THE PERFORMANCE EVALUATION AND PERSISTENCE OF A TYPE MUTUAL FUNDS IN TURKEY

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Approval of the Graduate School of Social Sciences

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I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Business Administration.

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ABSTRACT

THE PERFORMANCE EVALUATION AND PERSISTENCE OF A TYPE MUTUAL FUNDS IN TURKEY

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Literature reveals studies on mutual fund performance analysis and persistency, with various results. Some studies support short term performance persistence, while the rest claiming no such persistency among the portfolios. This thesis is an attempt to analyze the performances of Turkish open-end mutual funds for the period of 2003-2010 and search for persistency by extending the time period to June 2011.

For performance evaluation, single factor CAPM and Fama-French's Three Factor Model are applied. Persistency analysis is done by tracking the relative fund performances on a monthly basis.

The results of this study indicate that for the sample period, Turkish A Type mutual funds neither overperform nor underperform the overall market. Nearly all Jensen's alphas are found to be zero, statistically significant. This is also an implication that the mutual funds are earning their expected returns in an efficient mutual fund market in Turkey.

The Fama-French's three factor model shows slightly better performance, on the other hand. The size and book to market equity factors are not found significant in general, however they are found jointly significant in all regressions.

Persistency is analyzed by tracking the mutual fund performances on monthly basis. When some mutual funds showed negative or positive performance persistency during the period individually, but the overall picture demonstrates a balanced distribution of performance groups. The number Loser-Loser performances is slightly more than the other three groups, resulting in a tendency for short term negative persistency for the sample analyzed between the period of January 2003 to June 2011.

Keywords: A Type Mutual Funds, Fama and French's Three Factor Model, Turkish Institutional Investment Managers' Association (TKYD), Performance Evaluation, Performance Persistence.

öz

TÜRKİYE'DEKİ A TİPİ YATIRIM FONLARININ PERFORMANS DEĞERLENDİRME VE DEVAMLILIK ANALİZİ

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Yatırım fonu performans analizi ve performans devamlılığı üzerine yapılan akademik çalışmalar çeşitli sonuçlar ortaya koymaktadır. Yapılan çalışmaların bir bölümü kısa vadede performans devamlılığının mümkün olduğunu savunurken, geriye kalan çalışmalar devamlılığın söz konusu olmadığını söylemektedir. Bu tez çalışması, 2003 ve 2010 yılları arasında Türkiye'de faaliyet gösteren açık uçlu A Tipi yatırım fonlarının performans analizinin ve devamlılığının araştırılmasını amaçlamaktadır. Performans devamlılığı analizi, Ocak 2003 ve Haziran 2011 dönemleri arasını kapsamaktadır.

Performans değerlendirmesi, tek faktörlü performans değerlendirme modeli (CAPM) ve Fama ve French'in üç faktörlü performans değerlendirme modeli uygulanarak yapılmıştır. Performans devamlılığı, aylık bazda yatırım fonu performanslarının takip edilmesi yoluyla analiz edilmiştir.

İnceleme konusu 2003-2011 yılları arasında, Türkiye'de faaliyet gösteren A Tipi yatırım fonlarının, piyasa portföyüne kıyasla iyi veya kötü performans sergileyemedikleri sonucuna varılmıştır. Jensen alfa değerlerinin büyük ölçüde istastistiksel olarak sıfırdan farklı olmaması, yatırım fonlarının piyasa beklentisine paralel hareket ettiği sonucunu çıkarmaktadır.

Performans değerlendirme modelleri karşılaştırıldığında, Fama ve French tarafından geliştirilen üç faktörlü modelin açıklayıcı yönü daha kuvvetlidir. Piyasa

kapitalizasyon ve defter-piyasa oranlarına göre oluşturulan faktörler, çoğunlukla istatistiksel olarak anlamlı bulunmazken, model bütün olarak anlamlı çıkmaktadır.

Performans devamlılığı, fon performanslarının aylık bazda takip edilmesi yoluyla izlenmiştir. Yatırım fonlarının bazılarının pozitif veya negatif yönde performans devamlılığı gösterdiği sonucuna varılmasına rağmen, örneklemin tümüne bakıldığında performans grupları açısından genel olarak dengeli bir dağılım olduğu görülmektedir. Negatif performansını bir sonraki dönemde yineleyen negatif-negatif performans grubu, sayısal olarak diğer performans gruplarından bir miktar fazladır. Bu açıdan bakıldığında, Ocak 2003 ve Haziran 2011 dönemleri arasında, Türkiye'de faaliyet gösteren A Tipi yatırım fonlarında negatif-negatif performans gösterme eğilimi olduğu savunulabilir.

Anahtar Kelimeler: A Tipi Yatırım Fonları, Fama ve French Üç Faktörlü Performans Değerlendirme Modeli, Türkiye Kurumsal Yatırımcı Yöneticileri Derneği (TKYD), Performans Değerlendirme, Performans Devamlılığı.

To My Mother

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I wish to express my deepest gratitude to my supervisor Assist. Prof. Dr. Engin Küçükkaya for his guidance, advice, criticism, encouragements and insight throughout the research.

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CHAPTER 1

INTRODUCTION

Investment companies have become important financial intermediaries in the globalized financial markets in recent years. Mutual funds are examples of professional investment vehicles managed by the financial intermediaries.

The subject of this study is the performance analysis of open end mutual funds which attempt to improve performance either by identifying mispriced securities or by timing the market by taking the effects of overall economic conditions into account. Empirical research on the performance of mutual funds report mixed results. Some studies agree that the markets are efficient and there is no performance persistency, but the majority claims that there are successful fund managers who consistently outperform the market at least in short term. Those results makes us think that mutual fund managers are able to select the right securities to improve performance and also able to time the market for the return maximization.

Previous studies employed various performance evaluation models to analyze the performance of mutual funds. The widely used models can be listed as:

- Single Factor (Capital Asset Pricing) Model (CAPM)
- Fama-French Three Factor Model
- Carhart's Four Factor Model

The evolution of performance evaluation models is the result of discovering additional factors in explaining asset returns. While the single factor CAPM model first applied by Jensen (1968) takes the market premium as the only factor to be effective on the fund performance, Fama and French (1992, 1993) introduces two more factors, size and book-to-market factors, into the

evaluation model. Previous research claims that the average return on small stocks with low market value is higher than the average return on large stocks with high market value, even after controlling for their betas. Second, the average return on value stocks with high book-to-market ratios (high BME) is higher than that on growth stocks with low book-to-market ratios (low BME). To account for those two anomalies, Fama and French add those factors to the single factor CAPM model to explain fund performances.

The main goal of adding more factors to the performance evaluation model is to increase the explanatory power of the model and to show the factors' power to explain the performance at different levels. By doing this, the error term is minimized, implying that main factors related to the fund performance are included in the model. Different than those factors, some unknown factor can still exist in the model. The constant term is inferred as the manager's ability to select right stocks or time the market and depending on the statistical power of that constant, the fund manager is said to outperformed or underperformed the market.

In Turkey, after the foundation of Istanbul Stock Exchange (ISE) in 1986, the first mutual fund emerged in 1987 with the declaration of legislation prepared to organize capital markets to perform mutual fund management. Accompanying the completion of the legal infrastructure with additional regulations, the mutual fund sector started to grow in an increasing rate. In 1994, the existing mutual funds have been classified as A Type and B Type funds according to their investment styles. The portfolios which are obliged to invest at least %25 of their holdings into the Turkish stocks are started to be called as A Type funds, whereas the rest who have no such an obligation are started to be called as B Type mutual funds. The sample used in this thesis includes the A Type mutual funds as we seek for the effect of stock price anomalies on the performance of portfolios by using Fama-French's Three Factor Model.

Another classification is based on their structures. Originally, the mutual funds have been created as actively managed open-end funds in which there is no limitation on the number of outstanding shares. In other words, those funds can issue or redeem any number of shares when needed. Then emerged another type of fund, called closed-end mutual funds, in which the number of

outstanding shares is limited and further issuance is not allowed. Apart from that, the closed end mutual funds are traded in organized financial markets, i.e. ISE in Turkey. The price of closed end fund is not only related to the stock selection or market timing abilities of the fund managers. Due to the structural and functional differences between open-end and closed-end mutual funds, this study only covers the open-end mutual funds which try to earn superior returns over the market by investing in stocks and broad asset classes by selecting the right assets.

The persistence of mutual fund performance is another core issue that should also be taken account. This thesis aims to provide a detailed analysis about the mutual fund performances using different evaluation models and whether that performance is persistent or not. For the period of 2003-2010, the potential persistency trend will be tracked in Turkish open-end mutual funds sector by using non-parametric method similar to that of Brown and Goetzmann (1995).

The second chapter gives general information about the structure of mutual funds and overviews the fund sector in Turkey. Chapter 3 covers the literature about the performance evaluation and performance persistency. The fourth chapter summarizes the data and methodology used throughout the research. Empirical results are given in Chapter 5 and finally Chapter 6 concludes.

CHAPTER 2

OVERVIEW OF THE MUTUAL FUNDS SECTOR

2.1. DEFINITION

Mutual funds are defined as the collective investment schemes that are professionally managed to collect excess funds from investors for being invested in securities in general. Funds are required to maintain a specific level of diversification for operating in the best interests of the investors who need to put their money in a diversified portfolio which seizes the available opportunities in the market across various sectors. and they operated and sponsored by various kinds of investment management companies.

SEC[1] (Securities and Exchange Commission) defines the mutual fund as "the investment company that pools money from investors and invests in stocks, bonds, short-term money-market instruments, or some combination of them". The fund portfolio is composed of the combined holdings which are divided into shares called certificate of deposits. Each share represents an investor's proportionate ownership of the fund's holdings and the income that those holdings generate.

Mutual fund shares are priced daily at the net asset value (NAV), which is calculated by subtracting fund liabilities from the total market value of the assets in the portfolio. Per share price is computed by dividing the net asset value by the number of outstanding shares.

[1] Securities and Exchange Commisson, http://www.sec.gov/investor/pubs/inwsmf.htm

2.2.ADVANTAGES AND DISADVANTAGES OF MUTUAL FUNDS

According to the SEC's identification, there are advantages and disadvantages of mutual funds like all other investment strategies. On the other hand, any feature of a mutual fund can be classified as an advantage or a disadvantage depending on the investor's risk attitude.

> Mutual funds take the advantage of economies of scale. Individuals can also make such investment decisions in order to manage their portfolio by selecting stocks, bonds or other investment tools for profit gains; however the related costs would be much higher when compared to the large professionally managed portfolios in the hands of investment companies. Mutual funds have the advantage of large scale trading and portfolio management, while the small investors are assigned a related share of the total funds according to the size of their investment. Participators of those mutual funds get the advantage of being a part of the professionally managed portfolio, just being exposed to the management fee for the financial service. In return, they expect to earn positive profits over the fee discharged during the process.[2]

From that point, whether the fund would generate positive return and whether this performance would persist or not is an important question to be answered.

2.2.1. ADVANTAGES OF MUTUAL FUNDS

a. Professional Management

"Professional managers research, select, and monitor the performance of the securities which the fund purchases."[3] According to the fund's investment strategy, the fund managers make decisions on which asset class they should invest, on a risk adjusted basis. Funds under professional management also issue periodic status reports to inform the individual investors and the capital markets about the fund strategy and the overall financial markets.

b. Diversification

Diversification is a the portfolio strategy designed to reduce exposure to risk by combining a variety of investments, such as stocks, bonds, and real estate, which are unlikely to all move in the same direction or at the same rate simultaneously. The goal of diversification is to reduce the overall risk, or

[2] Bodie, Z.,Kane, A., Marcus, A.; 2007, *Essentials of Investments*, 6th Edition, McGraw-Hill International Edition, 14-16

[3] http://www.ag.ndsu.edu/pubs/yf/fammgmt/fe606w.htm

variance, of investment returns by mixing multiple stocks, bonds, mutual funds, cash accounts, and other types of investments into a portfolio; by limiting volatility of movements up and down in value of asset classes included. Diversification reduces both the upside and downside potential and allows for more consistent performance under a wide range of economic conditions.

c. Affordability

Investors are able to invest by their limited sources in professionally managed mutual fund portfolios. On the other hand, investments made through mutual funds benefits from the economies of scale. Because funds trade large blocks of securities, the transactions cost per share would be lower than the individual investors would be exposed on their individual transactions.[4]

d. Liquidity

Mutual fund shares can be easily redeemed. Increased liquidity contributes to lowering the overall level of risk.

2.2.2. DISADVANTAGES OF MUTUAL FUNDS

Mutual funds also have features that might be viewed as disadvantages, such as:

a. Risks

Mutual funds are considered as safe investment tools because they diversify the risk by allocating the collections into several asset classes. However, because of the nature of financial industry, there is always some risk cannot be abolished even the portfolio is diversified and well balanced.

b. Management

While management can also be an advantage of mutual funds, it can also be a disadvantage because of the probability of making incorrect decisions on the

[4] Bodie, Z.,Kane, A., Marcus, A.; 2007, *Essentials of Investments*, 6th Edition, McGraw-Hill International Edition, 98-101

investment strategy. Such decisions could result in capital loss for the investors.

c. Fees and taxes

Mutual funds charge fees that cover their daily expenses. In addition to this, many also have commission fees and other expenses to pay the brokers or consultants.[5]

When deciding to invest in a mutual fund, all the advantages and disadvantages should be taken into consideration.

2.3.STRUCTURE OF MUTUAL FUNDS

While all investment companies pool the assets of individual investors, they also need to divide claims to those assets among those investors. Investors buy shares in mutual funds, and ownership is proportional to the number of shares purchased or the amount invested accordingly. The value of each share is called the net asset value (NAV). Net asset value is expressed on a per share basis and must be announced by the mutual funds at the end of each trading day. Net asset value is calculated as follows;

NAV = Market value of assets minus liabilities / Shares outstanding

This study involves open end mutual funds in Turkey, which are free to issue new stocks when needed and in which investors are free to sell their stocks back to the mutual fund under some rules arranged in the contract they assigned. The sale price is equal to the net asset value on that day and they are different from the closed end ones in that manner. In Turkey, open end mutual funds are the most prevailing ones and differentiated as A type and B Type mutual funds according to the investment objectives and some requirements. A mutual fund is referred as A Type when at least 25 percent of the portfolio is invested in Turkish stocks in the investment scheme and this thesis will analyze the A Type equity funds in 2003-2010 period in Turkey.

[5] http://www.businessknowledgesource.com/investing/the_pros_and_cons_of_investing_in_mutual_funds_and_bonds_when_you_are_a_business_025700.html

> In Turkey, the number and volume of investment funds, mainly managing security portfolios, has shown a huge increase since they were first introduced in 1986. Due to their liquidity, Investment Fund Participation Certificates (IFPC) are generally preferred by the majority of small to large size investors. Turkish investment funds established in accordance with the Capital Market Law (CML) are deemed as corporations and are subject to Corporate Tax (CT) on their worldwide income. On the other hand, the portfolio investment income of investment funds is exempt from corporate tax for the purposes of improving the capital markets in Turkey.[6]

Today, Turkish mutual funds industry is consisted of 291 mutual funds, 110 of which are A Type and 181 of which are B Type. In the thesis sample, 33 of the A Type equity funds which were in existence starting from 2003 to 2010. Because the stock anomalies will be integrated for the investigation of performance evaluation of the mutual funds in the data analysis, it is found fair to include only those who put emphasis on the stock investments in their investment objectives.

[6] PricewaterhouseCoopers(PWC), 2004, Investment Funds of Turkey, pg 5

2.4.INVESTMENT MANAGEMENT COMPANIES

Mutual funds benefit from the investment management companies that sponsor, organize, and arrange for provision of services required by funds. They act as fund investment advisors and provide the essential research and portfolio management services consistent with fund investment objectives, policies, and limitations. In other words, mutual fund is a portfolio of securities whereas the administrative, investment and legally required functions are provided by the investment management companies which could manage a basket of funds at the same time. The major services provided by investment management partners are stated below.

a. **Investment Advisory:** Investment management companies provide research and portfolio management services consistent with fund investment objectives, policies, and limitations as stated in the prospectus. Portfolio management functions include formulation and implementation of investment style and strategies, security analysis, market and economic analysis, portfolio allocation, security buy/sell decisions, and performance evaluation through fund publications.

b. **Administrative Services:** They provide management and regulatory oversight for a healthy operation. Management companies review and report performance of other administrative service providers, ensuring fund regulatory compliance, providing general accounting services and prepare legal and tax documentation. They also provide fund marketing and advertising services.

c. **Custody Services:** On behalf of the mutual fund, the investment management company is responsible to hold portfolio cash and securities in safe. Operational services, i.e. receiving cash and securities, cash payments and security deliveries, collection of portfolio interest and dividends, payment of authorized expenses, shareholder redemptions, and disbursements, are also under control of the partner company.

d. Distribution Services: As broker-dealer provides direct and/or indirect distribution of shares to investors; distributes fund publications; and provides fund marketing and advertising.[7]

In Turkey, there are fifty-nine (59) financial institutions engage in the mutual fund management services by June 2011. Table 2.1 presents the number of mutual funds being managed by those financial intermediaries, grouped by the mutual fund type. According to Table 2.1., total number of mutual funds has raised to the level of 291, 110 of which are A Type portfolios whereas the remaining 181 mutual funds are B Type portfolios.

Sorting investment companies by the number of mutual funds they manage, T. Is Bank comes first with twenty-one portfolios, consisting of thirteen B Type and eight A Type mutual funds. Garanti Bank and Finansbank take the second rank with fifteen mutual funds under management.

[7] Haslem, John A.; 2003, Mutual Funds Risk and Performance Analysis for Decision Making, Blackwell Publishing, 16-19

Table 2.1: Financial Institutions Managing Mutual Funds in Turkey by June 2011

	Name of Financial Institution	Number of Mutual Funds		
		A Type	B Type	Total
1	T.İŞ BANKASI	8	13	21
2	FİNANSBANK	7	8	15
3	T.GARANTİ BANKASI	5	10	15
4	YAPI VE KREDİ BANKASI	5	9	14
5	TÜRK EKONOMİ BANKASI	2	10	12
6	İŞ YATIRIM MENKUL DEĞERLER	4	7	11
7	AKBANK	2	8	10
8	DENİZBANK	4	6	10
9	TÜRKİYE VAKIFLAR BANKASI	2	8	10
10	GLOBAL MENKUL DEĞERLER	6	3	9
11	ATA YATIRIM MENKUL KIYMETLER	2	6	8
12	ING BANK	3	5	8
13	YAPI KREDİ YATIRIM MENKUL DEĞERLER	5	3	8
14	ECZACIBAŞI MENKUL DEĞERLER	3	4	7
15	GEDİK YATIRIM MENKUL DEĞERLER	3	3	6
16	T.C. ZİRAAT BANKASI	4	2	6
17	T.HALK BANKASI	2	4	6
18	ALTERNATİFBANK	2	3	5
19	BİZİM MENKUL DEĞERLER	4	0	4
20	ERGOİSVİÇRE HAYAT SİGORTA	2	2	4
21	HSBC BANK	2	2	4
22	HSBC YATIRIM MENKUL DEĞERLER	1	3	4
23	KARE YATIRIM MENKUL DEĞERLER	1	3	4
24	OYAK YATIRIM MENKUL DEĞERLER	1	3	4
25	TEB YATIRIM MENKUL DEĞERLER	1	3	4
26	TEKSTİL BANKASI	2	2	4
27	TURKISH BANK	1	3	4
28	TÜRKİYE SINAİ KALKINMA BANKASI	1	3	4
29	YATIRIM FİNANSMAN MENKUL DEĞERLER	1	3	4
30	ZİRAAT YATIRIM MENKUL DEĞERLER	1	3	4
31	ACAR YATIRIM MENKUL DEĞERLER	2	1	3
32	EUROBANK TEKFEN	0	3	3
33	FİNANS YATIRIM MENKUL DEĞERLER	1	2	3
34	FORTIS YATIRIM MENKUL DEĞERLER	1	2	3
35	GARANTİ YATIRIM MENKUL KIYMETLER	1	2	3

Source: CMB Bulletin June 2011

Table 2.1: Financial Institutions Managing Mutual Funds in Turkey by June 2011 (Cont'd)

	Name of Financial Institution	Number of Mutual Funds		
		A Type	B Type	Total
36	MİLLENİUM BANK	0	3	3
37	ŞEKERBANK	1	2	3
38	TACİRLER MENKUL DEĞERLER	2	1	3
39	TÜRKİYE KALKINMA BANKASI	1	2	3
40	UNICORN CAPITAL MENKUL DEĞERLER	2	1	3
41	ANADOLUBANK	1	1	2
42	DELTA MENKUL DEĞERLER	0	2	2
43	EFG İSTANBUL MENKUL DEĞERLER	1	1	2
44	EKİNCİLER YATIRIM MENKUL DEĞERLER	0	2	2
45	EVGİN YATIRIM MENKUL DEĞERLER	1	1	2
46	HALK YATIRIM MENKUL DEĞERLER	1	1	2
47	İNFO YATIRIM	0	2	2
48	MEKSA YATIRIM MENKUL DEĞERLER	1	1	2
49	SANKO MENKUL DEĞERLER	1	1	2
50	STANDARD ÜNLÜ MENKUL DEĞERLER	1	1	2
51	STRATEJİ MENKUL DEĞERLER	2	0	2
52	ŞEKER YATIRIM MENKUL DEĞERLER	1	1	2
53	TAİB YATIRIM	1	1	2
54	AK YATIRIM MENKUL DEĞERLER	0	1	1
55	AKTİF YATIRIM BANKASI	0	1	1
56	BANKPOZİTİF	0	1	1
57	BAŞKENT MENKUL DEĞERLER	1	0	1
58	KUVEYT TÜRK KATILIM BANKASI	0	1	1
59	METRO YATIRIM MENKUL DEĞERLER	0	1	1
Total		**110**	**181**	**291**

Source: CMB Bulletin June 2011

Apart from than the investment companies operating mutual funds, there are also other financial intermediaries in the sector. Foreign mutual funds perform through foreign investment banks in general. Even the number foreign mutual funds has decreased after the 2008 financial crisis, they get the largest share with pension funds after domestic mutual funds in the sector. Table 2.2. presents the numbers of foreign mutual funds and pension funds during the period of analysis.

Table 2.2: Number of Investment Companies in Turkey (2004-2011/6)

Year	Foreign Mutual Funds	Pension Funds
2004	47	81
2005	53	96
2006	60	102
2007	60	104
2008	80	121
2009	77	130
2010	69	140
2011-6	64	147

Source: CMB Bulletin June 2011

Figure 2.1 presents the number of all capital market institutions in Turkey by the end of June 2011.

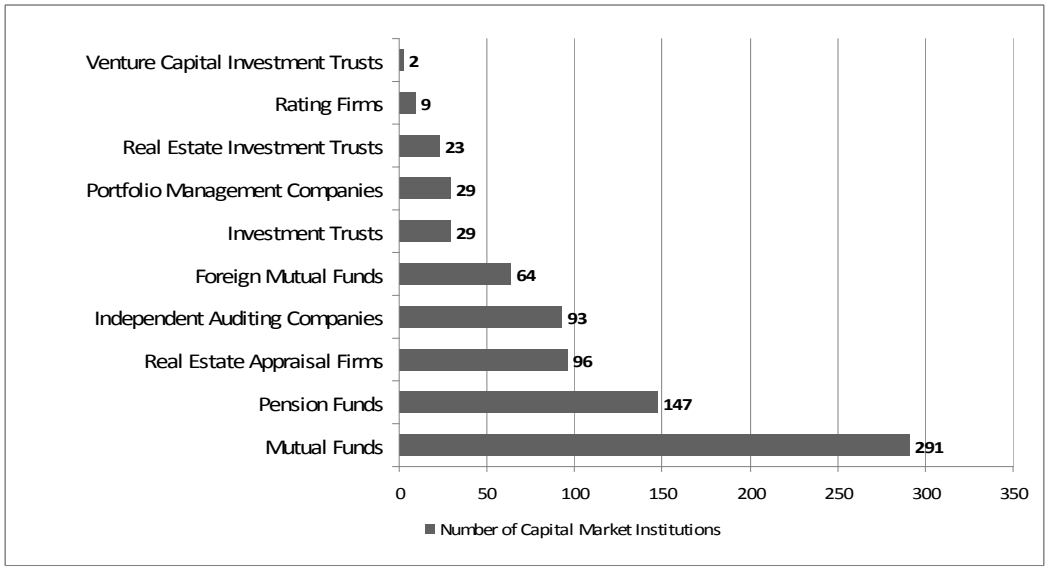

Figure 2.1: Capital Market Institutions in Turkey
Source: CMB Bulletin June 2011

Figure 2.2. shows the number of A Type mutual funds between the years 2004 and 2011/6. After January 2010, the number of guaranteed funds is also included in total value by Capital Markets Board (CMB) database. By taking the guaranteed funds into account, the number has been increased to a hundred and thirty two in 2010 and remained as the same level in June 2011.

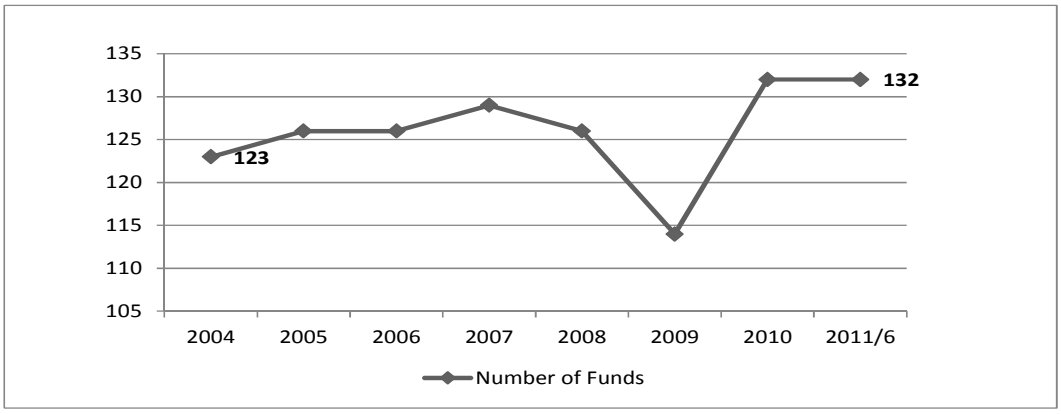

Figure 2.2: Number of A Type Mutual Funds in Turkey
Source: CMB Bulletin June 2011

In Turkey, mutual funds started to become popular especially after the end of 1999, related to the positive performance of ISE index in those years. (Imisiker, 2004). Figure 2.3 demonstrates the total net asset value (NAV) of portfolios managed by mutual funds. Although the total net asset value has decreased during times of financial distress in 2003 and 2008, an increasing trend exists in the industry at all. By the end of June 2011, total value of A Type mutual funds' portfolios valued at 1.8 trillion Turkish Liras.

The number of investors[8] has also been growing in a positive trend, similar to the total net asset value. By the end of June 2011, total number of investors pooling their money in A Type mutual funds has increased to 271 thousand as demonstrated in Figure 2.4.

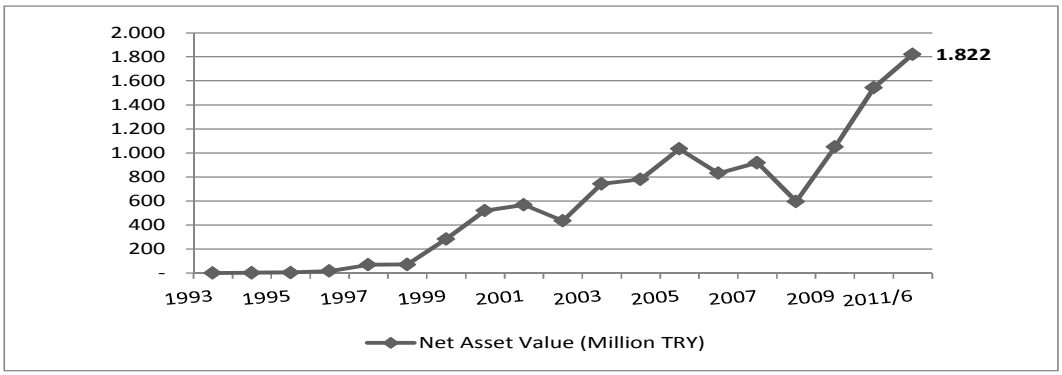

Figure 2.3: Net Asset Value (Million TRY)
Source: CMB Bulletin June 2011

[8] An investor is counted for each of the funds he has invested in.

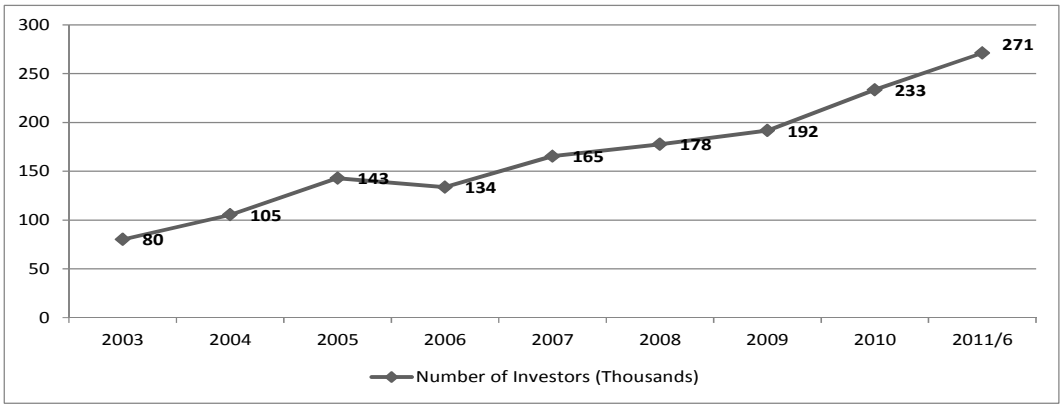

Figure 2.4: Number of Investors (Thousands)
Source: CMB Bulletin June 2011

Figure 2.5 demonstrates the biggest 10 A Type mutual funds in the sample. Is Bank A Type Affiliates Fund (TI3) has reached to the net asset value of 155 million TRY, taking the share of %22 from the whole sample. In terms of number of investors, Garanti Bank A Type ISE30 Index Fund (GAE) takes the share of %14 with 4,636 investors, as shown in Figure 2.6.

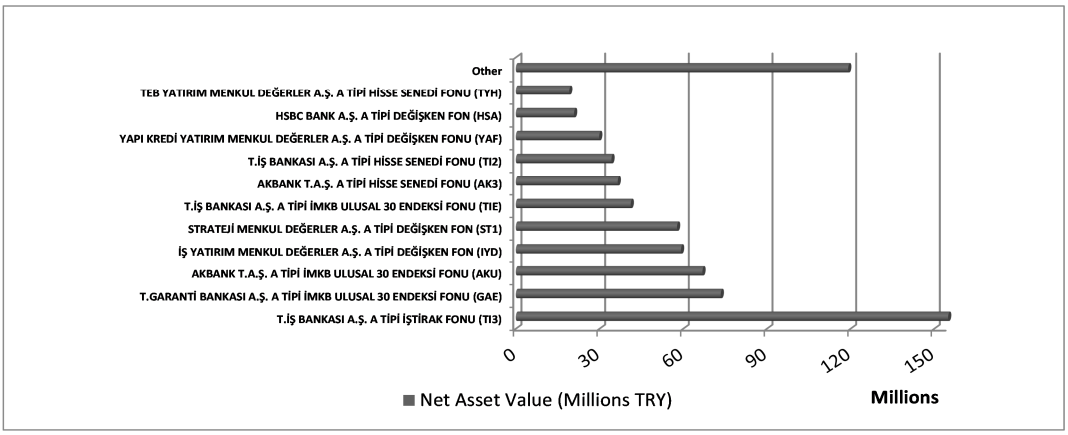

Figure 2.5: Net Asset Value (Millions TRY) of Thesis Sample (June 2011)
Source: CMB Bulletin June 2011

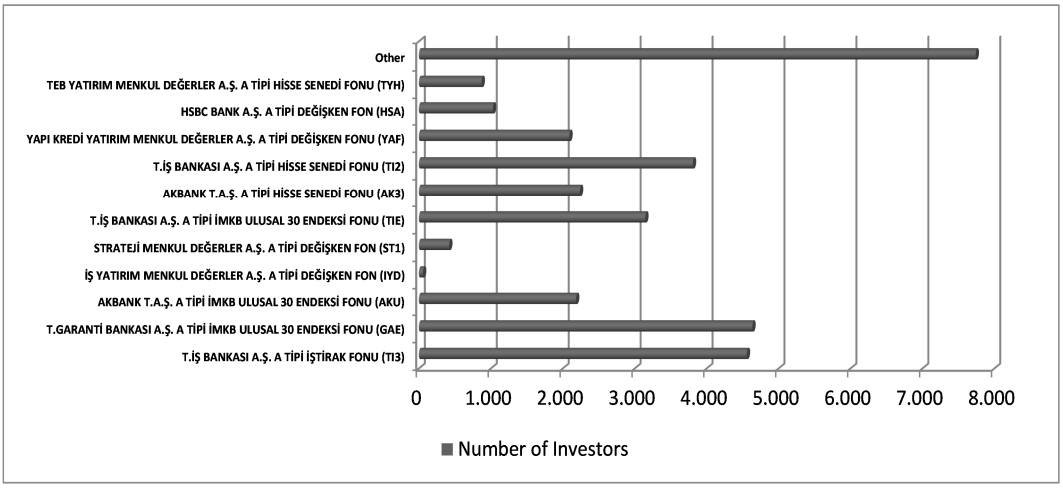

Figure 2.6: Number of Investors in the Thesis Sample (June 2011)

Source: CMB Bulletin June 2011

Mutual funds are categorized according to the allocation of securities in their portfolio. While some portfolios have stock-focused investment strategy, the other could put emphasis on a different security, depending on the fund investment style.

A Type mutual funds are also classified into groups according to their investment styles as;

- **Variable Funds:** A Type Variable Funds are those which have no limitations apart from investing %25 of the holdings to the Turkish stocks.
- **Index Funds:** Funds investing at least %80 of the holdings to mimic a benchmark index. The correlation between the fund portfolio and the benchmark portfolio should be at least %90.
- **Stock Funds:** Funds investing at least %51 of the holdings to Turkish stocks.
- **Balanced Funds:** Fund's entire portfolio consists of at least two investment classes, which are stocks, bonds, gold and other precious metals.
- **Affiliate Funds:** Funds investing at least %51 of the holdings to the affiliate companies.
- **Sector Funds:** Funds investing at least %51 of the holdings to one specific sector.

- **Foreign Securities Funds:** Funds investing at least %51 of the holdings to foreign securities or foreign government bonds.

Figure 2.7 demonstrates the shares of A Type mutual fund categories in Turkey by the end of June 2011. Variable funds who have no specific limitation on what percentage it should invest in a specific investment tool take the share of %42 from the whole sample. Index funds who mimic the benchmark portfolio, i.e. ISE100, ISE50, has a %21 share and stock funds whose holdings are directed mainly to stocks constitutes %19 of the A Type mutual fund sector.

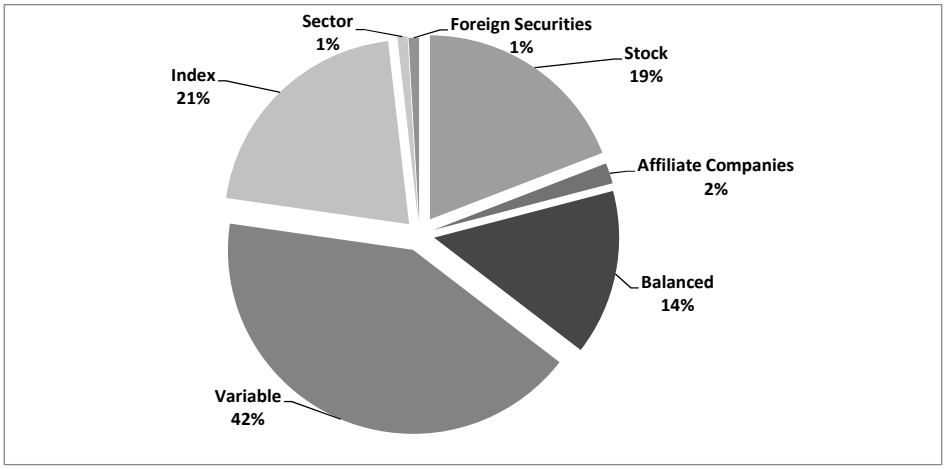

Figure 2.7: Categorization of A Type Mutual Funds in Turkey
Source: CMB Bulletin June 2011

CHAPTER 3

LITERATURE REVIEW

Mutual fund performance has been analyzed by several researchers for long years, especially after 1960's. The major goal is to determine the investment strategy of the mutual fund and fund manager's ability to select right stocks and/or time the market.

Most of the developed performance evaluation models are in a risk-adjusted format because the risk level is not stationary during time. While the fund managers have a performance target, they should also take the macro conditions into account when making decisions on their investment portfolio.

Previous studies employ single factor and multi factor performance evaluation models which give way to make comparative rankings among the mutual funds. Performance tracking and comparison between the mutual funds are made by using some generally accepted ratio analysis. The generally accepted ratios developed are the Sharpe's ratio, Jensen's alpha, Treynor Ratio, M^2 ratio, Sortino Ratio and Appraisal Ratio. Academic studies in Turkey have mainly focused on that type of ratio analysis.

On the other hand, as the multi-factor performance modeling started to develop, performance evaluation is oriented to apply those models. Fama and French's Three Factor Asset Pricing Model (1993) and Carhart's Four Factor Asset Pricing Model (1997) are the most commonly used performance evaluation models throughout the literature in recent years. Turkish studies also started to apply those models to include the additional factor impacts to the model, in order to estimate coefficients more accurately.

This section reviews the literature on the performance and persistence analysis of mutual funds. Performance evaluation models and performance measures used widely in literature are summarized in section 3.1 and 3.2. The academic studies on performance analysis and performance persistence are reviewed in section 3.3 and 3.4 respectively.

3.1. PERFORMANCE EVALUATION MODELS

The most commonly used performance evaluation models in the literature are given below;

a) Single Factor Capital Asset Pricing Model – CAPM (1964):

The Capital Asset Pricing Model of Sharpe (1964) is a generally accepted model employed by most of the previous studies. It argues that the funds return can be explained by the market premium at a certain level of risk measured by beta. The remaining explanatory items different than that single factor are hidden in the intercept term.

$$R_{i,t} - r_{f,t} = \alpha_{jensen} + \beta_i(r_{m,t} - r_{f,t}) + \varepsilon_{i,t}$$

where;

α_{jensen} : The intercept (Jensen's alpha) for security i,

$R_{i,t}$: The return on security i at time t,

$r_{f,t}$: The risk-free rate of return at time t,

β_i : The market risk for security i,

$r_{m,t}$: The return on the market portfolio at time t,

$\varepsilon_{i,t}$: The random error with zero mean.

b) Fama and French's Three Factor Asset Pricing Model (1993):

Fama-French Three Factor Model suggests that the market premium is not the only factor affecting asset return and there should be other factors hidden in the model. Fama-French results in their study that the capitalization ratios

and the book to market equity values also important in explaining fund returns.

$$\boldsymbol{R_{i,t} - r_{f,t} = \propto_i + \beta 1_i (r_{m,t} - r_{f,t}) + \beta 2_i SMB_t + \beta 3_i HML_t + \varepsilon_{i,t}}$$

where;

$\propto_i$: The intercept for security i,

$\boldsymbol{R_{i,t}}$: The return on security i at time t,

$\boldsymbol{r_{f,t}}$: The risk-free rate of return at time t,

$\boldsymbol{\beta 1_i}$: The sensitivity of security i to the market factor,

$\boldsymbol{\beta 2_i}$: The sensitivity of security i to the size factor,

$\boldsymbol{\beta 3_i}$: The sensitivity of security i to the book-to-market factor,

$\boldsymbol{SMB}$ (Small minus Big): the risk premium on the size factor,

$\boldsymbol{HML}$ (High minus Low): the risk premium on the book-to-market factor,

$\boldsymbol{\varepsilon_{i,t}}$: The random error with zero mean.

Fama and French (1992, 1993) develop the alternative model by adding two more factors to the traditional CAPM model. They propose small minus big (SMB – difference in returns on portfolios of small capitalization firms and big capitalization firms) and high minus low (HML – difference in returns on portfolios of high book-to-market ratio firms and low book-to-market ratio firms) factors to the classical asset pricing model.

First anomaly is about the size effect which suggests that the average return on stocks with low market equity is higher than the average return on stocks with high market equity. Second anomaly is about the value effect suggesting that the average returns on stocks with high book-to-market ratios are greater than the average return of stocks with low book-to-market ratios. The size anomaly is denoted as SMB factor, similarly the value anomaly is denoted as HML factor in the Fama and French's performance evaluation model.

c) Carhart's Four Factor Asset Pricing Model (1997):

The Carhart's Four Factor Model carries the Fama and French's three factor performance evaluation model to one step further by adding a momentum factor.

$$R_{i,t} - r_{f,t} = \propto_{carhart} + \beta_{m,t}(r_{m,t} - r_{f,t}) + \beta 1_{i,t} SMB_t + \beta 2_{i,t} HML_t + \beta 3_{i,t} MOM_t + \varepsilon_{i,t}$$

where;

$\propto_{carhart}$: The intercept for security i,

$R_{i,t}$: The return on security i at time t,

$r_{f,t}$: The risk-free rate of return at time t,

$\beta 1_i$: The sensitivity of security i to the market factor,

$\beta 2_i$: The sensitivity of security i to the size factor,

$\beta 3_i$: The sensitivity of security i to the book-to-market factor,

SMB (Small minus Big): the risk premium on the size factor,

HML (High minus Low): the risk premium on the book-to-market factor,

MOM_t (Momentum): The momentum factor

$\varepsilon_{i,t}$: The random error with zero mean.

The Single Factor Capital Asset Pricing Model and Fama and French's Three Factor Asset Pricing Model are employed for performance analysis in this thesis.

3.2.PERFORMANCE EVALUATION RATIOS

Apart from performance evaluation models, there are some performance measures derived from performance evaluation models in general. The widely used performance measures are given below;

a) **Jensen's Alpha:** $\mathbf{R_p - (R_f + \beta_i * (R_m - R_f))}$
where;

$\boldsymbol{R_p}$: The fund return
$\boldsymbol{R_f}$: Risk free rate
$\boldsymbol{R_m}$: The market return
$\boldsymbol{\beta_i}$: The sensitivity of fund to the market factor
$\boldsymbol{(R_m - R_f)}$: Excess of the market return over the risk free rate.

Jensen's alpha determines the excess return of the asset, or mutual fund, over its expected return. The expected return estimated by the single asset capital asset pricing model. The constant term, Jensen alpha, is found positive, when the mutual fund's return is higher than the expected return determined by the classical model and vice versa. This constant is therefore a point of interest for investors in order to rank mutual funds and invest in accordingly.

The Jensen's equation tells that if a portfolio manager predicts the price movements of the stocks well, the alpha term has a positive value, indicating that the selectivity, stock picking ability exists. In addition, if the portfolio manager performs superior forecasts on the market movements, they can increase their risk level by choosing more market sensitive stocks for their portfolios when they expect that the market will make positive returns in the next period. Such decision making reveals the manager's market timing ability.

According to the definition, the Jensen's alpha is derived from the single capital asset pricing model. For the performance analysis of mutual funds in this thesis, the constant term of both single capital asset pricing model and Fama and French's three factor model is used as an interpreter of stock picking and market timing abilities of fund managers.

b) Sharpe's Ratio = $(\mathbf{R_p} - \mathbf{R_f})$ **/** $\boldsymbol{\sigma_p}$

where;

$\boldsymbol{R_p}$: The asset return

$\boldsymbol{R_f}$: Risk free rate

$(\boldsymbol{R_p} - \boldsymbol{R_f})$: Excess of the asset return over the benchmark return

σ_p: The standard deviation of the excess of the asset return

Sharpe's ratio is the measure of the excess return per unit of risk. The ratio is used to compare the portfolios according how well their returns on a risk adjusted basis. It is preferred to select a mutual fund with higher Sharpe's Ratio, which gives more return at a certain level of risk.

c) Treynor Ratio: $(\mathbf{R_p} - \mathbf{R_f})/\ \boldsymbol{\beta_p}$

where;

$\boldsymbol{R_p}$: The fund return

$\boldsymbol{R_f}$: Risk free rate

$\boldsymbol{\beta_p}$: The sensitivity of fund to the market factor

$(\boldsymbol{R_p} - \boldsymbol{R_f})$: Excess of the fund return over the risk free rate

The Treynor Ratio measures the return in excess of risk free rate, per unit of risk level. Different from Sharpe's ratio, it takes the systematic risk instead of all risk. Investors prefer portfolios with high Treynor Ratios because they claim more return at a certain level of systematic risk.

Sharpe and Treynor ratios are not included in the analysis of mutual fund performance in this thesis.

3.3. RESEARCH ON PERFORMANCE EVALUATION

The research on multi-factor performance evaluation models has started in early 1980's. Banz (1981) analyzed the relationship between the NYSE stock returns and total market capitalization in his study. For the period 1926-1975, the results show that the returns of stocks with small market capitalization ratios are higher than the stocks with big market capitalization ratios.

Reingaum (1981) incorporated the earnings per share (EPS) factor in addition to the size factor to the evaluation model. He recognizes that the expected returns estimated by the multi-factor model reveal different results than the CAPM model. However, the results show that the earnings per share affect is covered by the size effect, that is, including size factor is enough for explaining the fund performance.

Basu (1983) conducted a similar research with Reingaum (1981). He analyzed the stock returns between the years 1963-1980 and found that stocks with high earnings per share have higher stock returns, even when controlling the size effect.

Chan, Chen and Hsieh (1985) claim that the size factor is in relation with the sensitivity of stock prices to market movements. The small firms are riskier than the big firms, because they are affected from the market movements more than the others. Therefore, the small firms' stocks returns are found higher than the bigger firms.

Similar studies exist in the literature until the Fama and French's three factor model has emerged in 1993. Because this methodology is used in this thesis, the detailed explanation of the model is given in the data and methodology section, in Chapter 4.

Multi-factor performance evaluation models are also started to be used in academic studies in Turkey, in recent years. Canbas and Erismis (2007) have conducted a performance analysis of Turkish stocks between the years 1992-2005, by taking the size and book to market equity factors into account. They try all combinations of performance evaluation model by incorporating the solely market return, market return and size factor, market return and book to market equity factor, all three factor, into the evaluation model in order to

differentiate the models between each other. The results show that all factors are meaningful in explaining stock returns. Size factor results in the firms with small capitalization ratios seem to have higher stock returns than that of firms with big market capitalization. Similar to the Fama and French's results, firms with high book to market equity ratios have higher returns than that of firms with low book to market equity ratios for the period of analysis. Among the other combinations, three-factor performance evaluation model has been found the best model in explaining the stock performance.

Akdeniz, Altay-Salih and Aydogan's (2000) study investigates a cross section analysis of expected stock returns in ISE for the period 1992-98, by a similar methodology of Fama and French. Similar to them, monthly returns indicate that stock returns are positively related with book-to-market and inversely with size factors. In addition, market beta has no explanatory power even in models where it is the only variable.

Apart from the multi factor performance evaluation models, Turkish studies also focus on performance evaluation measures. Arslan, M. (2005) applied the Treynor performance measure to see whether the market timing ability is in existence or not in Turkish mutual funds market. Only 3 of the 45 funds are found successful in terms of market timing ability. In general, they found small evidence on market timing ability throughout the period of analysis. Another finding reveals that the beta coefficients are too low during the time period among the sample which is consisted of 45 A type equity funds and those coefficients are not found significant in estimating the future movements of the capital markets. In addition, Turkish capital markets are said to have unforeseeable characteristics due to the unstable economic structure.

Imisiker and Ozlale (2008) similarly conducted a performance evaluation analysis among mutual funds. They compare portfolios in terms of Jensen's alpha and find weak evidence of selectivity and some evidence of market timing ability for mutual fund managers in Turkey for the selected time period.

3.4. RESEARCH ON PERFORMANCE PERSISTENCE

Measuring the persistence of mutual fund performance has been another popular subject in the field of mutual funds' performance analysis. From the investors' point of view, the fund managers are expected to be skillful in selecting the right stocks and time the market to outperform a benchmark persistently. That persistency is an important factor for investors to decide on which mutual fund they select. To achieve persistent performance, the research says that the past performance should be taken as raw data to forecast the future movements of the portfolios. Whether that past performance data has any predictive power about the future price movements is a crucial question behind the studies.

The early studies on performance persistence of mutual funds gave many contradictory results. Firstly, Sharpe (1966) developed the Sharpe ratio to measure the fund performance. He ranked mutual funds according to their Sharpe ratio over two periods 1944-53 and 1954-63 and found a significantly positive relationship between the two ranking periods. Thus, he concluded that differences in performance can be predicted; however, the results did not indicate the sources of these differences.

Jensen (1964) used Jensen's Alpha and concluded that prediction of the individual fund performance were not very different from that predicted by chance. In his studies, he used Jensen's alpha to compute the risk adjusted abnormal returns for funds and examined their performance during the period between 1945 and 1964.

Grinblatt and Titman (1989) studied equity funds for the period from 1974 to 1984, with evaluation periods consisting of 5 years, and found partial persistence explained by the expenses of the fund. In 1993, Grinblatt and Titman (1993) examined CRSP listed quarterly holdings of mutual fund portfolios during 1974-84 and found positive results on persistence. They found the strongest evidence of abnormal performance persistence in aggressive growth category of funds. They found that funds which performed well in first half of the sample period continued to do so in second half thereby suggesting that superior performance was predictable.

Grinblatt et al. (1995) also provided evidence for performance persistence. The study analyzed the extent to which mutual funds purchased stocks based on their past returns as well as their tendency to exhibit herding behavior which means buying and selling the same stock at the same time. They found that 77% of the mutual funds studied were momentum investors who bought stocks that were past winners; however most of them did not systematically sell the past losers. On average the funds that invested in momentum realized significantly better performance than other funds. They also found relatively weak evidence of herding in their sample.

Hendricks, Patel and Zeckhauser (1993) found performance persistence where 'hot hands' was used to refer to funds that delivered sustained short-run superior performance in their study. The authors studied portfolios of top performing growth oriented mutual funds for 1974-88 period and measured performance in terms of Jensen's alpha. They found that mutual funds that perform well in one year evaluation period persist in their superior performance in the following year and that underperformers displayed short term persistence.

Brown and Goetzmann (1995) study performance persistence in mutual funds covering the period between 1976 and 1988 for the sample of U.S. mutual funds. They formed 8 size groups beginning from the best to the worst performers and repeat for each year. Their results showed that the top two groups had a substantially better performance than the remaining groups. Although top managers seem to have more volatile returns, their performance compensates the investors by providing significant positive alphas.

Brown and Goetzmann (1993) also report the relative number of repeat winners and losers, without grouping. Of the total 5144 funds examined by them close to 60% of the winners in current year, were also winners in following year. This study seeks for whether persistence exists or not in the funds for the period examined using absolute and relative benchmarks. When they decompose the persistence effect, they see that persistence is not only related to the standard stylistic categories or risk adjusted procedures, but also to the time period observed or the managers employed. They use the contingency tables to track for the existence of persistence through the mutual funds. The table identifies a fund as winner in the current year if it is

above or equal to the median of all funds and find evidence of significant persistence in seven or eight out of twelve years. Another point that the study suggests that the different methods used for performance analysis may yield different rankings across the mutual funds. They conduct their analysis using relative and absolute benchmarks where the S&P index was used as an absolute benchmark. When the results are aggregated across years, the persistence is a more common phenomenon for repeat-losers rather than repeat winners. In conclusion, they find that the persistence phenomenon is strongly dependent upon the time period of study when they disaggregating the persistence tests on an annual basis. When the specific methods used in order to escape from the survivorship bias suggested by Brown et al., they have reached a larger database and they find clear evidence of relative performance persistence, suggesting that investors can use historical information to beat the market.

Bollen and Busse's (1997) main purpose in their study is to estimate the parameters of the standard stock selection and market timing models using daily mutual fund returns and quarterly measurement periods. After ranking the mutual funds according to their abnormal returns on a quarterly basis, similar to the Brown and Goetzman's study, they have reached ten deciles which helped them to compare the post-ranking periods' results. The top deciles of the mutual funds have shown a similar trend of abnormal return in the following quarter indicating that short term persistence exists in this sample for time period analyzed. Daily per share net asset values, dividends, and daily versions of the size and book-to-market factors similar to the Fama and French are included.

Burton (1995), studied equity funds for the period from 1971-90 and using evaluation period of one year concluded the presence of partial persistence. The author found evidence of persistent performance in the 1970s but not in 1980s.

Elton et al. (1996) studied 188 equity funds for the period from 1977-93 and found evidence of persistence in one year and three year risk adjusted returns.

Grünbichler and Pleschiutschnig (1999) conduct a study on a sample of 333 European equity mutual funds. They search for the persistence is due to the Fama's factor anomalies or the momentum factor. The results demonstrate that neither factor anomalies nor the investment style are the reason for persistent performance. Other than those factors, European equity mutual funds seem to have persistent performance for the years between 1988 and 1998.

Ibbotson and Patel (2002) indicated that winning funds repeat good performance. Their work was an extension of the study carried out by Goetzmann and Ibbotson (1994), which revealed that past mutual fund performances and relative rankings are useful in predicting their future performance.

Kazemi et al. (2003) tells that if past performance can predict future performance, then a portfolio consisting of best performing managers should consistently outperform a randomly selected portfolio of money managers.

Karatepe and Gökgöz (2002) conclude in their article that the Turkish fund managers do not have a significant timing ability. Because of the inconsistent financial environment especially in the years around 2001, it is claimed that there is no such consistent trend in the performances of the portfolios. Financial crisis experienced in the Turkish economy during the period of 2001-2002 emerge as an obstacle to the performance persistence. The results show that only one fund has shown negative selectivity with positive market timing ability. The majority of the funds show positive selectivity and negative market timing ability accordingly.

Overall studies looking at the performance of mutual funds focus on single and/or multi-factor performance evaluation models and performance measures derived from those models. Factors apart from market premium gained importance after the emergence of multi-factor modeling in performance evaluation. Major studies claim that mutual fund performance is directly related with book to market equity ratios and inversely related with market capitalization. On the other hand, academic studies research on mutual fund persistency by different methodologies with different results.

Some studies resulted in short term persistence whereas there are others claiming that future performance cannot be predicted by using past data.

CHAPTER 4

DATA AND METHODOLOGY

This thesis is an attempt to evaluate historical performance of A Type mutual funds in Turkey and investigate whether a persistency trend exists or not. For performance evaluation, data covers the period from January 2003 to December 2010; while for the persistency analysis, data is extended to June of 2011 for the selected sample size.

Data used in this study is taken from different sources. Daily returns and portfolio values of A Type mutual funds are obtained from Capital Markets Board Monthly Bulletins. Using net asset values of the equity mutual funds, daily returns are calculated as shown below;

$$R_{i,t} = [(NAV_t - NAV_{t-1})/NAV_{t-1}] \times 100$$

where;

NAV_t : Net Asset Value of mutual fund on day t

NAV_{t-1}: Net Asset Value of mutual fund on day t-1

$R_{i,t}$: Daily return of mutual fund

The computed daily returns are then compounded to obtain monthly returns to be used in the regression analysis.

Rather than using a stock market index (e.g. ISE 100), A Type TKYD Mutual Fund Index is taken as the proxy for the benchmark portfolio. A Type TKYD Mutual Fund Index is constructed using market cap weighted methodology from top 50 A Type Funds that are selected according to the largest market cap and largest number of shares criteria. Data is taken from TKYD (Turkish Institutional Investment Managers' Association) Database.

TKYD A Type Fund Index;

$$A_g = \sum_{i=1}^{i=n} F_{i,g} \times PD_{i,g}/PD_g$$

where;

n: Number of funds in the index

$F_{i,g}$**:** Daily price rate of return of i th fund on day g

$PD_{i,g}$**:** The average value of the total market capitalizations based on the last 30 business days for i number of funds on day g

PD_g**:** The sum of the averages of market capitalizations based on the last 30 business days for n number of funds on day g

> KYD index for open ended A Type mutual funds are calculated using market cap weighted method. KYD Fund index constituents represent those funds that have the largest market capitalization and the largest number of fund shares. In order to select constituent funds, the first step is to rank all funds according to their total market capitalizations and to their total number of fund shares held. Afterwards, funds' final ranking values are determined by adding up these two different rankings. Then only the top (first) 50 funds are selected as constituents for the respective A Type Fund Index. In cases where the final ranking values are equal between two funds, the fund with the largest market capitalization is selected as a constituent.[9]

Figure 4.1: TKYD A Type Fund Index for 2000-2011
Source: Turkish Institutional Investment Managers' Association

O/N repo return is taken as the proxy for the risk-free rate and data is taken from the TKYD O/N Repo Index which is constructed in order to follow the

[9] Turkish Institutional Investment Managers' Association, http://www.tkyd.org.tr/T/endex_hesaplama_yont.aspx#2

daily returns of repo/reverse repo agreements realized in the Istanbul Stock Exchange (ISE) and also to give insight to the small investors allocating funds to those short term investment instruments.

In calculation of TKYD O/N Repo Index, daily value-weighted averages of ISE Repo/Reverse Repo rates are taken as the overnight return. That rate including the withholding tax is multiplied by the days to the maturity and finally divided by 365 in order to calculate daily gross O/N repo index value. The same formulation is used to calculate the net O/N repo index by excluding withholding tax from the overnight return at first.

$$E_t - E_{t-1} \times [(R \times v/365) + 1]$$

E_t **:** Value of KYD Repo Index on day t

E_{t-1}**:** Value of KYD Repo Index on day t-1

R**:** Average rate of return realized in ISE Repo/Reverse Repo Market

v**:** Maturity of Repo/Reverse Repo agreement

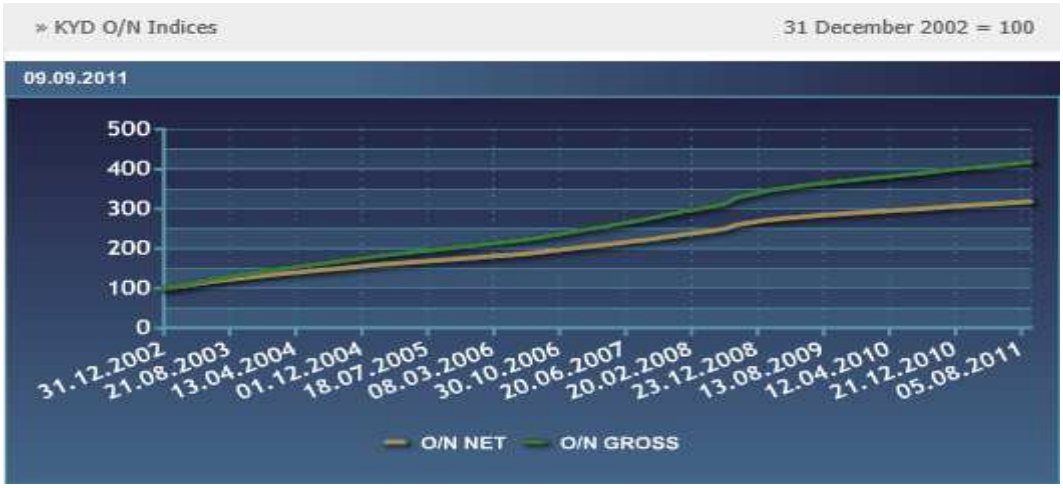

Figure 4.2: TKYD O/N Repo Index for 2002-2011
Source: Turkish Institutional Investment Managers' Association

Throughout the study, only the funds who survived all years who have relevant data are involved. The rationale behind why only the equity mutual funds are selected is to investigate whether the Fama-French's risk factor anomalies are significant or not in the Turkish mutual fund industry. Because size and book-to-market ratio risk factors are designed by using stock returns, equity funds are best for analysis compared to other investment

vehicles. Newly established or closed mutual funds are excluded from the analysis in order to equalize the observation sample and to increase the comparative power of the models constructed for each mutual fund. The thesis sample is consisted of 33 A Type mutual funds satisfying all of the conditions required above.

The performance of mutual funds is evaluated on a risk adjusted basis. Risk adjusted returns are calculated using two different models. The first model is the traditional single-factor model introduced by Jensen (1968). Second, the three-factor model of Fama and French (1993) is used.

The literature provided that there is three basic models employed throughout the studies for performance evaluation. The first and the most common one is the classical CAPM model developed by Sharpe (1964) and the others are the advanced versions of the Sharpe's model. Fama (1996) has realized that there exist more factors affecting the fund performance other than market premium, and introduced size and book-to-market risk factors to the model in order to capture those risks also in the model.

4.1.THE SINGLE-FACTOR CAPITAL ASSET PRICING MODEL (CAPM)

The Capital Asset Pricing Model of Sharpe (1964), is a generally accepted model employed by most of the previous studies. It argues that the funds return can be explained by the market premium at a certain level of risk measured by beta. The remaining explanatory items other than that single factor are hidden in the intercept term. CAPM framework deals with the sensitivity of a certain security to the overall market movements. The classical CAPM equation is given below;

$$\boldsymbol{R_{i,t}} = \boldsymbol{r_{f,t}} + \boldsymbol{\beta_i}\left(\boldsymbol{r_{m,t}} - \boldsymbol{r_{f,t}}\right) + \boldsymbol{\varepsilon_{i,t}}$$

where;

$\boldsymbol{R_{i,t}}$: the return on security i at time t,

$\boldsymbol{r_{f,t}}$: the risk-free rate of return at time t,

$\boldsymbol{\beta_i}$: the market risk for security i,

$\boldsymbol{r_{m,t}}$: the return on the market portfolio at time t,

$\boldsymbol{\varepsilon_{i,t}}$: the random error with zero mean.

Jensen (1964) for the first time employs the CAPM to measure the performance of mutual funds in the US.

$$\boldsymbol{R_{i,t} - r_{f,t} = \alpha_{i,t} + \beta_i(r_{m,t} - r_{f,t}) + \varepsilon_{i,t}}$$

where;

$\boldsymbol{\alpha_{i,t}}$:the intercept (Jensen's alpha) for security i,

$\boldsymbol{R_{i,t}}$: the return on security i at time t,

$\boldsymbol{r_{f,t}}$: the risk-free rate of return at time t,

$\boldsymbol{\beta_i}$: the market risk for security i,

$\boldsymbol{r_{m,t}}$: the return on the market portfolio at time t,

$\boldsymbol{\varepsilon_{i,t}}$: the random error with zero mean.

In this model, monthly returns of net asset values of mutual funds (excess of risk-free rate) are regressed on market premium, which is the difference between the return on the market portfolio and the risk-free rate. Jensen's alpha suggests that if there are remaining explanatory items different from the market premium, the intercept term is a statistically positive value, indicating that there are either omitted relevant variables in the model or fund manager is skillful in market timing and selectivity.

4.2.THE FAMA-FRENCH THREE-FACTOR MODEL

Fama-French Three Factor model suggests that the market premium is not the only factor affecting asset return and there should be other factors in the model. Fama-French find in their study that the capitalization and the equity market ratios also important in explaining fund returns. The model in which those risk factors are incorporated is specified as below;

$$\boldsymbol{R_{i,t} - r_{f,t} = \propto_i + \beta 1_i(r_{m,t} - r_{f,t}) + \beta 2_i SMB + \beta 3_i HML + \varepsilon_{i,t}}$$

where;

$\boldsymbol{\propto_i}$: the intercept for security i,

$\boldsymbol{R_{i,t}}$: the return on security i at time t,

$\boldsymbol{r_{f,t}}$: the risk-free rate of return at time t,

$\boldsymbol{\beta 1_i}$: the sensitivity of security i to the market factor,

$\boldsymbol{\beta 2_i}$: the sensitivity of security i to the size factor,

$\boldsymbol{\beta 3_i}$: the sensitivity of security i to the book-to-market factor,

SMB (Small minus Big) : the risk premium on the size factor,

HML (High minus Low) : the risk premium on the book-to-market factor,
$\varepsilon_{i,t}$: the random error with zero mean.

Fama and French (1992, 1993) develop the alternative model by adding two more factors to the traditional CAPM model. They propose small minus big (SMB – difference in returns on portfolios of small capitalization firms and big capitalization firms) and high minus low (HML – difference in returns on portfolios of high book-to-market ratio firms and low book-to-market ratio firms) factors to the classical asset pricing model.

First anomaly is about the size effect which suggests that the average return on stocks with low market equity is higher than the average return on stocks with high market equity. Second anomaly is about the value effect suggesting that the average returns on stocks with high book-to-market ratios are greater than the average return of stocks with low book-to-market ratios. The size anomaly is denoted as SMB factor, similarly the value anomaly is denoted as HML factor in the Fama and French's performance evaluation model.

SMB and HML factors used in this analysis are constructed similar to the design of Fama and French (1993). Stocks trading on the ISE are involved in the stock data set and obtained from the ISE database. Moreover, the market capitalization values of those stocks are also taken from the ISE database for all years.

To construct size factor, the stocks are sorted on size and the whole sample is divided into two by using median value. The biggest half is named as the big stocks (B) whereas the remaining sample is named as small stocks(S). Similarly, the stocks are also independently sorted on their book-to-market equity values and grouped into three parts. The group of stocks with high book to market equity values is called high (H), that with medium book to market equity values is called medium (M) and finally that with low book to market equity values is called low (L). Afterwards six portfolios are generated from the intersection of two size groups and three BME groups. Those six portfolios include;

SL: Stocks with small market capitalization and low book-to-market ratio.
SM: Stocks with small market capitalization and medium book-to-market ratio.
SH: Stocks with small market capitalization and high book-to-market ratio.
BL: Stocks with big market capitalization and low book-to-market ratio.
BM: Stocks with big market capitalization and medium book-to-market ratio.
BH: Stocks with big market capitalization and high book-to-market ratio.

SMB factor is calculated as the difference between the monthly simple average return on the three small-size portfolios (SL, SM, SH) and the monthly simple average return on the three big-size portfolios (BL, BM, and BH). Similarly, HML factor is calculated as the difference between the monthly simple average return on the two high-BME portfolios (SH and BH) and the monthly simple average return on the two low-BME portfolios (SL and BL).

Beside the market premium in CAPM, monthly SMB and HML factors are incorporated to the performance evaluation model after all. The excess return of any mutual fund in the sample is regressed on the market excess return (TKYD Mutual Fund Index Return minus TKYD O/N Repo Index Return), SMB and HML factors on a monthly basis.

In the performance evaluation models used in the analysis, the main objective is to measure the intercept term (alpha) correctly. The intercept term implies superior performance when it is statistically significantly positive and inferior performance when it is statistically significantly negative in the model. The null and alternative hypotheses can be shown as following:

$$\mathbf{H_0}: \alpha_i = 0$$
$$\mathbf{H_1}: \alpha_i \neq 0$$

It is expected that the explanatory power of the performance model will increase as more explanatory variables would be added to the performance evaluation process as Fama and French's three factor model suggests. Moreover, it is also expected that this improved model will also be more efficient in determining the intercept term, by not including the anomaly effects. The empirical results will be discussed in the following chapter.

4.3. REPEAT PERFORMERS

Brown et all. (1992) and Goetzman and Ibbotson (1994) track the evolution of the mutual fund universe using a non-parametric methodology based upon contingency tables.

Brown and Goetzman states the null hypothesis that performance in the first period is unrelated to performance in the first period corresponds to an odds ratio of one. In large samples with independent observations, the standard error of the natural log of the odds ratio is well approximated.

The persistency analysis in this thesis is conducted by using a methodology similar to Brown and Goetzman's study in terms of classification of mutual funds as Winner or Loser. Rather than using an odds ratio, the individual performances are tracked during the period on a monthly basis, by using the same sample of mutual funds in the performance evaluation section and by extending the data period to the June of 2011.

A mutual fund is called Winner if it performed better than the median value of the fund returns in that month. If its performance is greater than the median value in the following period, that fund is said to be a Winner-Winner mutual fund. The same logic is valid for determining Loser-Loser (LL), Winner-Loser (WL) and Loser-Winner (LW) mutual funds. For each mutual fund, the numbers of Winner-Winner (WW) and Loser-Loser (LL) performances are counted during the sample period of 2003 to June of 2011 in order to track for the persistency months. On the other side, the non-persistency months are also counted as the Winner-Loser (WL) and Loser-Winner (LW) performances according to the same logic. Overall, for each mutual fund, the track of monthly performance and a potential trend of persistency can be seen by that non-parametric tool.

CHAPTER 5

EMPIRICAL RESULTS

Chapter 5 presents the empirical results on the performance and persistency analysis of the selected A Type open-end mutual funds in Turkey for the years between 2003 and 2011.

The risk adjusted performance of mutual funds is measured by single factor CAPM model and Fama and French's three factor asset pricing model. Among the performance measures explained in Chapter 2, only Jensen's alphas are interpreted for the performance evaluation. Then, the sample of mutual funds is analyzed for persistency by a non-parametric method similar to that of Brown and Goetzman (1995).

5.1. DESCRIPTIVE STATISTICS

There are thirty three A Type mutual funds included in the sample period from January 2003 to December 2010 for performance evaluation analysis and to June 2011 for performance persistence analysis. Samples of equal length are analyzed in this thesis in order to have the same number of observations for each fund to determine the significance of coefficients and compare explanatory power of models more accurately.

Table 5.1 summarizes the basic descriptive statistics for TKYD O/N Repo Index returns and TKYD A Type Mutual Fund returns which are used as proxies for risk free rate and market return respectively. According to Table 5.1; the average market return for the period from January 2003 to June 2011 is greater than the risk free rate as expected. The average monthly return of TKYD Mutual Fund Index is %1.6, whereas the average TKYD O/N Repo Index Return is %1.1 during the sample period. It can also be seen that the market returns have a wider range and larger variance compared to those of risk free returns.

Table 5.1: Descriptive Statistics of Market Proxies and A Type Mutual Funds

	REPO	FON	ACD	AK3	AKU	AAK
Mean	0,011	0,016	0,008	0,017	0,019	0,013
Standard Error	0,001	0,006	0,004	0,007	0,009	0,004
Median	0,012	0,023	0,014	0,025	0,024	0,017
Standard Deviation	0,006	0,060	0,039	0,071	0,088	0,042
Sample Variance	0,000	0,004	0,001	0,005	0,008	0,002
Kurtosis	1,865	0,182	0,522	0,397	0,219	1,017
Skewness	1,244	(0,425)	(0,546)	(0,309)	(0,154)	(0,505)
Range	0,026	0,310	0,210	0,416	0,479	0,225
Minimum	0,004	(0,165)	(0,107)	(0,204)	(0,238)	(0,117)
Maximum	0,030	0,146	0,103	0,212	0,240	0,108
Sum	1,157	1,583	0,840	1,755	1,980	1,355
Count	102	102	102	102	102	102
Largest(1)	0,030	0,146	0,103	0,212	0,240	0,108
Smallest(1)	0,004	(0,165)	(0,107)	(0,204)	(0,238)	(0,117)
Confidence Level (95%)	0,001	0,012	0,008	0,014	0,017	0,008

	DZA	DAH	DZK	EC2	EV1	FYD
Mean	0,012	0,013	0,014	(0,012)	0,021	0,023
Standard Error	0,004	0,006	0,003	0,007	0,006	0,006
Median	0,016	0,014	0,015	(0,013)	0,020	0,028
Standard Deviation	0,043	0,060	0,030	0,076	0,064	0,065
Sample Variance	0,002	0,004	0,001	0,006	0,004	0,004
Kurtosis	1,878	0,594	0,425	2,010	1,877	1,091
Skewness	(0,534)	(0,288)	0,097	0,026	(0,403)	(0,231)
Range	0,280	0,341	0,158	0,477	0,434	0,406
Minimum	(0,154)	(0,173)	(0,065)	(0,232)	(0,209)	(0,177)
Maximum	0,126	0,169	0,093	0,245	0,225	0,230
Sum	1,238	1,308	1,411	(1,199)	2,173	2,347
Count	102	102	102	102	102	102
Largest(1)	0,126	0,169	0,093	0,245	0,225	0,230
Smallest(1)	(0,154)	(0,173)	(0,065)	(0,232)	(0,209)	(0,177)
Confidence Level (95%)	0,008	0,012	0,006	0,015	0,013	0,013

Table 5.1: Descriptive Statistics of Market Proxies and A Type Mutual Funds (Cont'd)

	Fİ2	FAF	GAE	GL1	GBK	HLK
Mean	0,018	0,024	0,046	(0,003)	0,010	0,016
Standard Error	0,006	0,008	0,029	0,011	0,005	0,004
Median	0,032	0,031	0,027	0,010	0,013	0,022
Standard Deviation	0,063	0,077	0,292	0,112	0,052	0,036
Sample Variance	0,004	0,006	0,085	0,012	0,003	0,001
Kurtosis	0,043	0,233	84,173	63,882	1,040	1,222
Skewness	(0,384)	(0,281)	8,751	(7,242)	(0,311)	(0,917)
Range	0,321	0,419	3,088	1,101	0,289	0,188
Minimum	(0,157)	(0,186)	(0,258)	(1,000)	(0,145)	(0,110)
Maximum	0,164	0,232	2,831	0,101	0,144	0,078
Sum	1,813	2,488	4,651	(0,272)	1,054	1,658
Count	102	102	102	102	102	102
Largest(1)	0,164	0,232	2,831	0,101	0,144	0,078
Smallest(1)	(0,157)	(0,186)	(0,258)	(0,195)	(0,145)	(0,110)
Confidence Level (95%)	0,012	0,015	0,057	0,022	0,010	0,007

	HSA	Tİ7	Tİ2	TİE	Tİ3	İYD
Mean	0,015	0,014	0,017	0,020	0,022	0,016
Standard Error	0,004	0,005	0,007	0,009	0,008	0,006
Median	0,018	0,019	0,024	0,027	0,032	0,025
Standard Deviation	0,043	0,049	0,068	0,087	0,078	0,060
Sample Variance	0,002	0,002	0,005	0,008	0,006	0,004
Kurtosis	0,860	1,136	0,268	0,097	(0,053	(0,041)
Skewness	(0,333)	(0,699)	(0,377)	(0,142)	(0,403)	(0,510)
Range	0,252	0,276	0,369	0,458	0,378	0,296
Minimum	(0,125)	(0,169)	(0,195)	(0,220)	(0,182)	(0,147)
Maximum	0,126	0,107	0,174	0,238	0,196	0,148
Sum	1,575	1,386	1,708	2,037	2,200	1,594
Count	102	102	102	102	102	102
Largest(1)	0,126	0,107	0,174	0,238	0,196	0,148
Smallest(1)	(0,125)	(0,169)	(0,195)	(0,220)	(0,182)	(0,147)
Confidence Level (95%)	0,008	0,010	0,013	0,017	0,015	0,012

Table 5.1: Descriptive Statistics of Market Proxies and A Type Mutual Funds (Cont'd)

	KA2	ST1	TAD	TE3	TYH	TAH
Mean	0,013	0,006	0,010	0,014	0,018	0,020
Standard Error	0,004	0,019	0,004	0,004	0,007	0,007
Median	0,019	0,033	0,007	0,019	0,026	0,026
Standard Deviation	0,043	0,195	0,037	0,044	0,075	0,067
Sample Variance	0,002	0,038	0,001	0,002	0,006	0,005
Kurtosis	0,035	19,583	5,777	1,582	0,159	0,394
Skewness	(0,523)	(4,101)	1,113	(0,859)	(0,296)	(0,350)
Range	0,204	1,334	0,276	0,252	0,424	0,382
Minimum	(0,110)	(1,000)	(0,084)	(0,146)	(0,210)	(0,199)
Maximum	0,095	0,334	0,193	0,106	0,214	0,183
Sum	1,314	0,561	1,041	1,388	1,801	2,044
Count	102	102	102	102	102	102
Largest(1)	0,095	0,334	0,193	0,106	0,214	0,183
Smallest(1)	(0,110)	(0,112)	(0,084)	(0,146)	(0,210)	(0,199)
Confidence Level (95%)	0,008	0,038	0,007	0,009	0,015	0,013

	VAF	YAK	YAF	YAD	TZD	Average
Mean	0,015	0,015	0,015	0,012	0,013	0,014
Standard Error	0,005	0,004	0,004	0,005	0,005	0,005
Median	0,021	0,017	0,015	0,021	0,020	0,018
Standard Deviation	0,048	0,044	0,045	0,050	0,046	0,049
Sample Variance	0,002	0,002	0,002	0,003	0,002	0,003
Kurtosis	0,096	(0,036)	0,637	0,111	0,460	0,789
Skewness	(0,458)	(0,272)	(0,313)	(0,480)	(0,440)	(0,158)
Range	0,248	0,215	0,253	0,261	0,239	0,272
Minimum	(0,125)	(0,094)	(0,118)	(0,133)	(0,112)	(0,135)
Maximum	0,123	0,121	0,135	0,128	0,126	0,136
Sum	1,500	1,534	1,530	1,222	1,322	1,403
Count	102	102	102	102	102	102
Largest(1)	0,123	0,121	0,135	0,128	0,126	0,136
Smallest(1)	(0,125)	(0,094)	(0,118)	(0,133)	(0,112)	(0,135)
Confidence Level (95%)	0,009	0,009	0,009	0,010	0,009	0,010

Table 5.2 summarizes the basic descriptive statistics for SMB and HML factors used for the performance analysis of mutual funds. The mean value of SMB factor is -0,86, whereas the average mean value of HML factor is -2,42 during the sample period.

Tablo 5.2: Descriptive Statistics of SMB and HML Factors

	SMB	HML
Mean	(0,858)	(2,425)
Standard Error	0,341	0,319
Median	(0,698)	(2,100)
Standard Deviation	3,340	3,128
Sample Variance	11,155	9,787
Kurtosis	(0,025)	1,607
Skewness	0,123	(0,801)
Range	15,301	17,175
Minimum	(7,971)	(12,721)
Maximum	7,330	4,454
Sum	(82,360)	(232,795)
Count	96	96
Largest(1)	7,330	4,454
Smallest(1)	(7,971)	(12,721)
Confidence Level (95%)	0,677	0,634

A Type mutual funds are required to invest at least %25 of their holdings to the Turkish stocks trading in the Istanbul Stock Exchange. Other than stocks, mutual funds invest in treasury bills/bonds, reverse repo agreements, money market instruments and other investment tools. Table 5.3 presents the asset allocation of A Type mutual funds in the sample. Whereas the biggest share of investment capital belongs to the stocks, treasury bills, bonds and reverse repo agreements are also popular among selected equity fund portfolios. Money market instruments and foreign securities are not common investment tools for Turkish equity funds.

The proportion of asset classes varies from mutual fund to the other. For example, Taib Investment Variable Fund (TAD) allocates %82.3 of assets to treasury bills and government bonds, %17.7 of its assets to stock investments, with no investment to other instruments. On the other hand, Global Securities Variable Fund's (GL1) allocates almost all of the assets to stock investments, whereas Eczacıbaşı Securities Variable Fund (EC2) allocates %63.9 of its assets to the reverse repo agreements.

The average shares of asset classes are shown in Figure 5.1, for selected mutual fund sample by June of 2011.

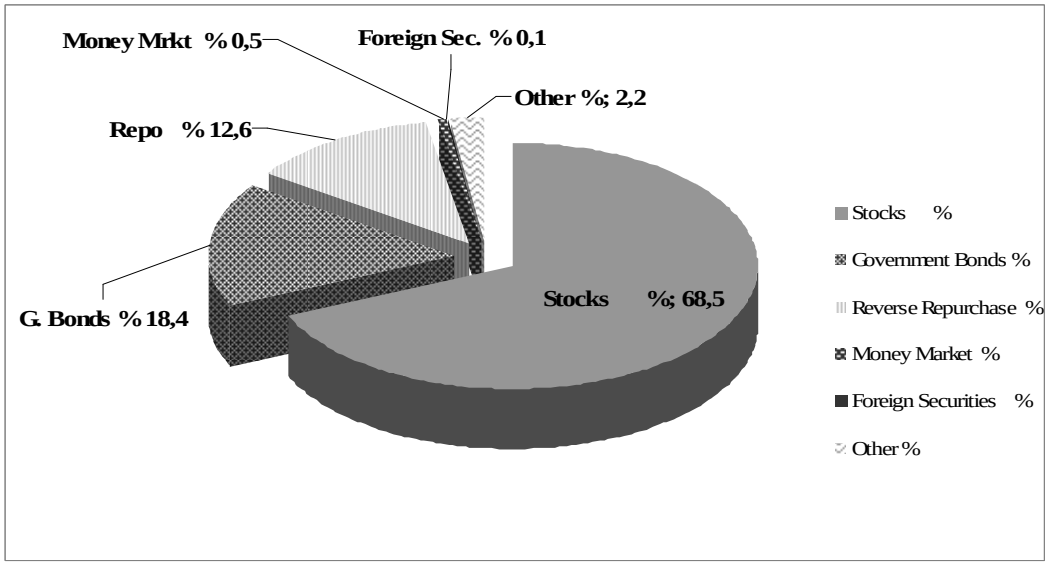

Figure 5.1: Asset Allocation of Mutual Fund Sample in 2011/6
Source: CMB Bulletin June 2011

Table 5.3: Asset Allocation (%) of Mutual Funds as of June 2011

	Name of Mutual Fund (A TYPE)	Code	Stocks	T-Bills &Bonds	Reverse Repo	Money Market	Other	NAV (Million TRY)	Number of Investors
1	ATA INV. SEC. BALANCED FUND	AAK	75,32	0,00	9,17	15,51	0,00	10,88	80
2	ACAR INV. SEC. VARIABLE FUND	ACD	66,73	22,36	3,50	4,26	3,16	15,03	38
3	AKBANK STOCKS FUND	AK3	78,56	6,93	14,51	0,00	0,00	36,55	2.239
4	AKBANK ISE-30 INDEX FUND	AKU	90,62	0,00	9,38	0,00	0,00	66,92	2.185
5	DENIZBANK STOCKS FUND	DAH	66,62	0,00	33,38	0,00	0,00	1,03	184
6	DENIZBANK VARIABLE FUND	DZA	70,45	0,00	29,55	0,00	0,00	1,59	199
7	DENIZBANK BALANCED FUND	DZK	47,33	25,23	27,44	0,00	0,00	0,53	121
8	ECZACIBASI SEC. VARIABLE FUND	EC2	36,07	0,00	63,93	0,00	0,00	4,45	135
9	EVGIN INV. SEC. BALANCED FUND	EV1	54,72	28,93	16,35	0,00	0,00	0,91	91
10	FINANSBANK STOCKS FUND	FAF	95,85	0,00	4,15	0,00	0,00	14,14	437
11	FINANSBANK VARIABLE FUND	FI2	90,70	0,00	9,30	0,00	0,00	5,10	266
12	FINANS INV. SEC. VARIABLE FUND	FYD	85,15	0,00	14,85	0,00	0,00	13,41	944
13	GARANTI ISE-30 INDEX FUND	GAE	82,85	13,28	3,87	0,00	0,00	73,48	4.636
14	GLOBAL SEC. BALANCED FUND	GBK	68,11	19,72	12,17	0,00	0,00	0,58	25
15	GLOBAL SEC. VARIABLE FUND	GL1	99,56	0,00	0,44	0,00	0,00	0,46	78
16	HALK BANK BALANCED FUND	HLK	54,89	26,47	18,64	0,00	0,00	5,08	411
17	HSBC BANK VARIABLE FUND	HSA	45,94	51,39	2,47	0,20	0,00	20,89	1.029

Table 5.3: Asset Allocation (%) of Mutual Funds as of June 2011 (Cont'd)

	Name of Mutual Fund (A TYPE)	Code	Stocks	T-Bills &Bonds	Reverse Repo	Money Market	Other	NAV (Million TRY)	Number of Investors
18	IS INV. SEC.VARIABLE FUND	IYD	58,06	0,00	41,94	0,00	0,00	59,24	57
19	DEV. BANK VARIABLE FUND	KA2	33,00	17,73	49,28	0,00	0,00	1,42	5
20	STRATEJI SEC. VARIABLE FUND	ST1	98,99	0,00	0,00	1,01	0,00	57,81	421
21	TAIB YATIRIM VARIABLE FUND	TAD	17,71	82,29	0,00	0,00	0,00	0,01	108
22	TEKSTIL BANK STOCKS FUND	TAH	87,25	0,00	12,75	0,00	0,00	2,08	112
23	TEB BALANCED FUND	TE3	38,67	57,22	2,32	0,00	1,79	13,72	310
24	IS BANK STOCKS FUND	TI2	64,48	19,43	16,09	0,00	0,00	34,29	3.809
25	IS BANK AFFILIATES FUND	TI3	90,08	0,62	2,43	0,00	6,87	155,86	4.559
26	IS BANK VARIABLE FUND	TI7	61,75	10,20	28,06	0,00	0,00	16,54	2.087
27	IS BANK ISE-30 INDEX FUND	TIE	90,54	0,00	9,46	0,00	0,00	41,20	3.147
28	TEB INV. SEC. STOCKS FUND	TYH	93,58	0,00	6,42	0,00	0,00	19,16	872
29	ZIRAAT INV. SEC. VARIABLE FUND	TZD	84,74	13,50	1,76	0,00	0,00	1,36	478
30	VAKIFBANK VARIABLE FUND	VAF	47,00	24,80	15,03	13,17	0,00	3,42	429
31	YAT. FIN. SEC. VARIABLE FUND	YAD	56,74	27,53	15,73	0,00	0,00	1,84	513
32	YKB INV. SEC. VARIABLE FUND	YAF	46,49	15,49	37,33	0,00	0,69	29,91	2.092
33	YKB BALANCED FUND	YAK	55,43	28,63	15,41	0,00	0,54	5,61	690
	TOTAL							**714,47**	**32.787**

5.2.EMPIRICAL RESULTS FOR THE SINGLE FACTOR CAPM MODEL

This section presents the empirical results of performance evaluation obtained from the single-factor CAPM. The results for A Type mutual funds in the sample are summarized in Table 5.4.

In single factor CAPM equation, the dependent variable (the excess return of a specific portfolio) is regressed on the market premium. Beta coefficient represents the sensitivity of portfolio to the market premium factor. Remaining explanatory items are hidden in the intercept term, the Jensen alpha in this case. The mutual fund manager is said to be skillful to select right stocks and time the market trends, if the intercept term is found statistically significantly positive in a risk-adjusted basis. The negative Jensen alpha implies for the negative performance on the other hand.

In the CAPM performance evaluation process, Jensen's alphas of only four mutual funds are found to be statistically significant at the 5% level. The remaining twenty nine mutual funds' Jensen alphas are found not to be different from zero at the 5% level.

Unlike Jensen's alphas, beta coefficients of all Turkish mutual funds are significant at 5% level. Betas range from 0.40 to 4.00, while the average beta is 0.996. The average beta coefficient is statistically significant and near one, meaning that the mutual funds are moving with the TKYD mutual fund universe and the fund managers are not able to outperform or underperform the market by their stock selection or market timing abilities.

The explanatory power of the regression models are measured by the R square and adjusted R square values which ranges between zero and one. R square value gives information about the goodness of fit of the model, whereas the adjusted R square is the modified version of R square when the number of explanatory variables is increased in the model. In the analysis, the adjusted R square values are taken as the explanatory powers of the regression models. The highest R^2 of 94.9% belongs to Is Bank Stocks Fund (TI2), while regression equation for the Ziraat Investments Securities Variable Fund has the lowest explanatory power of 0.041%. The average adjusted R^2 level in the observation sample is 74.2%.

Table 5.4: Regression Results for the Single Factor CAPM Model

No	Mutual Fund		Jensen's Alpha	(R_m-R_f)*	Adj. R2	F-Stat
1	Ata Inv. Sec. Balanced	AAK	-0,001 0,570	0,590 0,000	0,735	264,374 0,000
2	Acar Inv. Sec. Variable	ACD	0,000 0,004	0,566 0,000	0,809	403,248 0,000
3	Akbank Stocks	AK3	0,001 0,578	1,158 0,000	0,935	137,322 0,000
4	Akbank Ise-30 Index	AKU	0,003 0,255	1,424 0,000	0,942	1551,365 0,000
5	Denızbank Stocks	DAH	-0,002 0,515	0,883 0,000	0,772	321,865 0,000
6	Denızbank Variable	DZA	-0,001 0,604	0,602 0,000	0,711	234,555 0,000
7	Denızbank Balanced	DZK	0,001 0,394	0,400 0,000	0,720	244,720 0,000
8	Eczacıbası Sec. Var.	EC2	-0,029 0,000	4,000 0,000	0,563	123,482 0,000
9	Evgın Inv. Sec. Bal.	EV1	0,007 0,114	0,822 0,000	0,595	140,818 0,000
10	Fınansbank Stocks	FAF	0,008 0,001	1,235 0,000	0,907	923,646 0,000
11	Fınansbank Variable	Fİ2	0,003 0,260	0,986 0,000	0,872	648,888 0,000
12	Fınans Inv. Sec. Var.	FYD	0,008 0,008	0,986 0,000	0,808	402,045 0,000
13	Garantı Ise-30 Index	GAE	0,029 0,328	1,709 0,001	0,109	12,668 0,001
14	Global Sec. Balanced	GBK	-0,004 0,126	0,732 0,000	0,736	265,190 0,000
15	Global Sec. Variable	GL1	-0,017 0,128	0,527 0,005	0,071	8,244 0,005
16	Halk Bank Balanced	HLK	0,002 0,255	0,531 0,000	0,772	322,213 0,000
17	Hsbc Bank Variable	HSA	0,002 0,268	0,680 0,000	0,902	878,726 0,000
18	Is Inv. Sec. Variable	İYD	0,000 0,869	0,949 0,000	0,883	715,320 0,000
19	Dev. Bank Variable	KA2	-0,001 0,686	0,646 0,000	0,830	465,852 0,000
20	Stratejı Sec. Variable	ST1	-0,016 0,357	1,887 0,000	0,319	45,437 0,000

*Market Premium: (R_m - R_f)

Table 5.4: Regression Results for the Single Factor CAPM Model (Cont'd)

No	Mutual Fund		Jensen's Alpha	(R_m-R_f)*	Adj. R2	F-Stat
21	Taıb Yatırım Variable	TAD	-0,003 0,134	0,504 0,000	0,672	195,491 0,000
22	Tekstıl Bank Stocks	TAH	0,005 0,108	0,994 0,000	0,776	330,387 0,000
23	Teb Balanced	TE3	0,000 0,745	0,709 0,000	0,909	950,899 0,000
24	Is Bank Stocks	Tİ2	0,001 0,567	1,106 0,000	0,949	1775,155 0,000
25	Is Bank Affiliates	Tİ3	0,005 0,087	1,232 0,000	0,879	690,782 0,000
26	Is Bank Variable	Tİ7	-0,001 0,524	0,777 0,000	0,879	689,113 0,000
27	Is Bank Ise-30 Index	TİE	0,003 0,171	1,425 0,000	0,943	1586,992 0,000
28	Teb Inv. Sec. Stocks	TYH	0,002 0,414	1,205 0,000	0,913	1004,215 0,000
29	Zıraat Inv. Sec. Var.	TZD	0,000 0,958	0,648 0,000	0,041	335,949 0,000
30	Vakıfbank Variable	VAF	0,000 0,764	0,767 0,000	0,930	1267,295 0,000
31	Yat. Fın. Sec. Variable	YAD	-0,003 0,128	0,784 0,000	0,864	606,880 0,000
32	Ykb Inv. Sec. Variable	YAF	0,001 0,631	0,699 0,000	0,871	640,324 0,000
33	Ykb Balanced	YAK	0,001 0,632	0,693 0,000	0,868	626,160 0,000
	Mean		0,000	0,996	0,742	569,988
	Maximum		0,029	4,000	0,949	1775,155
	Minimum		-0,029	0,400	0,041	8,244

*Market Premium: (R_m - R_f)

5.3. EMPIRICAL RESULTS FOR THE FAMA-FRENCH THREE-FACTOR (FF3F) MODEL

This section presents the empirical results of performance evaluation obtained from the Fama and French's three factor asset pricing model.

The six portfolios are constructed by the methodology explained in Chapter 4 by using the stock data obtained from ISE database for the years between 2003 and 2010. Table 5.5, presents the number of stocks in those six portfolios during the years of analysis. The number of stocks with available data was 269 in 2003, while that number has increased to 301 in year 2010. On average, it can be seen that the dominant portfolios are the SH (Small market capitalization and high book-to-market values) and the BL (Big market capitalization and low book-to-market values) throughout the years.

Table 5.5: Number of Stocks in the Six Intersection Portfolios

Portfolio	2003	2004	2005	2006	2007	2008	2009	2010	Average
SL	32	50	32	33	33	30	34	38	35
SM	38	33	45	48	45	50	41	45	43
SH	65	55	67	67	71	65	69	67	66
BL	58	68	64	66	66	67	62	62	64
BM	51	47	51	51	54	47	55	56	52
BH	25	25	29	32	30	32	27	33	29
Total	**269**	**278**	**288**	**297**	**299**	**291**	**288**	**301**	**-**

Table 5.6 presents the model results for the selected mutual funds. Similar to the single factor model, only seven mutual funds' Jensen alphas are found to be statistically significant. The remaining twenty six funds' alphas are found not different from zero. Six out of thirty three SMB coefficients are positive, statistically significant, while only one of two significant HML coefficients is positive. Remaining coefficients are not different from zero at 5% level.

Similar to the CAPM evaluation, the three factor model finds that all mutual fund market factor betas are statistically significant and positive. Average beta is 1.008, which is slightly higher than the one obtained with single-factor model. The additional factors in the model are set for the anomalies of size and book-to-market values. Mutual fund excess returns are regressed on market excess return, size and book to market equity factors as explained in the data and methodology section.

Average adjusted R^2 for mutual funds with the three factor model is 77.3%, which is higher than the one obtained with the single-factor model meaning that added variables helped explain more of the variation in the dependent variable. In our case, increased adjusted R^2 suggests that three factor model is better in explaining the return on equity mutual funds. As it can be observed from the table, the highest R^2 of 94.8% once again belongs to Isbank Stocks Fund (TI2), while regression equation for the Global Securities Variable Fund has the lowest explanatory power of 18.9%.

From the F-test results, all coefficients in the performance evaluation models are found to be jointly significant at 5% level in all regressions.

Table 5.6: Regression Results for the Fama-French Three-Factor Model

No	Mutual Fund		Alpha	(R_m-R_f)*	SMB	HML	Adj. R^2	F-Stat
1	Ata Inv. Sec. Balanced	AAK	-0,003 -0,359	0,59 0,00	0,00 0,95	0,00 0,47	0,73 0,00	87,01 0,00
2	Acar Inv. Sec. Variable	ACD	-0,005 0,032	0,58 0,00	0,00 0,05	0,00 0,73	0,81 0,00	138,94 0,00
3	Akbank Stocks	AK3	0,003 0,260	1,16 0,00	0,00 0,88	0,00 0,31	0,93 0,00	454,67 0,00
4	Akbank Ise-30 Index	AKU	0,004 0,139	1,41 0,00	0,00 0,42	0,00 0,24	0,94 0,00	515,51 0,00
5	Denızbank Stocks	DAH	-0,002 0,651	0,88 0,00	0,00 0,97	0,00 0,93	0,77 0,00	105,02 0,00
6	Denızbank Variable	DZA	0,002 0,474	0,60 0,00	0,00 0,85	0,00 0,10	0,71 0,00	80,42 0,00
7	Denızbank Balanced	DZK	0,000 0,924	0,40 0,00	0,00 0,44	0,00 0,35	0,72 0,00	82,36 0,00
8	Eczacıbası Sec. Variable	EC2	-0,026 0,000	4,00 0,00	0,00 0,79	0,00 0,58	0,56 0,00	40,69 0,00
9	Evgin Inv. Sec. Balanced	EV1	0,013 0,013	0,84 0,00	0,00 0,04	0,00 0,20	0,62 0,00	52,73 0,00
10	Finansbank Stocks	FAF	0,010 0,002	1,23 0,00	0,00 0,89	0,00 0,39	0,91 0,00	304,06 0,00
11	Finansbank Variable	Fİ2	0,003 0,280	1,00 0,00	0,00 0,18	0,00 0,91	0,87 0,00	216,73 0,00
12	Finans Inv. Sec. Variable	FYD	0,012 0,002	0,98 0,00	0,00 0,53	0,00 0,15	0,81 0,00	137,05 0,00
13	Garanti Ise-30 Index	GAE	-0,048 0,177	1,90 0,00	0,00 0,99	-0,03 0,00	0,20 0,00	8,77 0,00
14	Global Sec. Balanced	GBK	-0,005 0,122	0,76 0,00	0,00 0,07	0,00 0,27	0,74 0,00	91,24 0,00
15	Global Sec. Variable	GL1	0,015 0,251	0,47 0,01	0,00 0,64	0,01 0,00	0,19 0,00	8,38 0,00
16	Halk Bank Balanced	HLK	0,004 0,067	0,55 0,00	0,00 0,00	0,00 0,66	0,79 0,00	122,02 0,00
17	Hsbc Bank Variable	HAS	0,004 0,035	0,68 0,00	0,00 0,75	0,00 0,07	0,90 0,00	301,21 0,00
18	Is Inv. Sec. Variable	İYD	-0,002 0,470	0,96 0,00	0,00 0,65	0,00 0,15	0,88 0,00	239,44 0,00

*Market Premium: $(R_m - R_f)$

Table 5.6: Regression Results for the Fama-French Three-Factor Model (Cont'd)

No	Mutual Fund		Alpha	(R_m-R_f)*	SMB	HML	Adj. R^2	F-Stat
19	Dev. Bank Variable	KA2	-0,001 0,543	0,66 0,00	0,00 0,03	0,00 0,25	0,84 0,00	162,68 0,00
20	Strateji Sec. Variable	ST1	-0,012 0,585	2,06 0,00	0,01 0,01	0,00 0,62	0,35 0,00	18,17 0,00
21	Taib Yatırım Variable	TAD	-0,005 0,112	0,51 0,00	0,00 0,92	0,00 0,49	0,67 0,00	64,29 0,00
22	TekstilBank Stocks	TAH	0,006 0,129	0,97 0,00	0,00 0,23	0,00 0,44	0,78 0,00	110,29 0,00
23	Teb Balanced	TE3	0,002 0,360	0,71 0,00	0,00 0,10	0,00 0,20	0,91 0,00	333,77 0,00
24	Is Bank Stocks	Tİ2	0,002 0,413	1,11 0,00	0,00 0,91	0,00 0,59	0,95 0,00	581,63 0,00
25	Is Bank Affiliates	Tİ3	0,004 0,253	1,25 0,00	0,00 0,26	0,00 0,51	0,88 0,00	229,29 0,00
26	Is Bank Varıable	Tİ7	0,001 0,758	0,78 0,00	0,00 0,60	0,00 0,28	0,88 0,00	230,27 0,00
27	Is Bank Ise-30 Index	TİE	0,004 0,133	1,41 0,00	0,00 0,25	0,00 0,31	0,94 0,00	528,75 0,00
28	Teb Inv. Sec. Stocks	TYH	0,003 0,296	1,21 0,00	0,00 0,63	0,00 0,63	0,91 0,00	330,23 0,00
29	Zıraat Inv. Varıable	TZD	0,002 0,582	0,65 0,00	0,00 0,32	0,00 0,55	0,78 0,00	112,52 0,00
30	Vakıfbank Variable	VAF	0,001 0,556	0,78 0,00	0,00 0,01	0,00 0,76	0,93 0,00	449,68 0,00
31	Yat. Fin. Sec. Variable	YAD	-0,005 0,028	0,80 0,00	0,00 0,19	0,00 0,05	0,87 0,00	209,23 0,00
32	Ykb Inv. Sec. Variable	YAF	-0,001 0,527	0,70 0,00	0,00 0,61	0,00 0,16	0,87 0,00	216,51 0,00
33	Ykb Balanced	YAK	0,001 0,617	0,68 0,00	0,00 0,29	0,00 0,60	0,87 0,00	207,32 0,00

*Market Premium: $(R_m - R_f)$

Table 5.6: Regression Results for the Fama-French Three-Factor Model (Cont'd)

	Alpha	(R_m-R_f)	SMB	HML	Adj. R^2	F-Stat
Number of Stat. Significant Variables	7	33	6	2	-	33
Number of Stat. Insignificant Variables	26	0	27	31	-	0
Mean	-0,001	1,008	0,001	0,000	0,773	205,18
Maximum	0,015	4,000	0,014	0,013	0,948	581,63
Minimum	-0,048	0,398	-0,001	-0,031	0,189	8,382

5.4.EMPIRICAL RESULTS FOR THE PERFORMANCE PERSISTENCE

The persistency analysis is made by using the same sample of mutual funds by extending the data period to the June of 2011.

After sorting the mutual funds according to the average monthly returns, they are classified as winner or loser each month by comparing to the median values. After all, a specific mutual fund is classified as Winner-Winner (WW) if the good performance persists in the following period. Loser-Loser (LL), Winner-Loser (WL) and Loser-Winner (LW) performances are also captured by using the same method. Table 5.7 presents the number of times the portfolio performed as WW, LL, WL or LW, for each mutual fund in the sample during 102 months.

Table 5.7: Performance Pattern of Mutual Funds for Period 2003-2011/6

Number of Periods	**acd**	**ak3**	**aku**	**aak**	**dza**	**dah**	**dzk**	**ec2**	**ev1**	**fyd**	**fi2**
Winner	38	56	53	45	46	50	44	26	56	61	54
Loser	64	46	49	57	56	52	58	76	46	41	48
Winner-Winner	**14**	**27**	**27**	**22**	**22**	**24**	**18**	**6**	**34**	**37**	**28**
Loser-Loser	**41**	**17**	**24**	**34**	**32**	**26**	**33**	**56**	**24**	**17**	**22**
Winner-Loser	23	28	25	23	23	25	25	19	22	24	26
Loser-Winner	23	29	25	22	24	26	25	20	21	23	25

Number of Periods	**faf**	**gae**	**gl1**	**gbk**	**hlk**	**hsa**	**ti7**	**ti2**	**tie**	**ti3**	**iyd**
Winner	63	54	35	43	51	52	46	57	58	60	48
Loser	39	48	67	59	51	50	56	45	44	42	54
Winner-Winner	**35**	**29**	**11**	**17**	**26**	**25**	**24**	**29**	**29**	**39**	**22**
Loser-Loser	**11**	**23**	**43**	**33**	**26**	**23**	**34**	**18**	**16**	**21**	**28**
Winner-Loser	28	25	24	26	24	26	21	27	28	21	25
Loser-Winner	27	24	23	25	25	27	22	27	28	20	26

Number of Periods	**ka2**	**st1**	**tad**	**te3**	**tyh**	**tah**	**vaf**	**yak**	**yaf**	**yad**	**tzd**
Winner	42	68	35	48	56	55	50	46	49	43	44
Loser	60	34	67	54	46	47	52	56	53	59	58
Winner-Winner	**15**	**46**	**12**	**22**	**29**	**29**	**29**	**21**	**25**	**18**	**21**
Loser-Loser	**32**	**11**	**43**	**27**	**18**	**21**	**31**	**31**	**29**	**33**	**35**
Winner-Loser	27	22	23	26	27	26	20	24	23	25	23
Loser-Winner	27	22	23	26	27	25	21	25	24	25	22

Results show that, some mutual funds show positive or negative performance persistency during the period. For example, Eczacıbaşı Securities Variable Fund (EC1) has a Loser-Loser (LL) performance for 56 times in 102 months, signaling negative persistency, whereas Strateji Securities Variable Fund (ST1) performed as Winner-Winner for 46 months. Figure 5.1 presents the overall performance pattern of the sample during the period of analysis.

Figure 5.2. presents the shares of performance groups (WW, LL, WL and LW) in total, while the shares of performance groups based on the number of observations are demonstrated in Figure 5.3.

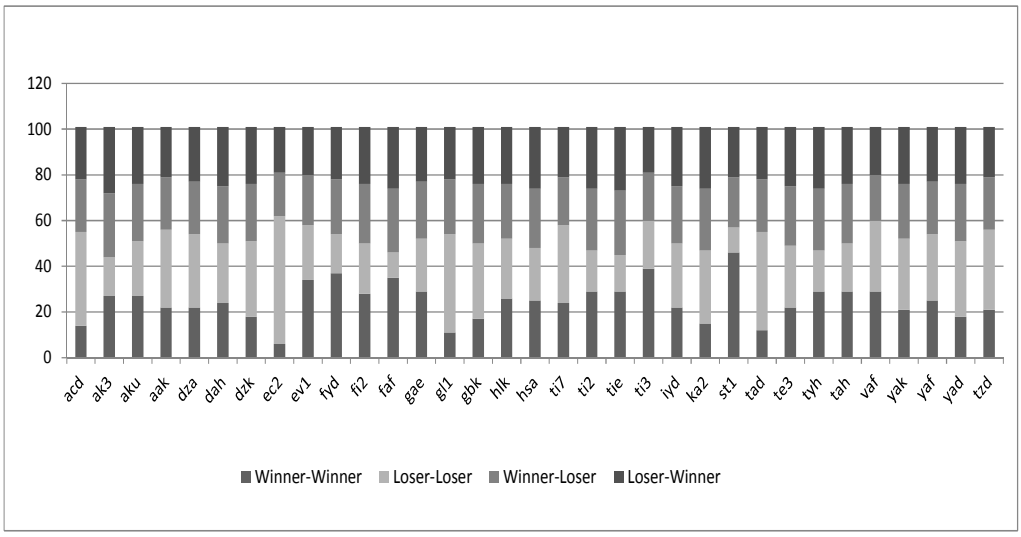

Figure 5.2: Performance Distribution of Mutual Funds (2003-2011/6)

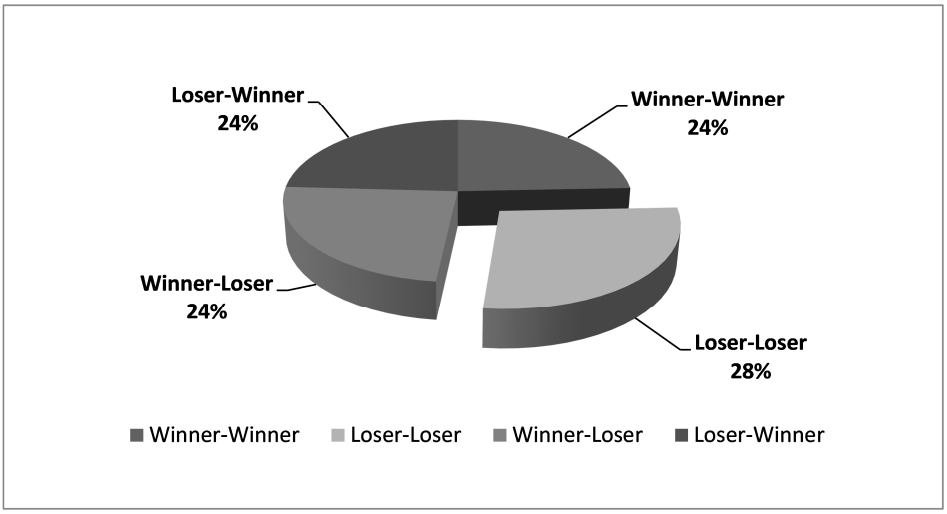

Figure 5.3: Shares of Performance Groups of Mutual Funds

Even though some mutual funds showed negative or positive performance persistency during the period, the overall results show a balanced distribution of performance groups. The number of Loser-Loser performance observations is slightly more than the other three groups, by taking a %28 share from the pie chart. On a monthly basis, these non-parametric analyses results in negative performance persistence tendency for the sample of funds analyzed between the years 2003 and 2011/6.

CHAPTER 6

CONCLUSION

Research on performance evaluation started to be popular in academics especially after 1960's and several studies have been devoted to investigate the mutual fund performance and performance persistency. The evaluation models are developed by researchers as more explanatory factors are recognized and tested in different samples in different time periods.

Most of the previous academic research in Turkey focused on the mutual fund performance by investigating for the fund manager's stock picking and market timing abilities with the help of performance measures, i.e. Sharpe Ratio, Treynor Ratio or Jensen's alpha. In those tests, the primary variables of interest are the market premium and beta coefficient, similar to the CAPM approach. Later research started to include additional factors to the performance model as Fama and French suggests. In the thesis, together with the market excess return, size and book-to-market factors are incorporated to the model in order to analyze fund performance and interpret the constant term by using monthly data. The intercept terms will give insight about the selectivity and timing abilities of the fund managers in their investment decisions.

The empirical study in this thesis for the CAPM performance evaluation process suggests that Jensen's alphas of only four mutual funds are found to be statistically significant at the 5% significance level. The remaining twenty nine mutual funds' Jensen alphas are found insignificant at the 5% significance level. Unlike Jensen's alphas, beta coefficients of all Turkish mutual funds are significant at 5% level. Regression results show that the average beta is 0.996, indicating that the mutual funds are moving with the TKYD mutual fund sector.

According to the Fama and French's Three Factor Model on the other hand, six out of thirty three SMB coefficients are found positive and statistically

significantly different from zero, while only two HML coefficients found statistically significant. Average adjusted R^2 for the three factor models is 77.3%, which is higher than that obtained for the single-factor model. This means that added variables helped to explain the variation in the funds' excess returns better.

For performance evaluation, this study indicates that for the sample period from January 2003 to December 2010, Turkish A Type mutual funds neither over perform nor underperform the overall market. Because nearly all Jensen alphas are found statistically significantly equal to zero, it can be said that the fund managers lack ability to select right investment tool or time the market. Intercepts in almost all models are statistically significantly not different from zero, implying that mutual funds are earning their expected returns, implying for the efficiency of the mutual fund market in Turkey. The Fama-French Three-Factor Model has slightly better performance in explaining the returns of mutual funds compared to the single factor model. The size and book to market equity risk factors are not found statistically significant in general. However, they are found statistically jointly significant in the three factor performance evaluation models for all mutual funds in the sample.

On the other hand, whether persistency exists or not is analyzed by tracking the mutual funds on a monthly basis according to their monthly returns. Even some mutual funds showed negative or positive performance persistency during the period individually, this non-parametric method results in a tendency for short term negative performance persistency for the sample of funds analyzed between the years 2003 and 2011/6.

REFERENCES

Bodie, Z., Kane, A., Marcus, A., 2007, Essentials of Investments, 6th Edition, McGraw-Hill International Edition,

Haslem, John A.; 2003, Mutual Funds Risk and Performance Analysis for Decision Making, Blackwell Publishing.

Arslan M., 2005, The Relationship between the Market Timing Skills and Performance in A Type Equity Funds: A Case Study for the Period of 2002-2005, Journal of Commerce&Tourism Education.

Teker S, 2008, Yatirim Fonlarinin Risk Odakli Performans Değerlemesi, Dogus University Journal; 9(1):89-105.

Imisiker S, Özlale U., 2008, Assessing Selectivity and Market Timing Performance of Mutual Funds for an Emerging Market: The Case of Turkey, Emerging Markets Finance &Trade.; 44(2):87-99.

Lee C., 1990, Market Timing, Selectivity, and Mutual Fund Performance: An Empirical Investigation, Journal of Business; 63(2):261-278.

Gökgöz F, Karatepe Y., 2002, Analysis of Persistent Performance of Equity Mutual Funds; 62(2):76-108.

Fama, E., and French K., 1993, Common Risk Factors in the Returns on Stocks and Bonds, Journal of Financial Economics, 33, 3–56.

Fama, Eugene F., and French K.R., 1992, The Cross-Section of Expected Stock Returns, The Journal of Finance, 47, 427-465.

Fama, Eugene F., and French K.R., 1995, Size and Book-to-Market Factors in Earnings and Returns, The Journal of Finance, 50, 131-155.

Fama, E.F., French K., 1996, Multifactor Explanations of Asset Pricing Anomalies. The Journal of Finance; 51(1):55-84.

Cortez, M., Romacho J., 2006, Timing and selectivity in Portuguese mutual fund performance. Research in International Business and Finance; 20:348-368.

Henriksson R.D., Merton R.C., 1981, On Market Timing and Investment Performance. Statistical Procedures for Evaluating Forecasting Skills, Journal of Business; 54(4):513-533.

Kazemi, H., Schneeweis, T., Pancholi D., 2003, Performance Persistence for Mutual Funds: Academic Evidence, Center for International Securities and Derivatives Markets.

Sharpe W., 1996, Mutual Fund Performance, The Journal of Business; 39(1):119-138.

Treynor J.L., Mazuy K., 1966, "Can Mutual Funds Outguess the Market?" Harvard Business Review 44, p131-136

Jensen M.C., 1964, The Performance Of Mutual Funds In The Period 1945-1964 The Performance Of Mutual Funds In The Period 1945-1964 ;23(2):389-416.

Grinblatt M, Titman S., 1989, Mutual Fund Performance: An Analysis of Quarterly Portfolio Holdings. Journal of Business; 62(3):393-416.

Grinblatt, M., Titman S., 1992, The Persistence of Mutual Fund Performance, The Journal of Finance; 22(5).

Grinblatt M, Titman S., 1993, Performance Measurement without Benchmarks: An Examination of Mutual Fund Returns. Journal of Business; 66(1):47-68.

Patel, J., Zeckhauser, R., Hendricks D., 1993, Hot Hands in Mutual Funds: of Relative Short-Run Persistence Performance, 1974-1988. The Journal of Finance; 48(1):93-130.

Brown S.J, Goetzmann W.N., 1995, Performance Persistence. The Journal of Finance; 50(2):679-698.

Carhart M.M., 1997, On Persistence in Mutual Fund Performance. The Journal of Finance; 52(1):57-82.

Busse J., Bollen B., 2005, Short-Term Persistence in Mutual Fund Performance, The Review of Financial Studies; 18(2):569-597.

Grinblatt M., Titman S., Wermers R., 1995, Momentum Investment Strategies, Portfolio Performance, and Herding: A Study of Mutual Fund Behavior, Portfolio the Magazine of The Fine Arts; 85(5):1088-1105.

Malkiel B., 1995, Returns from Investing in Equity Mutual Funds 1971 to 1991, The Journal of Finance; 50(2):549-572.

Elton E.J, Gruber M.J, Blake C.R., 1996, The Persistence of Risk-Adjusted Mutual Fund Performance, Journal of Business; 69(2):133-157.

Ibbotson R.G, Patel A.K., 2002, Do Winners Repeat with Style?, Yale International Center for Finance.

Banz, Rolf W., 1981, The Relationship between Return and Market Value of Common Stocks, The Journal of Financial Economics, 9, 3-18.

Stattman, D., 1980, Book Values and Stock Returns, The Chicago MBA: A Journal of Selected Papers, 4, 25-45.

Akdeniz, L., Salih-Atalay, A., Aydoğan K., 2000, Cross Section of Expected Stock Returns in ISE, Russian and East European Finance and Trade, 36(5), 6-26