PERFORMANCE ANALYSIS OF TURKISH MUTUAL FUNDS & RELATIONSHIP BETWEEN COMMISSIONS AND PERFORMANCE

ALİ CAN KAYA

108664012

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TEZ DANIŞMANI : PROF. DR. ORAL ERDOĞAN

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Tezin Onaylandığı Tarih : 11/11/2010

Toplam Sayfa Sayısı : 55

Anahtar Kelimeler (Türkçe)	Anahtar Kelimeler (İngilizce)
1) Mutual Fund	1) Yatırım Fonu
2) Commission	2) Komisyon
3) Performance	3) Performans
4) Selective Ability	4) Seçme Yeteneği
5) Timing Ability	5) Zamanlama Yeteneği

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Özet

Bu çalışmada yatırım fonlarının komisyon oranlarının fon performansına etkisi incelenmiştir. Performans ölçütü olarak fon yöneticilerinin zamanlama ve seçicilik yetenekleri hesaplanılmış, sonrasında bu veriler fonların komisyonları ile karşılaştırılmıştır. Sonuç olarak fon yöneticilerinin sadece bir kısmının kaynaklarını performansa çevirme konusunda başarılı olduğu gözlemlenmiştir.

Abstract

This paper aims to analyze the performance of Turkish A Type mutual funds in terms of market timing and selectivity, and investigate any possible relationship between the performance and commissions of mutual funds. Drawing on monthly data from 2001-2009, the analysis does not show a strong relation between micro and macro forecasting skills of fund managers and the commission fee rates of the respective funds which implies that not all the fund managers are able to convert extra resources into better forecasts.

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List of Abbreviations

ISE	İstanbul Stock Exchange
ICI	Investment Company Institute
EFEMA	European Fund and Asset Management Association
SSI	Social Securities Institution
EMT	Efficient Market Theory
CAPM	Capital Asset Pricing Model
CMB	Capital Markets Board
OECD	Organization for Economic Co-operation and Development
PAYG	Pay As You Go
DC	Defined Contribution
IRA	Individual Retirement Account

1. INTRODUCTION

The Investment Companies Institute (ICI) defines institutional investors as "businesses, nonprofit organizations, and other similar investors who own funds and other securities on behalf of their organizations."

The concept behind institutional investment is to provide support to individuals who lack the time, information, ability or resources to efficiently manage their savings; instutional investors' core service consists of the pooling those individuals' capital and its management within the restrictions set by legal provisions, internal fund regulations and predefined fund goals.

Individuals are incentivized to use services of institutional investment if lacking the ability to follow market developments and creating rational portfolios in the framework of portfolio theories and risk diversification with their savings; moreover, the amount of their savings might only allow for a limited scope of investment due to high transaction costs. Via institutionally managed instruments such as mutual funds, investment trusts, exchange traded funds, pension funds or portfolio management services of banks, investors can benefit from professional capital management in exchange for a commission fee (and other expenses in some cases, such as load charges) whichever instrument fit into their risk perception. When working with institutional investment agencies, individuals can choose the degree of risk they wish to bear by making a choice from a huge variety of funds from low risk funds that invest on fixed return government debt

instruments only to high risk funds that invest on volatile equity stocks or a combination of both via funds that invest on both high and low risk instruments in their portfolios.

The Turkish Capital Markets Board (CMB) lists the advantages of investing in funds to be;

- Savings of individuals are managed by professionals who are more informed about investment regulations and principles.
- It is possible to lower return risks by spreading investments over different assets such as stocks, fixed return assets and instruments based on foreign exchange.
- Individuals no longer have to spend time and resources on events evaluating securities and following coupon, interest and dividend payment schedules.
- Individuals have a chance to invest in securities that cannot be included in a small portfolio.
- As the changes in fund values are calculated daily, investors can cash out their investment with accumulated gains fully or in part whenever they want.
- Commission fees are lowered by large-scale fund purchases and sales.
- Certain investment funds allow investors to write checks over their participation shares.

Aside from the advantages, disadvantages of the mutual funds are listed by SEC to be ,

- Individuals pay commissions and other charges even when the fund records losses.
- Investors no longer have any decision power over their savings, and cannot influence the trades of fund managers.
- While prices of stocks are available on a real time basis, the price of contribution shares (NAV – net asset value) of funds are usually calculated once a day. Investors might pay for losses not yet realized during the day through their share purchases.

Aside from offering individual investors direct benefits, investment institutions also are essential for capital markets and the wider economy. They enable individuals' savings to reach financial markets, which in return lowers the volatility of financial assets by increasing the liquidity, and also helps mitigating the problem of scarcity of capital stocks. The assumption that professionals are better-informed and more qualified decision-makers than non-professional individuals, implies that institutional investment serves market efficiency.

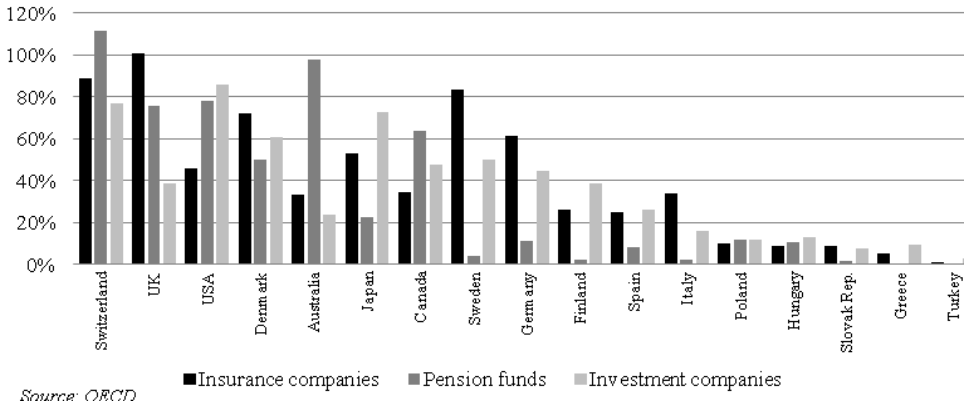
1.1 Institutional Investments

Institutional investors play a significant role in the developed world's contemporary capital markets. The Organization for Economic Co-operation and Development (OECD) notes that the size of funds managed by US -

based insurance companies, pension funds and investment companies in the year 2007 equaled 46%, 78% and 86% of the United States' GDP respectively. By the end of 2009, US mutual funds alone were managing a portfolio worth more than 11 trillion USD while US retirement assets have comprised 16 trillion USD.

According to European Fund and Asset Management Association (EFAMA) International Statistical Release 2009:Q4, total worldwide mutual fund assets amounted to 23 trillion USD by the end of 2009. US-based mutual funds held 48%, Europe-based funds 33% and funds based in other continents 18% of worldwide total net assets held by mutual funds.

Figure 1: Financial Assets of Institutional Investors in 2007 , % of GDP



Source: OECD

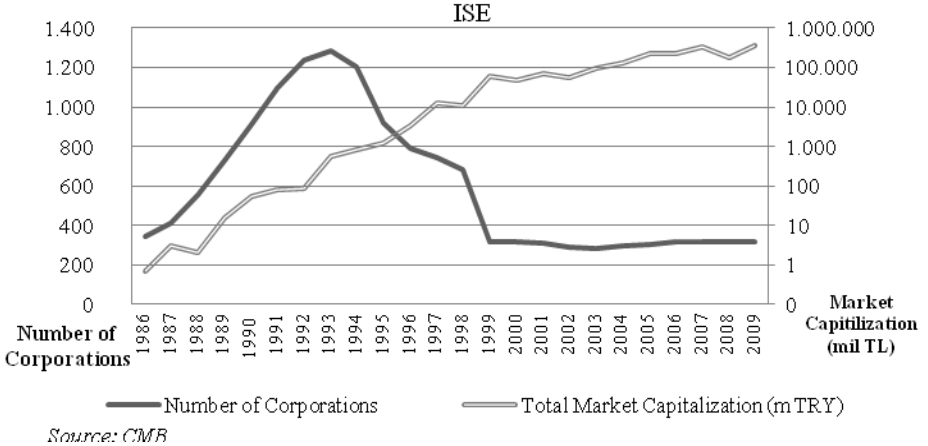
Table 1 : Number of Investment Institutions in Turkey and Net Asset Values, 2009

Type of Investment	Number of funds / trusts / companies	Net Asset Value (mil TL)
A and B type Mutual Funds	316	29,608
Pension Funds	130	9,105
Investment Trusts	33	712
Real Estate Trusts	14	4
Venture Capital Investment Trusts	2	154
Portfolio Management Companies	23	39,952

Source: Capital Markets Board

OECD numbers show that institutional investment is an underdeveloped field in Turkey, compared to its status in developed countries. The main reasons for the underdevelopment of professional investments are Turkey's comparatively low GDP per Capita, low historical capital accumulation, the rather recent introduction of private pension funds, the of public social security systems' cashflow problems and a relatively low consciousness for insurances.

Figure 2: Number of Listed Companies and Market Capitilization of ISE



Source: CMB

Private retirement has only been in late 2001; however, the sector has accumulated more than 9 bn TL of assets and over 5 million contributors so far. Although private pension funds are a recent phenomenon in Turkey they are becoming increasingly popular, a development partly due to public social security system's enforcement of increased retirement age and tax benefits.

Erdoğan and Özer (1998) point out that social security institutions are the most important component among institutional investors in developed capital markets, however these institutions show to be fund demanding rather than providing in economies whose social security system's revenue generation ability does not cover the exepnses of the system.

In contrast to private pension funds, which are contributing to both economic growth and market stability, the public social security system (Social Security Institution, SSI) records large-scale monthly deficits, which are then compensated through via the central government budget by capital transfers in Turkey, such as the case in other countries like

Public social security system in Turkey runs under SSI, which is based on the "Pay As You Go" model in which the cash inflows to the system from active workers at a given time are required to at least meet the amount of cash outflows caused by pension payments of retired (passive) workers plus healthcare insurance spendings at that particular moment. The main problem with this model is that it requires a high active/retired worker ratio in order to be able to compensate for the costs and function properly. or this reason the traditional PAYG social security models have even been called "Ponzi

Schemes". Unfortunately, the aging of society along with the increase in healthcare spendings and other factors cause the system to be dependent on continuous government funding, as it is the case in Turkey. A quick transition from the PAYG model to a private individual pension funds system is a complex process, considering the current amount of retirees expecting salaries and healthcare to be paid off the contributions of workers today and tomorrow. All workers are required by law to be registered to the SSI, private individual insurances are optional as a secondary insurance.

Figure 3 : Cashflows of SSI

Source: SSI

As an alternative to this model, the private social security system allows individuals to make monthly deposits into a private pension fund of their chosen degree of risk. The funds accumulating in the private retirement funds are then invested on different assets and capital market instruments by professional fund managers. For the United States, retirement assets invested in different plans added up to 16.0 trillion USD by the end of 2009. Individual retirement accounts (IRA) and employer sponsored defined contribution plans (DC) held 4.2 and 4.1 trillion USD, respectively. A survey conducted in May 2009 shows that 68% of US households hold a DC or IRA or both.

1.2 Mutual Funds

Mutual funds are the biggest subdivision in Turkish institutional investments. As CMB regulations allow, funds can be founded by banks, stock brokerage houses, insurance companies, the Social Security Institution and private retirement institutions such as OYAK (Armed Forces Pension Fund). Fund founders can sign fund management contracts with portfolio management companies and stock brokerage houses that are licensed by the Capital Markets Board. The net value of the fund is calculated by adding up the market values of the fund's instruments and the net debt of the fund itself. The value of a participation share is found by dividing the net value of the fund by the number of shares. The investment funds do not pay yearly dividends but instead investors' gains are realized and taxed by the change on the value of participation shares when they are sold.

Table 2 : Net Asset Value of Turkish Mutual Funds

Year	Number of Funds	Net Asset Value (mil TL)	Number of Investors (m)	Stock Shares %	Government Bills %	Reverse Repo %	Money Market %	Foreign Shares %	Other %
2000	-	1,937	-	12.4	12.72	74.63	0	0.18	0.06
2001	-	4,755	-	7.43	32.94	59.47	0	0.11	0.05
2002	-	9,346	-	2.56	49.28	48.04	0	0.1	0.02
2003	-	19,858	-	2.43	66.98	30.5	0	0.09	0
2004	253	24,443	2.632	2.22	67.17	27.77	2.83	0.02	0
2005	275	29,374	2.960	2.52	70.27	26.03	1.14	0.03	0
2006	289	22,011	2.471	2.7	38.27	57.53	1.39	0.09	0.02
2007	297	26,381	2.998	2.53	37.9	56.29	2.97	0.05	0.25
2008	340	23,978	2.939	1.51	43.74	49.42	4.81	0.04	0.48
2009	316	29,608	2.999	2.68	32.02	58.67	5.12	0.12	1.39

Source: CBM

Turkish Capital Markets Board divides Turkey's investment funds into the following groups :

Government Bonds and Treasury Bills Fund : Funds which invest a minimum of 51% of their portfolio on public and/or private sector debt instruments.

Stock Fund : Funds investing minimum of 51% of their portfolio on stocks of companies based in Turkey.

Sector Fund : Funds investing minimum of 51% of their portfolio on stocks of companies on one specific industrial sector (such as cement or textile).

Affiliate Companies Fund : Funds which invest a minimum of 51% of their portfolio on the subsidiaries of its founder.

Group Fund : The funds that invest minimum of 51% of their portfolio on securities of companies of a specific capital group (such as Koç Holding)

Foreign Securities Fund : Funds which invest minimum 51% of their portfolio on foreign public and/or private securities.

Gold Fund : Funds investing a minimum of 51% of their portfolio on gold or gold-backed securities that are traded in domestic or foreign markets.

Gold and Other Precious Metals Fund : Funds investing minimum 51% of their portfolio on gold or other valuable minerals or securities with these underlying assets that are traded on domestic or international markets.

Composite Fund : Funds which are composed of at least two of stocks, debt instruments, gold, other valuable minerals and related capital market instruments in which neither component composes less than 20% of the portfolio.

Liquid Fund : Funds that have a weighted average of 45 days to maturity and only invest on capital market instruments which have a maximum of 180 days to maturity.

Variable Fund : Funds that do not fit into any of these categories in terms of portfolio limitations.

Index Fund : Funds that are required to resemble(?) 90% correlation coefficient to the index targeted at 80% of its portfolio and is composed of either all of the securities listed in the index or some of them chosen by sampling.

Fund of Funds: Funds investing a minimum of 80% of their portfolio on other investment funds.

Private Fund : Funds whose participation shares are only dedicated to predeterminated individuals or institutions.

Hedge Fund : Funds whose participation shares are sold only to qualified investors.

In addition to this grouping, funds that keep a minimum of 25% of their portfolio on stocks of companies based in Turkey (including Public Economic Enterprises that are planned to be privatized) are considered A Type Funds while the rest is called B type funds.

1.3 Commission Fees of Mutual Funds

Financial service companies charge different types of fees on investors to cover for their fund management expenses and profits. These fees differ

between different fund types, fund families and countries. The main types of fees are one time load charges and periodic commission rates. Sale loads are one time payments upon purchase or sale of shares of a fund while ongoing expenses are commission rates that are deducted on a daily basis from investors. Some fund families have different procedures regarding loads such that if an investor purchases shares of a fund in the related fund family, he or she then is able to switch between other funds in that specific family without paying load charges for the second time.

In the literature, load fees are usually annualized by dividing over a certain number of years that an investor is thought of holding the funds until cashing in. For example, Khorana et al. (2009) used an estimated period of five years while Luo (2002) used 3 years while calculating total yearly commission rates.

The ICI reports that asset weighted average of total fees expenses for US stock, bond and money market funds have been %0.99, %0.75 and %0.34 respectively. The ICI also notes that the fees and expenses have been halved in the last decade.

"Since 1990, the average fees and expenses paid by mutual fund investors have fallen by half. In 1990, investors on average paid 198 basis points (or $1.98 for every $100 in assets) to invest in stock funds. By 2009, that figure had fallen to 99 basis points. Over the same period, the average fees and expenses paid by investors in bond funds dropped from 189 basis points to 75 basis points in 2009, a decline of 60 percent."

This decline is explained by changes in the brokerage system, waiving of load charges on retirement (such as 401(k) plans) investments and the development of a breakpoint system which lowers the load rates as the amount invested increases.

According to data from fonmarket.com and internal regulations of the funds, the current commissions of the Turkish Mutual funds are as listed below;

Table 3 : Yearly Commissio Rates of Turkish Mutual Funds

	A TYPE	B TYPE	TOTAL
Number of Funds	112	179	291
Average Yearly Commission (%)	3.98	4.40	3.45
Maximum (%)	7.28	5.46	7.28
Minimum (%)	0.1019	0.1019	0.1019
Mean (%)	4.00	3.276	3.64

Table 4 : Load Fees and Expense Ratios for US Mutual Funds, basis points

	Stock Funds			Bond Funds			Money Market Funds
	Fees and Expenses	Annualized Load Fees	Ongoing Expenses	Fees and Expenses	Annualized Load Fees	Ongoing Expenses	Ongoing Expenses
1990	198	99	100	189	100	89	55
1991	191	90	100	179	90	89	53
1992	177	76	101	165	77	87	53
1993	165	65	101	153	69	85	52
1994	164	59	105	149	63	85	52
1995	155	51	104	145	58	86	52
1996	147	46	102	136	51	85	52
1997	139	41	98	129	46	84	51
1998	131	35	96	121	39	82	51
1999	127	33	94	113	34	79	50
2000	128	29	98	103	26	76	49
2001	124	25	99	97	22	75	47
2002	125	25	100	94	21	73	45
2003	122	23	99	95	21	74	43
2004	118	23	95	92	20	72	42
2005	110	20	90	87	17	70	42
2006	106	18	88	82	15	67	41
2007	101	16	85	78	13	65	39
2008	99	15	84	75	12	63	38
2009	99	13	86	75	10	65	34

Source: ICI

1.4 Taxation of Institutional Investments

With the recent changes in September 2006 in Turkish income tax code, investors are responsible for 10% taxation on their returns upon sale of their shares of mutual funds. Before this change, funds were taxed internally and their share prices were tax included.

According to the current tax code, mutual fund investors pay 10 % income tax when they sell their shares. This tax is calculated using the profit

between purchase and sale share price of the fund minus commissions and fees paid to portfolio management company and brokerage. Investors that hold shares of a mutual funds which keep at least 51% of its portfolio on publicly traded equity stocks in ISE at all times, are exempt from taxation. For the pension funds, the legislation provides certain advantages. Contributions on retirement fund of oneself or spouse during active work years are tax deductible up to 10 percent for employees, and also employers can account their shares of contributions for the employees directly as costs. If a contributor wishes to cash out of the system, they are taxed 3.75% if retired, 10% if contributed for at least ten years but left the system before retirement, and 15% if they have not contributed for 10 years, on their investment returns.

2. LITERATURE REVIEW

Measuring performances of mutual funds since their inception has been an attractive topic in economics research. Pioneers of the field Sharpe (1966) and Treynor (1965) have built up performance indices to rank mutual funds. Economist Jack L. Treynor (1965) defends that individuals can choose the riskiness of their portfolio by additionally investing or borrowing on risk free instruments, so the core element of performance analysis of a fund should be its return per risk as defined in the equation below

$Treynor_p$ = Risk Premium / Index of Undiversifiable Risk

$Treynor_p = (\bar{r}_p - RFR) / \beta_p$

W.F. Sharpe (1966) analyzes the risk-adjusted return performance of funds by dividing the premiums for risk taken to find their reward to variability ratio. In his wording, "The predicted performance of a portfolio is described with two measures: the expected rate of return (E_i) and the predicted variability or risk, expressed as the standard deviation of return (σ_i)."

$Sharpe_p$ = Risk Premium $_p$ / Total $Risk_p$

$Sharpe_p = (\bar{r}_p - RFR) / \sigma_p$

The risk-adjustment in Sharpe's approach holds penalizes upside and downside volatility equally. In objection to this aspect of Sharpe's Ratio,

another method called “Sortino’s Ratio” has been developed which aims to differentiate upside and downside risk and penalize returns only below the benchmark. Noted by Kurun et al. Sortino’s Ratio is often used as a performance measurement method for hedge funds.

$$\text{Sortino}_p = (\tilde{r}_p - \text{Minimum Acceptable Return}_p) / \text{Downside Risk}_p$$

Jensen (1968) noted “A number of people in the past have attempted to evaluate the performance of portfolios (primarily mutual funds), but almost all of these authors have relied heavily on relative measures of performance when what we really need is an absolute measure of performance.” . He used the CAPM model and defined alpha values of funds as their selective ability.

Michael C. Jensen also uses the simple regression model $y = \alpha + \beta x + \epsilon$ and substitutes risk premium instead of return:

$$\tilde{r}_{i,t} - RFR_t = \alpha_i + \beta_i (\tilde{r}_{m,t} - RFR_t) + \epsilon$$

Where,

$$\beta_i = \text{Covariance}(r_{i,t} - RFR_t)(r_{m,t} - RFR_t) / \text{Variance}(r_{m,t} - RFR_t)$$

α in this model represent excess return (positive or negative) on the portfolio regardless of the market returns, which means it shows the ability of fund managers to evaluate underpriced and overpriced assets successfully.

His conclusion is that ".. not only that these 115 mutual funds were on average not able to predict security prices well enough to outperform a buy-the-market-and-hold policy, but also that there is very little evidence that any individual fund was able to do significantly better than that which we expected from mere random chance."

As Ippolito (1993) notes in his account of Sharpe and Jensen, "Based on these results, Sharpe concluded that the evidence is consistent with EMT that funds' expenditures seemingly are at least partly wasted. These results were soon confirmed by Jensen. Jensen used the so-called market equation to calculate alphas for his funds. He had 115 funds in his sample, 56 of which had 20 years of data starting in 1945 and 59 of which had 10 years of data starting in 1955. He found the average alpha in his funds to be minus 110 basis points.", first studies on the subject matter concluded that the funds were underperforming the market and the fees paid to the fund managements did not compensate themselves.

"It is commonly believed that mutual fund investment performance is consistent with the original version of the so-called efficient market theory, hence that expenditures of money on research and trading are wasted because securities prices already reflect all available information. This impression is attributable primarily to two well-known studies done in the 1960s (referring to Sharpe and Jensen), which showed that mutual funds underperformed common market indexes. But most of the other empirical studies performed over a 30- year period contradict these two studies. The results of these other studies are inconsistent with the hypothesis that funds'

fees and expenses are wasted. They are generally consistent with the hypothesis that mutual funds are sufficiently successful in finding and implementing new information to offset their expenses. The results fit neatly into a modified version of efficient markets, which takes account of the simple proposition that information is not free."

As Fama (1970) defines a market to be efficient if it "fully reflects all available information" at any time. Efficient Market Theory (EMT) defends that the current prices reflect all the available information and thus, it is not possible to attain a better insight of markets by spending resources on reaching a higher level of information to outguess the market. Therefore, it should not be possible to reach continuous and statistically significant positive α values if the market structure is efficient, on the long term average, funds could only attain neutral or negative α values due to fees and commissions. Grossman and Stiglitz (1980) later oppose this theory and defend that "…because information is costly, prices cannot perfectly reflect the information which is available, since if it did, those who spent resources to obtain it would receive no compensation. There is a fundamental conflict between the efficiency with which markets spread information and the incentives to acquire information." In other words, since publicly available information does not cover the complete set of information, any resources spent in this manner can yield more attractive investment returns and alpha values of mutual funds might be significantly positive if nonpublic information was efficiently collected and acted on.

Francis and Ibbotson suggest that the "Sharpe, Treynor and Alpha tools are well suited to evaluating a portfolio's asset selection ability." Apart from these methods that evaluate the selective ability of managers, another method has been developed which tests the ability of fund managers to forecast and act on broad market movements.

Treynor and Mazuy (1966) note that most common stocks fluctuate with a correlation and thus it is possible in this context to speak about broad market movements. They subsequently ask whether the professional fund managers can anticipate major turns in the markets and prepare their portfolios accordingly, such that if a rise/decline in markets is expected, fund managers would shift their portfolios towards assets with high /low market correlation and high/low volatility.

Therefore, the authors test if the volatility of mutual funds were higher in periods of bull markets and vice versa. In order to test the ability of fund managers, Treynor and Mazuy draw the "characteristic lines" of each fund by least squares regression as a quadratic function of performance to check for any curvature in the lines.

If the fund manager is able to outguess the market, the characteristic line of the fund would show an increasing slope as the market returns are increasing, and decreasing slope when the market is sloppy. They find that out of 57 funds they test, only one fund shows market timing ability and conclude that "Our results suggest that an investor in mutual funds is completely dependent on fluctuations in the general market. This is not to say that a skillful fund management cannot provide the investor with a rate

of return that is higher in both bad times and good than the return provided by the market averages, but it does suggest that the improvement in rate of return will be due to the fund manager's ability to identify underpriced industries and companies, rather than to any ability to outguess turns in the level of the market as a whole."

Kon (1983) examined 37 funds on a monthly return basis between 1960 and 1976. 14 had positive timing estimates but none was statistically significant.

Chang and Lewellen (1984) have examined a total of 67 mutual funds between 1971 and 1979 on a monthly basis and conclude that "... those same results suggest that neither skillful market timing nor clever security selection abilities are evident in abundance in observed mutual fund return data, and the general conclusion of prior literature that mutual funds have been unable collectively to outperform a passive investment strategy still seems valid."

Henriksson (1984) analyzed 116 open-end mutual funds for the period between February 1968 and June 1980. He found 62% of the funds having negative market timing coefficients and only 3 out of 116 had positive coefficients within 95 % confidence interval.

Ippolito (1989) tests the performance of 143 mutual funds over the period 1965-1984 in terms of any relation between fees and expenses to fund returns and states "Mutual funds, net of all fees and expenses, except load charges, outperformed index funds on a risk-adjusted basis; these results contrast with results reported in first-generation studies that tended to find

evidence of negative alphas [Friend et al., 1962; Friend, Blume, and Crockett, 1970; Jensen, 1968; Sharpe, 1966]. … These results showed that mutual funds with higher turnover, fees and expenses earn rates of return sufficiently high to offset the higher charges. These results are consistent with the notion that mutual funds are efficient in their trading and information gathering activities [Grossman, 1976; Grossman and Stiglitz, 1980]. In addition, load funds earned rates of return sufficiently high to offset their sales charges compared with no-load funds. These results persisted in the face of numerous model specifications and fund subsamples. More reliable empirical work could be done if tractable models of informed trading"

Lee and Rahman (1990) studied monthly returns of 93 mutual funds between 1977 and 1984 for 87 months. Out of those 93, 14 had statistically significant and positive selectivity coefficient and 10 had statistically significant and negative α selectivity coefficients. 4 had significant selection with no timing skill and 5 had significant timing with no selection skill. 10 funds had both significant timing and selectivity skills.

Philippas (2002) studied market timing and selectivity abilities of 19 Greek mutual funds between 1993 and 1998 and states that "The empirical findings do not reveal any general ability of the fund managers to time the market correctly."

Erdoğan and Berk (2004) have used Treynor & Mazuy model to test timing ability of Turkish mutual funds between 1988 and 1996. They found only 2 of 92 funds showed positive market timing.

3. EMPIRICAL TEST OF MARKET TIMING AND SELECTION ABILITIES OF TURKISH MUTUAL FUNDS

3.1 Data

We used monthly returns of 63 A Type private, variable, equity stock, mixed and affiliate companies funds between the years of 2001 and 2009, consisting of 108 periods. The return data of the funds have been taken from fonbul.com. ISE-100 Index has been taken as the benchmark market index. Funds that invest on foreign equities have been removed from the database as the ISE 100 Index benchmark would not give meaningful results for their market timing analysis.

We used the data of 90 day treasury bills performance index of ISE for the risk free rate. The market return and risk free rates are taken from imkb.gov.tr.

ISE 100 index does not include dividend payments of stocks listed within. For this reason, the results are going to be biased in favor of the fund managers as the dividend payments are reflected in the fund prices, but not in the benchmark. Another potential source of error is that the fund managements have different benchmarks, often some combination of different indices and their real performance in respect to their specific benchmark can be different than the values calculated in this research. Choice of benchmark has been a generally tough problem for researchers. Roll (1978) points that an unsuitable benchmark choice will result in beta

and systematic risk coefficients to be miscalculated. Later, Reilly and Akhtar (1995) uses six different benchmarks for calculating beta values and finding very different results for their sample group of enterprises.

The dataset might have survivorship bias. As Elton et al.(1996) note, "Mutual fund attrition can create problems for a researcher because funds that disappear tend to do so due to poor performance." No further research has been done to include any information about funds that ceased to exist.

Another systematical error in the dataset is that prices before September 2006 are tax included. There has been a change in Turkish income tax code ending internal taxation. Therefore, real returns of the funds before September 2006 might have been higher than the values used in this test.

3.2 Methodology

We have used the model applied by Lee and Rahman (1990).

Fama (1972) names the selective and timing abilities of fund managers microforecasting and macroforecasting. For microforecasting measurements, Jensen (1968) uses the equation (1) to capture any ability of forecasting security prices by the α value. Since the equation has an error term $\tilde{u}_{pt}$ which is expected to have a value of zero and an intercept that is not bound by origin, α is expected to explain the fund management's success of asset picking.

$$\tilde{R}_{pt} - R_{ft} = \alpha_p + \beta_p (\tilde{R}_{mt} - R_{ft}) + \tilde{u}_{pt} \qquad (1)$$

However this model alone is not able to identify any macroforecasting skills due to β_p being a fixed coefficient without any time subscript. Jensen (1968) acknowledges that the risk parameter can vary in time as the market factor (π) expectation of fund managers change in time. In order to include the variability in the risk parameter, he defines $\tilde{\beta}_p$ as;

$$\tilde{\beta}_{pt} = \beta_p + \tilde{\varepsilon}_{pt} \qquad (2)$$

..where $\tilde{\varepsilon}_{pt}$ is a normally distributed random variable with $E(\tilde{\varepsilon}_{pt})=0$. Jensen defines this $\tilde{\varepsilon}_{pt}$ as a "vehicle through which the manager may attempt to capitalize on any expectations he may have regarding the behaviour of market factor $\tilde{\pi}$ in the next period." Since now the manager is able to forecast and implement market movements into the portfolio to some extent, there should be a positive relation, which can be expressed as;

$$\tilde{\varepsilon}_{pt} = a_p\tilde{\pi}_t + \tilde{w}_{jt} \qquad (3)$$

With the assumption $\tilde{w}_{jt}$ to be normally distributed with $E(\tilde{w}_{jt})=0$. The a_p coefficient will show the manager's ability to forecast market turns and its magnitude will reflect his aggressiveness on risk taking with this forecast. With these assumptions and equations, we can write

$$\tilde{R}_{pt} - R_{ft} = \alpha_p + (\beta_p + \tilde{\varepsilon}_{pt}) (\tilde{R}_{mt} - R_{ft}) + \tilde{u}_{p,t} \quad (4)$$

And

$$E(\tilde{\beta}_{pt}) = \frac{cov (\tilde{R}pt - Rft),(\tilde{R}mt - Rft)}{\sigma 2(\tilde{R}mt)} \quad (5)$$

For the regression of $\tilde{R}_{pt}$ on coefficients of $\tilde{\pi}_t$ and $\tilde{\pi}_t^2$,

$$\tilde{R}_{pt} = c_1 + c_2 \tilde{\pi}_t + c_3 \tilde{\pi}_t^2 + \tilde{u}_{p,t} \quad (6)$$

Jensen states that;

$$\text{plim } c_1 = \alpha_p + \beta_p E(\tilde{R}_m) + \theta(p^2 - 1) \ \sigma_\pi^2 \quad (7)$$

$$\text{plim } c_2 = p^2 \theta E(\tilde{R}_m) + \beta_{pt} \quad (8)$$

$$\text{plim } c_3 = \theta_p \quad (9)$$

p being correlation between predicted and realized $\tilde{\pi}_t$.

Pfleiderer and Bhattacharya (1983) object to Jensen's derivations on this point.

"Jensen assumed that the expected return on the market was known or could be measured with precision. He also allows the target level of β to take on any value – it is not constrained to equal $\theta\epsilon(\tilde{R}_m)$. If his expressions for the probability limits of η_0, η_1, η_2 [c_1, c_2 and c_3 in the notation used in this paper] are correct, it is indeed impossible to recover the value of α. But

notice that in the calculation of these values (specifically in the plim of η_2) it is implicitly being assumed that the covariance between $\tilde{\pi}_t$ and $\tilde{v}_{pt}$ is zero. We have argued that it is not."

Finally rewriting the equation as;

$$\tilde{\alpha}_p = c_1 + [c_2 - c_3 E(\tilde{R}_m)] E(\tilde{R}_m)) \quad (10)$$

Pfleiderer and Bhattacharya (1983) notes that this model is able to detect macro and microforecasting abilities due to positive α and c_2, however it does not allow ranking. $c_{2\,i}$ can be related to both the well-informedness of the manager or give false conclusions due to the fund manager's aggressiveness of. Another disadvantage of this model is that it requires precise E $(\tilde{R}_m)$ estimations. The amendments made by Pfleidrer et al. on Jensen's model are shown in equation 6.

First, they replace $\tilde{\pi}_t$ by $\tilde{R}_m$ as $\tilde{\pi}_t$ is not observable as long as E $(\tilde{R}_m)$ is unknown.

$$\tilde{R}_{pt} = c'_1 + c'_2 \tilde{R}_{mt} + c'_3 \tilde{R}_{mt}^2 + \tilde{\omega}'_t \quad (11)$$

$$= \alpha_p + \theta (E(\tilde{R}_m) + \varphi[(\tilde{R}_{mt} \varphi[\tilde{R}_{mt} - E(\tilde{R}_{mt}) + \tilde{\varepsilon}_t]) (E(\tilde{R}_m) + \tilde{\pi}_t) + \tilde{u}_{pt}$$

$$= \alpha_p + \theta E(\tilde{R}_m)(1-\varphi)(\tilde{R}_{mt} + \theta\varphi\tilde{R}_{mt})^2 + \theta\varphi\tilde{\varepsilon}_t\tilde{R}_{mt} + \tilde{u}_{pt} \quad (12)$$

Since $\tilde{\epsilon}_t$ is a forecast error independent of the return,

$$\text{plim } \tilde{c}'_1 = \alpha_p \quad (13)$$

$$\text{plim } \tilde{c}'_2 = \theta E(\tilde{R}_m)(1-\varphi) \quad (14)$$

$$\text{plim } \tilde{c}'_3 = \theta\varphi \quad (15)$$

The error term in equation 11 has two parts;

$$\tilde{\omega}_{pt} = \theta\varphi\tilde{\varepsilon}_t\tilde{R}_{mt} + \tilde{u}_{pt} \quad (16)$$

Pfleiderer et al. note that the second term $\tilde{u}_{pt}$ is assumed to be independent of both $\tilde{\varepsilon}_t$ and $\tilde{\pi}_t$, however the first term has valuable information about performance of the fund manager. In order to extract that information, they suggest a regression in the form of;

$$(\tilde{\omega}'_{pt})^2 = \theta^2\varphi^2\sigma_\epsilon^2\tilde{R}_{mt}^2 + \hat{\zeta}_t \quad (17)$$

And

$$\hat{\zeta}_t = \theta^2\varphi^2\tilde{R}_{mt})^2(\tilde{\varepsilon}_t^2 - \sigma_\epsilon^2) + (\tilde{u}_{pt})^2 + 2\theta\varphi\tilde{R}_{mt}\tilde{\varepsilon}_t\tilde{u}_{pt} \quad (18)$$

By this derivation, we can obtain σ_ϵ^2, since $\tilde{\epsilon}_t$ and $\tilde{u}_{pt}$ are independent of $\tilde{R}_{mt}$, and $\hat{\zeta}_t$ is uncorrelated with $\tilde{R}_{mt}$. By the consistent estimate of $\theta\varphi$ in equation 11, it is possible to calculate σ_ϵ^2. It is now possible to estimate φ

$$\varphi = (\sigma_\pi^2 / (\sigma_\pi^2 + \sigma_\epsilon^2)) = p^2 \qquad (19)$$

Pfleiderer and Bhattacharya (1983) state that at this point it is possible to calculate θ by using the estimation of φ "What may not be immediately obvious is the fact that our ability to distinguish *p* from θ allows us to recover $E(\tilde{R}_m)$. This we do using $\tilde{c}'_1$. $\tilde{c}'_1$ is a consistent estimate of $\theta(1-\varphi^2)E(\widetilde{R}_m)$. Since both θ and *p* are known, $E(\tilde{R}_m)$ is easily obtained."

Lee and Rahman (1990) use the method proposed by Merton (1980) to calculate $\tilde{\pi}_t$ which allows them to estimate the variance without estimating the mean and saving one degree of freedom.

$$\tilde{\sigma}_\pi^2 = \{ \sum_{k=1}^{n} [\ln (1 + \tilde{R}_{mt})^2] \} / n \qquad (20)$$

They have used generalized least squares (GLS) method with correction for heteroscedasticity by using the variances of $\tilde{\omega}_{pt}$ in equation 11 and $\tilde{\zeta}_t$ from equation 17.

$$\sigma_{\omega}^{2} = \theta^{2}\varphi^{2}\sigma_{\epsilon}^{2}\tilde{R}_{mt}^{2} + \sigma_{u}^{2} \quad (21)$$

$$\sigma_{\zeta}^{2} = 2\theta^{4}\varphi^{4}\sigma_{\epsilon}^{4}\tilde{R}_{mt}^{4} + 2\sigma_{u}^{4} + 4\theta^{2}\varphi^{2}\sigma_{\epsilon}^{2}\tilde{R}_{mt}^{2}\sigma_{u}^{2} \quad (22)$$

σ_{ω}^{2}, σ_{u}^{2} and σ_{ζ}^{2} are variances of $\tilde{\omega}'_{t}$, $\tilde{u}_{pt}$ and $\tilde{\zeta}_{t}$ respectively. σ_{u}^{2} and σ_{ϵ}^{2} estimations are necessary to predict σ_{ω}^{2} and σ_{ω}^{2} and σ_{ζ}^{2}. σ_{ϵ}^{2} is estimated by equations 11 and 17 and σ_{u}^{2} is obtained from equation 1.

Finally, the variables in equation 11 are divided by σ_{ω}^{2} and those in equation 17 are divided by σ_{ζ}^{2}; subsequently OLS is applied to transformed observations.

After calculating the coefficients of selection and timing, we have separately regressed them over commission rates in order to check for a positive or negative relation in the form of $y = \alpha + \beta x$.

In addition, we have tested timing and selection abilities over each other to investigate any significant relation in either direction.

3.3 Results:

Empirical testing shows that a significant majority of mutual fund managers have microforecasting ability. Out of 63 funds tested, 47 had positive alpha where 21 of which have been found to be statistically significant at .05 confidence interval. Only 6 funds were statistically significant at .05 confidence level in terms of timing performance

Table 5 : Summary of the Results of Selectivity and Timing Abilities

	Selectivity		Timing	
	Positive	Negative	Positive	Negative
Total	47	16	63	-
Significant at				
5%	21	4	6	-

Table 6 : Selectivity and Timing Performances of Mutual Funds

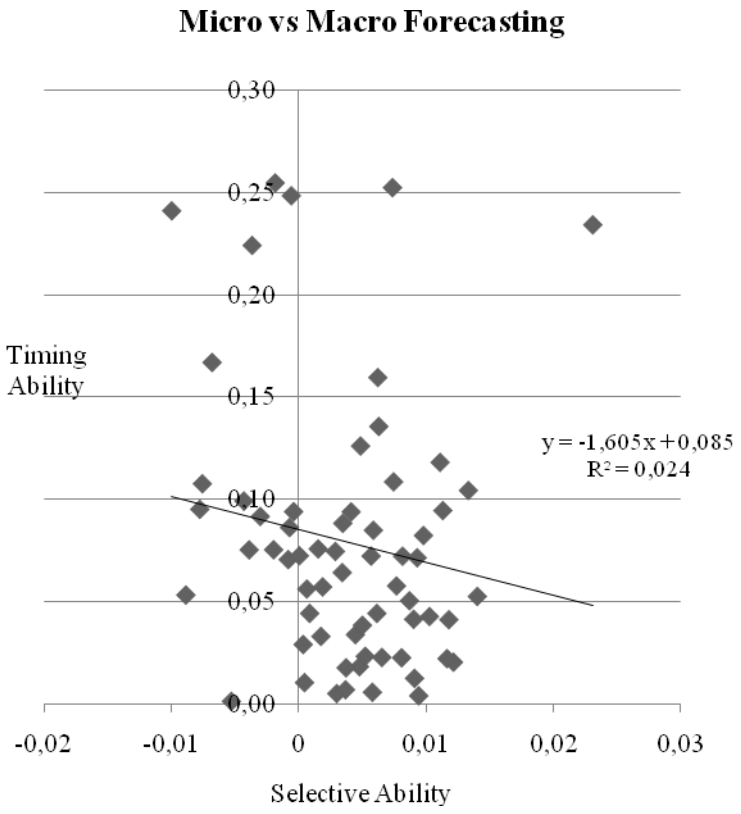
	Selectivity		Timing			Selectivity		Timing	
Fund 1	0.00340		0.06435		Fund 33	0.00151		0.075892	
Fund 2	0.00978	*	0.08243		Fund 34	0.01215	*	0.020632	
Fund 3	0.00475		0.01843		Fund 35	-0.00434		0.099310	
Fund 4	0.00297		0.00530		Fund 36	0.00744		0.108637	
Fund 5	-0.00085		0.07067		Fund 37	-0.00075		0.086294	
Fund 6	0.01179	*	0.04132		Fund 38	0.00484		0.126126	
Fund 7	0.01332	*	0.10441		Fund 39	0.00185		0.057329	
Fund 8	-0.00200		0.07547	*	Fund 40	-0.00369		0.224061	
Fund 9	0.01402	*	0.05270		Fund 41	0.00521		0.023463	
Fund 10	0.01109	*	0.11812		Fund 42	0.00443		0.034008	
Fund 11	-0.00187		0.25453		Fund 43	0.00084		0.044431	
Fund 12	0.00044		0.01063		Fund 44	-0.00890	*	0.053365	
Fund 13	0.00286		0.07464		Fund 45	0.00499		0.038622	
Fund 14	0.00366		0.00714		Fund 46	0.00815		0.072357	*
Fund 15	-0.00532		0.00151		Fund 47	-0.00305		0.091751	*
Fund 16	-0.00042		0.09410		Fund 48	0.00003		0.072565	*
Fund 17	0.00908	*	0.01272		Fund 49	-0.01001	*	0.240920	
Fund 18	0.00901	*	0.04153		Fund 50	0.00577	*	0.005914	
Fund 19	0.00567	*	0.07238		Fund 51	0.00410		0.093992	
Fund 20	0.00620	*	0.15954		Fund 52	0.01164	*	0.022333	
Fund 21	0.00767	*	0.05782		Fund 53	0.00735		0.252238	
Fund 22	0.00370		0.01787		Fund 54	0.00612		0.044396	*
Fund 23	0.00585		0.08499		Fund 55	0.00172		0.033182	
Fund 24	0.00868	*	0.05059		Fund 56	-0.00760	*	0.107689	
Fund 25	0.01026	*	0.04291		Fund 57	-0.00684		0.166906	
Fund 26	-0.00392		0.07543		Fund 58	-0.00780	*	0.095214	*
Fund 27	0.00345		0.08837		Fund 59	-0.00061		0.248296	
Fund 28	0.00652	*	0.02294		Fund 60	0.00628		0.135654	
Fund 29	0.02311	*	0.23411		Fund 61	0.00930	*	0.071554	
Fund 30	0.00061		0.05631		Fund 62	0.00807	*	0.022763	
Fund 31	0.00033		0.02922		Fund 63	0.01131	*	0.094622	
Fund 32	0.00941	*	0.00419						

* Significant at the .05 level

There is also evidence of weak negative relation between the selective and timing coefficients suggesting that the fund managers or relative research

departments tend to specialize in one aspect over another. The linear regression of coefficients yield a negative slope, which fails to be statistically significant at .05 interval.

Figure 4: Relationship between Micro and Macro Forecasting



The commission rates have a positive but very slight relation with both micro and macro forecasting skills. This alone is not enough to conclude that fund managers are able to turn the extra resources into better information and improve their decision making. Furthermore, the degree of efficiency in this process has not been tested and it is possible that the extra performance of high commission funds do not cover the extra fees for the investors.

Figure 5: Selective Ability over Commission Rates

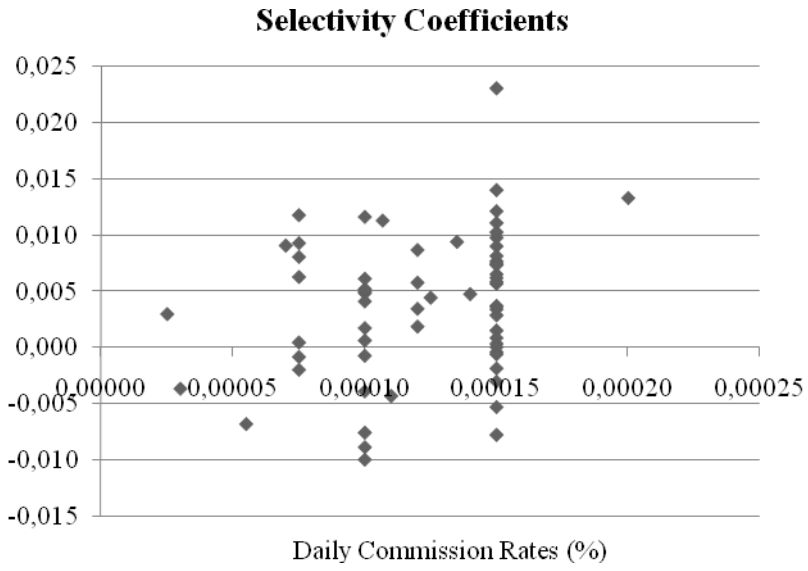
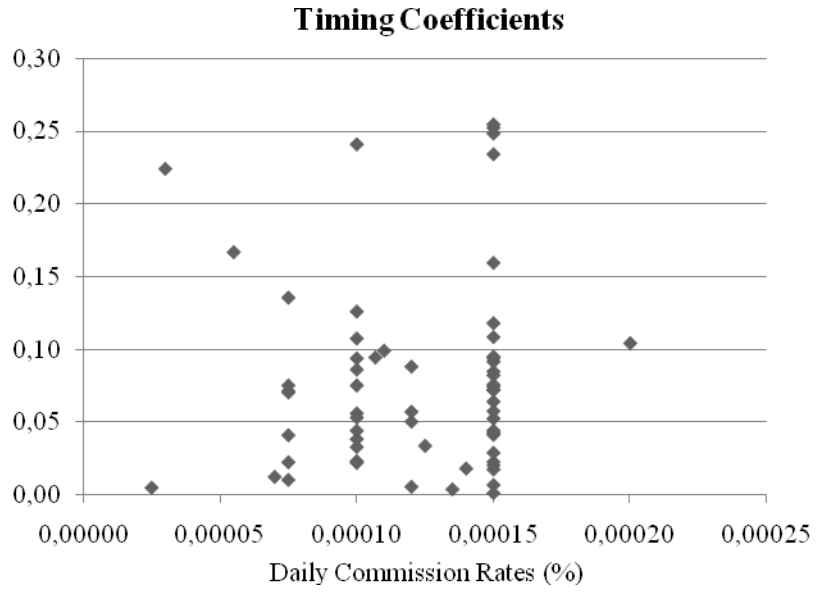


Figure 6: Timing Ability over Commission Rates



A better way to compare fund performances can be taking a closer look at those commission rates in which most funds are clustered. 29 of 63 total

funds in this research have a daily commission rate of 0,00015%, 12 have a rate of 0,00010% and 7 are grouped in the rate of 0,00008%.

Figure 7: Performance of Funds with 0.00015% Daily Commission Rate

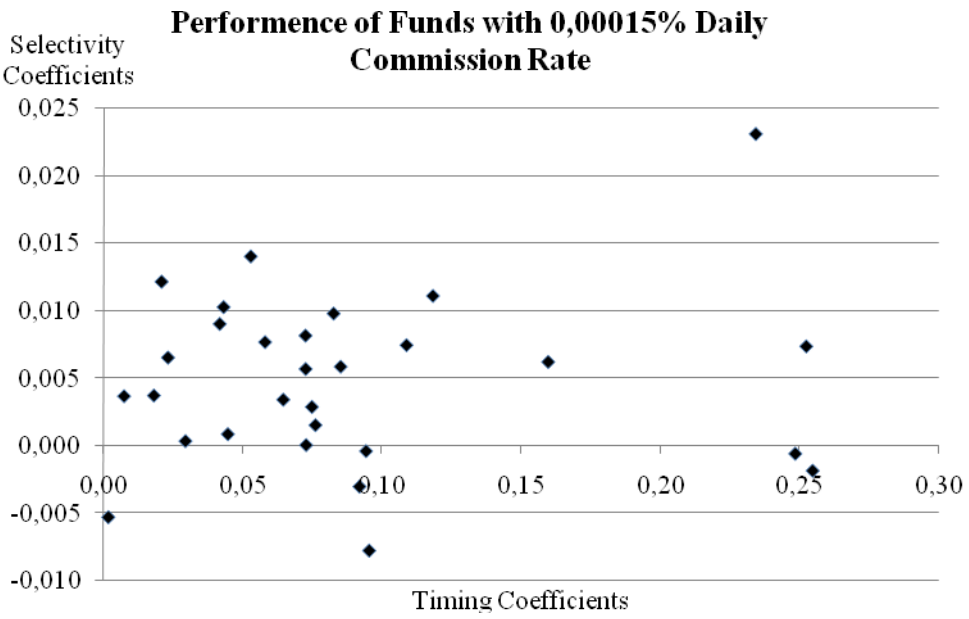


Figure 8: 0 Performance of Funds with 0.00008% Daily Commission Rate

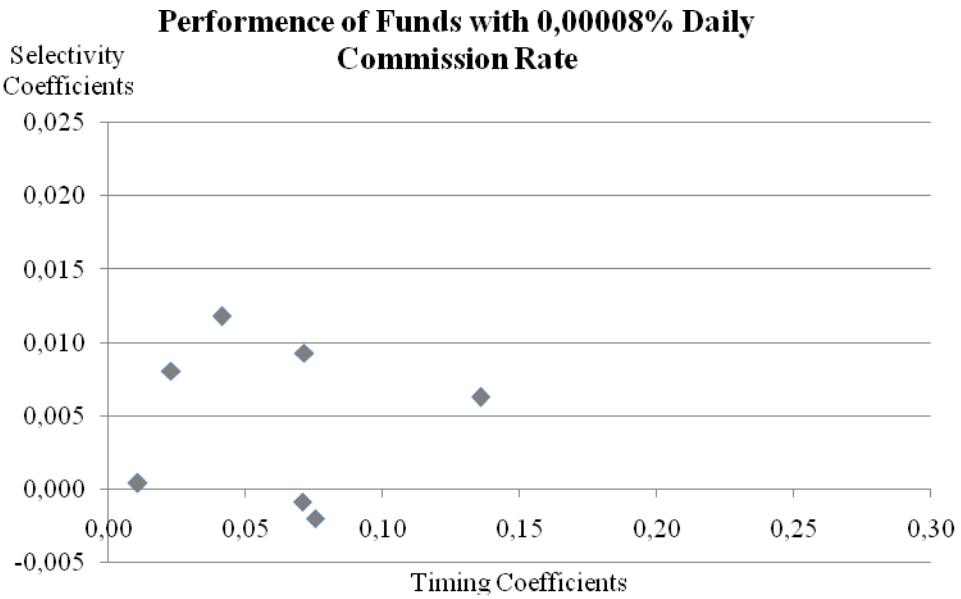
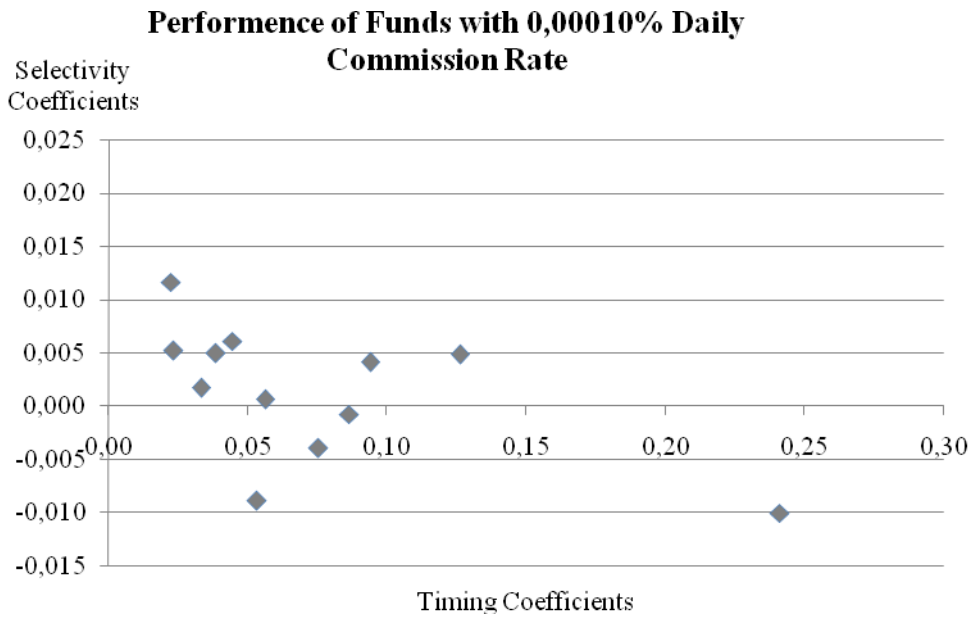


Figure 9: Performance of Funds with 0.00010% Daily Commission Rate



As seen on cluster testing, the funds of same commission levels have significantly different timing and selective performances. Based on this evidence, it can be claimed that not all fund managements are able to efficiently convert their commissions to performance and therefore there are differences amongst funds of same commission levels in terms of their returns. At least some fund managements are violating the fiduciary ownership principle.

It is possible to investigate performances of similar types of funds with each other as well. Out of 63 funds used in this research, 27 were variable, 11 were stocks, 2 were private, 12 were mixed, 8 were index and 2 were affiliate company funds.

Figure 10: Performance of Mixed Funds

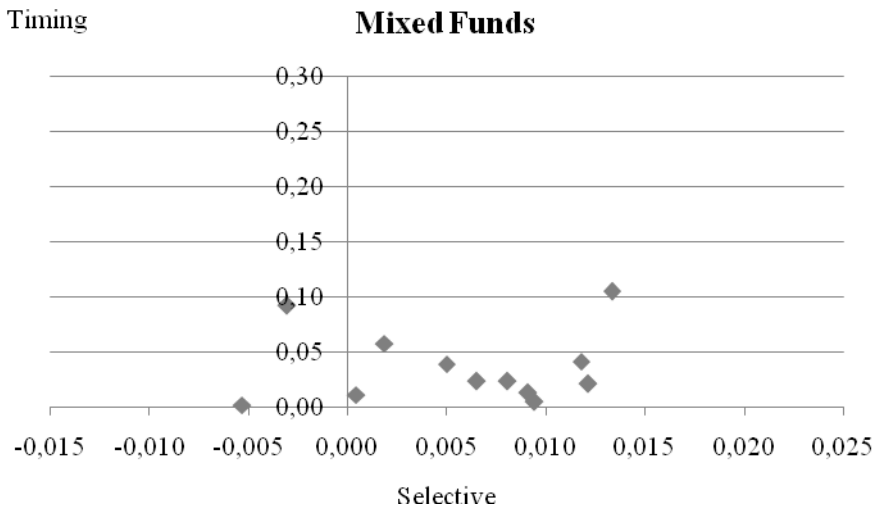


Figure 11: Performance of Stock Funds

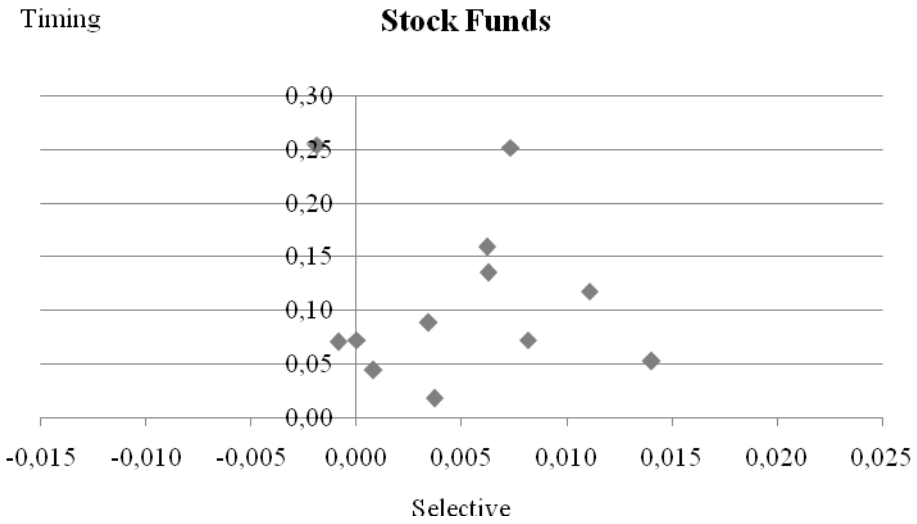


Figure 12: Performance of Index Funds

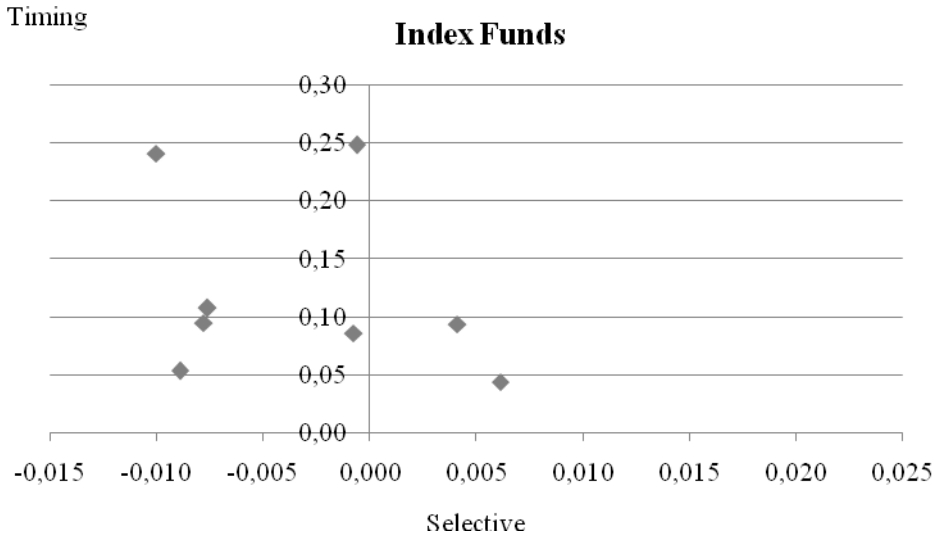


Figure 13: Performance of Index Funds

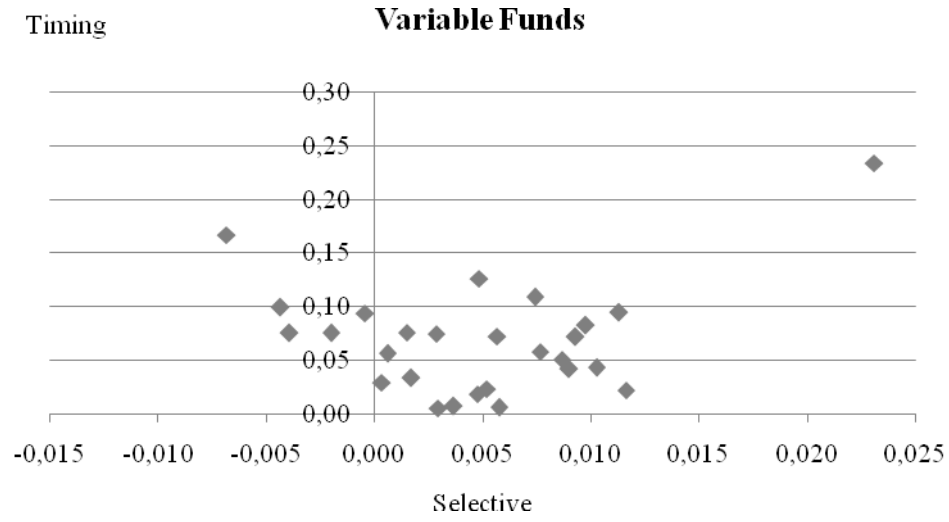


Table 7: Arithmetic Means of Selective and Timing Ability Coefficients According to Fund Type

	Selective	Timing
Variable	0.0048	0.0684
Index	-0.0032	0.1213
Stocks	0.0049	0.1116
Mixed	0.0058	0.0357

Mixed funds show lowest selective performance due to the relatively higher proportion of fixed return assets included in their portfolios. Index and stock funds seem to capitalize the market movements better than others due to higher ratio of equity stocks held (and also due to our choice of benchmark index) but they differ from each other on selective ability which is explainable by their different limitations and aims.

4. CONCLUSION

The performance of professional portfolio managers has been questioned many times in the literature. Main motive behind this might be trying to see if it is possible to outguess the market and continuously perform above the average. Conflicting answers has been given by many different authors to this question.

In this study, selectivity and market timing abilities of Turkish mutual fund managers and relation between commission fees and performance have been tested. Monthly data for 9 year period was used for 63 A Type mutual funds and the tests found vague evidence of micro and macro forecasting abilities being positively related to fund fees. However funds that are good on one aspect on average has performed slightly worse in the other aspect.

Positive relation between fund fees and performance is not strong enough to conclude information is not free, and managers with more resources tend to be more successful in information gathering and processing over those with less resources. Cluster testing of funds with same commission rates shows great variance among performance enough to say that at least some mutual funds are violating the fiduciary ownership principle since they are not able to yield higher returns with with each marginal commission fee paid by an investor.

There has been no evidence of fund managers being successful at both picking undervalued assets and estimating market movements on the whole.

It must be noted that despite the slight positive relation between commissions and forecasting abilities has been found, the degree of this relation has not been examined. It is possible that on average, although funds with higher commissions generate higher yields than others, this extra income might not be sufficient to offset the extra commission fee payments and investors might still be better off on investing on low fee – low performance funds. Further testing is necessary for making any claims on this topic, which has not been the scope of this research.

The systematical errors in the dataset might have influenced the result to be in favor of fund managers. The dataset was survivorship based, meaning funds that performed badly might have ceased to exist and the sample tested might not represent the population. The fund returns were uncommissioned, which tells that from an investor's point of view, statistical conclusions might not represent the performance enjoyed by the investors. In addition, the benchmark index did not include the dividend payments of public stocks which are represented in fund returns, causing results to be even more biased in favor of the fund managers. Another possible source of error is that we have compared the performance shown in a 9 year period of 2001-2009 with the commission rates of 2010. If there has been a significant change in fund fees over the period, our findings might be misleading. A final disturbance is that there has been a change in the tax code which affected the calculation of fund returns. The returns used prior to 2006 have been post-taxation due to internal taxation of funds at the time, and after

2006 are untaxed. This difference might have affected the calculation of timing and selection ability coefficients.

Fund managers might be using different frequencies when making their plans and acting upon, so monthly intervals might not be the best frequency to analyze the skills. For further research and higher confidence levels, reapplying the same test over different time periods (semi-annually, quarterly, weekly or daily) can give useful information.

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http://www.fonbul.com 5 February 2010
http://www.fonmarket.com 9 March 2010

Appendix 1 : Types and Number Codes of Funds

Abank (A) Anadolu Özel	Fund #1	Private
Abank A Tipi Değ.	Fund #2	Variable
Eczacıbaşı A Tipi Değ.	Fund #3	Variable
Acar A Tipi Değ.	Fund #4	Variable
Denizbank A Tipi Hisse	Fund #5	Stocks
Denizbank A Tipi Karma	Fund #6	Mixed
Evgin Men A Tipi Karma	Fund #7	Mixed
Finansbank A Tipi Değ.	Fund #8	Variable
Fortis Bank A Tipi Küçük Ve Orta Ölçekli İşl. Hisse Sen.	Fund #9	Stocks
Garanti Ban. A Tipi Hisse Senedi	Fund #10	Stocks
Gedik Yat. A Tipi Hisse	Fund #11	Stocks
Gedik Yat. A Tipi Karma	Fund #12	Mixed
Global Menkul A Tipi Değ. Piri Reis	Fund #13	Variable
Global Menkul A Tipi Değ.	Fund #14	Variable
Global Menkul A Tipi Karma Aktif Strateji	Fund #15	Mixed
Halkbank A Tipi Değişken	Fund #16	Variable
Halkbank A Tipi Karma	Fund #17	Mixed
HSBC Bank A Tipi Değ.	Fund #18	Variable
ING Bank A Tipi Değ.	Fund #19	Variable
ING Bank A Tipi Hisse	Fund #20	Stocks
İş Bank A Tipi Değ.	Fund #21	Variable
İş Bank A Tipi Hisse	Fund #22	Stocks
İş Bank A Tipi İştirak	Fund #23	Affiliate Companies
Kalkınma Ban A Tipi Değ.	Fund #24	Variable
İş Yatırım A Tipi Değ.	Fund #25	Variable
Meksa Yat A Tipi Değ.	Fund #26	Variable
Akbank A Tipi Hisse	Fund #27	Stocks
Ata Yat A Tipi Karma	Fund #28	Mixed
Strateji Men A Tipi Değ.	Fund #29	Variable
Şekerbank A Tipi Değ.	Fund #30	Variable
Tacirler Men A Tipi Değ.	Fund #31	Variable
Tacirler Men A Tipi Karma	Fund #32	Mixed
Taib Yat. A Tipi Değ.	Fund #33	Variable
Teb A Tipi Karma	Fund #34	Mixed
Unicorn Capital İstanbul A Tipi Değişken	Fund #35	Variable
Vakıfbank A Tipi Değ.	Fund #36	Variable
Vakıfbank A Tipi U30 End.	Fund #37	Index
Yapı Kredi Yat. A Tipi Değ.	Fund #38	Variable
Yapı Kredi Yat. A Tipi Karma	Fund #39	Mixed
Yapı Kredi Yat. A Tipi Koç Şrk. İştirak	Fund #40	Affiliate Companies
Yatırım Finansman A Tipi Değişken	Fund #41	Variable
YKB A Tipi Allianz Sig. Özel	Fund #42	Private
YKB A Tipi Hisse	Fund #43	Stocks

YKB A Tipi İMKB U100 End.	Fund #44	Index
YKB A Tipi Karma	Fund #45	Mixed
Tekstilbank A Tipi Hisse	Fund #46	Stocks
Global Menkul A Tipi Karma	Fund #47	Mixed
Teb Yat A Tipi Hisse	Fund #48	Stocks
İş Bank A Tipi U30 End.	Fund #49	Index
Akbank A Tipi Değ.	Fund #50	Variable
ING Bank A Tipi İMKB Ulusal 30 Endeks	Fund #51	Index
Ziraat Yat. A Tipi Değ.	Fund #52	Variable
TSKB A Tipi Hisse	Fund #53	Stocks
YKB A Tipi Özel Bank. U30 Endeks	Fund #54	Index
Yapı Kredi Yat. A Tipi Özel Portföy Yön. Değ.	Fund #55	Variable
Akbank A Tipi U30 End.	Fund #56	Index
Anadolubank A Tipi Değ.	Fund #57	Variable
Garanti Ban. A Tipi U30 End.	Fund #58	Index
Ata Yat (A) U30	Fund #59	Index
Finansbank A Tipi Hisse	Fund #60	Stocks
Finans Yat. A Tipi Değ.	Fund #61	Variable
Finans Yat. A Tipi Karma	Fund #62	Mixed
Garanti Men A Tipi Port.Yön.Hiz.Değişken	Fund #63	Variable

Appendix 2: Investment Funds Structure of Portfolio as of May 2010

Asset Type	Value (mio $)
T-BILLS - G-BONDS	5,308
TURKISH EUROBONDS -FOREIGN SECURITIES	142
REVERSE REPO	12,940
STOCKS	602
ISE SETTLEMENT AND CUSTODY BANK MONEY MONEY MARKET	1,256
TOTAL	20,248

source: ISE Settlement and Custody Bank

Appendix 3 : Investment Funds Portfolio Size by Fund Type as of May 2010

Fund Type	Value (mio $)
Government Bonds and Treasury Bills Fund	1,641
Private Fund	174
Variable Fund	1,689
Liquid Fund	15,226
Affiliate Companies Fund	105
Protected Fund	670
Fund of Funds	10
Composite Fund	214
Foreign Securities Fund	72
Gold and Other Precious Metals Fund	164
Hedge Fund	93
Sector Fund	0
Guaranteed Fund	166
Stock Fund	104
Index Fund	134
TOTAL	20,461

source: ISE Settlement and Custody Bank

Appendix 4 : Pension Funds Structure of Portfolio as of May 2010

Asset Type	Value (mio $)
T-BILLS - G-BONDS	4,286
TURKISH EUROBONDS -FOREIGN SECURITIES	230
TIME DEPOSIT	433
REVERSE REPO	1,049
STOCKS	730
ISE SETTLEMENT AND CUSTODY BANK MONEY MARKET	15
TOTAL	6,743

source: ISE Settlement and Custody Bank

Appendix 5 : Pension Funds Portfolio Size by Fund Type as of May 2010

Fund Type	Value (mio $)
Public TL Debt Instruments Fund	3,754
Public FX Debt Instruments Fund	238
Composite Fund	58
International Composite Fund	7
International Debt Instruments Fund	14
Liquid Fund - Public	809
Liquid Fund - Composite	16
Flexible Fund	1,450
Stock Fund	343
Index Fund	26
Composite Debt Instruments Fund	16
Balanced Fund	74
TOTAL	6,806

source: *ISE Settlement and Custody Bank*

Appendix 6 : Exchange Traded Funds Structure of Portfolio as of May 2010

Asset Type	Value (mio $)
T-BILLS - G-BONDS	35.9
TURKISH EUROBONDS -FOREIGN SECURITIES	0,00
TIME DEPOSIT	0,00
REVERSE REPO	0.5
STOCKS	37.3
ISE SETTLEMENT AND CUSTODY BANK MONEY MONEY MARKET	0,00
TOTAL	73.7

source: ISE Settlement and Custody Bank

Appenix 7 : Investment Trusts Structure of Portfolio as of May 2010

Asset Type	Value (mio $)
T-BILLS - G-BONDS	206
TURKISH EUROBONDS -FOREIGN SECURITIES	4
TIME DEPOSIT	0
REVERSE REPO	115
STOCKS	148
ISE SETTLEMENT AND CUSTODY BANK MONEY MONEY MARKET	0
TOTAL	474

source: ISE Settlement and Custody Bank