. However the funds with incentive fees are managed by increased level of risk after periods of poor performance and decreased level of risk after period of high performance. Furthermore they take more risk than the funds with non-incentive fee.

In a very recent paper, Ariely *et al.* (2009) criticize the high-rewarding system based on performance. By conducting some experiments in USA and India, they conclude that very high reward levels (for managers) may have an adverse effect on performance. Considering the above literature we have mentioned, we are now aware of the fact that in order to maximize their compensation, mutual fund managers have a strong incentive on taking higher risk on their portfolios if their previous performance is not good enough.

Turkey with a young, developing and highly regulated mutual funds market has not been researched much from risk point of view. There are few studies about mutual funds in Turkey. A relevant one of those studies belongs to Canbaş and Kandır (2002) who try to evaluate the performance of mutual funds in Turkey between 1996 and 2000. Their findings reveal that the mutual funds in Turkey do not perform better than indices, and repo returns that form the majority of their portfolio. This study aims to measure the risk allocations of equity mutual funds where we use the equity portion of their investments through six years in the database to find differing management risk attitudes depending on their performance in the first half of the year. In Turkey the majority of the mutual funds are managed by portfolio management companies, which are subsidiaries of banks and brokerage houses and most of the funds did not have long-term equity fund managers responsible only from the same mutual fund until recently. One of the reasons for this is that the equity funds have been a small part of the funds managed. Secondly, the majority of the assets under management in the mutual fund market were composed of short-term maturity fixed income investments. These funds provided high real return and the inflation rate was very high until 2006 where the investors had been skeptical on equity investments. Even though there is no transparent

reporting mechanism in the mutual fund market where we can obtain any data on compensation, the compensation mechanism of the mutual fund managers for the equity funds is expected to be aligned to performance. Hence these managers have different responsibilities of portfolio management where they manage several funds in general. It is not possible to link their performance to individual funds, but they are expected to be compensated by their total fund management performance and profitability of the past year and other responsibilities they have.

Both the monthly and daily data of mutual fund portfolio information are not publicly available in Turkey, Capital Markets Board of Turkey kindly provided us with this data. Using a monthly data, we follow the Brown *et al.* (1996)' methodology for this analysis and calculate the returns and risk adjusted returns of each fund based on their month-end portfolio equity allocation. After this, we first divide the year in two parts and group the funds as losers and winners according to their return performance in the first part of the year. We then check whether or not the funds' performance in the first part affects the portfolio's volatility in the second part. More precisely we try to find whether being a loser in the first part of the year causes the manager to take higher risk in the second part of the year and vice versa. Our findings reflect that the loser fund managers tend to increase the risk of their portfolio to catch up their goal. Our results also confirm the previous findings of Brown *et al.* (1996).

What we contribute to the literature is twofold: First, we reveal the performance of "the equity portion of the portfolios of mutual funds" in Turkey which is not publicly available. Second, this is a country specific analysis where we test the validity of some empirical findings of various researchers for Turkey. The results generally confirm their conclusions about the fund managers' changing risk behavior according to their initial performance in the first half of the year.

The next part of the paper is designed as follows. We give background information and data description in Section II, Section III briefly overviews the methodology. We then summarize our findings in Section IV and Section V concludes.

## **II. Industry perspective of Turkey and the dataset**

According to the report prepared by The Association of Capital Market Intermediary Institutions of Turkey (2009), TSPAKB, Turkey has a young stock market, namely Istanbul Stock Exchange (ISE), established by the end of 1985 and the market capitalization of the stock market was \$120 billion in 2008 with about \$1 billion trading volume per day. There were 317 stocks in the market as of 2008. There are currently 1,115,314 investors in the Turkish

stock market. Out of this number 1,104,071 are individual investors living in Turkey. The ratio of total investors to whole population in Turkey is 2% and is well below the levels in developed countries. 32.7% of the total Turkish stock market portfolio is held by domestic investors and 67.3% is held by foreign investors. 67.3% of the equity transactions are made by domestic individuals, 18.4% by domestic institutions and 14.3% by the foreign investors. A more detailed summary of market statistics can be found in Table VII in the Appendix.

#### **Turkish Mutual Fund Market**

Mutual funds are collections of assets, which have been established with the money collected from the public for participation with the purpose of managing portfolios. These portfolios are invested on capital market instruments, gold and precious metal on the account of the holders of these certificates on the basis of principle of risk distribution and fiduciary ownership. Mutual fund founders are restricted to banks, insurance companies, non-bank intermediaries, unemployment funds and pension funds.<sup>1</sup>

Turkish institutional market is comprised of A and B Type funds, private pension funds, Exchange Traded Funds, Investment Trusts, Real Estate and Venture Capital Investment Trusts. There are 29,562 million TL investments on total 323 mutual funds market in Turkey. A-type funds have 919 million USD assets under management. B-type funds, the funds that generally have an equity restriction and are mostly managed with bonds and repos, have 19,295 million USD assets under management. The asset under management for private pension funds is 8 billion USD. Total size of assets under management for investment funds with A-type, B-type and pension funds, investment trusts, exchange traded funds are 36,130 million USD. The ratio of institutional investor to GNP is 5.4%.

There are 3,337,000 investors in the mutual fund market.<sup>2</sup> The mutual funds are comprised of 2.7% stocks and the total size of the equity investment is 791 million TL. The total size of A-type funds is 1,440 million TL. They have 66.3% equity investment on the average. There are 132 funds and 230,000 investors in the Turkish A-type fund market as of October 2010 having duration of 161 days.<sup>3</sup>

Mutual funds in Turkey are established in open-end form. Mutual funds started to be found from 1986 onwards. Type A mutual funds are required to invest at least 25% of their assets in equities that are issued by Turkish companies. Mutual funds that have no such obligations are classified as Type B mutual funds. Mutual funds cannot purchase more than 9% out of the total

1 <http://www.cmb.gov.tr/indexpage.aspx?pageid=9&submenuheader=4>

2 Capital Markets Board 2010-7, <http://www.spk.gov.tr/apps/aylikbulten/index.aspx?submenuheader=0>

3 <http://www.spk.gov.tr/apps/MutualFundsPortfolioValues/SummaryInfos.aspx?submenuheader=0>

outstanding shares of one company and they cannot invest more than 10% of the Net Asset Value for one company's shares. The mutual funds are classified according to their asset allocation such as Variable, Balanced/Mixed, Affiliate Companies, Sector, Equity, Private, Index, Notes and Bonds, Liquid and Foreign Securities Funds. According to the same report, TSPAKB (2010), the ratio of Type A mutual funds to total mutual funds is very small: 4.5%. The rest is composed of Type B funds which has a ratio of 95.5% as of December 2010.

#### **Dataset**

We use monthly data of all A-type mutual funds from January 2002 to December 2007, which are provided by the Capital Markets Board in Turkey. Thus the data period starts after the major economic crisis and devaluation in January 2001 and it ends just before the US and world economic crisis in September 2008. We use only data available for the full years from 2002 through 2007. Table I reports the Turkish A-type funds market for these dates. The number of funds in the market, the number of investors, duration of the fund, and total Turkish Lira assets of the fund and equity portion of the portfolio are reported. The equity funds in Turkey can hold bonds as a part of their portfolio which is not invested in equities.

**Table I: Descriptive Statistics of A-Type Mutual Funds in Turkey**

Year	Number of Funds	Number of Investors	Duration	Total TL Assets (in million TL)	Total Equity Assets %
2002	143	82.802	28	449	52.55
2003	137	106.617	81	778	62.18
2004	137	105.276	134	781	68.00
2005	136	143.944	156	1.031	69.69
2006	135	141.635	127	835	65.25
2007	139	165.396	199	922	68.35

Source: Capital Markets Board

The assets of the mutual funds are valued daily. They are valued at weighted average prices or rates of the market if a price exists. If the price is not available, the valuation is based on the last market price for stocks and the internal rate of return for fixed income securities. After valuation is calculated for each asset, they are added up to calculate the portfolio value. The costs of the fund are subtracted from the value of total assets to find the net asset value of the fund.

The name of the funds are known, hence in the Turkish market the managers may change from time to time and there is no such management that

manager's style could be analyzed since no manager is with a fund for a long time. The funds are mainly identified by the company which established them. However we have information of fund families and this enables a comparison as the names of the funds are known. During this period in our data we can observe that the number of investors of A-type funds and the number of funds increases more than two times. Hence the assets under management in equity funds did not show a stable increase. After the economic crisis in 2001 there was a heavy consolidation of the banking sector including mergers in the mutual funds sector. The increase of assets took place mainly in liquid funds, those funds do not hold any equity investments in their portfolios or if any very negligible.

Table II describes the data in detail. The number of A-type funds is 74 as of 2002 and 133 as of 2008. Out of these funds, 7 are index funds replicating Istanbul Stock Exchange ISE 30 or ISE 100 index. The dataset includes the fund code, the fund name, the stock code, stock name, number of nominal shares, price of the share, value of the share, date of inventory.

**Table II: Descriptive Statistics of A-Type Mutual Funds in Data**

Year	Number of A-Type Funds	Number of Trading Days	Average Number of Stocks in Funds	Total Number of Different Stocks in Funds
2002	74	252	16	198
2003	77	248	16	200
2004	86	250	17	215
2005	97	252	18	235
2006	106	251	22	248
2007	120	252	23	264

source: Capital Markets Board, Note: TL is converted to YTL in January 1st, 2005 and 1YTL=10<sup>6</sup> TL

There are 3,082,958 lines of data, which comprises each daily stock portfolio holdings of mutual funds through that period. The dataset does not identify the funds, if the company which established the fund merged was acquired by another company and the name of the fund is changed. The funds show an increased level of diversification throughout the years which is interesting to see. Their number of average stocks is 16 for the year 2001, where this number increases to 23 in 2007.

The data is included in the tournament calculation, if there is return information for the full year available. If the fund is established during the



year or if the fund is discontinued on a certain year, it is not included in the calculations of that year. Table II reports the year and the funds available on that year.

### III. Methodology

We follow the Brown *et al.* (1996)'s methodology for this analysis. First, we define the "winner" and "loser" funds according to their cumulative returns. The M-month cumulative equity portfolio return of each fund *j* in year *y* is calculated as follows:

$$RTN_{jMy} = [(1 + r_{j1y})(1 + r_{j2y}) \dots (1 + r_{jMy})] - 1 \quad (1)$$

where *r*'s are the monthly change in the fund's net asset value and dividend income is excluded from this return. RTN is aimed to measure the cumulative return from January to the month *M* in the same year. The month *M* varies between April and August so that the first part of the year will be either of January-April, January-May, January-June, January-July or January-August. The second part of the year will be the remaining part of the year. We calculate all cumulative returns with and without December returns, as December can be regarded as the month where funds will be manipulated for year end. We group funds according to their RTNs. The first grouping is made with the median. The funds, whose RTN above the median will be winners, and the rest will be the losers. The second grouping is made according to quartiles where we have to omit half of the sample. The upper quartile will be the winners, whereas the lower quartile will be the losers. The data period is selected starting from January 1<sup>st</sup> and ending December 31<sup>st</sup>, as the sector of mutual funds is evaluated by the 12 month returns in that period.

Secondly, the risk adjustment ratio, RAR, of the fund *j* in a given year *y*, is calculated as follows:

$$RAR_{jy} = \sqrt{\frac{\sum_{m=M+1}^{12} (r_{jmy} - \bar{r}_{j(12-M)y})^2}{(12-M)-1}} / \sqrt{\frac{\sum_{m=1}^M (r_{jmy} - \bar{r}_{jMy})^2}{M-1}} \quad (2)$$

The RAR is aimed to measure the ratio of fund's volatility in the second half of the year to fund's volatility in the first half of the year. Thus a high RAR would imply a volatility increase in the second half of the year. A high RAR is defined to be the one which is higher than the median of all RARs, and a low RAR is defined accordingly.

In this way, every fund would have a (RTN, RAR) pair assigned it for every year. This is done for the whole sample period of six years and a contingency table where each of these pairs placed is created. This procedure is repeated for several time intervals each of which is composed of two tournaments such as January-April vs. May-December, January-May vs. June-December, January-June vs. July-December, or January-July vs. August-December and January-August vs. September-December. In each trial we try to understand whether the performance in the first tournament affects the risk taking behavior in the second tournament. In other words, we try to explore whether the loser funds (ones with low RTN) in the first part of the year take higher risk (high RAR) level in the second part of the year or not.

Thus the null hypothesis is that the percentage of funds in each cell is equal (i.e. 25%) which implies that the classifications RTN and RAR are independent. We test the significance of the results using a chi-square test with 2-1 degree of freedom. The statistic is

$$\chi^2 = \sum_{i=1}^2 \sum_{j=1}^2 \frac{(f_{ij} - 25\%)^2}{25\%}$$

where  $f_{ij}$  refers to the observed cell frequencies with  $i$  indicating RTN type (loser, winner),  $j$  indicating RAR type (high, low).

Note that the rejection of this hypothesis is not sufficient enough to conclude that the company alters their portfolio risk according to their performance in the first part of the year. For this proposition to hold, the frequencies of low RTN/high RAR and high RTN/low RAR cells must also be significantly higher than 25% in addition to rejection of the hypothesis. If these two requirements hold, we will conclude that low RTN/high RAR and high RTN/low RAR are related.

#### IV. Findings

We first present the returns of "the equity portion of the mutual funds' portfolios" with that of Istanbul Stock Exchange (ISE-100) Index on Table III. Even though we do not adjust the data with inflation, we can report that out of six year performances there are three years that the performances of the equity portion of the funds on the average are above the Istanbul Stock Exchange 100 Composite Index.

**Table III: Istanbul Stock Exchange ISE 100 Index Return and the Average of Mutual Fund Returns (RTN) Statistics (in percentages)**

Year	2002	2003	2004	2005	2006	2007
RTN	-13.3 (73)	83.3 (77)	31.0 (86)	55.9 (97)	2.3 (106)	29.9 (118)
ISE 100	-24.8	79.6	34.1	59.3	-1.7	42.0
Inflation	29.5	9.9	8.6	7.1	8.8	7.3

RTN=Mean cumulative nominal return of all funds for the whole year.  
 The values in parenthesis is the number of funds for the defined calculation.  
 ISE 100 is the Istanbul Stock Exchange nominal return for the ISE 100 index.  
 Inflation is the change in consumer price index for that year.

Before starting to test the risk-altering behavior, we also add a summary of RAR statistics for the whole sample of mutual funds which can be found in Table VIII in the Appendix.

Here we present the results of our analysis. Table IV summarizes the findings according to first classification i.e. RTN's ranked with median. The analysis is done with and without December returns. The first column indicates the end month of each period, where second column shows the number of funds included for the analysis of that period. The columns 3-6 gives the percentage of mutual funds in that group. A 25% percentage in each of these columns would suggest the independence between RTN and RAR. Thus the fourth (low RTN and high RAR) and fifth (high RTN and low RAR) columns which shows the percentage of risk-altering mutual funds of which we are seeking for are of special importance. The seventh column shows that chi-square test-statistics and the very right column presents the p-values of our test described in the previous section. Looking at p-values of Table IV, there are 10 periods we investigated for our hypothesis, 5 of which are the replication of other 5 without December returns. We reject the null hypothesis that the RTNs and RARs are independent in most cases (9 times, 7 times, 4 times with 10%,5%, 1% significance levels respectively). Even though we reject the hypothesis for the pairs divided by earlier months, the pairs divided by June (i.e. 6-11 and 6-12) and by July (i.e. 7-12 and 7-11) are the most significant ones. So even though some managers change their portfolio risk earlier, as a general rule of thumb they wait for the mid-year comparison. The p-value is the highest for the pairs divided by August (i.e. 8-12 and 8-11). This may also be attributable to the same idea: Those who change their portfolio risk do not wait until August. Our findings are generally in line with the results of Brown *et al.* (1996).

**Table IV: Frequency Distributions of Risk-Adjustment Ratios (RAR) and Cumulative Returns (RTN) ranked with Median**

Period	Number of Observations	Low RTN (Losers)		High RTN(Winners)		$\chi^2$	p-value
		Low RAR	High RAR	Low RAR	High RAR		
4-11	520	22.7%	28.8%	27.1%	21.3%	7,38	0,01
4-12	520	22.7%	28.8%	26.9%	21.5%	6,90	0,01
5-11	528	23.3%	28.2%	26.5%	22.0%	4,73	0,03
5-12	528	23.9%	27.7%	25.9%	22.5%	2,73	0,10
6-11	534	21.5%	29.8%	28.1%	20.6%	13,19	0,00
6-12	534	22.3%	29.0%	27.3%	21.3%	8,64	0,00
7-11	536	20.3%	31.2%	29.5%	19.0%	24,24	0,00
7-12	536	22.2%	29.3%	27.6%	20.9%	10,20	0,00
8-11	539	23.9%	27.6%	26.0%	22.4%	2,82	0,09
8-12	539	25.2%	26.3%	24.7%	23.7%	0,22	0,64

The columns 3-6 give the percentage of mutual funds in that group. Thus the fourth (low RTN and high RAR) and fifth (high RTN and low RAR) columns which show the percentage of risk-altering mutual funds of which we are seeking for are of special importance. The seventh column shows that chi-square test-statistics and the very right column presents the p-values of our test described in the previous section.

\*The evaluation period is indicated as M-N where M indicates the end month of the first tournament and N indicates the end month of the second tournament.

As we have mentioned above, the second classification is made according to the quartiles. Here, the number of observations decreases with respect to first classification since we omit the medium half of the sample. Table V summarizes these results which reveals similar patterns with Table IV in four out of ten pairs (i.e. 6-11, 6-12, 7-11 and 7-12) The higher p-values in this set-up can be attributable to the confidence of extreme winners and desperation of extreme losers. Besides, during the months with significant p-values, we again observe that risk altering behavior is mainly observed among poor performing funds (i.e. the ratio of low RTN/high RAR funds are always larger than high RTN/low RAR funds in June and July).

**Table V: Frequency Distributions of Risk Adjustment Ratios (RAR) and Cumulative Returns (RTN) ranked with Quartiles**

Period*	Number of Observations	Low RTN (Losers)		High RTN(Winners)		$\chi^2$	p-value
		Low RAR	High RAR	Low RAR	High RAR		
4-11	264	24.6%	26.5%	25.4%	23.5%	0,38	0,54
4-12	264	23.1%	28.0%	25.4%	23.5%	1,20	0,27
5-11	270	25.9%	24.4%	27.0%	22.6%	0,24	0,62
5-12	270	25.6%	24.8%	26.3%	23.3%	0,14	0,71
6-11	271	22.1%	28.4%	27.7%	21.8%	4,02	0,05
6-12	271	22.1%	28.4%	27.7%	21.8%	4,02	0,05
7-11	268	19.4%	31.3%	29.1%	20.1%	11,66	0,00
7-12	268	20.9%	29.9%	28.4%	20.9%	7,21	0,01
8-11	269	22.7%	27.9%	27.5%	21.9%	3,13	0,08
8-12	269	22.7%	27.9%	25.7%	23.8%	1,33	0,25

The columns 3-6 give the percentage of mutual funds in that group. Thus the fourth (low RTN and high RAR) and fifth (high RTN and low RAR) columns which show the percentage of risk-altering mutual funds of which we are seeking for are of special importance. The seventh column shows that chi-square test-statistics and the very right column presents the p-values of our test described in the previous section.

\*The evaluation period is indicated as M-N where M indicates the end month of the first tournament and N indicates the end month of the second tournament.

As a result, we observe that some low risk funds have low returns, and some high risk funds have high returns as expected. The interesting cases are that high return funds decrease their risk level in the second part of the year and that the low risk funds increase their risk in the second part of the year. Previous researches such as Brown *et al.* (1996) find the managers with worst returns increase the risk at the highest level, whereas those with best returns decrease the risk. We find similar results that loser/winner funds in the first part of the year increase/decrease their risks in the second part of the year. Thus we show that the tournament analysis of Brown *et al.* (1996) generally holds also for a specific emerging country namely Turkey. Comparing the two studies we may also conclude that the mutual funds in the emerging countries are not as keen to take extreme risks as those in developed countries. As Koski and Pontiff (1999) also show that there is a strong relation between change in risk and prior performance of the fund. But they attribute this fact to managers' speed in reaction to cash inflows/outflows. The alternative reasoning of Koski and Pontiff (1999) cannot be tested here, since we do not have the cash inflow/outflow information of the funds. Furthermore, even if we could test the hypothesis there might have been a possible difficulty to analyze the results clearly, since the dataset is on a highly volatile period with mergers in funds, discontinued funds.

Note that as Brown *et al.* (1996) state that survivorship bias is not issue in tournament analysis, as the existence of the poorest performing funds would provide more evidence supporting the results.

Concerning the game theoretic approach proposed by Taylor (2003), we can make some additional comments on the winners' behavior. There are two things to note:

a) Checking the fourth (low RTN, high RAR) and sixth column (high RTN, high RAR) of Table IV and V, we observe no evidence supporting that interim winners increase risk more than losers.

b) The comparison of the fourth (low RTN, high RAR) and fifth (high RTN, low RAR) columns of both tables also indicates a strong evidence that the ratio of the risk-increasing poor performing funds are higher than risk-decreasing high performing funds. That is, risk altering behavior is mostly observed among poor performing funds. This may be explained by the satisfaction of high performing funds from adequate returns.

Alternatively, given the non-normal characteristics of return distributions, a Value at Risk (VaR) can be used to measure the downside risk of the funds, since VaR provides information about the left tail of the empirical return distributions. Here we also report the downside risk of the funds to give some clue about their distributions. For the nonparametric estimates we follow Bali *et al.* (2009) methodology. They are simply the minimum monthly returns

of all funds observed during the past year. The parametric estimates are calculated using a Cornish-Fisher expansion, and following Bali *et al.* (2008). Both results can be found in Table VI. The parametric and nonparametric VaR estimates are very similar except year 2002, which is the subsequent year after the big financial crisis experienced in 2001 in Turkey. That year is also associated with the highest inflation in the sample period.

Table VI:

PANEL A: Descriptive Statistics of Monthly Fund Returns and Value at Risk over Years

	Mean	Median	Std.Dev	Max	Min	Skewness	Kurtosis	Non-Parametric Var	Parametric VaR
2002	-0.010	-0.024	0.179	0.573	-3.217	-6.835	128.996	-0.209	-0.822
2003	0.061	0.055	0.131	0.442	-0.263	0.353	2.693	-0.115	-0.114
2004	0.025	0.046	0.071	0.207	-0.177	-0.439	2.300	-0.083	-0.078
2005	0.042	0.055	0.085	0.303	-0.202	-0.339	2.679	-0.100	-0.081
2006	0.004	0.015	0.079	0.366	-0.206	0.014	2.890	-0.114	-0.105
2007	0.023	0.019	0.039	0.227	-0.170	0.514	4.647	-0.028	-0.028

This table corresponds to  $n=1$  case in Bali *et al.* (2009). Summary statistics for the lowest monthly return of mutual funds observed during the mentioned year. Non parametric VaR, is defined as the minimum return observed during the last 12 months as of the end of each year. For the parametric VaR, we follow Bali *et al.* (2008).

PANEL B: Descriptive Statistics of Lowest Monthly Returns

	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis
2002	-0.367	-0.108	0.081	-3.217	0.908	-2.891	9.630
2003	-0.072	-0.073	0.041	-0.263	0.087	-0.703	3.044
2004	-0.061	-0.027	0.027	-0.177	0.079	-0.346	1.418
2005	-0.057	-0.048	0.043	-0.202	0.081	-0.368	2.017
2006	-0.100	-0.088	-0.018	-0.206	0.068	-0.364	1.772
2007	-0.053	-0.039	0.002	-0.170	0.049	-1.428	4.043

#### IV.I. Robustness

Concerning the possibility that the results may be driven a certain year, we checked the robustness of the results by dividing the data into two 3-year period: 2002-2004 and 2005-2007. The results show that risk-altering behavior is mostly observed in the latter 3-year period. During the first sub-period three out of ten months produce significant evidence, while during the second sub-period six out of ten months produce significant evidence (with 10% level of significance) in favor of tournament behavior. This is probably due to the money illusion that the high inflation caused. As Table III illustrates, the first period is associated with abnormal high inflation and thus very high interest rates.

Besides neither of the sub-periods provides evidence in favor of strategic behavior that Taylor (2003) proposes. That is, risk altering behavior is again mostly observed among poor performing funds. We think that the winner fund managers might not be willing to alter their risk in the high inflation period, since the difference in returns of winner and loser funds seems difficult to be diminished; therefore we observe the changing risk appetite mostly in the loser funds than winner funds.

#### V. Conclusion

The analysis of fund managers' risk taking behavior in developed countries has gained a lot of attention in literature. Various researches show that managers have an incentive to alter the volatility of their portfolios depending on the performance in a certain assessment period. That is to say the losers/winners in this assessment period take higher/lower risk in the rest of the year. In this study, we check the validity of this argument for a specific emerging country, namely Turkey. It is not possible to find the detailed data for the compensation mechanism in the mutual funds industry in the emerging market example Turkey. Our study of the risk in the portfolio composition and the performance of "the equity portion of the portfolios of mutual funds" presents similar evidence with Brown *et al.* (1996). That is, the mutual funds are inclined to alter their risk-taking behavior especially strongly significant for the mid-year months such as June and July. It is known that most of the bonuses in the finance sector are paid on year-end performance, and the funds are evaluated on year-end performance and profitability to the portfolio management company. Therefore we think that this is a good reason to believe that the most of the risk shifting in mutual funds happen by mid-year months. Even though Brown *et al.* (1996) attributes this behavior to solely fund managers themselves, this may be attributable both to managers and portfolio management companies in the emerging market example of Turkey, since the funds are not generally identified with certain managers. As the market is not mature and big enough, there is more frequent change of the managers in emerging countries than those in developed countries. Most of the mutual fund market in Turkey is dominated by subsidiaries of major banks, therefore this risk-altering behavior may also be thought as a result of aggressive customer acquisition race. The finding of risk-shifting even under this condition raises the question of the danger of the pressure of the cash inflow for the funds, where both the portfolio management companies themselves as well as the managers are responsible for this increase in the risk level related to comparative lower performance related to the market.

After the US financial crisis in 2008, various proposals put forward by academicians: One is to calculate bonuses according to long-term returns

instead of short-term returns. (See for example Roubini, Mihm (2010) pp 187.). The other one is to use bonus-malus system which is using a compensation for good performance, but a penalty for bad performance etc. Every system has its own merits and faults but deserve to be studied to update the current system. In order to propose a significant change in the system we should be able to measure the cause and effects of the current mechanism of the mutual funds properly. Future transparency will be important to fulfill that task. For further research it may be interesting to analyze the mutual fund portfolios by measuring their reaction to research reports in stock markets, although the fund's daily equity portfolio information may not be transparent most of the time. One further analysis would be to see the effects of the cash inflows and outflows (which are not transparent again) on the return of the funds. Considering the characteristics of non-normal return distribution, another interesting future analysis would be to redo same research with using a Value at Risk approach in a longer period.



References

- Ariely, D., Gneezy, U., Lowenstein, G., Mazar, N. (2009). Large Stakes and Big Mistakes. *Review of Economic Studies*, 76, 451-469. <http://dx.doi.org/10.1111/j.1467-937X.2009.00534.x>
- Bali, T. G., Demirtaş, K.O., Levy, H. (2009). Is There an Intertemporal Relation between Downside Risk and Expected Returns? *Journal Of Financial and Quantitative Analysis* 44(4), 883-909 <http://dx.doi.org/10.1017/S0022109009990159>
- Bali, T. G., Demirtaş, K.O., Levy, H. (2008). Nonlinear Mean-Reversion in Stock Prices. *Journal of Banking & Finance*, 32 (5), 767-782. <http://dx.doi.org/10.1016/j.jbankfin.2007.05.013>
- Bollen, N. P. B, Busse, J.A. (2001). On the Timing Ability of Mutual Fund Managers. *The Journal of Finance*, 56(3), 1075-1094. <http://dx.doi.org/10.1111/0022-1082.00356>
- Brown KC, Harlow WV, Starks LT. (1996). Of tournaments and temptations: an analysis of managerial incentives in the mutual fund industry. *The Journal of Finance*, 51, 85-110. <http://dx.doi.org/10.1111/j.1540-6261.1996.tb05203.x>
- Busse JA. (2001). Another look at mutual fund tournaments. *Journal of Financial and Quantitative Analysis*, 36(1), 53-73. <http://dx.doi.org/10.2307/2676197>
- Busse JA. (1999). Volatility Timing in Mutual Funds: Evidence from Daily Returns. *The Review of Financial Studies*, 12(5), 1009-1041. <http://dx.doi.org/10.1093/rfs/12.5.1009>
- Canbaş, S., Kandır, Y. (2002). Türkiye'deki Yatırım Fonlarının Performans Değerlendirmesi [An evaluation of the performance of mutual funds in Turkey]. *İktisat, İşletme ve Finans* Volume: 17(201), 13-19. <http://dx.doi.org/10.3848/iif.2002.201.0164>
- Capon N, Fitzsimons GJ, Prince RA. (1996). An individual level analysis of the mutual fund investment decision. *Journal of Financial Services Research*, 10(1), 59-82. <http://dx.doi.org/10.1007/BF00120146>
- Chevalier, J.A., and Ellison G.D. (1997). Risk taking by mutual funds as a response to incentives, *Journal of Political Economy*, 105, 1167-1200. <http://dx.doi.org/10.1086/516389>
- Elton EJ, Gruber MJ, Blake CR. (2003). Incentive Fees and Mutual Funds. *Journal of Finance*, 58(2), 779-804. <http://dx.doi.org/10.1111/1540-6261.00545>
- Goetzmann W, Greenwald B, Huberman G. (1992). Market response to mutual fund performance. Working Paper. Columbia Graduate School of Business. 25.
- Gruber MJ. (1996). Another puzzle: The growth in actively managed mutual funds. *Journal of Finance* 51(3): 783-810. <http://dx.doi.org/10.1111/j.1540-6261.1996.tb02707.x>
- Kahneman D, Tversky A. (1979). Prospect Theory: An Analysis of Decision Under Risk. *Econometrica* 47(2): 263-91. <http://dx.doi.org/10.2307/1914185>
- Koski J, Pontiff J. (1999). How Are Derivatives Used? Evidence from the Mutual Fund Industry *Journal of Finance* 54(2): 791-816. <http://dx.doi.org/10.1111/0022-1082.00126>
- Roubini N, Stephen M. (2010). *Crisis Economics*. The Penguin Press, NY.
- Shefrin H, Statman M. (1985). The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence. *The Journal of Finance* 40(3): 777-790. <http://dx.doi.org/10.1111/j.1540-6261.1985.tb05002.x>
- Sirri E.R., Tufano P. (1998). Costly search and mutual fund flows. *The Journal of Finance* 53(5): 1589-1622. <http://dx.doi.org/10.1111/0022-1082.00066>
- Taylor J. (2003). Risk-taking behavior in mutual fund tournaments. *Journal of Economic Behavior & Organization* 50: 373-383. [http://dx.doi.org/10.1016/S0167-2681\(02\)00028-8](http://dx.doi.org/10.1016/S0167-2681(02)00028-8)
- TSPAKB, (2010, December). Yayınlar ve Raporlar [Publications] Retrieved 2011 May 03, from <http://www.tspakb.org.tr>
- TSPAKB, (2009, May). Yayınlar ve Raporlar [Publications] Retrieved 2011 May 03, from <http://www.tspakb.org.tr>

Appendix

Table VII. Market Statistics for Istanbul Stock Exchange

Year	2002	2003	2004	2005	2006	2007
Market Capitalization	34.4	69.0	98.1	162.8	163.8	290.0
Number of Stocks	288	285	297	304	316	319
Dividend Yield %	1.20	0.94	1.37	1.71	2.10	1.9
P/E (USD)	195.92	14.54	14.18	17.19	22.02	12.16

source: Istanbul Stock Exchange, Market Capitalization is in USD billions.

Table VIII. Risk Adjusted Returns (RAR) of All Mutual Funds (in percentages)

Year	2002	2003	2004	2005	2006	2007
RAR (M=4)	2.0	0.9	0.7	0.8	0.9	1.4
	(69)	(73)	(78)	(89)	(98)	(112)
RAR (M=5)	2.0	1.1	0.8	0.8	0.7	1.0
	(69)	(73)	(80)	(91)	(100)	(115)
RAR (M=6)	2.1	1.1	0.9	0.9	0.7	1.1
	(70)	(73)	(81)	(93)	(102)	(115)
RAR (M=7)	2.3	1.1	0.9	0.9	0.7	1.0
	70	73	82	93	102	115
RAR (M=8)	2.4	1.4	1.0	1.1	0.8	0.9
	(70)	(75)	(82)	(94)	(102)	(115)

RAR=Mean of Risk Adjusted Return of all funds for the whole year where M represents the end month of the first assessment period in equation (2).  
 RTN=Mean cumulative nominal returns of all funds for the whole year.  
 The values in parenthesis is the number of funds for the defined calculation.