AN ANALYSIS OF THE PERFORMANCE OF INVESTMENT COMPANIES: EVIDENCE FROM THE ISTANBUL STOCK EXCHANGE

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ABSTRACT

AN ANALYSIS OF THE PERFORMANCE OF INVESTMENT COMPANIES: EVIDENCE FROM THE ISTANBUL STOCK EXCHANGE

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The purpose of this master's thesis is to evaluate the performance of investment companies, namely Real Estate Investment Trusts (REITs) and Closed-End Funds (CEFs) in Turkey. In this study, three different models are used to evaluate the risk adjusted performances of Turkish investment companies. These models are: 1) the single-factor CAPM; 2) the Fama-French three-factor model; and 3) the Carhart's four factor model.

The results of this study indicate that for the sample period from January 1997 to December 2009, Turkish REITs and Turkish CEFs neither overperform nor underperform the overall market. Intercepts in almost all models are statistically significantly not different from zero, implying that both REITs and CEFs are earning their expected returns. The results are robust to different models used in this study. Among employed models, the Fama-French three-factor model is the best in explaining the returns on both REITs and CEFs. In general, coefficients of the size and the book-to-market equity risk factors are significant and positive. The explanatory power of the regressions does not improve with the Carhart's four-

factor model, since momentum factors have statistically insignificant coefficients in all regressions.

Findings of this study have an important implication for the efficiency of the Istanbul Stock Exchange. The inability of professional money managers to beat the overall market could be taken as an evidence in favor of the ISE being either semi-strong or strong form efficient. On the other hand, lack of skills on the part of Turkish fund managers might be another explanation for their inability to surpass the performance of the overall market.

Keywords: Real Estate Investment Trust (REIT), Closed-End Fund (CEF), Istanbul Stock Exchange, performance

ÖZ

YATIRIM ŞİRKETLERİNİN PERFORMANS ANALİZİ: İSTANBUL MENKUL KIYMETLER BORSASI'NDAN BULGULAR

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Bu yüksek lisans tezinin amacı Türkiye'deki Gayrimenkul Yatırım Ortaklıkları (GYO) ve Menkul Kıymet Yatırım Ortaklıklarının (MKYO) performansını değerlendirmektir. Bu çalışmada Türk yatırım şirketlerinin riske göre düzeltilmiş performansı üç değişik model kullanılarak değerlendirilmektedir. Bu üç model: 1) Sermaye Varlıklarını Fiyatlandırma Modeli (CAPM); 2) Fama-French üç faktör modeli, ve 3) Carhart dört faktör modelidir.

Yapılan analizler, Ocak 1997 - Aralık 2009 dönemi için Türk GYO ve MKYO'larının ne olağan dışı pozitif ne de olağan dışı negatif getiri elde edemedikleri göstermektedir. Neredeyse tüm Jensen alfa katsayılarının (kesişimler) istatistiksel olarak sıfırdan farklı olmaması, hem GYO hem de MKYO'ların beklenen getiriyi kazandıklarını ifade etmektedir. Çalışma sonuçları kullanılan farklı varlık fiyatlandırma modeline göre değişmemektedir. Kullanılan modeller arasında Fama-French üç faktör modeli, hem GYO hem de MKYO'ların getirilerini açıklanma konusunda en yüksek güce sahip olan modeldir. Genel olarak, şirket büyüklüğü ve defter değeri/piyasa değeri oranı risk faktörleri istatistiksel olarak anlamlı ve pozitif katsayıya sahiptirler. Momentum faktörünün katsayısı tüm

regresyonlarda istatistiksel olarak sıfırdan farklı olmadığı için, Carhart dört faktör modeli ile regresyonların açıklayıcı gücü artmamaktadır.

Bu çalışmanın bulguları İstanbul Menkul Kıymetler Borsası'nın (İMKB) etkinliğine dair önemli bir takım çıkarımlara işaret etmektedir. Profesyonel portföy yöneticilerinin genel piyasaya göre üstün performans sergileyememeleri İMKB'nin yarı güçlü veya güçlü formda etkin olduğu anlamına gelebilir. Bununla birlikte, Türk fon yöneticilerinin genel piyasadan üstün performans gösterememiş olmamalarının bir diğer açıklaması da fon yöneticilerinin yönetim becerileri eksikliği olabilir.

Anahtar Kelimeler: Gayrimenkul Yatırım Ortaklığı (GYO), Menkul Kıymet Yatırım Ortaklığı (MKYO), İstanbul Menkul Kıymetler Borsası (İMKB), performans

To My Parents

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CHAPTER 1

INTRODUCTION

Performance of investment companies has been watched quite closely by investors and academics. Real Estate Investment Trusts and Closed-End Funds are two main examples of investments companies. Real Estate Investment Trust (REIT) is a relatively new investment instrument. Modern REITs were established in the US as early as in 1960s, but gained worldwide popularity after late 1980s. Turkey had its REIT market founded in 1996, leaving behind most of the developed and developing markets in this front. REITs, being a special type of a closed-end investment company, are obliged to invest in real estate and real estate related investment tools in exchange for having a favorable tax treatment. Securitization of real estate through REITs makes considering the real estate in the modern portfolio context possible. Furthermore, it allows small investors to participate in real estate investments by pooling their resources together. Therefore, the performance of REIT shares has continuously intrigued the interest of investors and the scholars.

Compared to REITs, closed-end funds (CEFs) have a history longer than 100 years in the US. Although CEFs have been dominating their open-ended counterparts, i.e. mutual funds, at the beginning of 1990s, they remained in the shadow of mutual funds after the Great Crash of 1929 until the mid-1980s. In Turkey, the legislative framework for the operation of closed-end funds was developed in 1992. As opposed to REITs, CEFs can invest in a broader range of financial assets.

The purpose of this thesis is to measure the performance of Turkish investment companies (REITs and CEFs) trading on the Istanbul Stock Exchange (ISE) from 1997 to 2009. As a part of this thesis, the performance of Turkish REITs is compared to the performance of Turkish closed-end funds (CEFs). In this way, one

can assess the performance of REIT stocks relative to that of common stock investment companies. As a basis for this comparison, closed-end funds are preferred to mutual funds, because the latter type is open-ended, so its capitalization changes continuously. In contrast, closed-end funds' capitalization is relatively stable over time just as the equity of REITs. Furthermore, mutual fund shares always trade at their net asset values (NAV) whereas both REITs and closed-end funds can trade at prices different from their NAV.

Despite the fact that REITs have existed in Turkey for more than 10 years, they have stayed in the shadow of mutual funds. Particularly, the performance of individual REITs as well as the REIT sector as a whole has not been studied. This study tries to fill this gap by measuring the performance of Turkish REITs. Findings of this study can have important implications for the attractiveness of REIT stocks in portfolios of Turkish investors. If it would appear that REIT stocks exhibit superior performance, then the investors can add them into their investment portfolios to enhance their returns.

Findings of studies examining the performance of the US REITs might not be that helpful in guessing the performance of Turkish REITs because of several differences in their markets and regulatory environments. As opposed to US REITs, which must distribute at least 90% of their income as dividends, Turkish REITs are exempt from obligatory dividend distribution requirement. Thus, REITs in Turkey can plow back all of their income into their businesses. On the other hand, US REITs constantly turn to financial markets for additional equity or debt capital. Since issuance of new stock creates some flotation costs, cost of new equity is relatively higher than the opportunity cost of using internal equity financing. For that reason, Turkish REITs might be expected to exhibit better performance than their US counterparts. On the other hand, excessive reliance of US REITs on external financing sources makes them subject to monitoring by the capital markets constantly. Furthermore, usage of higher amounts of debt financing might be constraining the activities of REIT managers and forcing them to be more disciplined than their counterparts in Turkey. In this respect we may expect US REITs to perform better than Turkish REITs.

Empirical research on the performance of REITs report mixed results. These studies mainly analyze the performance of the US REITs. Particularly, until late 1970s, most of the studies find that REITs underperform the overall market. However, studies capturing data from late 1970s and early 1980s find that REITs exhibit similar or superior performance compared to that of the stock market. Seiler, Webb and Myer (1999) propose three reasons for this ambiguity in findings of these studies: differences in a) data and; b) methods used; and c) sample periods analyzed.

Majority of the studies on CEFs examine the issue of discounts (premiums), and there is limited number of studies investigating the performance of CEF stocks. One of the major and the earliest studies examining the investment performance of closed-end funds is done by Roenfeldt and Tuttle (1973). They use data for 12 diversified CEFs obtained from Wiesenberger's Investment Company for the period from 1953 to 1970. They employ Jensen's performance measure (Jensen's alpha) to estimate the risk-adjusted performance of subject funds. Roenfeldt and Tuttle find that CEFs could not outperform or underperform the overall market. In another study, Guy (1978) examines the performance of British closed-end funds, which are called investment trusts in the UK. The sample period is from January 1960 to December 1970. A total of 149 trusts are left in his final sample after imposing certain restrictions. He uses Jensen, Treynor and Sharpe measures to estimate the performance of these companies. In the end, Guy concludes that either trusts in the UK underperform the benchmark or the tests are not powerful enough to identify superior performance of these companies.

Overall, studies looking at the performance of CEFs strongly suggest that CEFs fail to exhibit superior performance compared to their benchmarks. Very limited number of funds exhibit significant positive performance for a limited period of time. In general, majority of studies conclude that the performance of funds is inferior to the selected benchmarks, and a few studies report performance of CEF being similar to the overall market.

The performance of investment companies has been measured using different methods, ranging from relatively simple linear regression models to more complex nonlinear models. This study employs linear regression framework to measure the

performance of Turkish REITs and CEFs. Namely, three models are specified: 1) the single-factor CAPM; 2) the Fama-French three-factor model; and 3) the Carhart's four factor model. All of these models are widely used in the literature for measuring performance of investment companies. Jensen (1968), for the first time, applied the single-factor CAPM model for measuring the performance of mutual funds. This model and its different modifications have been extensively used since then, but the model received a lot of criticisms on its inability to capture all the risks inherent in the stock investments. An alternative solution was proposed by Fama and French (1993), who introduced size and book-to-market equity factors in addition to the market risk (beta) factor. The Fama-French three factor model aims to provide a model that captures more of the risks inherent in stock investments compared to Jensen's single-factor model. Finally, Carhart (1997) argued that even the Fama-French three factor model does not capture all the risks. In his study he refers to one year momentum effect reported in Jegadeesh and Titman (1993) as the fourth risk factor to be included in the model. Consequently, he proposes his four factor model, where the first three factors are from the Fama and French (1993) three factor model, and the last factor – momentum – is constructed to replicate the momentum effect of Jegadeesh and Titman. All of the abovementioned models are used in this study to estimate the risk-adjusted returns of REIT and CEF shares. According to the efficient market hypothesis, the intercept (alpha) of the specified equations is expected to be statistically significantly not different from zero. Any significant positive/negative alpha would imply positive/negative abnormal return for that particular security.

The results of this study indicate that for the sample period from January 1997 to December 2009 both Turkish REITs and CEFs exhibit a performance similar to the overall market. Almost all Jensen's alphas (intercepts) are statistically significantly not different from zero, implying that both REITs and CEF are earning their expected returns. Only two CEFs exhibit significant negative performance with the four-factor model. The results are essentially the same for all asset pricing models used in this study.

Among employed models, the Fama-French three-factor model is the best one in explaining the returns on both REITs and CEFs. In general, the size and the book-to-market equity risk factors have significant and positive coefficients. The explanatory power of the regressions does not improve with the Carhart's four-factor model, since momentum factors have statistically insignificant coefficients in all regressions.

The results of this study also have an important implication for the efficiency of the Istanbul Stock Exchange. The inability of professional money managers to beat the overall market could be interpreted as an evidence in favor of the ISE being either semi-strong or strong form efficient. On the other hand, lack of skills on the part of Turkish fund managers might be another explanation for their inability to surpass the overall market.

The following chapter overviews the REIT and the CEF industries, describing their types and characteristics. Chapter 3 reviews the literature on the performance of REITs and CEFs. Chapter 4 outlines data and methodology used for measuring the performance of REITs and CEFs in Turkey. Empirical results of this study are presented in Chapter 5. Chapter 6 presents the conclusions based on the empirical analyses of this thesis.

CHAPTER 2

OVERVIEW OF REAL ESTATE INVESTMENT TRUST (REIT) AND CLOSED-END MUTUAL FUND INDUSTRIES

2.1 Real Estate Investment Trusts (REITs)

Real estate investment trust (REIT) concept is originated in the United States in the mid-19th century. However, REITs became popular after 1960 US Tax law, which awarded them favorable tax-treatment opportunities. The first REIT is established in 1961 in the United States, after approximately 100 years of the concept origination (Chan, Erickson, and Wang, 2003). The United States has the most developed REIT industry around the world and most of the research on REITs is conducted on the US REITs so far. Interestingly, REITs are relatively new investment vehicles not only for emerging markets, but also for many developed markets. For instance, REITs were established in Australia in 1971, in Canada and Brazil in 1993. Developed markets such as Germany and the United Kingdom introduced REIT as an investment vehicle only in 2007. In Asia REIT market was first launched in Japan in 2001, followed by Singapore in 2002 and Hong Kong in 2005. Particularly, in the case of Turkey, the REIT legislation was prepared in 1995 and the first REIT is offered to public in 1996 (Aydınoğlu, 2004). Despite being an emerging market, Turkey has left behind several emerging and developed markets in introducing REIT as an investment instrument. Thus, analyzing the performance of REITs in Turkey, an emerging market, would be an interesting and a valuable contribution to the literature.

REIT is a special type of a closed-end fund created to invest exclusively in real estate and real estate related assets. REITs provide investors with mainly 2 advantages: (1) more liquidity compared to acquiring real estate directly;

(2) increased affordability of real estate investments for small investors. REITs are also attractive investments because of their tax-exempt status. However, legislation imposed several restrictions on REITs as well (Chan, Erickson, and Wang, 2003).

2.1.1 Legal Requirements and Development Dynamics of REITs

As explained in Brueggeman and Fisher (2006), to qualify for a REIT status in the US, an entity should satisfy the following conditions:

Asset Requirements

- Minimum 75% of a REIT's assets must consist of real estate assets, cash and government securities;
- Maximum 5% of a REIT's assets may belong to one issuer of securities if these securities are not included under the 75% requirement;
- Maximum 10% of the outstanding voting securities of any one issuer can be owned by a REIT if those securities are not included under the 75% requirement;
- Maximum 20% of a REIT's assets can consist of stocks in taxable REIT subsidiaries.

Income Requirements

- Minimum 95% of a REIT's gross income must be obtained from dividends, interest, rent or gains from the sale of its assets;
- Minimum 75% of a REIT's gross income must be obtained from rents, interest on mortgage securities, gains from the sale of its assets, or income from investments in other REITs;
- Maximum 30% of a REIT's gross income can be obtained from sale or disposition of securities held for no more than six months or real estate held for no more than four years, excluding the real estate unwittingly sold or foreclosed on.

Distribution Requirements

- Minimum 90% of a REIT's taxable income should be distributed to shareholders.

Since, in general, investors in low-tax brackets tend to invest in stocks with high dividend payout, REIT clientele is expected to be mostly those in low-tax brackets.

Stock and Ownership Requirements

- A REIT should be taxable as a corporation;
- A REIT should be managed by a board of directors or trustees;
- A REIT should have shares that are fully transferable and held by a minimum of 100 persons;
- Maximum 50% of a REIT's shares may be held by no more than five investors during the second half of a taxable year.

As it can be seen from abovementioned requirements, REITs are somewhat limited in their operations because of legal constraints. Another important limitation, which hampered the development of REITs in the US before 1986, is the requirement that REITs' properties should be managed by a separate advisory company. As a result, REITs for a long time were considered as passive investment vehicles, since the properties owned by REITs were actually managed by advisory firms. These advisors charged fees for their services, as a rule, in the form of a percentage of total assets. Since most of the time these advisors didn't own shares of the REIT that they manage the assets of, there was room for a conflict of interest (Chan, Erickson, and Wang, 2003).

The evolution of a modern REIT starts after 1961, when the first REIT was established. REITs were not very popular just after their establishment in 1960s, because of stock market decline in early 1960s. In addition, investors were not well informed about this new investment vehicle. Furthermore, laws and rules regulating REITs were not well developed (Chan, Erickson, and Wang, 2003).

However, as time passed investors became more familiar with REITs. Furthermore, demand for short term construction and development (C&D) loans increased during 1968-1973 time period. In order to satisfy this demand, many REITs were created by banks and credit companies because they could not finance such loans directly due to legal restrictions. As a consequence, a growth in REIT industry was observed during this time period (Chan, Erickson, and Wang, 2003).

For all REITs, 1970s were marked by difficulties. By 1973, credit conditions turned against REITs and most of them reported operating losses. Since, they financed long-term construction projects heavily by short-term debt, increasing interest rates led to default of several REITs (Chan, Erickson, and Wang, 2003).

Market crash of 1973 affected all REITs, but especially mortgage REITs, negatively. Decline in the industry has been prolonged till late 1970s. During this time period, mortgage REITs are the ones that are affected the most adversely. The industry started to recover from this decline in late 1970s and early 1980s, partly due to the US Tax Reform Act of 1976. This act offered several advantages to REITs, like avoiding disqualification from being a REIT for unintentionally failing to meet gross income requirement, and having the option of carrying losses forward for eight years (Kelley, 1998).

In mid and late 1980s, REITs became attractive investment vehicles due to the passage of the US Tax Reform Act of 1986. This Act, for the first time, allowed REITs to be actively managed. Thus, from this point on, a REIT could assign its own employees to manage its own properties and engage in active management strategies (Garrigan and Parsons, 1997).

The most significant boom in the REIT industry occurred in 1990s as a result of a substantial drop in property prices. For instance, from 1990 to 1995, the REIT index increased by 149%. The industry growth observed in this time period can be attributed mostly to equity REITs (Garrigan and Parsons, 1997).

2.1.2 Types of REITs

REITs can be classified into three based on the types of assets that they invest in (Brueggeman and Fisher, 2006):

1- Equity REITs (EREITs): have equity interests in real estate properties (i.e. have the ownership of income producing real estate)
2- Mortgage REITs (MREITs): invest in mortgages and debt claims (i.e. hold long-term and short-term construction loans, mortgages on commercial and residential properties in their portfolios)
3- Hybrid REITs: Have characteristics of both EREITs and MREITs.

In addition to this classification, REITs can be grouped into classes according to different criteria, like property type, geographic location etc. For description purposes, EREITs are generally grouped by property type. The United States National Association of Real Estate Investment Trusts (NAREIT) classifies EREITs in the following manner[1]:

1. Industrial/Office: own industrial and/or office properties
2. Retail: own shopping centers, malls and outlets
3. Residential: own residential properties like apartments
4. Diversified: own various types of real estate
5. Lodging/Resorts: own hotels, motels, and resort areas
6. Health Care: own hospitals and other health related properties
7. Self Storage: own warehouses and other related self storage facilities
8. Specialty: own special purpose properties, like timberland and prisons

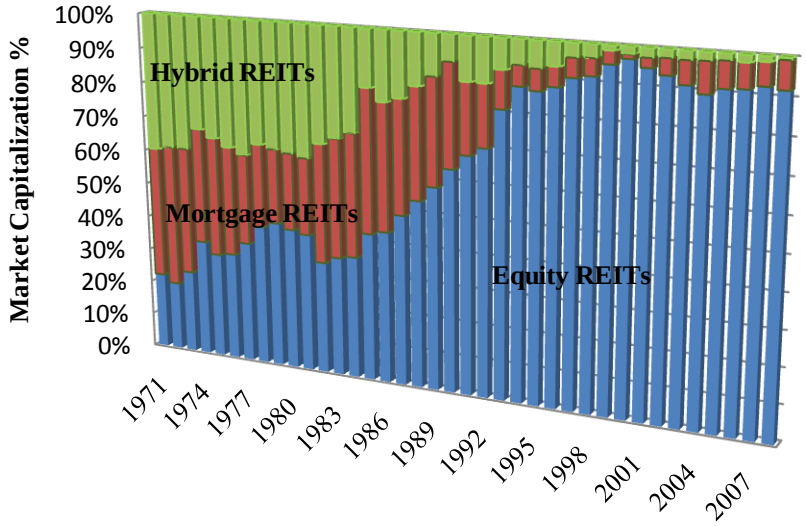
There is also a special type of REIT called "private" REIT. Private REITs are not listed on recognized exchanges or traded over the counter. A private REIT may refer to a REIT that is held privately or a REIT that is registered publicly, but not listed on any exchange. In practice, most of private REITs are public companies, which remain unlisted. According to NAREIT classification there are three types of private REITs: (1) REITs targeted to institutional investors such as insurance companies

[1] www.nareit.org

and pension funds; (2) REITs targeted to investors as a part of a package offered by a financial consultant; (3) "incubator" REITs. Incubator REITs are created by venture capitalists with the hopes that they will grow large enough to be taken to public. Among these private equity types the second one is the most common type. In this type of organization, private REITs sell subscriptions of their shares to investors through a financial planner. Part of the proceeds from selling subscriptions goes to financial planners as a fee and part of it goes to the REIT's advisor firm. Private REITs are criticized for being more illiquid than REITs listed on organized exchanges. On the other hand, proponents claim that private REITs are not exposed to short-term market volatility like their counterparts listed on organized exchanges (Brueggeman and Fisher, 2006).

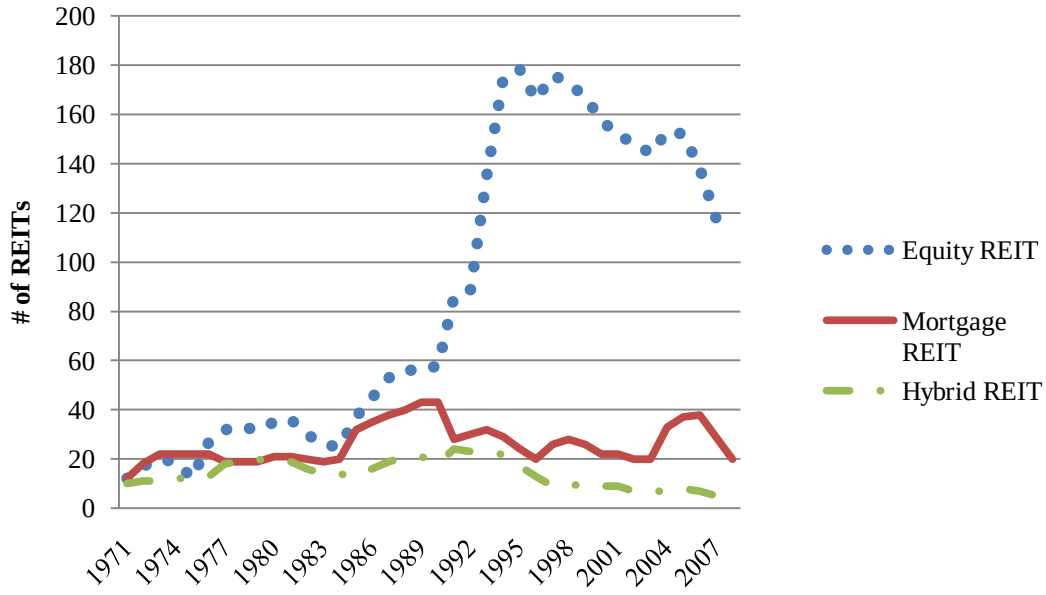
Historically, EREITs yielded higher risk-adjusted excess return than mortgage and hybrid REITs. Therefore, investors were dominantly investing in EREITS. On top of that, EREITs had lower market risk than mortgage and hybrid REITs (Chan, Erickson, and Wang, 2003). Historical market capitalization by REIT type is shown in Figure 2.1 for the time period between 1971 and 2008. By 1998, 92% of total REIT industry capitalization was due to EREITs. This percentage is approximately the same in 2008. However, it is noteworthy to mention that total market capitalization of the REIT industry plummeted from $312,009 million in 2007 to $191,651 million in 2008. EREITs dominated other two types not only in terms of market capitalization, but also in terms of number of REITs available in each category. Figure 2.2 depicts the distribution of number of REITs available in each category for the time period between 1971 and 2008.

Figure 2.1 REIT Market Capitalization in the US from 1971 to 2008



Source: www.nareit.org

Figure 2.2 Number of REITs in the US from 1971 to 2008



Source: www.nareit.org

2.2 Closed-End Funds (CEF)

Investment companies have existed in the US for more than 100 years, but they became well-known after the passage of the Investment Company Act in 1940. This Act shaped the legislative framework for operation of investment companies (Madlem and Sykes, 2000). Prior to 1940 Act, obligations and responsibilities of investment companies remained undefined, so people had little confidence in them, especially after Great Crash of 1929. This legislation provided many individuals with an excellent opportunity to invest in professionally managed and diversified portfolios at an adequate cost (Anderson, Born, and Schnusenberg, 2009).

Investment companies, like any other company, raise capital in the primary market and invest this capital in financial assets, unlike an industrial company. There are basically two types of investment companies: (1) open-end investment companies (commonly referred to as *mutual funds*) and (2) closed-end investment companies (commonly referred to as *closed-end funds*). Among these two types, mutual funds prevail worldwide in financial markets, so they received more attention from academia as well (Reilly and Brown, 2003). Despite the fact that mutual funds are more common nowadays, the first fund was a closed-end fund and was formed in Britain in 1860s. This type of investment structure reached the United States close to the end of the 19th century (Madlem and Sykes, 2000).

Closed-end funds has proliferated in the US at the beginning of 1900s and dominated the mutual funds until the Great Crash of 1929. CEFs were blamed for contributing to Great Crash of 1929, because of their extensive usage of leverage and active involvement in acquisition of other funds during that time. After the crash, CEFs remained in the shadow of mutual funds until the mid-1980s (Anderson, Born, and Schnusenberg, 2009). During the mid-1980s, flourishing financial markets has contributed to the growth of CEFs. Investors were redirecting their investments from government securities to various funds offering higher returns. Introduction of "personality funds"[2] and spread of single-country funds in mid-1980s also increased the popularity of CEFs. Moreover, a lot of CEFs investing in

[2] A fund that maintains portfolios which reflect distinctive investment style of a certain manager. For example, Gabelli Equity Trust, Zweig Fund, Barry Ziskin's fund.

bonds appeared after 1987 market crash, when investors preferred to invest in fixed-income securities rather than a weak stock market (HighBeam Research, Industry Report, n.d.).

The following sections review the features of CEFs, as well as describing different types of CEFs that are available.

2.2.1 Similar and Distinguishing Features of Closed-end Funds and Mutual Funds

Both closed-end funds and mutual funds are investment companies. Even though they have several common characteristics, in most cases, they significantly differ from each other in the way they operate. Both mutual funds and CEFs pool the resources from many investors and make wise investment choices on behalf of their investors using the skills and capabilities of professional money managers who manage the investments of funds for a certain fee. Thus, investors, especially small ones, can benefit from economies of scale, liquidity and investment expertise offered by an investment company. Moreover, funds have clear objectives indicated by their policies and have "pass through" taxation, in other words, they do not pay taxes at the fund level on the amounts distributed to their investors (Madlem and Sykes, 2000).

Perhaps the main distinguishing feature of CEFs from mutual funds is that their shares are traded on organized exchanges (either on a stock exchange, like the Istanbul Stock Exchange or over-the-counter, like NASDAQ), just like shares of any other company. In contrast, investors should directly contact mutual funds in order to be able to trade in their shares (Reilly and Brown, 2003).

Another important difference is related to the number of shares outstanding for these companies. CEFs generally do not issue new stock after their initial public offering (IPO) and almost never redeem their shares. Subsequently, number of shares outstanding for a CEF remains constant until the company does a secondary equity offering. Therefore, someone who wants to trade (purchase/sale) shares of a CEF should execute this transaction in a secondary market. In this regard, trading in

shares of CEFs is more similar to that in shares of an industrial company than mutual funds. On the other hand, mutual funds welcome new capital inflows in exchange for newly issued shares, so a mutual fund's capitalization changes continuously (Fink, 2008).

Since mutual funds are open-ended by construction, they can issue and redeem shares whenever necessary (Fink, 2008). For that reason, they always trade at their net asset values (NAV). In contrast, CEFs seldom trade at their NAVs. Almost always, they trade below (at a discount) or above (at a premium) the value of their underlying assets, namely their NAVs. Thus, the stock price of a CEF is determined by supply and demand in the market just like the price of shares of any other company trading on a stock exchange (Faerber, 2008).

Investors who want to purchase/sell the shares of a CEF can do it in a secondary market through a broker. Moreover, shares of a CEF can be traded at any time during the day, just like shares of any other company. Mutual fund's shares are generally traded at the closing price (at the end of a trading day), when its NAV has been updated. Actually, orders for mutual fund shares are placed throughout the day, but they are processed, hence the price is determined, only after the NAV of this fund is re-calculated at the end of the trading day. When an order is placed after a certain closing time, then this order is executed at the price determined on the next closing time. Since CEFs trade like a stock, an investor buying/selling their shares should pay some fixed commission to a broker. On the other hand, mutual funds' commissions (front and back end loads, redemption fees) vary according to the share type and the trading method used, so it may be costlier for an investor to acquire mutual funds shares (Gremillion, 2005).

Another advantage of CEFs over mutual funds may appear during an unexpected market fall, when investors tend to sell their shares in large quantities. In such circumstances, mutual fund managers have to maintain high level of cash to pay for redemptions, so they may be forced to sell shares that they would not sell otherwise and vice versa. However a manager of a CEF does not need to sell stocks from the underlying portfolio, since CEF's shares are traded in the secondary market (Madlem and Sykes, 2000).

Another distinguishing feature of CEFs is that they have different leveraging options. They commonly use preferred stock and long-term debt, as well as reverse-repurchase agreements as a way of leveraging their company. They may use a combination of these alternatives, however they usually select one and use that. In contrast, mutual funds are quite restricted in their usage of leverage; repos are, perhaps, the only option available to them (Haslem, 2009).

2.2.2 Types of Closed-End Funds

CEFs can be divided into several categories. According to the extent of diversification of closed-end fund portfolios, they can be divided into diversified and undiversified CEFs. Diversified CEFs have less risk because of low correlation among the assets invested. Such CEFs typically invest in different industries, different companies and even different countries. Undiversified CEFs usually invest in one industry, but select different firms from that industry. An example of an undiversified CEF may be a precious metal fund (Madlem and Sykes, 2000).

Lipper/Reuters Company[3] divides CEFs into two main categories according to the type of assets held in their portfolio:

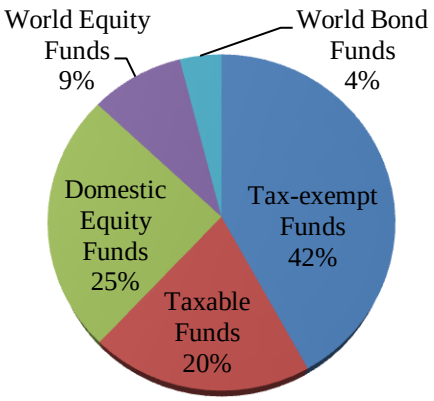
1. **Bond Funds:** This category can be divided into two sub-categories:
   a. Tax-exempt bond funds: These funds invest in tax-exempt bonds like municipal bonds, which invest in bonds of a single state or several states. Tax-exempt bonds comprise the major part of the whole CEF market in terms of assets under management (AUM);
   b. Taxable bond funds: These funds invest in corporate bonds (high-quality and "junk" bonds), government bonds, international bonds, and income bonds.
2. **Equity Funds:** This category can be divided into three sub-categories:
   a. Domestic equity funds: These funds invest in common stocks listed on major domestic exchanges;
   b. Sector funds: These funds invest in a particular industry, like financial services industry, energy/natural resources industry;

[3] www.lipperweb.com

c. Global/International funds: These funds invest in securities of several countries.

The following figure reflects the relative sizes of different fund types.

Figure 2.3 Percentage Distributions of Major Closed-End Fund Types in the US



Source: Lipper, a Reuters Company, April, 2006

2.3 Development of REITs in Turkey

As it was mentioned earlier, Turkey is one of the leading countries that initiated REITs as an investment tool. The first REIT was launched in 1996, while the first variant of Communiqué on Principles Regarding Real Estate Investment Companies (hereinafter Communiqué) which became the legal base for REITs, was enacted in 1995. However, this law was substantially overruled by a new communiqué in 1998. Currently, REITs in Turkey are regulated according to the basic principles reflected in 1998 Communiqué. After 1998, several amendments were adopted with the last one being in 2006 (Aydınoğlu, 2004).

Traditionally, investing in real estate has been quite popular in Turkey because of limited investment opportunities available in the country. However, the most important factor contributing to the popularity of investment in real estate in Turkey was the high inflation rates experienced in the country and real estate being considered to be a good hedge against inflation (Aydınoğlu, 2004). However, investing in real estate directly has high illiquidity risk and requires large amount of

money. REITs might be good substitutes for investing in real estate directly for several reasons. First of all, this structure still has the inflation hedging advantages of real estate. Secondly, REITs considerably improve the liquidity of real estate investments. Thirdly, REITs allow small investors to participate in real estate investments by reducing the required investment amounts.

Turkish REITs are granted two significant tax incentives. Specially, REITS do not pay either the corporate or the income taxes. For Turkish market, these tax incentives might have another important implication. Since REITs are tax exempt companies, they might increase the transparency of real estate market. In Turkey, large portion of real estate transactions are reported/declared at below market values of traded real estate. This is done in order to avoid taxes. REITs might reduce this problem, since they are not obliged to pay taxes. Furthermore, market values of real estate that is held in their portfolios are determined by independent appraisal companies, which are certified by the Capital Markets Board (CMB) of Turkey. In addition to traditional popularity of real estate investments, demand for real estate has increased in the last 15-20 years as a result of urbanization and increased demand for offices with modern design and characteristics (Aydınoğlu, 2004).

In 1999 Turkey had several big earthquakes, which hurt the real estate market. On the other hand, these earthquakes increased people's awareness of building quality. Thus, in some measure, these natural disasters have created a new demand for better quality buildings (Kodal, 2001). Unfortunately, development of REITs and real estate sector in general, was hampered by 2001 financial crisis. Negative effect of this crisis on the economy due to high inflation and decreased GDP was worsened by political instability in 2002. Real estate market had scarcely recovered from this shock when Iraq war in 2003 began. As a consequence, real estate prices reached their lowest level in the first half of 2003, since 2001 financial crisis (Aydınoğlu, 2004).

Another factor hindering the development of REITs in Turkey is related to the cost of capital. Since the inflation in Turkey has been very high and it fluctuated considerably, banks have been unwilling to lend money for long-term projects. Therefore, Turkish REITs were deprived of bank loan, which is one of the main

sources for capital inflow for the US REITs. In Turkey upper and middle income people usually obtain real estate through inheritance or with the help of family and friends, while lower income stratum mostly depends on government subsidy (Aydınoğlu, 2004).

One of the distinctive characteristics of Turkish REIT market is the absence of mortgage REITs. This circumstance also has negative impact on the development of REITs. However, in 2007, the CMB developed a legislation to introduce mortgages in Turkey, but the mortgage system is still not very developed in Turkey. One of the essential requirements that would stipulate successful operation of mortgage system is a decrease in interest rates to more reasonable levels. In an environment of stable and relatively reasonable interest rates, REITs have favorable conditions to realize in mortgage projects (ISGYO Report, 2007). Currently, there are no mortgage REITs trading on the ISE.

2.3.1 Legal Issues

According to 1998 Communiqué, REITs are defined as "capital market institutions, which can invest in real estates and real estate backed capital market instruments. They are also allowed to engage in real estate projects and set up ordinary partnerships to fulfill certain projects and other activities allowed by this Communiqué".

REITs have mainly three main characteristics that distinguish them from other companies trading on the Istanbul Stock Exchange. First of all, their activities are regulated by a separate legal document, namely, Communiqué on Principles Regarding Real Estate Investment Companies. Secondly, legislation stipulates REITs to have at least 49% of their shares trading on the ISE. However, offering of these shares to the public should not take place immediately. It may take from one year to five years, depending on the amount of paid in capital necessary to reach the required minimum. Lastly, and the most importantly, Turkish REITs are exempt from both corporate and income taxes (Aydınoğlu, 2004). In the absence of both

corporate and income taxes, value added tax (VAT) at the rate of 18% applied to all property transactions is the most important tax obligation of Turkish REITs.

One of the common features of REITs is that they enable small investors, who otherwise would not be able to overcome high cost barrier, to participate in real estate market. The requirement to float 49% of a REIT's capital per se is intended to increase the involvement of small investors in REITs in order to create a balanced and diverse ownership structure. Nevertheless, such a rule still protects the founders against takeovers, since they can hold the remaining 51% of shares of the company (Aydınoğlu, 2004).

A major difference between a Turkish REIT and a US REIT is that the former does not have to distribute a certain percentage of its income as dividends. Lack of dividend distribution requirement allows Turkish REITs to re-invest all of their earnings in their operations. The importance of this difference can be seen clearly when the obstacles of obtaining funds through bank loans for Turkish REITs, as described earlier, are taken into account. Distributed dividends are taxed at the rate of 30%.

According to 1998 Communiqué, in Turkey, REITs can be established:

1. to undertake a certain project within a finite time period

2. to invest in certain areas (like tourism, health) either for a finite or an infinite time period

3. without any restrictions on their purpose for a finite or an infinite time period

First type of REITs, as the name implies, are dedicated to fulfilling a certain project and then liquidated at the completion of that project. The second type encompasses REITs investing in particular areas like geographical regions or property types. The third type of structure is not limited by a certain project or a geographical region. As of December 2009, all 14 REITs trading on the Istanbul Stock Exchange are of the third type.

There are two different ways of establishing REITs in Turkey. Firstly, a new company can be established as a REIT from the outset Secondly, an already existing company might acquire the REIT status later on[4]. Currently, three of fourteen Turkish REITs are converted from an established firm to a REIT. All remaining REITs are established as REITs from the outset. In both cases, the company should apply to the CMB of Turkey with its registered capital and fulfill the legislative requirements, like public offering, to qualify as a REIT.

In order to assess the true market value of a REIT's assets, these assets have to be appraised by a real estate appraisal company, which is registered and certified by the CMB. Introduction of independent appraisal companies is to prevent undervalued transactions. REITs should sell/buy real estate assets at fair market values determined by these appraisal companies. However, 2004 Communiqué allows REITs to trade their real estate assets at prices different from those assessed by appraisal companies, but these values still serve as a reference for transactions.

For the purpose of transparency REITs have to disclose certain documents showing their financial performance. Particularly they should submit following documents to the CMB[5]:

- the appraisal reports;
- all transaction records exceeding 10% of the portfolio value;
- the portfolio value table which include REIT's assets;
- the independent audit report and financial statements prepared in accordance with the principles of the CMB;
- the annual operation statement;
- the copy of each newspaper containing any announcement and advertisement related that particular REIT.

According to the ISE report in January 2010, net asset value of 14 REITs is 4,346,030,421TL and their market value is 3,148,462,243TL. Thus, it can be concluded that in general REITs in Turkey trade at a discount from their NAV as

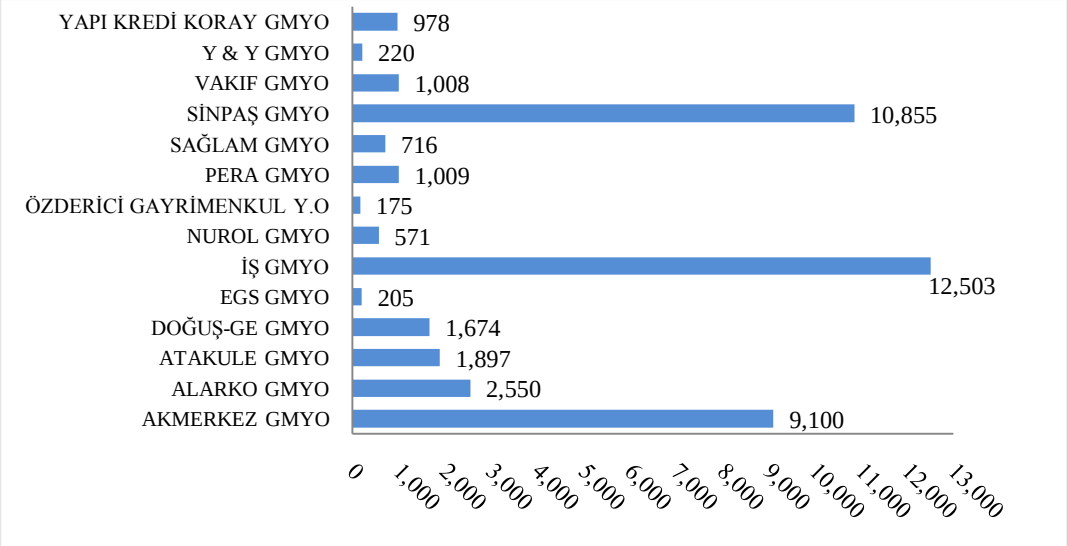
[4] 1998 Communiqué
[5] 1998 Communiqué

well. There are only two REITs, Vakif GMYO and Y & Y GMYO, which trade at a premium to their NAV.

Figures 2.4, 2.5, and 2.6 reflect NAVs, market values and portfolio values of REITs currently trading on the ISE, respectively.

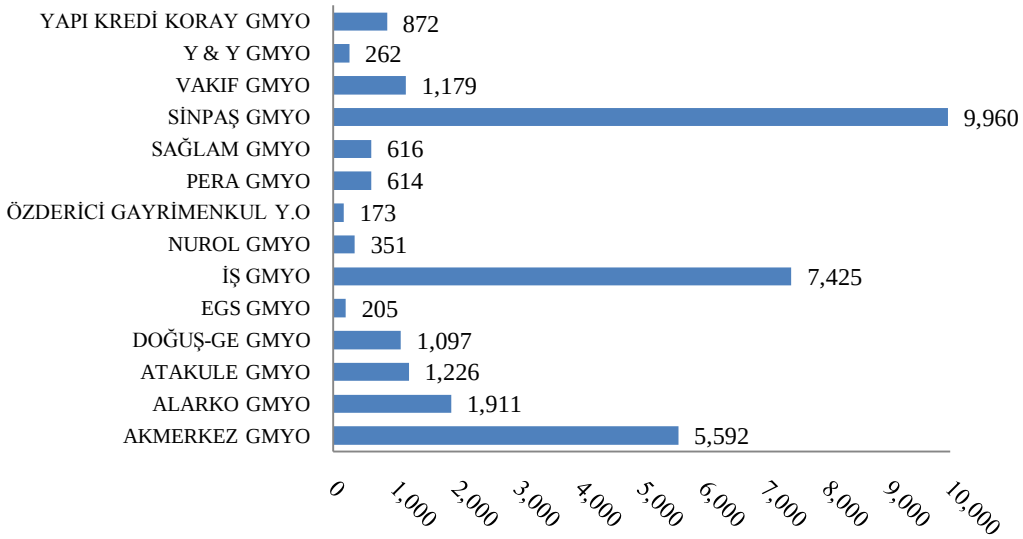
Figure 2.7 compares NAVs and market capitalization of Turkish REITs from 1997 to 2009. In general, Turkish REITs trade at a discount from their NAVs. However, in 2004 and 2005, market values were slightly higher than their NAVs. As we proceed from 2005 to 2009, we can observe that market capitalization of REITs decreases gradually. On the other hand, NAVs of Turkish REITs continuously increased from 1997.

Figure 2.4 Net Asset Values of Turkish REITs in January 2010 (in hundred thousand TL)



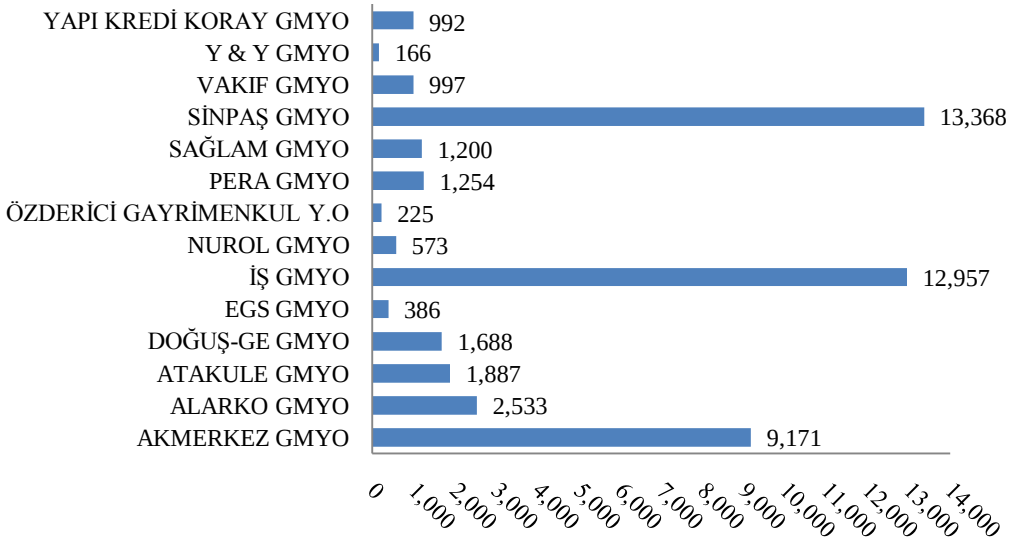
Source: CMB Bulletin January 2010

Figure 2.5 Market Values of Turkish REITs in January 2010 (in hundred thousand TL)



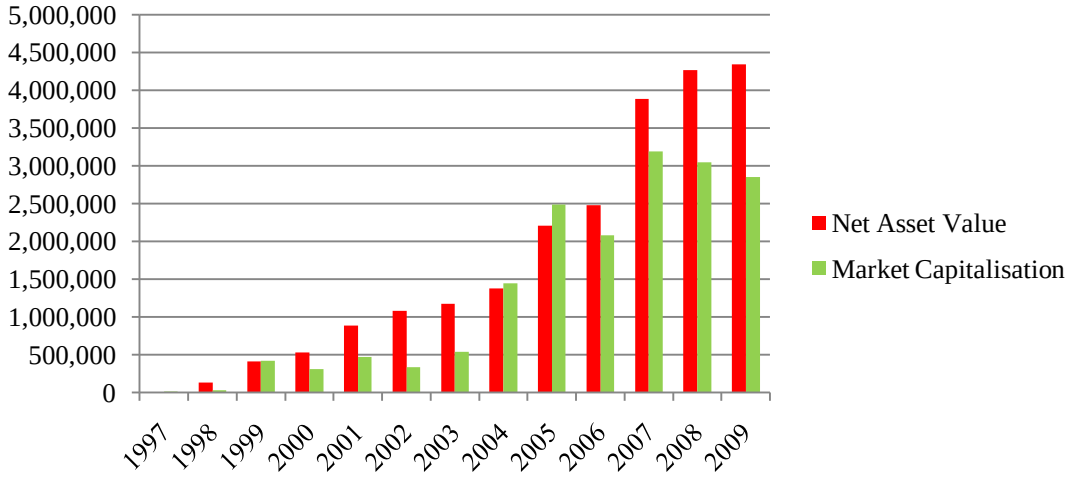
Source: CMB Bulletin January 2010

Figure 2.6 Portfolio Values of Turkish REITs in January 2010 (in hundred thousand TL)



Source: CMB Bulletin January 2010

Figure 2.7 Net Asset Values and Market Capitalization of Turkish REITs in 1997-2009 years (in thousand TL)



Source: CMB Bulletin January 2010

CHAPTER 3

LITERATURE REVIEW

This section reviews the literature on the performance of REITs and CEFs. Studies on the performance of REITs are summarized in section 3.1. Then, the literature regarding the performance of CEFs is reviewed in section 3.2.

3.1 REITs Literature Review

Although first REITs were established in early 1960s in the United States, they did not receive much attention for a while. However, starting from late 1970s and early 1980s, several studies have been devoted to the analysis of this new investment vehicle. Nowadays, financial literature covers numerous studies on REITs. Zietz, Sirmans and Friday (2003) summarize the most significant studies on REITs in a very systematic way. They group past research in four broad categories, which, in turn, are divided into several subcategories:

1. the general environment of REITs (regulatory and financial market changes);
2. investment decisions of REITs;
    a. asset acquisition and disposition issues
    b. corporate structure and REITs
3. financing decisions of REITs;
    a. dividend policy and REITs
    b. capital structure of REITs
    c. agency costs associated with REITs
    d. initial public offerings
    e. capital budgeting for REITs

4. risk and return performance of REITs;
    a. return issues
    b. risk and diversification
    c. the hedging ability of REITs
    d. the relationship between REIT returns and macroeconomic variables

Since, this thesis is mainly concerned with the performance of REITs and CEFs; articles on the last topic will be discussed further in detail.

It should be noted that the results of studies on the performance of REITs are mixed. The reasons for such an ambiguous outcome are summarized by Seiler, Webb and Myer (1999) as: (1) issues concerning the data used; (2) issues related to performance measurement method; and (3) period of study. Especially, early papers on REIT performance analyzed a small sample of REITs over a short period of time. Moreover, traditionally S&P 500 was used as a benchmark to evaluate the performance of REITs, despite the fact that REITs mostly behave like small stocks. Similarly, CAPM framework was criticized by many authors (Titman and Warga (1986); Chan, Hendershott and Sanders, 1990) for failing to capture the behavior of REIT stocks. In addition, boom and bust periods in real estate market affect the returns on REITs, and may lead to biased results. Han and Liang (1995) note that until late 1970s, studies mostly found REITs underperforming the overall market. During late 1960s and early 1970s, REITs in the US have grown rapidly due to increased demand for construction and development financing. The boom was mostly financed by funds borrowed through short-term commercial paper and bank notes. However, 1973-1974 crash substantially affected REIT industry. Since, REITs invested in long-term projects with short-term debt, they incurred large losses during this time period. Nevertheless, Han and Liang mention that studies analyzing the data from late 1970s and early 1980s find that the performance of REITs is similar or superior to that of market during that time period. Significant structural changes occurred in the REIT industry during the late 1970s and the early 1980s. Tax Reform Act of 1976 contributed to the recovery of the REIT industry. The average leverage for the REIT industry was reduced from 64% in 1972 to 55% in

1984. Short-term debt of the REITs also declined from 44% in 1972 to 8% in 1984. The investment in construction and development loans also decreased from 53% in 1972 to 6% in 1984 (NAREIT, 1994, pp. 691-92).

The following sections of this chapter review the significant literature on the performance of REITs. Studies are grouped into the following subsections: (1) performance of REITs compared to other asset classes; (2) performance of REITs across specific property types; (3) effect of size and capitalization on REIT performance; (4) effect of management structure on REIT performance; (5) predictability and seasonality of REIT returns; and (6) methods used for measuring REIT performance.

3.1.1 Performance of REITs Compared to Other Asset Classes

Perhaps, the first thorough study of REIT performance is done by Smith and Shulman (1976). They use single-factor CAPM to analyze the performance of REITs over a period from 1963 to 1974. They also compare their results for REITs to that of closed-end funds. Open-end mutual funds are not used for comparison as their capitalization changes constantly, while the asset value of closed-end funds remains relatively stable over time. They find that over the entire sample period REITs underperform the market by 2.1% on a risk-adjusted basis, while closed-end funds outperform the market by 0.2% annually on a risk–adjusted basis. On the other hand, REITs have lower betas, but also are less diversified than closed-end mutual funds. They also point out that when year 1974 is excluded from the sample, both REITs and closed-end funds outperform the market annually on average by 0.6% and 0.4%, respectively. The 1973–1974 period coincide with stock market crash that lasted from January 1973 to December 1974. It was one of the worst stock market downturns in modern history and it affected all the major stock markets around the world. The crash came after the collapse of the Bretton Woods system over the previous two years. Burns and Epley (1982) examine REITs in a portfolio context along with common stocks. They argue that REITs have low correlation coefficient with common stocks, so more superior risk return relationship can be achieved by combining these two types of assets. They show that a portfolio of

REITs and common stocks is more efficient in Markowitz sense. This result contradicts the findings of Smith and Shulman (1976), who document little diversification benefit for REITs.

Earlier studies on REITs examine the performance of REITs over a period from 1963 to 1979. Since REITs has exhibited ameliorating performance in 1980s, Kuhle, Walther and Wurtzebach (1986) revisit this issue by analyzing a period from 1973 to 1985. They use Jensen's measure of risk-adjusted performance to assess the performance of REITs during their sample period. They conclude that from 1973 to 1976 Jensen's alphas are negative showing that REITs underperform the overall market. This evidence is consistent with prior studies. However, starting from 1977, REITs exhibit superior performance on a risk-adjusted basis. Average alphas, since 1977, are between 6.2% and 18.8%. This major finding is contrary to most of the previous studies on REIT performance. Moreover, standard deviation of REIT returns stays relatively stable for the 1973-1976 period and gradually decrease since 1977. Kuhle, Walther and Wurtzebach attribute this finding to a more stable REIT industry environment. They also argue that decreasing significant positive abnormal returns from 1977 to 1985 may signify that REITs are approaching to their true market values over that time period as expected under the efficient market hypothesis.

Kuhle (1987) examines the effects of adding REITs on diversification of portfolios held by investors using monthly returns for 84 firms – 26 EREITs, 16 MREIT and 42 common stocks listed on various exchanges. The primary purpose of the study is to examine the reduction in total portfolio risk after adding REITs. The secondary purpose is to examine the overall performance of various portfolios created from common stocks and REITs. He shows that the absolute size of the risk reduction is greater for common stocks as the number of assets in the portfolio increases. He also shows that substantial risk reduction can be achieved with mixed-asset portfolios and the size of the risk reduction is greater for mixed portfolios of common stock and equity REITs than for mixed portfolios of common stock and mortgage REITs. However, Kuhle also finds that risk levels of common stock portfolios are substantially higher than the risk levels of equity and mortgage REIT portfolios.

Therefore, he concludes that a typical investor may prefer to hold portfolios consisting of equity REITs rather than portfolios of common stocks. Overall, he concludes that equity REITs have significantly lower portfolio risk than common stocks and mortgage REITs. The overall performance, which takes into account both risk and return for the same group of portfolios is measured by using a modified Sharpe performance ratio. The results suggest that equity REIT portfolios perform significantly better than portfolios of common stock, regardless of the number of assets held in the portfolio. On the other hand, mortgage REITs portfolios do not perform better than portfolios of common stock. Moreover, portfolios comprised of equity REITs outperform that of mortgage REITs. The analysis of mixed-asset portfolios shows that overall no better performance can be achieved by combining REITs and common stocks.

Peterson and Hsieh (1997) examine whether risk factors that explain the returns on common stocks and bonds can also explain the returns on equity and mortgage REITs. They utilize monthly return data from July 1976 to December 1992. Peterson and Hsieh use a five factor model (Fama and French, 1993) which is constructed using three stock market factors (market premium, size and book-to market ratios) and two bond market factors (unexpected changes in interest rates and changes in the probability of default) to explain the returns on REIT stocks. They demonstrate that EREIT returns are significantly related to three stock market factors. On the other hand, MREIT returns are significantly related to three stock market factors as well as two bond market factors. When they include only market factor in the regression, significant positive abnormal return is observed for EREITs throughout the sample period. However, when size and book-to-market factors are also added to regression, abnormal returns for EREITs disappear. On the other hand, when single factor model is applied for MREITs, the intercepts appear to be not significantly different from zero. However, they find that MREITs underperform by an average of 6.8% per year, when five factor model is employed. Additionally, they indicate that underperformance of the MREIT portfolio is not due to few bad years, outliers, an IPO effect, a missing factor associated with the prepayment option of a mortgage, captivity of REITs or advisor type. Overall, this study concludes that multifactor

models are superior to single-factor CAPM model in explaining returns on REIT securities.

One major study by Liang and McIntosh (1998) examines investment style and performance of REITs. They use the performance style model developed by Sharpe, and analyze monthly return data for REITs from March 1984 to December 1997. Total returns on S&P 500, S&P MidCap 400, S&P SmallCap 600, Lehman Brother's government bond index and Salomon Brother's three-month Treasury bill index are used as style portfolios to measure the performance of all REITs, i.e., equity REITs and mortgage REITs. The results reveal that, in terms of performance, all REITs exhibit negative alphas prior to 1995 and significant positive alphas since 1995. However, when we look at the performance of EREITs and MREITs separately, the story changes little bit. Equity REITs perform at par prior to 1994, and then dramatically outperform their style portfolios. On the other hand, mortgage REITs dramatically underperform prior to 1996 and outperform their style portfolios since then. In terms of style, all REITs and equity REITs perform like 40% small-cap stock and 60% bond plus Treasury bills. The only exception is the mortgage REITs, which do not fit into this asset allocation. Style attributes for mortgage REITs are less stable as evidenced by large standard deviations associated with their returns. Since, mortgage REITs comprise very small part of the REIT industry, authors base their conclusions primarily upon equity REITs. Moreover, R^2, one of the components of the model in use, gradually declines close to the end of sample period. The R^2 value of Sharpe model shows how much of the REIT returns is explained by public market factors. The lower the value of R^2 is, the higher the "unsystematic" return component of REITs. Thus, such a decrease in R^2 of the model implies that REITs become more "unique" relative to stock and bond factors close to the end of the sample period. Authors hypothesize that REIT market may have experienced some structural shifts towards the end of their sample period.

3.1.2 Performance of REITs Across Specific Property Types

Redman and Manakyan (1995) examine the relationship between risk-adjusted performance of REITs, and financial and property characteristics of their portfolios

from 1986 to 1990. They regress Sharpe ratios of EREITs and MREITs on financial ratios and characteristics of properties held in their portfolios. Financial variables are standard ratios applied in security analysis, such as gross cash flow, ROE, ROA, price-earnings ratio, etc. The real estate property characteristics examined are the amount of mortgages in a REIT portfolio, the geographic location of properties in the portfolio, the property types owned by a REIT, and the investments in securitized mortgages. According to Redman and Manakyan, property characteristics such as geographic location and property type (health care properties) appear to have significant influence on REIT returns. This finding is consistent with prior studies (Miles and Estes1982; Ibbotson and Siegel, 1984). On the other hand, they show that financial ratios are not incrementally significant in explaining REIT returns. This study stresses the importance of considering property characteristics of a REIT portfolio in examining its performance.

Myer and Webb (2000) use a methodology similar to that of Liang and McIntosh (1998) for evaluating the performance of REITs. They conclude that allocation of REITs' portfolio to different property types explains the difference in the performances of REITs. They show that poor performance of retail properties negatively influence the performance of their sample of REITs. In addition to that, they use data from 1994 to 1996; hence, they have a short sample period. Subsequently, their results for beta coefficient are not meaningful in statistical sense, so their performance results cannot be accurately interpreted.

3.1.3 Effect of Size and Capitalization on REIT Performance

Several authors addressed the relationship between a REIT's size and its performance. Financial literature documents that small firms outperform large firms – a phenomenon called as small-firm effect. McIntosh, Liang and Tompkins (1991) examine whether small-firm effect is present in REIT stocks as well. In their study, McIntosh, Liang and Tompkins use both ordinary least-squares method and aggregated coefficients method proposed by Dimson (1979) to measure the beta coefficients of securities. Aggregated coefficients method is proposed for those stocks, which trade infrequently in the market. The model incorporates both lagged

and leading market returns along with contemporaneous market returns. Contrary to previous research on common stocks, small REITs are shown to be not more risky than large REITs, according to both least-squares method and aggregated coefficients method. This finding casts doubt on explanations of small-firm effect in common stocks returns in financial literature on efficient markets which argues that small firms are more risky than large firms, therefore they should provide higher returns to compensate for their higher risk.

Mueller (1998) compares the performance of small-cap REITs with that of mid-cap and large-cap REITs. His results show that from 1993 to 1997, small-cap REITs outperform large-cap REITs on a risk-adjusted basis. However, Mueller points out that the results should be interpreted with caution. During their sample period, small-cap REITs are able to produce superior returns because of their property acquisitions rather than improving their funds from operations (FFO) per share as a result of active management strategies. This strategy may be successful in the short run when initial capitalization of a REIT is small. In this case, each additional acquisition has higher marginal contribution to the performance of a REIT. Moreover, small-cap REITs preferably invest in assets that provide investors with immediate return, whereas mid-caps can afford investing in income generating properties. Nevertheless, after a REIT becomes large enough, additional acquired properties are going to constitute an insignificant percentage of total capital, hence FFO per share tend to decrease gradually. Thus, people who invest in REITs for the long term and seek constant income should look for actively managed ones, while those who seek profit in the short run may be interested in investing in small-cap REITs.

Chandrashekaran and Young (1999) examine whether consolidation of the REIT industry changed in 1990s. A widely accepted view is that consolidation leads to better performance (as in automobile and petroleum industries), since greater size brings economies of scale. They employ three concentration measures; Gini concentration index, Herfindahl index and a heuristic measure based on market share of top three firms in the industry. Gini index measures to what extent the distribution of market shares of the industry is scattered. Third measure, market

share of top three firms, is not a formal procedure for testing the concentration level, however it provides an overall view of concentration level of top three firms. The main finding of this study is that concentration of the REIT industry did not increase significantly in 1990s. Chandrashekaran and Young also compare the concentration of the REIT industry with that of other industries and conclude that concentration level of the REIT industry is the smallest. An interesting finding of this study is that the REIT industry can achieve higher levels of concentration, while the number of firms stays the same or even increase. This is somewhat counterintuitive given the common view on concentration. Ambrose, Ehrlich, Hughes and Wachter (2000) study the benefits of consolidation in real estate industry. Particularly, Ambrose, Ehrlich, Hughes and Wachter (2000) examine whether there are gains due to economies of scale, brand imaging and geographic specialization. They conclude that there are no gains from economies of scale or geographic specialization. On the other hand, gains from brand imaging are symbolic.

3.1.4 Effect of Management Structure on REIT Performance

Prior to 1986 Tax Reform Act, legislation imposed several limitations on the REIT structure. For example, REIT's assets had to be managed by a separate independent advisory company. Thus, REIT management could not engage in active management of properties in their portfolios. The purpose of separating managing activities from the ownership was to separate fiduciary responsibility of REIT management from provision of services to tenants[6]. After 1986 Tax Reform Act, REITs are allowed to manage their properties themselves and many of them have selected this form of management.

Howe and Shilling (1990) examine the effect of advisor type on the performance of REITs. They divide advisor type into seven categories: real estate advisor, syndicator, mortgage banker, insurance company, individual, other and not known. They employ Jensen, Treynor, and Sharpe measures to investigate the performance of REITs over a period from 1973 to 1987. Howe and Shilling conclude that advisor type influences the performance of a REIT. However, all REITs in their sample

[6] Federal Tax Coordinator 2d

exhibit zero or negative abnormal returns during their sample period. Thus, regardless of advisor type, investors cannot achieve excess returns by investing in REITs, which are managed by professional money managers. Cannon and Vogt (1995) extend this study by comparing the performance of "advisor" and "self-administered" REITs. "Advisor" REITs are those, whose properties are managed by a separate advisory company and "self-administered" REITs manage their assets themselves. They show that self-administered REITs outperform their advisor managed counterparts. Similarly, Hsieh and Sirmans (1991) compare the performance of "captive" and "non-captive" REITs. A "captive REIT" differs from other types of REITs mainly due to two factors. First, it is founded by a sponsor or an affiliate. Second, this type of REIT is managed by an advisory company, which is wholly owned by its sponsor/affiliate. Thus, there may be a conflict of interest between the sponsor/affiliate and the shareholders of that REIT. Using monthly data for fifty-five NYSE-traded REITs they conclude that non-captive REITs exhibit superior performance compared to affiliated REITs. They attribute inferior performance of captive REITs to greater agency costs between managers and shareholders.

Kallberg, Liu and Trzcinka (2000) study REIT mutual funds. REIT mutual funds are open-end funds that specialize in investing in real estate related securities. Particularly, they invest in REIT stocks, so they may be also viewed as "fund of funds". They use both single-factor and multi-factor models with stock market and real estate market indexes to determine whether REIT mutual funds achieve abnormal returns. They show that actively managed funds are superior to passively managed funds. Moreover, contrary to findings in several prior studies on mutual funds, Kallberg, Liu and Trzcinka record positive significant alphas across their sample of REIT mutual funds.

Sirmans, Friday and Price (2006) examine the impact of management turnover on the performance of REITs. Since contribution of management to the performance of a fund is quite difficult to quantify, they take the return on REIT stocks as a proxy for management skills. The authors use abnormal returns and cumulative abnormal returns before and after the announcement of management change to track the

performance of REITs. They hypothesize that if the management of a REIT performs poorly, then the stock price of that REIT is going to decline both in absolute terms and in relation to the market. Sirmans, Friday and Price look at this issue both in absolute terms and in relation to the market. They use data on 158 REITs traded between 1984 and 2003. Their results show that significant relationship exists between negative performance of a REIT and turnover starting from three months before the management change. Moreover, a persistent negative effect is observed up to nine months following the management change. They also investigate the possibility of predicting management changes based on ex post negative performance. However, they find no predictive ability for negative performance. On the other hand, McIntosh, Rogers, Sirmans and Liang (1994) examine the ability of REIT performance to predict management changes, and conclude that performance and possibility of management change are inversely related.

3.1.5 Predictability and Seasonality of REIT Returns

Liu and Mei (1992) examine the predictability of EREIT returns. They use multifactor latent variable model that allows for time varying risk premiums. Sample includes 19 years of monthly data from 1971 to 1989. They find that expected excess returns are more predictable for EREITs than for all other asset classes. Moreover, the risk premiums for EREITs vary substantially throughout their sample period. Liu and Mei report that REIT stocks behave similar to small cap stocks, which is consistent with findings of several studies (Clayton and MacKinnon, 2001; Liang and Whitaker, 2000; Anderson, Clayton, MacKinnon and Sharma, 2005). An interesting finding of this study is that conditions prevailing in the real estate market influence returns on small cap stocks as well as EREIT returns. Liao and Mei (1998) extend the work of Liu and Mei (1992) by expanding the sample. They include not only equity and mortgage REITs, but also other real estate securities such as stocks of builder and owner companies, and mortgage backed securities (MBSs). They have several major findings. First, expected excess returns on real estate related securities are more predictable than expected excess returns on the value-weighted portfolio of stocks and bonds. Second, real estate market risk premiums vary

substantially over time, so market timing is important. Third, MBSs are more similar to bonds than mortgage REITs. Finally, real estate stocks have high sensitivity to movements in the stock market, which implies the existence of little diversification benefits from inclusion of REITs in stock portfolios. Predictability of REIT returns is supported by Nelling and Gyourko (1998). They examine the predictability of monthly returns on EREITs over a period from 1975 to 1995 and compare it with that of small-cap and mid-cap stocks. They use the time series approach introduced by Jegadeesh (1990) and find that REIT returns are less predictable than common stock returns, however due to transaction costs no arbitrage is possible. Another issue that Nelling and Gyourko address in their study is the persistence in the performance. Results of nonparametric tests indicate that only ten of sixty-one REIT exhibit significant persistence. When these REITs are examined in detail, it appears that they primarily invest in retail properties. Thus, persistence might be more attributable to property types held in their portfolios rather than the REIT structure itself.

Several studies investigate the existence of seasonality effects in the REIT industry. One of such studies is carried out by Colwell and Park (1990). They examine size-related seasonality effects in equity and mortgage REITs. They conclude that average return on REITs in January is higher than that in any other month, and excess return in January tends to disappear for large equity and mortgage REITs. Furthermore, they find that January effect is higher for mortgage REITs than for equity REITs. On the other hand, equity REITs perform better than mortgage REITs in the remaining months of the year.

Friday, Howton and Howton (2000) examine the operating performance of 200 REITs following their seasoned equity offerings (SEO). They show that on average REITs perform better than industrial firms following their SEOs. Moreover, REITs exhibit nonnegative performance changes after the SEO, whereas Loughran and Ritter (1997) find that industrial firms' performance deteriorate substantially following the SEO. Friday, Howton and Howton interpret this discrepancy as the result of a regulatory constraint imposed on REITs. Since, REITs have to distribute 95% of their income as dividends in order to keep their tax-free status, they turn to

external financing sources for growth purposes. Thus, as opposed to industrial firms, issuing equity may not be taken as a negative signal by the market for REITs.

3.1.6 Methods of REIT Performance Measurement

Different models are employed to measure the performance of REITs. Traditionally, performance is measured using the Capital Asset Pricing Model (CAPM). Performance measures, like Jensen's alpha and Sharpe's ratio, are frequently applied to REIT data. As mentioned above, one of the pioneering works in the area of REIT performance by Smith and Shulman (1976) use CAPM to calculate the intercept of the regression. A decade later, Titman and Warga (1986) argue that CAPM is not capable of capturing all information embedded in REIT stocks, so they introduce an APT model to explain the returns generated by REITs. They employ two multi-factor models. The first one is formed by the market portfolio and the portfolio of long-term government bonds. On the other hand, the second model includes five-factor portfolios, which are formed via maximum likelihood factor analysis. Combination of five-factor model portfolios tries to mimic major macroeconomic variables like interest rates and inflation. Nevertheless, their results indicate a poor performance for the APT as compared to the CAPM. Chan, Hendershott and Sanders (1990) use a methodology similar to that of Titman and Warga (1986) and find different results. Excess returns exist when they apply the CAPM to adjust for risk difference, but these excess returns disappear when the APT is used, instead.

Liu and Mei (1992) use multifactor latent variable model in their study. This model allows for time varying risk premiums. They argue that findings of previous research are driven by the use of constant risk premium models. Since it is very likely for the risk premium to change over time, imposing constant risk premium may lead to biased results. On the other hand, time varying risk premiums would provide more accurate estimates of risk for each time period.

Vines, Hsieh and Hatem (1994) employ the skewness preference CAPM (SPCAPM) model to explore the impact of systematic coskewness on EREIT returns. They conjecture that right skewed securities have higher probability of gaining above mean returns, so investors should be willing to accept lower risk-adjusted returns on

these securities. However, results of their study reveal that systematic coskewness does not explain EREIT returns.

An important study using factor loading (FLM) and macro-variable models (MVM) is conducted by Chen, Hsieh and Jordan (1997). Authors try to compare which of the two APT models better explains returns on equity REITs. They use three equal length sample periods, six year each: 1974-1979, 1980-1985, and 1986-1991. They employ two tests to compare these two models: comparison of cross-sectional adjusted R^2's and Davidson and McKinnon test. Overall, MVM performs better than FLM over second and third sample periods, and both models performed about the same for the first sample period.

Although most studies use various versions of classic linear regression models, some studies try to apply different models to REIT returns. Lizieri, Satchell, Worzala and Dacco (1998) hypothesize that linear model may not be appropriate for modeling different market behavior. Alternatively, they propose a threshold autoregressive (TAR) model for examining real estate performance. They conclude that TAR model offers better predictive power than conventional linear model. Ling and Naranjo (2006) examine the dynamic relation between REIT capital flows and REIT returns using a vector autoregressive (VAR) model. As opposed to conventional models, a VAR model allows for estimation of long-run, short-run relationships, impulse response functions, variance decompositions. They find that past performance of REITs and following capital flows are positively related, however, they do not find any influence of capital flows on REIT returns.

3.2 Closed-End Funds (CEFs) Literature Review

In the previous chapter it was mentioned that closed-end funds (CEFs) have been less popular than their open-end (mutual funds) counterparts. Since investors have mostly invested in mutual funds, most of the studies related to fund performance have been dedicated to the performance of mutual funds. Moreover, studies related to CEFs, in most cases, examine the issue of discounts (premiums) and there is limited number of studies investigating the performance of CEF stocks. Since the issue of discount (premium) is beyond the scope of this paper, those interested are

referred to an extensive survey done by Dimson and Minio-Kozerski (1999). One of the major and earliest studies examining the investment performance of closed-end funds is done by Roenfeldt and Tuttle (1973). They hypothesize that the stock price of a CEF deviates from the value of the assets in its portfolio because of below or above average performance expected from that fund. Specifically, they argue that investors expecting a particular CEF to exhibit inferior performance penalize that fund by paying a price less than its NAV for its stock. On the other hand, those funds that are expected to do better than the benchmark are in high demand, so are paid more than the NAV of their underlying portfolios (i.e. selling at a premium).

Arguments of Roenfeldt and Tuttle are supported if a CEF with negative (positive) risk adjusted performance trades at a discount (premium) throughout their sample period. Roenfeldt and Tuttle use data for 12 diversified CEFs obtained from Wiesenberger's Investment Company for the period from 1953 to 1970. Of those twelve funds in their sample, seven trade continuously at a discount from 1953 to 1966. Remaining five funds trade at a discount in some years and at a premium in others. Moreover, one fund trades continuously at a premium from 1962 to 1970.

Given the arguments of Roenfeldt and Tuttle, those funds selling at a continuous discount (premium) are of primary interest to authors. They employ Jensen's performance measure (Jensen's alpha) to estimate the risk-adjusted performance of these funds. Their results show that five of the seven funds trading at a discount throughout their sample period exhibit negative alphas with only two of them being statistically significant at 95% confidence level. However, none of these seven funds exhibit positive intercepts over the whole sample period. The fund which continuously trades at a premium over the period from 1962 to 1970 shows a positive alpha for that time period, although the intercept is not statistically significant. However, the power of these tests with limited observations is questionable. Overall, the result of this study shows that CEFs could not outperform or underperform the overall market.

The abovementioned results are obtained by analyzing returns based on NAVs of those funds. However the market price of a CEF frequently differs from its NAV, so

Roenfeldt and Tuttle also use the market prices in order to estimate the risk-adjusted performance of CEFs. Particularly, they propose that if the market prices are used instead of NAVs, then the intercepts (Jensen's alphas) should be no different from zero, since investors reflect their expectations in stock prices. Their results using a similar procedure with stock prices instead of NAVs support this argument.

In another major study, Guy (1978) examines the performance of British closed-end funds, which are called investment trusts in the UK.[7] The sample period is from January 1960 to December 1970. A total of 149 trusts are left in the final sample after imposing certain restrictions. From this sample, top 25 large-cap CEFs trading in London Stock Exchange (LSE) are selected and this sample is supplemented by 22 more CEFs selected randomly from remaining trusts.

Guy separates the performance measures into three groups: (1) traditional performance measures; (2) performance measures based on SML; and (3) performance measures based on zero-beta CAPM model. Traditional measures of performance, such as Jensen, Treynor and Sharpe, are used to evaluate the performance of the UK investment trusts. Guy evaluates the performance of UK investment trusts over three time intervals: 1960-1964; 1964-70 and 1960-1970. However, none of the traditional performance measures indicates statistically significant performance for any of the UK investments trusts in any time interval at 5% significance level.

Besides traditional measures of performance, Guy also uses historical risk return relationship of the market throughout the relevant period to measure the performance of investment trusts. Firstly, he uses 99 companies to estimate the SML. Then the performance measure is defined as the vertical distance from the estimated SML. Significant results are obtained if the performance of any of the 47 investment trusts lies more than two standard deviations from the estimated SML. In 1960-1964 sample period, among 47 trusts, 18 have significant positive or negative performance. Similarly, during the period from 1964 to 1970 only 9 trusts have significant performance.

[7] Similarly, open-end funds are called unit trusts in the UK.

Third approach to measure the performance is to use zero-beta form of the CAPM. In this model, return on a zero-beta portfolio is used instead of traditional risk-free security return. Thus, trust i's return in excess of the return on the zero-beta portfolio is regressed on the return on the market portfolio in excess of the return on the zero-beta portfolio. Consequently, if alpha of this regression is statistically significantly positive or negative, then it can be concluded that the trust performs better or worse than the overall market. During 1960-1964, no trust exhibit statistically significant results at 5% significance level. The same result is obtained for the years from 1964 to 1970. As a result, Guy concludes that either trusts in the UK underperform the benchmark or the tests are not powerful enough to detect the superior performance of these funds.

Woodward (1983) also examines the investment performance of the UK closed-end funds. In addition to traditional CAPM based performance measures (Jensen's alpha, Sharpe, Treynor measures), Woodward uses alternative performance measures; such as mean/variance (E-V), Arditti's 3rd moment (Arditti, 1971) and second degree stochastic dominance (SSD). These alternative measures are more advantageous than the CAPM based ones in the sense that they do not require the existence of a market portfolio which is hard to replicate. Moreover, SSD is a more general criterion than Arditti's 3rd moment and E-V criteria since it does not place restrictions on the return distributions (i.e. normality).

The sample includes 40 quarterly observations from January 1968 to December 1977 for each of the forty-one major UK funds. The return data is obtained from UK All-Share Actuaries market index and UK All-Share index is used as the proxy for the market portfolio. The results show that, on average, performance of UK CEFs is inferior to that of the UK All-Share Index (irrespective of the criteria used). However, separate funds seem to exhibit superior performance. According to the results, alternative performance measures (Arditti's 3rd moment, SSD, E-V) are more strict than the CAPM based measures. In other words it is harder to find funds with superior performance using these alternative measures.

Woodward also tries to look at the persistence in the performance of the CEFs. He divides the whole sample period into two five year sub periods. The results are

ambiguous. Three of these measures, namely Treynor, Jensen, Arditti criteria, imply that past performance is a good estimator of the future performance. This finding indicates that investors can look at the historical performance of a fund, while making their investment decisions. However, the remainder of these measures (SSD, E-V, Sharpe criteria) indicate exactly the opposite. Subsequently, Woodward concludes that past performance of the UK CEFs cannot be used by investors to predict the future performance.

Following Woodward (1983), Bal and Leger (1996) also examine the investment performance of the UK investment trusts. However they employ only Jensen, Sharpe and Treynor measures to evaluate the security selection ability of fund managers. They expand Woodward's study by analyzing a sample of 92 UK investment trusts trading from 1975 to 1993. They evaluate the performance of these trusts over 14 five-year rolling periods and use Financial Times All-Share Index to replicate the market portfolio. They conclude that UK investment trusts, on average, underperform the overall market regardless of which performance measure is used. They also note that application of Sharpe or Treynor measures does not affect the results significantly. This finding might be interpreted as high correlation between the total risk and the beta of a security. Nevertheless, several individual funds (29 out of 92) exhibit significant positive returns, which may be an indication of their superior stock selection ability.

As opposed to previous studies, Patro (2001) examines the investment performance of international closed-end funds, which gained popularity in recent years. He uses monthly returns for 45 US based international CEFs from January 1991 to August 1997. As a benchmark, returns on market indexes of various countries, regions and world market are obtained from Morgan Stanley Capital International (MSCI). In order to estimate the risk-adjusted performance of international CEFs, Patro employs Jensen's measure of performance, as well as Treynor-Mazuy measure of market timing ability of fund managers. The results suggest that international CEFs do not outperform the overall market and exhibit performance similar to selected market indexes. Treynor-Mazuy measure also shows that CEFs cannot outperform

related market indexes, so fund managers do not exhibit superior market timing ability.

Overall studies looking at the performance of CEFs strongly suggest that CEFs fail to exhibit superior performance compared to their benchmarks. Very limited number of funds exhibit significant positive performance for certain period of time. In general studies conclude that either the performance of funds is inferior to the selected benchmarks or the performance is not statistically significant.

CHAPTER 4

DATA AND METHODOLOGY

This study intends to measure the performance of investment companies in Turkey. First, the performance of REITs trading on the Istanbul Stock Exchange is measured on a risk-adjusted basis. Then, the performance of Closed-End Funds (CEFs) is analyzed. Finally, the performance of REITs is compared to that of CEFs.

All data is obtained from the Istanbul Stock Exchange (ISE). There are a total of 14 REITs and 33 CEFs trading on the ISE as of the end of year 2009. The sample of REITs is not very large; however it is the universe of REITs in Turkey. The earliest REIT started trading on January 1997. On the other hand, some REITs started operating in 2005, so they have very small number of observations. Samples of unequal length are analyzed for different REITs in this study in order to avoid survivorship bias and to have as many observations as possible in the sample. One REIT (EGS GMYO) is excluded from the sample, because it trades on the watch market. Similarly, five CEFs (Euro B Tipi Menkul Kıymetler Yatırım Ortaklığı, Euro Trend Yatırım Ortaklığı, İnfotrend B Tipi Menkul Kıymetler Yatırım Ortaklığı, Marbaş B Tipi Menkul Kıymetler Yatırım Ortaklığı, Merkez B Tipi Menkul Kıymet Yatırım Ortaklığı) are also excluded from the sample, because they are Type B funds[8]. Also, one former CEF – Pera Menkul Kıymetler Y.O. – is included in the sample for the period from January 1997 to August 2006. In September of 2006,

[8] There are two types of CEFs in Turkey. One is Type A fund, which must invest minimum 25% of their assets in equities that are issued by Turkish companies. Another one is Type B fund, which does not have such an obligation.

this CEF has its status changed to a REIT and included in the sample of REITs from September 2006 to December 2009 as Pera GMYO.

The monthly return on any asset analyzed in this study is calculated using the following equation:

$r_{it} = [(P_t - P_{t-1})/ P_{t-1}] * 100$

where r_{it} is the return on asset *i* at period *t*, P_t is the price of asset *i* at time *t*, and P_{t-1} is the price of asset *i* at time *t-1*.

The ISE-100 index is selected as the proxy for the market portfolio and return on three month government bonds is used as the proxy for the risk-free rate of return. Data on the ISE-100 index is obtained from the ISE's web site[9]. Daily transactions of government bonds are received from the ISE Database starting from January 1997 to December 2009. Then, each month the compound return on the bond that trades on the last working day of that month is taken as the risk-free rate of return, provided that maturity of the selected bond is approximately 90 days. If there is not any bond with exact maturity of 90 days, the one with maturity closest to 90 days is picked instead and if there are still no good candidates, then transactions on the previous or on the next day are analyzed. Finally, obtained returns are converted to the monthly rate using the following formula:

Monthly rate = $(1 + \text{Effective rate}/100)^{(1/12)} - 1$

The performance of REITs and CEFs is evaluated on a risk adjusted basis. Risk adjusted returns are calculated using three different asset pricing models. The first model is the traditional single-factor model introduced by Jensen (1968). Secondly, the three-factor model of Fama and French (FF) (1993) is used. Third model is Carhart's four-factor model (Carhart, 1997), which incorporates the momentum factor to the three factors in Fama-French three-factor model. In the following subsections, models used to calculate the risk adjusted returns on investment companies are explained in detail.

[9] www.imkb.gov.tr

4.1 The Single-Factor Capital Asset Pricing Model (CAPM)

The traditional Capital Asset Pricing Model of Sharpe (1964), Lintner (1965), and Black (1972) has been largely used by practitioners for a long time to assess the risk and return relationship of securities. The CAPM argues that the only variable related to the risk of a security is its covariance with the overall market or market beta. Thus, investors should only be concerned about the sensitivity of a certain security to the market fluctuations. Jensen (1968) for the first time employs the CAPM to measure the performance of mutual funds in the US.

Similar to Jensen's model, the following model can be specified to measure the performance of REITs and CEFs in Turkey:

$$r_{it} - r_{ft} = \alpha_i + \beta_i(r_{mt} - r_{ft}) + \varepsilon_{it} \quad \textbf{(1)}$$

where

α_i is the intercept (Jensen's alpha) for security *i*,

r_{it} is the return on security *i* at time *t*,

r_{ft} is the risk-free rate of return at time *t*,

β_i is the market risk for security *i*,

r_{mt} is the return on the market portfolio at time *t*,

ε_{it} is the random error with zero mean.

In this model, monthly returns on REIT and CEF shares are regressed on market premium, which is obtained as the difference between the return on the market portfolio and the risk-free rate. Thus, a significant positive intercept would imply abnormal positive returns for REITs (CEFs), and a significant negative intercept would mean that performance of a REIT (CEF) portfolio is inferior to that of the market portfolio. Moreover, beta coefficients greater than one would mean that REIT (CEF) stocks are more risky than the overall market and beta coefficients lower than one would imply that REIT (CEF) stocks are defensive securities.

4.2 The Fama-French Three-Factor Model (FF3F)

As mentioned above, the CAPM is a single factor model that uses the market beta as the only risk factor. However, later research suggests that besides the market beta there are other risk factors which investors should be concerned about. In other words, the CAPM is not capable of capturing all risks inherent in the securities investments.

Fama and French (1992, 1993) (thereafter FF) propose an alternative model known as Fama-French three factor (FF3F) model. FF (1992) state that there are mainly two anomalies, which cannot be explained by the single factor CAPM. First of all, prior research suggests that the average return on small stocks (stocks with low market equity (ME)) is higher than the average return on large stocks (stocks with high ME), even after controlling for their betas (Banz, 1981; Reinganum, 1981). Secondly, the average return on value stocks, which are characterized by high book-to-market ratios (high BME) is higher than that on growth stocks, which are characterized by low book-to-market ratios (low BME) (Stattman, 1980; Rosenberg, Reid and Lanstein, 1985). To account for these anomalies, FF propose adding two additional factors; namely 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) to the asset pricing model.

FF hypothesize that financial distress factor of Chan and Chen (1991) might be an explanation for the proportion of risk captured by BME. Particularly, Chan and Chen (1991) propose that firms which are expected to have bright future have high stock prices, therefore, low BME ratios. On the other hand, firms which are expected to perform poorly in the future have low stock prices, therefore, high BME ratios (market penalizes these firms).

FF3F model can be specified as follows:

$$r_{it} - r_{ft} = \alpha_i + \beta_{1i}(r_{mt} - r_{ft}) + \beta_{2i}SMB + \beta_{3i}HML + \varepsilon_{it} \quad \textbf{(2)}$$

where

α_i is the intercept for security *i*,

r_{it} is the return on security *i* at time *t*,

r_{ft} is the risk-free rate of return at time *t*,

β_{1i} is the sensitivity of security *i* to the market factor,

β_{2i} is the sensitivity of security *i* to the size factor,

β_{3i} is the sensitivity of security *i* to the book-to-market factor,

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

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

ε_{it} is the random error with zero mean.

Particularly, FF (1993) design is replicated to construct *SMB* and *HML* factors. In order to be included in a portfolio, a stock should be traded on the ISE in December of year *t-1* and also in June of year *t*. Moreover, a firm should have a fiscal year end of December[10].

First of all, each year on June 30, firms are sorted on size (ME). Size is measured as the stock price multiplied by the number of shares outstanding on that day. Then stocks are divided into two groups using median ME. The groups are designated as big (B) and small (S). The stocks are also independently sorted into three groups according to their book to market value of equity (BME). Top 30%, middle 40% and bottom 30% BME stocks are called as high (H), medium (M) and low (L), respectively. To determine BME of each stock, the book value of shareholder's equity on December 31st of year *t-1* is divided by the market value of equity on June 30th of year *t*. Negative equity firms are excluded from this grouping.

[10] Practically, all firms trading on the ISE have fiscal year-end in December.

Afterwards six portfolios are constructed from the intersection of two size groups and three BME groups (S/L, S/M, S/H, B/L, B/M, B/H). In other words, for instance, S/M portfolio consists of firms that are in the small ME group and also in the medium BME group. Then monthly value-weighted returns on each of these six portfolios are calculated starting from July 1^{st} of year *t* to June 30^{th} of year *t+1*, rebalancing the portfolios each year on June 30^{th}.

Finally, *SMB* factor is calculated each month as the difference between the simple average return on the three small-size portfolios (S/L, S/M, S/H) and the simple average return on the three big-size portfolios (B/L, B/M, and B/H). Similarly, *HML* factor is obtained as the difference between the simple average return on the two high-BME portfolios (S/H and B/H) and the simple average return on the two low-BME portfolios (S/L and B/L).

After *SMB* and *HML* factors are calculated, dependent variable – excess return on REITs (CEFs) – is regressed on market excess return, *SMB* and *HML* factors in accordance with the model specified above. Proxies for market return and risk free return are as specified in the beginning of this chapter.

4.3 The Carhart's Four-Factor Model

Fama and French (1993, 1995) in their studies recommend adding two more factors, namely *SMB* and *HML*, to the traditional single factor CAPM. The *SMB* and *HML* factors both are intended to mimic the risk factors that are important to investors. These two factors also account for two anomalies described in FF (1992). However, Carhart in 1997 modifies the FF3F model by adding a momentum factor to it; thus developing a four-factor model. Carhart argues that there exists one more anomaly which is not captured by the FF3F model and the investors should care about this as well. He calls this fourth factor as the momentum factor, which is designed to mimic one-year momentum effect in stock returns. Particularly, Jegadeesh and Titman (1993) show that buying well performing stocks (winners) and selling poorly performing stocks (losers) based on their past performance over the previous 3-12 month time periods produce significant positive abnormal returns per month for the following year. In fact, FF (1996) show that their three-factor model does not

capture the short-term momentum strategy of Jegadeesh and Titman (1993). Consequently, Carhart's fourth factor model is based on taking a long position in winner stocks and a short position in loser stocks.

Carhart's four-factor model can be shown as follows:

$$r_{it} - r_{ft} = \alpha_i + \beta_{1i}(r_{mt} - r_{ft}) + \beta_{2i}SMB + \beta_{3i}HML + \beta_{4i}WML + \varepsilon_{it} \qquad (3)$$

where

α_i is the intercept for security *i*,

r_{it} is the return on security *i* at time *t*,

r_{ft} is the risk-free rate of return at time *t*,

β_{1i} is the sensitivity of security *i* to the market factor,

β_{2i} is the sensitivity of security *i* to the size factor,

β_{3i} is the sensitivity of security *i* to the book-to-market factor,

β_{4i} is the sensitivity of security *i* to the momentum factor,

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

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

WML is the risk premium on the momentum factor,

ε_{it} is the random error with zero mean.

All factors except the *WML* factor are constructed as explained in the subsection 4.2. In order to construct Carhart's fourth factor, the procedure described in Carhart (1997) is followed. Every month, stocks are ranked on the basis of their previous 11 month return lagged by one month. In other words, this 11 month time period covers months from *t-2* to *t-12*. One month lag is used to avoid the bias introduced in returns due to bid-ask spread. Then stocks ranked in the top 30% and the bottom 30% based on their past performance are designated as Winner (W) and Loser (L) portfolios, respectively. The next step is to calculate the equally-weighted return for

both Winner and Loser portfolios. Finally, momentum (*WML*; winner minus loser) factor is obtained by subtracting the return on the Loser portfolio from that on the Winner portfolio (W-L). The portfolios are rebalanced each month, meaning that they are rolled one month forward each time throughout the sample period.

In all three models specified above, the primary variable of interest is the intercept (alpha). Hence, significant positive intercepts would imply superior performance of REITs (CEFs) and significant negative intercepts would indicate that REITs (CEFs) are underperforming the constructed benchmarks. The null and alternative hypotheses can be shown as following:

$$\boldsymbol{H_0}: \alpha = 0$$

$$\boldsymbol{H_1}: \alpha \neq 0$$

Moreover, as we proceed from single-factor CAPM to FF3F model and then to Carhart's four factor model, we will observe the changes in the adjusted R^2 of these regressions. It is expected that the explanatory power of model would increase as more variables are added to the regression equation.

CHAPTER 5

EMPIRICAL RESULTS

This section presents empirical results of the thesis on the performance of Turkish REITs and CEFs. In this thesis, the risk-adjusted performance of investment companies is measured using three different asset pricing models: 1) the single-factor CAPM; 2) the Fama-French three-factor model; and 3) the Carhart's four-factor model. First, some descriptive statistics for both REITs and CEFs are discussed. Then, estimation results of each model are explained in detail.

5.1 Descriptive Statistics

There are thirteen REITs and twenty nine CEFs included in the sample period from January 1997 to December 2009. Samples of unequal length are analyzed in this thesis to avoid the survivorship bias and to have as many observations as possible for each company. Thus, it should be noted that some REITs and CEFs have smaller number of observations than others.

Table 5.1 shows some descriptive statistics for Turkish REITs. As it can be seen from this table there are only two REITs trading on the ISE in 1997. By 2002, this number increased to eight. The first REIT established is Vakıf GMYO and the youngest one is Ozderici GMYO, which is founded in 2008. Actually, Ozderici GMYO, like Pera GMYO, is originally not established as a REIT but acquired the REIT status later on. The average monthly return for REITs varies from 0.76% to 5.72% with an overall average monthly return of 2.63%. According to Table 5.1, in general, mean monthly return on Turkish REITs is higher than mean monthly return on the ISE 100 index for the same period. Among 13 REITs only 4 REITs have lower average monthly returns than the ISE 100 index. However, all REITs, but one,

also have higher standard deviation than that of the ISE 100 index. Hence, a formal statistical procedure, which takes into account both the return and the standard deviation, is required to compare the average returns for REITs and the ISE 100 index. In this respect, test for equality of average returns on REITs and the ISE 100 index is conducted and the results are summarized in Table 5.2. As it can be observed from the table, the test fails to reject the null hypothesis of equality of average returns (H_0: $\mu_1 = \mu_2$) on all Turkish REITs to that on the ISE 100 index. In other words the mean return for any Turkish REIT is statistically indistinguishable from the mean return on the ISE 100 index for the same time period. Since the average returns for both REITs and the ISE 100 index are close to each other and their variability (standard deviation) is relatively high, the test results strongly suggest that statistically the mean returns on these assets are equal to each other. When we compare the basic statistics of REITs with returns on *SMB* and *HML* factors, which are constructed according to the three-factor model proposed by Fama and French (1993), we observe results very similar to those for ISE 100 index.

Table 5.3 summarizes basic statistics for Turkish CEFs. There are twenty nine CEFs in the sample, which is more than twice the size of the REIT sample. Significant number of CEFs included in our sample started trading on the ISE before 2000, so we have sufficient number of observations for most of the CEFs. According to Table 5.3, CEFs earned higher return than the ISE 100 index over the same time period. The average monthly return on all CEFs is 3.76%. However, as it is the case for REITs, CEFs also have higher variation in their returns, which is represented by higher standard deviation values. Only one CEF, Oyak Y.O., has a negative average monthly return of 0.61% during our sample period. This CEF is also the only one which has lower standard deviation than the ISE 100 index. In order to take into account both the returns and their standard deviations, the test for equality of means is conducted for Turkish CEFs as well. Table 5.4 presents the results of the test of equality of means for CEFs. Despite the fact that mean returns on CEFs are generally higher than mean returns on the ISE 100 index in values, statistically all CEFs have mean returns equal to the ISE 100 mean return for the same time period. Once again, large variability of the returns leads to the failure to reject the null hypothesis of equality of means.

Table 5.1 Selected Statistics for Turkish REITs

No	REIT Name	ISE Code	IPO Date	First Trading Date	REIT				ISE 100			
					Mean %	S.D	Max %	Min %	Mean %	S.D	Max %	Min %
1	ATAKULE GMYO	AGYO	Feb-02	Feb-02	2.53	16.14	47.48	-33.10	2.02	10.58	29.74	-23.12
2	AKMERKEZ GMYO	AKMGY	Apr-05	Apr-05	0.76	8.50	22.12	-22.92	1.74	9.64	22.85	-23.12
3	ALARKO GMYO	ALGYO	Dec-96	Jan-97	3.71	16.91	64.81	-42.31	3.70	15.71	79.78	-39.03
4	DOĞUŞ-GE GMYO	DGGYO	Mar-98	Mar-98	4.07	24.14	154.79	-44.52	3.04	15.26	79.78	-39.03
5	İŞ GMYO	ISGYO	Dec-99	Dec-99	2.66	20.51	153.57	-34.44	2.47	14.49	79.78	-35.39
6	NUROL GMYO	NUGYO	Dec-99	Dec-99	2.39	17.98	64.00	-40.74	2.47	14.49	79.78	-35.39
7	ÖZDERİCİ GMYO	OZGYO	Sep-94	Mar-08	1.21	30.26	107.87	-35.56	1.43	11.95	22.85	-22.80
8	PERA GMYO	PEGYO	Apr-92	Sep-06	1.40	24.42	66.38	-39.62	1.39	10.21	22.85	-23.12
9	SAĞLAM GMYO	SAGYO	Feb-07	Mar-07	2.60	18.44	51.54	-26.32	1.30	10.90	22.85	-23.12
10	SİNPAŞ GMYO	SNGYO	Jun-07	Jun-07	1.90	21.58	65.03	-35.14	1.01	11.38	22.85	-23.12
11	VAKIF GMYO	VKGYO	Dec-96	Jan-97	5.72	28.72	216.67	-53.51	3.70	15.71	79.78	-39.03
12	YAPI KREDİ KORAY GMYO	YKGYO	Jun-98	Jun-98	3.13	20.08	71.93	-62.11	2.99	15.22	79.78	-39.03
13	Y & Y GMYO	YYGYO	Dec-99	Dec-99	2.11	22.92	128.92	-47.44	2.47	14.49	79.78	-35.39

Table 5.1 Selected Statistics for Turkish REITs (continued)

No	ISE Code	SMB				HML				WML			
		Mean %	S.D	Max %	Min %	Mean %	S.D	Max %	Min %	Mean %	S.D	Max %	Min %
1	AGYO	1.51	8.61	65.00	-11.68	0.28	11.00	21.03	-95.28	106.40	35.06	197.17	47.78
2	AKMGY	0.77	5.67	17.49	-11.68	1.09	4.69	21.03	-8.91	98.60	34.79	186.21	47.78
3	ALGYO	1.48	8.84	65.00	-21.51	0.37	10.36	24.58	-95.28	144.42	91.20	543.55	42.53
4	DGGYO	1.61	8.93	65.00	-21.51	0.17	10.10	24.58	-95.28	135.35	89.71	543.55	42.53
5	ISGYO	1.87	8.57	65.00	-11.68	0.59	10.20	21.03	-95.28	131.44	93.80	543.55	42.53
6	NUGYO	1.87	8.57	65.00	-11.68	0.59	10.20	21.03	-95.28	131.44	93.80	543.55	42.53
7	OZGYO	0.70	6.12	11.84	-11.68	1.66	6.51	21.03	-8.91	83.69	37.19	168.17	47.78
8	PEGYO	1.21	5.59	17.49	-11.68	1.13	5.35	21.03	-8.91	84.37	28.76	168.17	47.78
9	SAGYO	1.21	5.90	17.49	-11.68	1.06	5.77	21.03	-8.91	86.46	30.41	168.17	47.78
10	SNGYO	0.82	5.30	11.84	-11.68	1.37	5.85	21.03	-8.91	87.12	31.77	168.17	47.78
11	VKGYO	1.48	8.84	65.00	-21.51	0.37	10.36	24.58	-95.28	144.42	91.20	543.55	42.53
12	YKGYO	1.64	8.87	65.00	-21.51	0.19	10.19	24.58	-95.28	133.33	89.60	543.55	42.53
13	YYGYO	1.87	8.57	65.00	-11.68	0.59	10.20	21.03	-95.28	131.44	93.80	543.55	42.53

This table provides summary statistics for Turkish REITs. The ISE Code is the ticker symbol for REITs trading on the Istanbul Stock Exchange. IPO Date is the first public offering date and First Trading Date is the date when a REIT's shares started trading on the Istanbul Stock Exchange. Monthly mean return, standard deviation, maximum and minimum returns are given for each REIT from its first trading date to December 2009. The same statistics are given for the ISE 100 index, SMB, HML, and WML factors for the same period. SMB, HML, and WML factors are those constructed for Fama-French three factor and Carhart's four-factor models.

* ÖZDERİCİ GMYO acquired REIT status in 2008. Prior to 2008 it was trading on the ISE as a factoring company.

** PERA GMYO acquired REIT status in 2006. Prior to 2006 it was trading on the ISE as a CEF.

Table 5.2 Test for Equality of Means between the Returns on Turkish REITs and the Return on the ISE 100 index

No	REIT Name	ISE Code	t-test	Anova F-test
1	ATAKULE GMYO	AGYO	0.80	0.80
2	AKMERKEZ GMYO	AKMGY	0.57	0.57
3	ALARKO GMYO	ALGYO	0.99	0.99
4	DOĞUŞ-GE GMYO	DGGYO	0.67	0.67
5	İŞ GMYO	ISGYO	0.93	0.93
6	NUROL GMYO	NUGYO	0.97	0.97
7	ÖZDERİCİ GMYO	OZGYO	0.98	0.98
8	PERA GMYO	PEGYO	1.00	1.00
9	SAĞLAM GMYO	SAGYO	0.72	0.72
10	SİNPAŞ GMYO	SNGYO	0.84	0.84
11	VAKIF GMYO	VKGYO	0.44	0.44
12	YAPI KREDİ KORAY GMYO	YKGYO	0.95	0.95
13	Y & Y GMYO	YYGYO	0.88	0.88

This table presents p-values associated with the test for equality of mean monthly return on each REIT and mean monthly return on the ISE 100 index for the same period. The ISE Code is the ticker symbol for a REIT trading on the Istanbul Stock Exchange. The null hypothesis is H_0: $\mu_1 = \mu_2$ (i.e. a REIT's mean monthly return is equal to the ISE 100's mean monthly return over the same period). t-test is the "usual" t-test, and Anova F-test is the "usual" F-test,

Table 5.3 Selected Statistics for Turkish CEFs

No	CEF Name	ISE Code	IPO Date	First Trading Date	CEF				ISE 100			
					Mean%	S.D.	Max%	Min%	Mean%	S.D.	Max%	Min%
1	AK Y.O.	AKYO	May-99	May-99	4.14	21.16	128.95	-40.91	2.76	14.53	79.78	-35.39
2	ALTERNATIF Y.O.	ARFYO	Aug-96	Sep-96	5.06	26.99	137.01	-64.60	3.70	15.71	79.78	-39.03
3	ATA Y.O.	ATAYO	Oct-97	Oct-97	3.97	27.05	224.14	-33.19	3.12	15.10	79.78	-39.03
4	ATLAS MENK.KIY. Y.O.	ATLAS	Jan-94	Feb-94	5.30	23.57	136.84	-41.54	3.70	15.71	79.78	-39.03
5	ATLANTIS Y.O.	ATSYO	May-95	May-95	3.83	20.00	92.86	-42.39	3.70	15.71	79.78	-39.03
6	AVRASYA MENK.KIY. Y.O.	AVRSY	Jun-96	Jul-96	3.42	27.61	157.94	-57.06	3.70	15.71	79.78	-39.03
7	BAŞKENT MENK.KIY. Y.O.	BSKYO	May-06	May-06	0.74	14.00	42.42	-23.46	0.93	10.05	22.85	-23.12
8	BUMERANG Y.O.	BUMYO	Apr-95	May-95	3.39	21.64	107.92	-58.40	3.70	15.71	79.78	-39.03
9	DENIZ Y.O.	DNZYO	Oct-95	Oct-95	7.66	42.45	378.18	-59.41	3.70	15.71	79.78	-39.03
10	ECZACIBAŞI Y.O.	ECBYO	Jan-99	Jan-99	3.88	22.71	143.14	-37.23	3.32	15.03	79.78	-35.39
11	EGELI-CO. Y.O.	EGCYO	Feb-95	Mar-95	4.98	24.35	149.32	-40.32	3.70	15.71	79.78	-39.03
12	EVG Y.O.	EVNYO	Jul-05	Jul-05	1.03	14.87	70.83	-22.58	1.73	9.77	22.85	-23.12
13	FINANS Y.O.	FNSYO	Apr-96	Apr-96	4.26	21.72	106.06	-43.48	3.70	15.71	79.78	-39.03
14	GEDIK Y.O.	GDKYO	Apr-99	Apr-99	3.08	18.30	125.00	-43.93	2.87	14.53	79.78	-35.39
15	GARANTI Y.O.	GRNYO	Nov-96	Nov-96	5.58	23.13	100.00	-34.78	3.70	15.71	79.78	-39.03
16	HEDEF MENK.KIY. Y.O.	HDFYO	Sep-05	Oct-05	1.51	18.21	71.76	-33.33	1.40	9.94	22.85	-23.12
17	İNFO MENK.KIY. Y.O.	INFYO	Mar-04	Mar-04	0.88	16.67	58.49	-37.31	1.90	9.20	22.85	-23.12
18	İŞ Y.O.	ISYAT	Apr-96	Apr-96	5.00	21.32	140.82	-35.71	3.70	15.71	79.78	-39.03
19	METRO MENK.KIY. Y.O.	METYO	May-06	Jun-06	0.99	17.50	58.33	-35.56	1.25	9.93	22.85	-23.12

Table 5.3 Selected Statistics for Turkish CEFs (continued)

No	CEF Name	ISE Code	IPO Date	First Trading Date	CEF				ISE 100			
					Mean%	S.D.	Max%	Min%	Mean%	S.D.	Max%	Min%
20	MUSTAFA YILMAZ Y.O.	MYZYO	Feb-95	Feb-95	5.13	29.97	211.48	-33.82	3.70	15.71	79.78	-39.03
21	OYAK Y.O.	OYAYO	Apr-07	May-07	-0.61	10.62	19.67	-25.00	1.12	11.21	22.85	-23.12
22	PERA MENK. KIYM. Y.O.*	PERYO	Apr-07	May-07	7.20	31.44	137.14	-45.94	4.49	17.17	79.78	-39.03
23	TAÇ Y.O.	TACYO	Dec-95	Apr-97	4.93	24.24	118.52	-44.90	3.35	15.07	79.78	-39.03
24	TACIRLER Y.O.	TCRYO	Jun-06	Jul-06	0.96	15.38	66.13	-26.32	1.45	9.97	22.85	-23.12
25	TAKSIM Y.O.	TKSYO	May-06	Jun-06	1.05	21.78	75.86	-39.68	1.25	9.93	22.85	-23.12
26	TSKB Y.O.	TSKYO	Oct-01	Oct-01	5.06	30.82	251.35	-42.50	2.56	10.97	29.74	-23.12
27	VARLIK Y.O.**	VARYO	Jun-98	Jul-98	6.50	49.66	519.79	-75.29	2.94	15.26	79.78	-39.03
28	VAKIF MENK.KIY. Y.O.	VKFYT	Aug-91	Aug-91	4.92	24.01	104.17	-56.33	3.70	15.71	79.78	-39.03
29	YAPI KREDI Y.O.	YKRYO	Sep-95	Oct-95	5.26	20.42	103.45	-45.39	3.70	15.71	79.78	-39.03

Table 5.3 Selected Statistics for Turkish CEFs (continued)

No	ISE Code	SMB				HML				WML			
		Mean%	S.D.	Max%	Min%	Mean%	S.D.	Max%	Min%	Mean%	S.D.	Max%	Min%
1	AKYO	1.70	8.65	65.00	-15.85	0.58	10.22	24.58	-95.28	133.61	92.37	543.55	42.53
2	ARFYO	1.48	8.84	65.00	-21.51	0.37	10.36	24.58	-95.28	144.42	91.20	543.55	42.53
3	ATAYO	1.58	8.81	65.00	-21.51	0.42	10.34	24.58	-95.28	138.82	90.43	543.55	42.53
4	ATLAS	1.48	8.84	65.00	-21.51	0.37	10.36	24.58	-95.28	144.42	91.20	543.55	42.53
5	ATSYO	1.48	8.84	65.00	-21.51	0.37	10.36	24.58	-95.28	144.42	91.20	543.55	42.53
6	AVRSY	1.48	8.84	65.00	-21.51	0.37	10.36	24.58	-95.28	144.42	91.20	543.55	42.53
7	BSKYO	0.80	5.62	17.49	-11.68	1.11	5.18	21.03	-8.91	86.76	29.01	168.17	47.78
8	BUMYO	1.48	8.84	65.00	-21.51	0.37	10.36	24.58	-95.28	144.42	91.20	543.55	42.53
9	DNZYO	1.48	8.84	65.00	-21.51	0.37	10.36	24.58	-95.28	144.42	91.20	543.55	42.53
10	ECBYO	1.55	8.85	65.00	-21.51	0.31	10.27	24.58	-95.28	132.55	91.15	543.55	42.53
11	EGCYO	1.48	8.84	65.00	-21.51	0.37	10.36	24.58	-95.28	144.42	91.20	543.55	42.53
12	EVNYO	0.91	5.77	17.49	-11.68	1.09	4.82	21.03	-8.91	97.59	35.47	186.21	47.78
13	FNSYO	1.48	8.84	65.00	-21.51	0.37	10.36	24.58	-95.28	144.42	91.20	543.55	42.53
14	GDKYO	1.62	8.68	65.00	-15.85	0.51	10.21	24.58	-95.28	133.39	92.04	543.55	42.53
15	GRNYO	1.48	8.84	65.00	-21.51	0.37	10.36	24.58	-95.28	144.42	91.20	543.55	42.53
16	HDFYO	1.13	5.85	1.13	-11.68	0.93	4.90	0.93	-8.91	95.18	34.98	186.21	47.78
17	INFYO	1.66	9.50	65.00	-11.68	-0.13	12.39	21.03	-95.28	106.45	37.69	197.17	47.78
18	ISYAT	1.48	8.84	65.00	-21.51	0.37	10.36	24.58	-95.28	144.42	91.20	543.55	42.53
19	METYO	0.91	5.64	17.49	-11.68	1.00	5.19	21.03	-8.91	85.54	28.19	168.17	47.78
20	MYZYO	1.48	8.84	65.00	-21.51	0.37	10.36	24.58	-95.28	144.42	91.20	543.55	42.53

Table 5.3 Selected Statistics for Turkish CEFs (continued)

No	ISE Code	SMB				HML				WML			
		Mean%	S.D.	Max%	Min%	Mean%	S.D.	Max%	Min%	Mean%	S.D.	Max%	Min%
21	OYAYO	1.34	5.99	17.49	-11.68	1.13	5.92	21.03	-8.91	87.12	31.25	168.17	47.78
22	PERYO	1.57	9.73	65.00	-21.51	0.11	11.61	24.58	-95.28	165.12	96.15	543.55	42.53
23	TACYO	1.54	8.78	65.00	-21.51	0.37	10.33	24.58	-95.28	143.26	91.49	543.55	42.53
24	TCRYO	1.07	5.60	17.49	-11.68	1.06	5.24	21.03	-8.91	84.87	28.19	168.17	47.78
25	TKSYO	0.91	5.64	17.49	-11.68	1.00	5.19	21.03	-8.91	85.54	28.19	168.17	47.78
26	TSKYO	1.47	8.46	65.00	-11.68	0.34	10.88	21.03	-95.28	108.01	35.63	197.17	47.78
27	VARYO	1.80	9.23	65.00	-21.51	0.05	10.69	24.58	-95.28	132.80	89.71	543.55	42.53
28	VKFYT	1.48	8.84	65.00	-21.51	0.37	10.36	24.58	-95.28	144.42	91.20	543.55	42.53
29	YKRYO	1.48	8.84	65.00	-21.51	0.37	10.36	24.58	-95.28	144.42	91.20	543.55	42.53

This table provides summary statistics for Turkish CEFs. The ISE Code is the ticker symbol for CEFs trading on the Istanbul Stock Exchange. IPO Date is the first public offering date and First Trading Date is the date when CEF shares started trading on the Istanbul Stock Exchange. Monthly mean return, standard deviation, maximum and minimum returns are given for each CEF from its first trading date or January 1997 (whichever is later) to December 2009. The same statistics are given for the ISE 100 index, SMB, HML, and WML factors for the same period. SMB, HML, and WML factors are those constructed for Fama-French three factor and Carhart's four-factor models. The sample period is from January 1997 to December 2009

[*] PERA MENK.KIYM.Y.O has its status changed to a REIT (PERA GMYO) in September 2006. So monthly returns from January 1997 to September 2006 are used for the analysis of this CEF.

[**] VARLIK Y.O. became B Type CEF in May 2008. So monthly returns from July 1998 to May 2008 are used for this CEF in the analysis.

Table 5.4 Test for Equality of Means between the Returns on Turkish CEFs and the Return on the ISE 100 index

No	CEF Name	ISE Code	t-test	Anova F-test
1	AK Y.O.	AKYO	0.54	0.54
2	ALTERNATIF Y.O.	ARFYO	0.59	0.59
3	ATA Y.O.	ATAYO	0.74	0.74
4	ATLANTIS Y.O.	ATSYO	0.95	0.95
5	ATLAS MENK. KIYM. Y.O.	ATLAS	0.48	0.48
6	AVRASYA MENK. KIYM. Y.O.	AVRSY	0.91	0.91
7	BAŞKENT MENK. KIYM. Y.O.	BSKYO	0.94	0.94
8	BUMERANG Y.O.	BUMYO	0.88	0.88
9	DENIZ Y.O.	DNZYO	0.28	0.28
10	ECZACIBAŞI Y.O.	ECBYO	0.81	0.81
11	EGELI-CO. Y.O.	EGCYO	0.58	0.58
12	EVG Y.O.	EVNYO	0.77	0.77
13	FINANS Y.O.	FNSYO	0.79	0.79
14	GARANTI Y.O.	GRNYO	0.40	0.40
15	GEDIK Y.O.	GDKYO	0.92	0.92
16	HEDEF MENK. KIYM. Y.O.	HDFYO	0.97	0.97
17	İNFO MENK. KIYM. Y.O.	INFYO	0.65	0.65
18	İŞ Y.O.	ISYAT	0.54	0.54
19	METRO MENK. KIYM. Y.O.	METYO	0.93	0.93
20	MUSTAFA YILMAZ Y.O.	MYZYO	0.60	0.60
21	OYAK Y.O.	OYAYO	0.53	0.53
22	PERA MENK. KIYM. Y.O.	PERYO	0.42	0.42
23	TACIRLER Y.O.	TCRYO	0.86	0.86
24	TAÇ Y.O.	TACYO	0.49	0.49
25	TAKSIM Y.O.	TKSYO	0.96	0.96
26	TSKB Y.O.	TSKYO	0.45	0.45
27	VARLIK Y.O.	VARYO	0.39	0.39
28	VAKIF MENK. KIYM. Y.O.	VKFYT	0.60	0.60
29	YAPI KREDI B TIPI Y.O.	YKRYO	0.45	0.45

This table presents p-values associated with the test for equality of mean monthly return on each CEF and mean monthly return on the ISE 100 index for the same period. The ISE Code is the ticker symbol for a CEF trading on the Istanbul Stock Exchange. The null hypothesis is H_0: $\mu_1 = \mu_2$ (i.e. a CEF's mean monthly return is equal to the ISE 100's mean monthly return, for the same period). t-test is the "usual" t-test, and Anova F-test is the "usual" F-test.

Table 5.5 depicts the correlations among independent variables, namely, the ISE 100 index, *SMB*, *HML*, and *WML* factors. The highest correlation in absolute value is -0.46 and it is the correlation between *SMB* and *HML* factors. Strong correlation between *SMB* and *HML* factors might be due to the correlation in market values over time. In *SMB* factor, market values at the end of June are used, whereas in *HML* factor, market values at the end of December are used in the denominator of book-to-market equity ratio. Thus, high correlation of market values at the end of June and

at the end of December might be a possible explanation for negative and significant correlation between these factors. There is also a negative and significant correlation between *SMB* factor and the ISE 100 index, which is -0.35. Since *SMB* factor is the difference between the returns on small and large firms and the ISE 100 index consists of large firms, the correlation between these two factors is expected to be negative. Momentum factor, *WML*, has significant but low correlation of 0.16 with *SMB* factor. Remaining correlations are not significant. Although some of the regression variables have significant correlations, they are not high enough to warrant concerns for multicollinearity.[11]

Table 5.5 Correlations among independent variables

	ISE100	**SMB**	**HML**
SMB	-0.35		
	(0.00)		
HML	0.08	-0.46	
	(0.33)	(0.00)	
WML	-0.01	0.16	0.10
	(0.89)	(0.04)	(0.22)

This table shows correlation coefficients among independent variables employed in regression models of this thesis. The ISE 100 stands for the ISE 100 index of the Istanbul Stock Exchange, SMB (Small minus Big) and HML (High minus Low) are size and book-to-market equity factors in Fama-French three factor model, and WML is the momentum factor in Carhart's four-factor model. p-values are given in parentheses. The correlation is calculated for monthly returns on these factors from January 1997 to December 2009.

In Table 5.6 asset allocation of Turkish REITs as of January 2010 is shown. As it was mentioned earlier, REITs are investment companies that invest in real estate and real estate related assets. Therefore, real estate investments constitute the largest part of Turkish REITs' portfolios. However, as it can be observed from the table, there is substantial variation in asset allocations of these REITs. For example, Alarko GMYO invests 54.7% of its funds in real estate assets and 45.3% of its funds in money and capital market instruments, while Akmerkez GMYO invests 98.21% and 1.79% of its funds in real estate and money market instruments, respectively. Hence, the performance of Akmerkez GMYO could be more dependent on fluctuations in real estate market than that of Alarko GMYO. According to Table 5.6, Yapı Kredi

[11] Kennedy (2003) explains that multicollinearity becomes an issue of concern when the simple correlation between two independent variables is 0.8 or greater in absolute value.

Koray GMYO is the REIT with lowest direct investment in real estate. However, 57% of its portfolio is invested in affiliates (GKY Real Estate Investment S.A., YKS Tesis Yönetim Hizmetleri A.Ş, Gelişim Gayrimenkul ve Yatırım Tic. A.Ş.), which are also companies investing in real estate and real estate related assets. Thus, Alarko GMYO is actually the REIT with lowest real estate investments. On the other hand, Akmerkez GMYO is the REIT with highest proportion (98.21%) of its assets invested directly in real estate.

Table 5.6 Asset Allocation (%) of Turkish REITs as of January 2010

No	REIT Name	ISE Code	Real Estate Investments	Affiliates	Money and Capital Market Instruments
1	ATAKULE GMYO	AGYO	58.95	0	41.04
2	AKMERKEZ GMYO	AKMGY	98.21	0	1.79
3	ALARKO GMYO	ALGYO	54.7	0	45.3
4	DOĞUŞ-GE GMYO	DGGYO	90	0	10
5	İŞ GMYO	ISGYO	90	0	10
6	NUROL GMYO	NUGYO	66	0	33
7	ÖZDERİCİ GMYO	OZGYO	76	0	24
8	PERA GMYO	PEGYO	97	3	0
9	SAĞLAM GMYO	SAGYO	91	2	7
10	SİNPAŞ GMYO	SNGYO	90.6	4.9	4.4
11	VAKIF GMYO	VKGYO	60.01	0	40
12	YAPI KREDİ KORAY GMYO	YKGYO	43	57	0
13	Y & Y GMYO	YYGYO	98	0	2

This table shows portfolio distribution of Turkish REITs. The ISE Code is the ticker symbol for a REIT trading on the Istanbul Stock Exchange. Real Estate Investments is the portion of a REIT's funds invested in real estate and related assets. Affiliates is the portion of a REIT's funds invested in its affiliates. Finally, Money and Capital Market Instruments is the portion of a REIT's funds invested in financial instruments like T-bills, repos, stocks, bonds etc. All figures are presented in percentages and are as of January 2010.
Source: CMB Bulletin January 2010

Table 5.7 illustrates asset allocations of Turkish CEFs as of January 2010. Although, in general, CEFs are investment companies that invest in common stocks, the proportion of common stocks in the portfolios' of Turkish CEFs is not very high. Instead, they prefer to invest their funds in government securities and repurchase agreements. As it can be observed from this table, majority of CEFs have less than 50% of their funds invested in common stock. One of the possible explanations for low interest of Turkish CEFs in Turkish stock market might be the considerable variability of the returns on the Turkish stock market. As a result, CEFs might be

finding such investments too risky and turning to government securities instead as safe heavens, since the return on Turkish T-bills and T-bonds has been quite high because of high real interest rates in Turkey during our sample period.

Table 5.7 Asset Allocation (%) of Turkish CEFs as of January 2010

No	ISE Code	Stocks	T-Bills & G-Bonds	Reverse Repo	Money Market	Foreign Securities	Other
1	AKYO	43.6	47.8	8.6	0.0	0.0	0.0
2	ARFYO	50.2	0.0	49.8	0.0	0.0	0.0
3	ATAYO	68.8	0.0	31.2	0.0	0.0	0.0
4	ATSYO	62.6	28.5	0.0	8.9	0.0	0.0
5	ATLAS	37.2	0.0	62.8	0.0	0.0	0.0
6	AVRSY	35.3	0.0	64.7	0.0	0.0	0.0
7	BSKYO	30.6	9.1	54.2	6.0	0.0	0.0
8	BUMYO	26.5	0.0	73.5	0.0	0.0	0.0
9	DNZYO	31.0	34.3	34.7	0.0	0.0	0.0
10	ECBYO	49.9	10.4	39.7	0.0	0.0	0.0
11	EGCYO	47.8	0.0	52.2	0.0	0.0	0.0
12	EVNYO	42.6	0.0	57.4	0.0	0.0	0.0
13	FNSYO	28.7	51.3	19.9	0.0	0.0	0.0
14	GRNYO	45.1	54.3	0.6	0.0	0.0	0.0
15	GDKYO	26.8	67.7	5.5	0.0	0.0	0.0
16	HDFYO	27.5	42.9	29.6	0.0	0.0	0.0
17	INFYO	30.5	29.8	39.8	0.0	0.0	0.0
18	ISYAT	29.9	65.0	3.0	0.0	0.0	2.2
19	METYO	33.4	0.0	66.6	0.0	0.0	0.0
20	MYZYO	66.2	30.7	0.0	3.2	0.0	0.0
21	OYAYO	29.0	57.9	13.1	0.0	0.0	0.0
22	TCRYO	25.4	49.6	25.1	0.0	0.0	0.0
23	TACYO	34.5	28.5	24.3	0.0	12.8	0.0
24	TKSYO	40.0	0.0	60.0	0.0	0.0	0.0
25	TSKYO	47.2	51.4	1.4	0.0	0.0	0.0
26	VKFYT	26.3	31.4	42.3	0.0	0.0	0.0
27	YKRYO	30.3	12.1	57.7	0.0	0.0	0.0

This table shows portfolio distribution of Turkish CEFs. The ISE Code is the ticker symbol for a CEF trading on the Istanbul Stock Exchange. Stocks is the portion of a CEF's funds invested in common stock. T-bills and G-bonds is the portion of a CEF's funds invested in T-bills and government bonds. Money Market is the portion of a CEF's funds invested in short-term financial instruments, and Foreign Securities is the portion of a CEF's funds invested in securities trading on exchanges other than the ISE. Finally, Other is the portion of a CEF's funds invested in any financial instruments other than those mentioned. All figures are presented in percentages and are as of January 2010.
Source: CMB Bulletin January 2010

5.2 Empirical Results for the Single-Factor CAPM

This subsection explains performance evaluation results based on the single-factor CAPM. The results for REITs and CEFs are summarized in Panels A and B of Table 5.8, respectively. As it is mentioned in the data and methodology chapter, the primary variable of interest is the intercept (Jensen's alpha) of the regression, since it shows the excess return achieved by a fund manager on a risk-adjusted basis. As it can be seen in Panel A of this table, Jensen's alphas for all REITs are insignificantly different from zero at the 5% significance level.

Unlike Jensen's alphas, beta coefficients of all Turkish REITs are significant at 5% level. Betas range from 0.53 to 1.36, while the average beta is 1.01. However, we are not able to argue that reported betas are statistically lower or higher than the market beta (greater or less than 1), since t-statistics reported under each beta coefficient estimate test the null hypothesis of beta being equal to zero. We need to conduct a separate hypothesis testing for each beta coefficient in order to conclude whether any given beta coefficient is statistically significantly higher or lower than the beta coefficient of the market portfolio (i.e. more or less risky than the market portfolio). These tests are conducted for each beta under all three models and the results are summarized in tables reported in the Appendix of this thesis. Here we briefly summarize the results of these tests for the single-factor model[12]. Four out of thirteen beta coefficients for Turkish REITs are statistically significantly different from 1. Two REITs, namely Yapı Kredi Koray GMYO and İş GMYO have higher betas compared to the market, and two REITs, namely Akmerkez GMYO and Alarko GMYO have beta coefficients that are lower than the market[13].

Another variable of interest is the explanatory power of the equation – R^2. According to Smith and Shulman (1976), R^2 can be viewed as an indication of the diversification level of a portfolio over the sample period. If it happens that R^2 of any REIT is 1.00, then it means that 100% of the variation in that REIT's returns is

[12] It should be noted that although all the hypotheses are tested using a two-tail test in this thesis, test of betas being greater or less than 1 is an exception. This is a one-tail test. If a beta coefficient is greater than 1, then upper tail test (H_{null}: $b \geq 1$) is conducted, and vice versa. All tests are done at 5% significance level.

[13] For these results, please refer to Panel A of Table A1 in the Appendix.

explained by the market portfolio. In other words, that REIT is perfectly diversified and does not have any unsystematic risk. Hence, the lower the R^2 of a regression is, the lower the diversification level of that REIT's portfolio is. As it can be observed from the table, the highest R^2 of 73% belongs to İş GMYO, while regression equation for the Vakıf GMYO has the lowest explanatory power of 19%. The average diversification level (i.e., the R^2 of regressions) in the REIT industry is 44%.

Similar results are also observed for CEFs with the single-factor model. None of the Jensen's alphas are significantly different from zero for 29 Turkish CEFs. Almost all beta coefficients are significantly different from zero at 5% significance level. Ten beta coefficients are statistically significantly different from 1 and nine of them have lower betas (less risky) compared to the market, whereas only one of them (Pera Menkul Kıymetler Y.O) has a higher beta (more risky) than the market[14]. The average explanatory power of the single-factor model for Turkish CEFs is 29%. Overall, the single- factor model has higher explanatory power for REIT returns than for CEF returns. At first view, this finding may seem surprising, since CEFs are investment companies that are supposed to invest in common stocks, while REITs specialize in real estate investments. Thus, one might expect CEFs to be more correlated with the stock market (i.e., the ISE 100 index in our case). Then, the regressions with the ISE 100 as the independent variable are expected to have higher explanatory power for CEFs compared to REITs. However, when we refer back to Table 5.7, where asset allocation of Turkish CEFs is reported, we observe that on average less than 50% of their portfolios are allocated to stocks. From this standpoint, the abovementioned finding may not be that unusual.

Given these results, based on a single-factor model, it can be concluded that neither REITs nor CEFs outperform or underperform the overall market.

[14] For these results, please refer to Panel B of Table A1 in the Appendix.

Table 5.8 Regression Results for the Single-Factor CAPM

Panel A: Regression results for REITs						
No	**REIT Name**	**ISE Code**	**Alpha (α)**	**R_m-R_f**	**Adj. R^2**	**F-Stat**
1	ATAKULE GMYO	AGYO	0.49	1.08	0.50	96.70
		95	0.41	9.83		0.00
2	AKMERKEZ GMYO	AKMGY	-0.72	0.53	0.35	31.48
		57	-0.79	5.61		0.00
3	ALARKO GMYO	ALGYO	0.14	0.76	0.51	157.39
		156	0.15	12.55		0.00
4	DOĞUŞ-GE GMYO	DGGYO	1.02	1.06	0.45	115.63
		142	0.67	10.75		0.00
5	İŞ GMYO	ISGYO	0.16	1.20	0.72	315.55
		121	0.16	17.76		0.00
6	NUROL GMYO	NUGYO	-0.06	0.88	0.49	118.44
		121	-0.05	10.88		0.00
7	ÖZDERİCİ GMYO	OZGYO	-0.32	1.26	0.22	6.85
		22	-0.06	2.62		0.02
8	PERA GMYO	PEGYO	-0.01	1.10	0.19	10.41
		40	0.00	3.23		0.00
9	SAĞLAM GMYO	SAGYO	1.29	1.06	0.38	21.27
		34	0.52	4.61		0.00
10	SİNPAŞ GMYO	SNGYO	0.93	1.36	0.50	31.06
		31	0.34	5.57		0.00
11	VAKIF GMYO	VKGYO	2.13	0.80	0.19	36.48
		156	1.03	6.04		0.00
12	YAPI KREDİ KORAY GMYO	YKGYO	0.13	1.12	0.71	346.52
		139	0.14	18.61		0.00
13	Y & Y GMYO	YYGYO	-0.34	0.88	0.31	54.99
		121	-0.20	7.42		0.00
+ / 0 / -			0 / 13 / 0	13 / 0 / 0		
Mean			0.37	1.01	0.43	
Maximum			2.13	1.36	0.72	
Minimum			-0.72	0.53	0.19	

Table 5.8 Regression Results for the Single-Factor CAPM (continued)

Panel B: Regression results for CEFs						
No	**CEF Name**	**ISE Code**	**Alpha (α)**	**R_m-R_f**	**Adj. R^2**	**F-Stat**
1	AK Y.O.	AKYO	1.36	1.09	0.56	163.18
		128	1.09	12.77		0.00
2	ALTERNATIF Y.O.	ARFYO	1.33	1.05	0.37	92.03
		156	0.77	9.59		0.00
3	ATA Y.O.	ATAYO	0.88	0.76	0.18	32.62
		147	0.44	5.71		0.00
4	ATLAS MENK. KIYM. Y.O.	ATLAS	1.54	1.11	0.55	187.58
		156	1.21	13.70		0.00
5	ATLANTIS Y.O.	ATSYO	0.13	1.00	0.62	251.14
		156	0.13	15.85		0.00
6	AVRASYA MENK. KIYM. Y.O.	AVRSY	-0.11	0.70	0.15	29.24
		156	-0.06	5.41		0.00
7	BAŞKENT MENK. KIYM. Y.O.	BSKYO	-0.36	0.37	0.05	3.13
		44	-0.17	1.77		0.08
8	BUMERANG Y.O.	BUMYO	-0.21	0.81	0.34	80.06
		156	-0.14	8.95		0.00
9	DENIZ Y.O.	DNZYO	4.01	0.91	0.11	19.53
		156	1.24	4.42		0.00
10	ECZACIBAŞI Y.O.	ECBYO	0.71	0.79	0.26	47.93
		132	0.41	6.92		0.00
11	EGELI-CO. Y.O.	EGCYO	1.25	1.04	0.45	127.72
		156	0.87	11.30		0.00
12	EVG Y.O.	EVNYO	-0.41	0.46	0.07	5.20
		54	-0.21	2.28		0.03
13	FINANS Y.O.	FNSYO	0.58	0.96	0.48	144.35
		156	0.46	12.01		0.00
14	GEDIK Y.O.	GDKYO	0.40	0.43	0.11	16.38
		129	0.26	4.05		0.00
15	GARANTI Y.O.	GRNYO	1.96	0.85	0.33	76.47
		156	1.28	8.74		0.00
16	HEDEF MENK. KIYM. Y.O.	HDFYO	0.16	0.80	0.18	11.68
		51	0.07	3.42		0.00
17	İNFO MENK. KIYM. Y.O.	INFYO	-0.88	0.77	0.17	15.07
		70	-0.48	3.88		0.00
18	İŞ Y.O.	ISYAT	1.32	0.96	0.49	152.33
		156	1.08	12.34		0.00
19	METRO MENK. KIYM. Y.O.	METYO	-0.25	0.76	0.17	9.65
		43	-0.10	3.11		0.00
20	MUSTAFA YILMAZ Y.O.	MYZYO	1.43	1.00	0.27	57.82
		156	0.69	7.60		0.00
21	OYAK Y.O.	OYAYO	-1.74	0.69	0.50	32.51
		32	-1.29	5.70		0.00
22	PERA MENK. KIYM. Y.O.	PERYO	2.56	1.22	0.44	91.54
		116	1.17	9.57		0.00

Table 5.8 Regression Results for the Single-Factor CAPM (continued)

No	CEF Name	ISE Code	Alpha (α)	R_m-R_f	Adj. R^2	F-Stat
23	TAÇ Y.O.	TACYO	1.66	0.70	0.19	35.76
		153	0.94	5.98		0.00
24	TACIRLER Y.O.	TCRYO	-0.46	0.91	0.33	21.56
		42	-0.24	4.64		0.00
25	TAKSIM Y.O.	TKSYO	-0.18	0.64	0.06	3.91
		43	-0.06	1.98		0.05
26	TSKB Y.O.	TSKYO	2.70	0.72	0.06	6.90
		99	0.90	2.63		0.01
27	VARLIK Y.O.	VARYO	4.34	0.93	0.07	9.77
		119	0.92	3.13		0.00
28	VAKIF MENK. KIYM. Y.O.	VKFYT	1.48	0.52	0.11	20.17
		156	0.82	4.49		0.00
29	YAPI KREDI Y.O.	YKRYO	1.60	0.93	0.51	163.16
		156	1.39	12.77		0.00
+ / 0 / -			0 / 29 / 0	27 / 2 / 0		
Mean			0.92	0.82	0.28	
Maximum			4.34	1.22	0.62	
Minimum			-1.74	0.37	0.05	

This table presents regression results for the single-factor CAPM:

$$r_{it} - r_{ft} = \alpha_i + \beta_{1i}(r_{mt} - r_{ft}) + \varepsilon_{it}.$$

The table consists of two panels: Panel A is for REITs and Panel B is for CEFs. The ISE Code is the ticker symbol for a REIT (CEF) trading on the Istanbul Stock Exchange. The dependent variable is the monthly excess return on a REIT (CEF). Alpha (Jensen's alpha, α) is the regression intercept, R_m-R_f is the beta coefficient for the excess return on the market portfolio. Adj. R^2 is the Adjusted R-Squared of the regression. F-Stat is the F-Statistics of the regression. The number of monthly observations for each REIT (CEF) is reported under the corresponding ISE Code. "+", "0", "-" refers to significantly positive, insignificant, and significantly negative alpha (or coefficient) estimates of the regression at the 5% significance level, respectively. Mean, Minimum and Maximum represent the average, the minimum and the maximum values of that coefficient for all REITs (CEFs) in the sample. t-Statistics are given in parentheses for the intercept (alpha) and for the coefficients and p-values are given in parentheses for F-Statistics. The sample period is from January 1997 to December 2009. Regressions are run using all available data for each company. So sample sizes are changing from one company to the other.

5.3 Empirical Results for the Fama-French Three-Factor (FF3F) Model

Panel A of Table 5.9 presents the FF3F model results for REITs. With three-factor model all Jensen's alphas are, once again, statistically significantly not different from zero for all REITs.

With the FF3F model, all REIT betas are statistically significant and positive. Average beta is 1.11, which is slightly higher than the one obtained with single-factor model. Six REIT's betas are statistically significantly different from 1, four of them are being more risky than the market and two of them are being less risky than the market. The remaining beta coefficients are statistically significantly not different from 1[15]. The FF3F model employs two additional factors, besides market factor. These are size (*SMB*) and book-to-market (*HML*) factors. Eight out of thirteen *SMB* coefficients are positive and statistically significantly different from zero, while only four *HML* coefficients are positive and significant. Also, Akmerkez GMYO and Pera GMYO have marginally significant positive *SMB* coefficients. Remaining coefficients are not statistically significantly different from zero at 5% significance level. Average R^2 for REITs with the FF3F model is 50%, which is slightly higher than the one obtained with the single-factor model. Another variable that would be interesting to observe is the adjusted R^2 of these regressions. As opposed to R^2, adjusted R^2 accounts for degrees of freedom which decrease when a new independent variable is introduced into equation. Thus, if adjusted R^2 still increases from the single-factor model to the multiple-factor model, it means that added variable helps to explain more of the variation in the dependent variable. In our case, we can observe that average adjusted R^2 increased from 43% to 47% when the FF3F model is used, so it is possible to say that the FF3F model is better in explaining the return on Turkish REITs. F-Statistics reject the null hypothesis that all coefficients are jointly zero at 5% level in all regressions.

Panel B of Table 5.9 shows FF3F model results for Turkish CEFs. Once again, we observe that all Jensen's alphas for CEFs with the FF3F model are statistically insignificant at 5% level significance level. Among 29 Turkish CEFs, 27 have

[15] For these results, please refer to Panel A of Table A2 in the Appendix

significant betas at 5% level and the average beta is 0.94. Başkent Y.O. and Taksim Y.O. have marginally significant betas at 5% level. As it can be seen in Appendix B, five beta coefficients are less than the market beta. Furthermore, six CEFs have higher betas than the market[16]. Twenty one *SMB* coefficients are significant and positive, and twenty *HML* coefficients are significant and positive at 5% significance level. Both R^2 and adjusted R^2 figures increase with the FF3F model. Particularly, average adjusted R^2 increases by 6 percentage points from 28% to 34% when we move from the single-factor CAPM to the FF3F model.

Despite the fact that both REITs and CEFs have statistically insignificant Jensen's alphas with the FF3F model as well, a general trend is that alpha values decrease when size and BME risk factors are taken into account. Moreover, the FF3F model outweighs the single-factor CAPM in explaining returns on REITs and CEFs.

[16] For these results, please refer to Panel B of Table A2 in the Appendix.

Table 5.9 Regression Results for the Fama-French Three-Factor Model

Panel A: Regression Results for Turkish REITs							
No	**ISE Code**	**Alpha (α)**	**R_m-R_f**	**SMB**	**HML**	**Adj. R^2**	**F-Stat**
1	AGYO	-0.98	1.22	0.86	0.50	0.58	43.42
	95	-0.86	11.29	4.18	3.19		0.00
2	AKMGY	-0.79	0.55	0.31	-0.16	0.39	12.73
	57	-0.84	5.71	1.90	-0.83		0.00
3	ALGYO	-0.56	0.82	0.39	0.26	0.53	59.13
	156	-0.58	13.03	3.06	2.50		0.00
4	DGGYO	0.18	1.13	0.48	0.27	0.46	41.55
	142	0.12	11.06	2.39	1.54		0.00
5	ISGYO	-0.39	1.22	0.25	0.14	0.73	106.86
	121	-0.37	17.73	1.67	1.17		0.00
6	NUGYO	-1.81	0.96	0.84	0.28	0.59	58.69
	121	-1.62	13.00	5.30	2.12		0.00
7	OZGYO	-2.08	1.59	2.55	-0.09	0.42	6.09
	22	-0.40	3.51	2.95	-0.11		0.00
8	PEGYO	-2.32	1.31	1.21	0.71	0.24	5.03
	40	-0.65	3.76	1.89	1.07		0.01
9	SAGYO	0.34	1.14	0.63	0.16	0.38	7.75
	34	0.13	4.76	1.41	0.36		0.00
10	SNGYO	-0.79	1.52	0.83	0.78	0.55	13.11
	31	-0.29	6.24	1.58	1.70		0.00
11	VKGYO	0.94	0.91	0.69	0.31	0.21	14.59
	156	0.45	6.56	2.49	1.41		0.00
12	YKGYO	-0.50	1.17	0.36	0.19	0.73	123.71
	139	-0.54	19.02	2.88	1.79		0.00
13	YYGYO	-1.69	0.93	0.58	0.42	0.33	20.86
	121	-0.94	7.79	2.28	2.00		0.00
+ / 0 / -		0 / 13 / 0	13 / 0 / 0	8 / 5 / 0	4 / 9 /0		
Mean		-0.80	1.11	0.77	0.29	0.47	
Maximum		0.94	1.59	2.55	0.78	0.73	
Minimum		-2.32	0.55	0.25	-0.16	0.21	

Table 5.9 Regression Results for the Fama-French Three-Factor Model (continued)

Panel B: Regression Results for Turkish CEFs							
No	**ISE Code**	**Alpha (α)**	**R_m-R_f**	**SMB**	**HML**	**Adj. R^2**	**F-Stat**
1	AKYO	-0.73	1.18	1.00	0.63	0.66	84.63
	128	-0.64	15.42	6.23	4.76		0.00
2	ARFYO	-0.83	1.25	1.23	0.64	0.48	48.90
	156	-0.52	11.76	5.79	3.74		0.00
3	ATAYO	0.23	0.82	0.37	0.15	0.18	11.45
	147	0.11	5.83	1.33	0.65		0.00
4	ATLAS	-0.14	1.26	0.95	0.50	0.64	90.97
	156	-0.12	16.28	6.14	4.04		0.00
5	ATSYO	-1.11	1.12	0.71	0.31	0.68	112.82
	156	-1.20	18.28	5.84	3.15		0.00
6	AVRSY	-2.06	0.86	1.07	0.74	0.24	17.67
	156	-1.04	6.59	4.10	3.54		0.00
7	BSKYO	-0.98	0.43	0.55	0.18	0.05	1.74
	44	-0.46	2.01	1.43	0.43		0.18
8	BUMYO	-1.89	0.96	0.95	0.56	0.44	42.30
	156	-1.42	10.83	5.36	3.94		0.00
9	DNZYO	1.77	1.09	1.23	0.85	0.15	10.18
	156	0.55	5.12	2.89	2.46		0.00
10	ECBYO	-1.64	0.95	1.28	0.81	0.43	33.81
	132	-1.06	9.12	6.11	4.62		0.00
11	EGCYO	-0.54	1.18	0.97	0.75	0.56	66.66
	156	-0.41	13.46	5.54	5.32		0.00
12	EVNYO	-1.20	0.54	0.72	0.09	0.11	3.25
	54	-0.60	2.65	2.07	0.22		0.03
13	FNSYO	-0.79	1.08	0.75	0.53	0.55	65.32
	156	-0.66	13.59	4.76	4.16		0.00
14	GDKYO	-0.90	0.48	0.62	0.55	0.17	9.63
	129	-0.59	4.58	2.89	3.08		0.00
15	GRNYO	0.12	1.00	1.02	0.68	0.44	42.12
	156	0.09	10.65	5.39	4.45		0.00
16	HDFYO	0.04	0.80	0.42	-0.38	0.17	4.52
	51	0.02	3.27	1.02	-0.76		0.01
17	INFYO	-2.62	0.95	1.03	0.69	0.28	9.80
	70	-1.47	4.94	3.44	3.05		0.00
18	ISYAT	0.10	1.06	0.67	0.46	0.55	64.91
	156	0.08	13.61	4.32	3.68		0.00
19	METYO	-0.85	0.83	0.65	0.00	0.17	3.95
	43	-0.34	3.28	1.45	0.01		0.01
20	MYZYO	-0.47	1.16	1.06	0.67	0.34	27.20
	156	-0.23	8.71	3.96	3.11		0.00
21	OYAYO	-2.44	0.74	0.33	0.23	0.51	11.87
	32	-1.74	5.96	1.40	0.99		0.00
22	PERYO	0.60	1.39	1.13	0.66	0.52	42.79
	116	0.29	11.04	4.43	3.28		0.00

Table 5.9 Regression Results for the Fama-French Three-Factor Model (continued)

No	ISE Code	Alpha (α)	R_m-R_f	SMB	HML	Adj. R^2	F-Stat
23	TACYO	-0.07	0.85	0.98	0.50	0.27	19.87
	153	-0.04	7.32	4.36	2.72		0.00
24	TCRYO	-1.12	0.98	0.44	0.16	0.32	7.56
	42	-0.54	4.72	1.18	0.40		0.00
25	TKSYO	-0.52	0.69	0.53	-0.15	0.04	1.57
	43	-0.15	2.01	0.88	-0.22		0.21
26	TSKYO	0.29	0.90	1.29	1.13	0.11	4.97
	99	0.09	3.15	2.33	2.73		0.00
27	VARYO	2.85	1.03	0.81	0.44	0.07	3.81
	119	0.59	3.33	1.29	0.84		0.01
28	VKFYT	0.10	0.63	0.75	0.56	0.17	11.48
	156	0.06	5.29	3.18	2.94		0.00
29	YKRYO	0.03	1.06	0.86	0.62	0.63	87.48
	156	0.03	15.56	6.30	5.63		0.00
+ / 0 / -		0 / 29 / 0	27 / 2 / 0	21 / 8 / 0	20 / 9 / 0		
Mean		-0.51	0.94	0.84	0.47	0.34	
Maximum		2.85	1.39	1.29	1.13	0.68	
Minimum		-2.62	0.43	0.33	-0.38	0.04	

This table presents regression results for the Fama-French three-factor model:

$$r_{it} - r_{ft} = \alpha_i + \beta_{1i}(r_{mt} - r_{ft}) + \beta_{2i}SMB + \beta_{3i}HML + \varepsilon_{it}$$

The table consists of two panels: Panel A is for REITs and Panel B is for CEFs. The ISE Code is the ticker symbol for a REIT (CEF) trading on the Istanbul Stock Exchange. The dependent variable is the monthly excess return on a REIT (CEF). Alpha (Jensen's alpha, i) is the regression intercept and R_m-R_f is the beta coefficient for the excess return on the market portfolio. *SMB* is the coefficient on the size factor and *HML* is the coefficient on the book-to-market equity factor. Adj. R^2 is the Adjusted R-Squared of the regression. F-Stat is the F-Statistics of the regression. The number of monthly observations for each REIT (CEF) is reported under the corresponding ISE Code. "+", "0", "-" refers to significantly positive, insignificant, and significantly negative alpha (or coefficient) estimates of the regression at the 5% significance level, respectively. Mean, Minimum and Maximum represent the average, the minimum and the maximum values of that coefficient for all REITs (CEFs) in the sample. t-Statistics are given in parentheses for the intercept (alpha) and for the coefficients and p-values are given in parentheses for F-Statistics. The sample period is from January 1997 to December 2009. Regressions are run using all available data for each company. So sample sizes are changing from one company to the other.

5.4 Empirical Results for the Carhart's Four-Factor Model

The empirical results on performance evaluation of REITs and CEFs with the Carhart's four-factor model are shown in Panels A and B of Table 5.10. The main difference between the previous three-factor and current four-factor model is that one additional risk factor – momentum factor, *WML* – is introduced by Carhart (1997) to the existing three risk factors advocated by Fama and French (1993). His momentum factor aims to capture the momentum effect (i.e. winners continue to be winners and loser continue to be losers) in stock returns. Panel A of this table summarizes the results for thirteen Turkish REITs. Consistent with the findings for the two previous models, all Jensen's alphas for REITs are not statistically significant at 5% level.

All beta coefficients are positive and significant at 5% level. Once again the same six out of thirteen REITs have betas that are significantly different from 1[17]. Eight out of thirteen *SMB* coefficients are significant. These are the same REITs which have significant *SMB* coefficients with the FF3F model as well. Among *HML* coefficients five are statistically significant and have positive signs. None of the Turkish REITs has a significant coefficient on the momentum factor at 5% significance level.

The average adjusted R^2 for REITs does not improve with the four-factor model. It even decreases by 0.74% compared to the three-factor model. Such a result is not surprising, since all the momentum coefficients are insignificant. Hence, the additional factor, *WML*, does not help in explaining REIT returns.

Panel B of Table 5.6 summarizes the regression results for CEFs with the four-factor model. Two out of twenty nine CEFs have statistically significant and negative Jensen's alphas. Avrasya Menkul Kıymetler Y.O. (t-stat -1.99, p-value 0.048) and Başkent Menkul Kıymetler Y.O. (t-stat -2.01 p-value 0.051), underperform the overall market by -7.19% and -13.07% per month, respectively. The remaining CEFs have insignificant alphas at 5% level.

[17] For these results, please refer to Panel A of Table A3 in the Appendix.

All CEFs, except Taksim Y.O, have statistically significant beta coefficients at 5% significance level. Taksim Y.O. has marginally significant beta at 5% level. The average beta for all CEFs with the four-factor model is 0.94. With the four-factor model, six CEFs have significant and lower beta coefficients than the market, and six CEFs have beta coefficients statistically significantly greater than 1[18]. Similar to the FF3F model, 21 out of 29 CEFs have significant *SMB* coefficients with the four-factor model, and 20 out of 29 *HML* coefficients are significant at 5% significance level with the four-factor model. None of 29 momentum coefficients are statistically significantly different from zero at 5% level. The R^2 and the adjusted R^2 values for CEFs do not change with the four-factor model, either.

Although none of the REITs exhibit statistically significant results, two CEFs have statistically significant results. These two CEFs substantially underperform the benchmark portfolios when Carhart's four factor model is used for performance evaluation.

[18] For these results, please refer to Panel B of Table A3 in the Appendix.

Table 5.10 Regression Results for the Carhart's Four-Factor Model

Panel A: Regression Results for Turkish REITs								
No	**ISE Code**	**Alpha (α)**	**R_m-R_f**	**SMB**	**HML**	**WML**	**Adj. R^2**	**F-Stat**
1	AGYO	0.00	1.21	0.86	0.49	-0.01	0.57	32.26
	95	0.00	11.20	4.17	3.16	-0.29		0.00
2	AKMGY	0.89	0.55	0.31	-0.15	-0.02	0.38	9.55
	57	0.33	5.71	1.87	-0.74	-0.66		0.00
3	ALGYO	0.47	0.83	0.41	0.27	-0.01	0.53	44.32
	156	0.27	13.03	3.14	2.59	-0.69		0.00
4	DGGYO	-0.36	1.13	0.47	0.26	0.00	0.46	30.96
	142	-0.13	11.01	2.24	1.46	0.24		0.00
5	ISGYO	-2.11	1.22	0.19	0.10	0.01	0.73	81.00
	121	-1.25	17.75	1.23	0.84	1.28		0.00
6	NUGYO	-1.69	0.96	0.85	0.28	0.00	0.59	43.65
	121	-0.92	12.94	5.08	2.07	-0.08		0.00
7	OZGYO	5.80	1.65	2.53	0.05	-0.10	0.40	4.54
	22	0.45	3.52	2.88	0.06	-0.68		0.01
8	PEGYO	-1.68	1.31	1.21	0.71	-0.01	0.21	3.67
	40	-0.15	3.70	1.87	1.05	-0.06		0.01
9	SAGYO	3.55	1.15	0.62	0.20	-0.04	0.36	5.70
	34	0.45	4.72	1.38	0.43	-0.43		0.00
10	SNGYO	2.29	1.53	0.82	0.82	-0.04	0.53	9.57
	31	0.29	6.15	1.53	1.72	-0.41		0.00
11	VKGYO	-1.44	0.91	0.64	0.28	0.02	0.21	11.04
	156	-0.37	6.52	2.24	1.23	0.73		0.00
12	YKGYO	1.26	1.17	0.40	0.22	-0.01	0.73	93.72
	139	0.78	19.10	3.13	2.04	-1.32		0.00
13	YYGYO	-1.01	0.93	0.61	0.44	-0.01	0.33	15.54
	121	-0.34	7.76	2.26	2.00	-0.29		0.00
+ / 0 / -		0 / 13 / 0	13 / 0 / 0	8 / 5 / 0	5 / 8 / 0	0 / 13 / 0		
Mean		0.46	1.12	0.76	0.31	-0.02	0.46	
Maximum		5.80	1.65	2.53	0.82	0.02	0.73	
Minimum		-2.11	0.55	0.19	-0.15	-0.10	0.21	

Table 5.10 Regression Results for the Carhart's Four-Factor Model (continued)

Panel B: Regression Results for Turkish CEFs								
No	**ISE Code**	**Alpha (α)**	**R_m-R_f**	**SMB**	**HML**	**WML**	**Adj. R^2**	**F-Stat**
1	AKYO	-2.40	1.18	0.95	0.60	0.01	0.66	63.84
	128	-1.25	15.39	5.71	4.40	1.07		0.00
2	ARFYO	-3.49	1.24	1.17	0.60	0.02	0.48	37.00
	156	-1.18	11.73	5.38	3.46	1.07		0.00
3	ATAYO	-1.90	0.82	0.32	0.11	0.02	0.17	8.67
	147	-0.51	5.80	1.12	0.48	0.68		0.00
4	ATLAS	-1.86	1.26	0.92	0.48	0.01	0.63	68.41
	156	-0.86	16.23	5.75	3.77	0.95		0.00
5	ATSYO	-0.92	1.12	0.72	0.31	0.00	0.68	84.07
	156	-0.54	18.21	5.70	3.10	-0.13		0.00
6	AVRSY	-7.19	0.85	0.97	0.67	0.04	0.25	14.13
	156	-1.99	6.57	3.63	3.15	1.69		0.00
7	BSKYO	-13.07	0.44	0.62	0.05	0.14	0.11	2.36
	44	-2.01	2.11	1.67	0.13	1.97		0.07
8	BUMYO	-0.60	0.96	0.97	0.58	-0.01	0.44	31.69
	156	-0.24	10.82	5.35	3.98	-0.63		0.00
9	DNZYO	4.16	1.10	1.28	0.88	-0.02	0.15	7.65
	156	0.70	5.12	2.92	2.50	-0.48		0.00
10	ECBYO	-4.52	0.94	1.21	0.76	0.02	0.43	25.95
	132	-1.70	9.09	5.57	4.24	1.32		0.00
11	EGCYO	-2.66	1.18	0.93	0.72	0.02	0.56	50.28
	156	-1.09	13.41	5.15	5.01	1.03		0.00
12	EVNYO	2.39	0.55	0.71	0.13	-0.04	0.10	2.53
	54	0.42	2.68	2.06	0.30	-0.67		0.05
13	FNSYO	0.56	1.08	0.78	0.55	-0.01	0.55	48.97
	156	0.25	13.59	4.80	4.21	-0.73		0.00
14	GDKYO	0.21	0.48	0.65	0.57	-0.01	0.16	7.25
	129	0.08	4.58	2.91	3.11	-0.52		0.00
15	GRNYO	1.50	1.01	1.04	0.70	-0.01	0.44	31.56
	156	0.57	10.64	5.38	4.48	-0.62		0.00
16	HDFYO	0.85	0.80	0.42	-0.37	-0.01	0.16	3.33
	51	0.12	3.24	1.01	-0.74	-0.13		0.02
17	INFYO	-3.97	0.95	1.03	0.69	0.01	0.27	7.27
	70	-0.76	4.89	3.39	3.03	0.28		0.00
18	ISYAT	-1.10	1.06	0.65	0.45	0.01	0.55	48.61
	156	-0.51	13.56	4.05	3.47	0.66		0.00
19	METYO	-2.48	0.83	0.66	-0.01	0.02	0.15	2.90
	43	-0.31	3.23	1.44	-0.03	0.21		0.03
20	MYZYO	2.61	1.16	1.12	0.71	-0.02	0.34	20.64
	156	0.70	8.73	4.08	3.25	-0.99		0.00
21	OYAYO	-4.91	0.74	0.33	0.20	0.03	0.50	8.82
	32	-1.19	5.81	1.40	0.84	0.64		0.00
22	PERYO	-0.59	1.39	1.10	0.64	0.01	0.52	31.87
	116	-0.14	10.98	4.15	3.08	0.34		0.00

Table 5.10 Regression Results for the Carhart's Four-Factor Model (continued)

No	ISE Code	Alpha (α)	R_m-R_f	SMB	HML	WML	Adj. R^2	F-Stat
23	TACYO	0.96	0.85	1.00	0.51	-0.01	0.27	14.85
	153	0.31	7.31	4.32	2.73	-0.39		0.00
24	TCRYO	-11.61	0.95	0.45	0.04	0.12	0.36	6.79
	42	-1.87	4.70	1.25	0.11	1.79		0.00
25	TKSYO	1.58	0.69	0.52	-0.13	-0.02	0.02	1.16
	43	0.15	2.00	0.85	-0.19	-0.21		0.34
26	TSKYO	-7.92	0.90	1.24	1.13	0.08	0.11	3.93
	99	-0.83	3.18	2.23	2.73	0.91		0.01
27	VARYO	10.18	1.04	1.00	0.57	-0.05	0.07	3.12
	119	1.18	3.35	1.53	1.06	-1.03		0.02
28	VKFYT	-0.06	0.63	0.75	0.56	0.00	0.16	8.56
	156	-0.02	5.27	3.07	2.86	0.06		0.00
29	YKRYO	-0.67	1.06	0.84	0.61	0.01	0.62	65.31
	156	-0.35	15.50	6.02	5.42	0.44		0.00
+ / 0 / -		0 / 27 / 2	28 / 1/ 0	21 / 8 / 0	20 / 9 / 0	0 / 29 / 0		
Mean		-1.62	0.94	0.84	0.46	0.01		0.34
Maximum		10.18	1.39	1.28	1.13	0.14		0.68
Minimum		-13.07	0.44	0.32	-0.37	-0.05		0.02

This table presents regression results for the Carhart's four-factor model:

$$r_{it} - r_{ft} = \alpha_i + \beta_{1i}(r_{mt} - r_{ft}) + \beta_{2i}SMB + \beta_{3i}HML + \beta_{4i}WML + \varepsilon_{it}$$

The table consists of two panels. Panels A and B report the results for REITs and CEFs, respectively. The ISE Code is the ticker symbol for a REIT (CEF) trading on the Istanbul Stock Exchange. The dependent variable is the monthly excess return on a REIT (CEF). Alpha (Jensen's alpha, α) is the regression intercept, and R_m-R_f is the beta coefficient for the excess return on the market portfolio. *SMB* is the coefficient on the size factor, and *HML* is the coefficient on the book-to-market equity factor. *WML* is the coefficient on the momentum factor. Adj. R^2 is the Adjusted R-Squared of the regression. F-Stat is the F-Statistics of the regression. The number of monthly observations for each REIT (CEF) is given under the corresponding ISE Code. "+", "0", "-" refers to significantly positive, insignificant, and significantly negative alpha (or coefficient) estimates of the regression at the 5% significance level, respectively. Mean, Minimum and Maximum represent the average, the minimum and maximum values of that coefficient for all REITs (CEFs) in the sample. t-Statistics are given in parentheses for the intercept (alpha) and for the coefficients and p-values are given in parentheses for F-Statistics. The sample period is from January 1997 to December 2009. Regressions are run using all available data for each company. So sample sizes are changing from one company to the other.

CHAPTER 6

CONCLUSION

Real Estate Investment Trusts (REITs) are special type of closed-end funds, which invest in real estate and real estate related assets. In Turkey, REIT industry exists for more than a decade, but it is still in its infancy stage. The number of REITs grew from two in 1997, the year when REIT market was first established, to fourteen as of December 2009. One REIT – EGS GMYO - is excluded from the sample because it trades on the watch market. In this thesis, the risk-adjusted performance of 13 Turkish REITs is measured on a monthly basis from January 1997 to December 2009. As a part of this study, the performance of Turkish REITs is compared to that of Turkish closed-end funds (CEFs). As a basis for comparison, CEFs are preferred to open-ended funds, because the former type is more similar to REITs than the latter type. As of December 2009, there are thirty-three CEFs trading on the Istanbul Stock Exchange (ISE), although the sample used in this study consists of twenty-nine CEFs. Five CEFs are excluded from the sample because they are Type B funds[19] and one former CEF, Pera Menkul Kıymetler Y.O., is included in the sample.

The risk-adjusted performance of REITs and CEFs is measured using three different asset pricing models: 1) the single-factor CAPM; 2) the Fama-French three-factor model; and 3) the Carhart's four-factor model. In order to employ Fama-French three-factor model, size (*SMB*) and book-to-equity (*HML*) risk factors are constructed for the sample period by following the procedures described in Fama and French (1993). Additionally, momentum factor, *WML*, for the four-factor model is constructed according to Carhart's (1997) design. As consistent with the

[19] There are two types of CEFs in Turkey. One is Type A fund, which must invest minimum 25% of their assets in equities that are issued by Turkish companies. Another one is Type B fund, which does not have such an obligation.

methodology, excess monthly returns on REITs and CEFs are regressed on excess monthly return on the market return proxy (the ISE100 index), and monthly returns on additional risk factors, introduced in the three and the four factor models.

Hypothetically, in an efficient market one cannot consistently achieve returns in excess of average market return on a risk-adjusted basis. Thus, the intercept (alpha) of the regressions is expected to be statistically not different from zero. A statistically significant positive (negative) alpha would imply superior (inferior) performance for that particular investment company (REIT or CEF).

The results of this study indicate that neither Turkish REITs nor Turkish CEFs exhibit superior or inferior risk-adjusted performance for the sample period (from January 1997 to December 2009). Almost all Jensen's alphas (intercepts) are statistically significantly not different from zero, implying that both REITs and CEFs are earning their expected returns. Only two CEFs exhibit significant negative performance with the four-factor model. The results are robust to different asset pricing models.

Among employed models, the Fama-French three-factor model is the best in explaining the returns on both REITs and CEFs. In general, the size and the book-to-market equity risk factors are significant and positive. The explanatory power of the regressions does not improve with the Carhart's four-factor model, since momentum factors have statistically insignificant coefficients in regressions for all REITs and CEFs.

Also, majority of beta coefficients are statistically significantly not different from the market beta for both REITs and CEFs. Among REITs which have beta coefficients significantly different from the market beta, more than half have greater risk than the market. The distribution of aggressive (greater than 1) and defensive (lower than 1) betas for CEFs is about the same.

As it was described in the Literature Survey chapter the empirical findings of earlier studies for the US REITs are mixed. Thus, the findings in this thesis are partly consistent with the prior research. However, majority of the studies on the performance of CEFs suggest some underperformance compared to the overall

market. In this respect, this study contradicts majority of the prior research by reporting that the performance of CEFs is being similar to the overall market.

There is also an important implication of this study for the efficiency of the ISE. The empirical results show that investment companies in Turkey do not exhibit superior performance on a risk-adjusted basis and earn returns similar to the overall market. Thus, based on the findings in this thesis, the ISE can be considered as either semi-strong or strong form efficient. On the other hand, failure of Turkish investment companies to exhibit superior performance might also be due to the poor investment skills of their managers.

There are, however, several limitations of this study. Particularly, the number of RIETs in the sample is not very large and there are only four REITs in the sample before December 1999. Moreover, the book values, which are used to construct the size and the book-to-market equity factors in the Fama-French three-factor model, are not reported consistently during the sample period, because of several changes introduced to financial statement reporting standards in Turkey, like inflation adjustment and switching to International Financial Reporting Standards. This reporting change in book value of equity numbers might have an impact on the findings of this thesis.

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Appendix A. Beta Test

Table A1. Beta Test For The Single-Factor Model

Panel A: Beta Test for Turkish REITs					
No	**REIT Name**	**ISE Code**	**R_{mt}-R_f**	**Standard Error**	**t-Stat**
1	ATAKULE GMYO	AGYO	1.08	0.11	0.76
2	AKMERKEZ GMYO	AKMGY	0.53	0.09	-4.96
3	ALARKO GMYO	ALGYO	0.76	0.06	-3.86
4	DOĞUŞ-GE GMYO	DGGYO	1.06	0.10	0.61
5	İŞ GMYO	ISGYO	1.20	0.07	2.94
6	NUROL GMYO	NUGYO	0.88	0.08	-1.55
7	ÖZDERİCİ GMYO	OZGYO	1.26	0.48	0.55
8	PERA GMYO	PEGYO	1.10	0.34	0.29
9	SAĞLAM GMYO	SAGYO	1.06	0.23	0.26
10	SİNPAŞ GMYO	SNGYO	1.36	0.24	1.47
11	VAKIF GMYO	VKGYO	0.80	0.13	-1.54
12	YAPI KREDİ KORAY GMYO	YKGYO	1.12	0.06	1.97
13	Y & Y GMYO	YYGYO	0.88	0.12	-1.02

Table A1. Beta Test For The Single-Factor Model (continued)

Panel B: Beta Test for Turkish CEFs					
No	**CEF Name**	**ISE Code**	**R_{mt}-R_f**	**Standard Error**	**t-Stat**
1	AK Y.O.	AKYO	1.09	0.09	1.06
2	ALTERNATIF Y.O.	ARFYO	1.05	0.11	0.47
3	ATA Y.O.	ATAYO	0.76	0.13	-1.78
4	ATLAS MENK. KIYM. Y.O.	ATLAS	1.11	0.08	1.35
5	ATLANTIS Y.O.	ATSYO	1.00	0.06	-0.02
6	AVRASYA MENK. KIYM. Y.O.	AVRSY	0.70	0.13	-2.32
7	BAŞKENT MENK. KIYM. Y.O.	BSKYO	0.37	0.21	-3.07
8	BUMERANG Y.O.	BUMYO	0.81	0.09	-2.12
9	DENIZ Y.O.	DNZYO	0.91	0.21	-0.45
10	ECZACIBAŞI Y.O.	ECBYO	0.79	0.11	-1.88
11	EGELI-CO. Y.O.	EGCYO	1.04	0.09	0.44
12	EVG Y.O.	EVNYO	0.46	0.20	-2.72
13	FINANS Y.O.	FNSYO	0.96	0.08	-0.45
14	GEDIK Y.O.	GDKYO	0.43	0.11	-5.47
15	GARANTI Y.O.	GRNYO	0.85	0.10	-1.54
16	HEDEF MENK. KIYM. Y.O.	HDFYO	0.80	0.23	-0.87
17	İNFO MENK. KIYM. Y.O.	INFYO	0.77	0.20	-1.18
18	İŞ Y.O.	ISYAT	0.96	0.08	-0.51
19	METRO MENK. KIYM. Y.O.	METYO	0.76	0.25	-0.96
20	MUSTAFA YILMAZ Y.O.	MYZYO	1.00	0.13	-0.02
21	OYAK Y.O.	OYAYO	0.69	0.12	-2.60
22	PERA MENK. KIYM. Y.O.	PERYO	1.22	0.13	1.71
23	TAÇ Y.O.	TACYO	0.70	0.12	-2.61
24	TACIRLER Y.O.	TCRYO	0.91	0.20	-0.45
25	TAKSIM Y.O.	TKSYO	0.64	0.32	-1.11
26	TSKB Y.O.	TSKYO	0.72	0.28	-1.01
27	VARLIK Y.O.	VARYO	0.93	0.30	-0.25
28	VAKIF MENK. KIYM. Y.O.	VKFYT	0.93	0.30	-0.25
29	YAPI KREDI Y.O.	YKRYO	0.93	0.07	-0.92

This table presents t-test results for the beta coefficients of Turkish REITs and CEFs. The ISE Code is the ticker symbol for REITs (CEFs) trading on the Istanbul Stock Exchange. R_m-R_f is the beta coefficient for the excess return on the market portfolio. The last two columns show standard error and t-statistics for each beta coefficient, respectively. t-statistics for this test is calculated as (Rm-Rf – 1)/standard error. If a beta coefficient is greater than 1, then upper tail test (H_{null}: b≥1) is conducted and vice versa. All tests are done at 5% significance level.

Table A2. Beta Test For The Fama-French Three-Factor Model

Panel A: Beta Test for Turkish REITs					
No	**REIT Name**	**ISE Code**	**R_{mt}-R_f**	**Standard Error**	**t-stat**
1	ATAKULE GMYO	AGYO	1.22	0.11	2.01
2	AKMERKEZ GMYO	AKMGY	0.55	0.10	-4.74
3	ALARKO GMYO	ALGYO	0.82	0.06	-2.79
4	DOĞUŞ-GE GMYO	DGGYO	1.13	0.10	1.29
5	İŞ GMYO	ISGYO	1.22	0.07	3.23
6	NUROL GMYO	NUGYO	0.96	0.07	-0.47
7	ÖZDERİCİ GMYO	OZGYO	1.59	0.45	1.31
8	PERA GMYO	PEGYO	1.31	0.35	0.90
9	SAĞLAM GMYO	SAGYO	1.14	0.24	0.60
10	SİNPAŞ GMYO	SNGYO	1.52	0.24	2.15
11	VAKIF GMYO	VKGYO	0.91	0.14	-0.66
12	YAPI KREDİ KORAY GMYO	YKGYO	1.17	0.06	2.72
13	Y & Y GMYO	YYGYO	0.93	0.12	-0.57

Table A2. Beta Test For The Fama-French Three-Factor Model (continued)

Panel B: Beta Test for Turkish CEFs					
No	**CEF Name**	**ISE Code**	**R_{mt}-R_f**	**Standard Error**	**t-stat**
1	AK Y.O.	AKYO	1.18	0.08	2.34
2	ALTERNATIF Y.O.	ARFYO	1.25	0.11	2.34
3	ATA Y.O.	ATAYO	0.82	0.14	-1.29
4	ATLAS MENK. KIYM. Y.O.	ATLAS	1.26	0.08	3.37
5	ATLANTIS Y.O.	ATSYO	1.12	0.06	1.91
6	AVRASYA MENK. KIYM. Y.O.	AVRSY	0.86	0.13	-1.07
7	BAŞKENT MENK. KIYM. Y.O.	BSKYO	0.43	0.21	-2.66
8	BUMERANG Y.O.	BUMYO	0.96	0.09	-0.50
9	DENIZ Y.O.	DNZYO	1.09	0.21	0.44
10	ECZACIBAŞI Y.O.	ECBYO	0.95	0.10	-0.49
11	EGELI-CO. Y.O.	EGCYO	1.18	0.09	2.07
12	EVG Y.O.	EVNYO	0.54	0.20	-2.25
13	FINANS Y.O.	FNSYO	1.08	0.08	0.96
14	GEDIK Y.O.	GDKYO	0.48	0.10	-5.03
15	GARANTI Y.O.	GRNYO	1.00	0.09	0.04
16	HEDEF MENK. KIYM. Y.O.	HDFYO	0.80	0.24	-0.83
17	İNFO MENK. KIYM. Y.O.	INFYO	0.95	0.19	-0.27
18	İŞ Y.O.	ISYAT	1.06	0.08	0.79
19	METRO MENK. KIYM. Y.O.	METYO	0.83	0.25	-0.65
20	MUSTAFA YILMAZ Y.O.	MYZYO	1.16	0.13	1.19
21	OYAK Y.O.	OYAYO	0.74	0.12	-2.06
22	PERA MENK. KIYM. Y.O.	PERYO	1.39	0.13	3.10
23	TAÇ Y.O.	TACYO	0.85	0.12	-1.27
24	TACIRLER Y.O.	TCRYO	0.98	0.21	-0.10
25	TAKSIM Y.O.	TKSYO	0.69	0.34	-0.92
26	TSKB Y.O.	TSKYO	0.90	0.28	-0.37
27	VARLIK Y.O.	VARYO	1.03	0.31	0.10
28	VAKIF MENK. KIYM. Y.O.	VKFYT	0.63	0.12	-3.15
29	YAPI KREDI Y.O.	YKRYO	1.06	0.07	0.88

This table presents t-test results for the beta coefficients of Turkish REITs and CEFs. The ISE Code is the ticker symbol for REITs (CEFs) trading on the Istanbul Stock Exchange. R_m-R_f is the beta coefficient for the excess return on the market portfolio. The last two columns show standard error and t-statistics for each beta coefficient, respectively. t-statistics for this test is calculated as (Rm-Rf – 1)/standard error. If a beta coefficient is greater than 1, then upper tail test (H_{null}: b≥1) is conducted and vice versa. All tests are done at 5% significance level.

Table A3. Beta Test For The Carhart's Four-Factor Model

Panel A: Beta Test for Turkish REITs					
No	**REIT Name**	**ISE Code**	**R_{mt}-R_f**	**Standard Error**	**t-stat**
1	ATAKULE GMYO	AGYO	1.21	0.11	1.98
2	AKMERKEZ GMYO	AKMGY	0.55	0.10	-4.67
3	ALARKO GMYO	ALGYO	0.83	0.06	-2.76
4	DOĞUŞ-GE GMYO	DGGYO	1.13	0.10	1.28
5	İŞ GMYO	ISGYO	1.22	0.07	3.21
6	NUROL GMYO	NUGYO	0.96	0.07	-0.47
7	ÖZDERİCİ GMYO	OZGYO	1.65	0.47	1.38
8	PERA GMYO	PEGYO	1.31	0.35	0.89
9	SAĞLAM GMYO	SAGYO	1.15	0.24	0.63
10	SİNPAŞ GMYO	SNGYO	1.53	0.25	2.14
11	VAKIF GMYO	VKGYO	0.91	0.14	-0.68
12	YAPI KREDİ KORAY GMYO	YKGYO	1.17	0.06	2.77
13	Y & Y GMYO	YYGYO	0.93	0.12	-0.56

Table A3. Beta Test For The Carhart's Four-Factor Model (continued)

Panel B: Beta Test for Turkish CEFs					
No	**CEF Name**	**ISE Code**	**R_{mt}-R_f**	**Standard Error**	**t-stat**
1	AK Y.O.	AKYO	1.18	0.08	2.31
2	ALTERNATIF Y.O.	ARFYO	1.24	0.11	2.30
3	ATA Y.O.	ATAYO	0.82	0.14	-1.30
4	ATLAS MENK. KIYM. Y.O.	ATLAS	1.26	0.08	3.33
5	ATLANTIS Y.O.	ATSYO	1.12	0.06	1.91
6	AVRASYA MENK. KIYM. Y.O.	AVRSY	0.85	0.13	-1.13
7	BAŞKENT MENK. KIYM. Y.O.	BSKYO	0.44	0.21	-2.73
8	BUMERANG Y.O.	BUMYO	0.96	0.09	-0.48
9	DENIZ Y.O.	DNZYO	1.10	0.21	0.45
10	ECZACIBAŞI Y.O.	ECBYO	0.94	0.10	-0.54
11	EGELI-CO. Y.O.	EGCYO	1.18	0.09	2.03
12	EVG Y.O.	EVNYO	0.55	0.21	-2.18
13	FINANS Y.O.	FNSYO	1.08	0.08	0.99
14	GEDIK Y.O.	GDKYO	0.48	0.10	-5.00
15	GARANTI Y.O.	GRNYO	1.01	0.09	0.06
16	HEDEF MENK. KIYM. Y.O.	HDFYO	0.80	0.25	-0.82
17	İNFO MENK. KIYM. Y.O.	INFYO	0.95	0.19	-0.27
18	İŞ Y.O.	ISYAT	1.06	0.08	0.76
19	METRO MENK. KIYM. Y.O.	METYO	0.83	0.26	-0.65
20	MUSTAFA YILMAZ Y.O.	MYZYO	1.16	0.13	1.23
21	OYAK Y.O.	OYAYO	0.74	0.13	-2.09
22	PERA MENK. KIYM. Y.O.	PERYO	1.39	0.13	3.08
23	TAÇ Y.O.	TACYO	0.85	0.12	-1.26
24	TACIRLER Y.O.	TCRYO	0.95	0.20	-0.24
25	TAKSIM Y.O.	TKSYO	0.69	0.34	-0.90
26	TSKB Y.O.	TSKYO	0.90	0.28	-0.34
27	VARLIK Y.O.	VARYO	1.04	0.31	0.12
28	VAKIF MENK. KIYM. Y.O.	VKFYT	0.63	0.12	-3.14
29	YAPI KREDI Y.O.	YKRYO	1.06	0.07	0.86

This table presents t-test results for the beta coefficients of Turkish REITs and CEFs. The ISE Code is the ticker symbol for REITs (CEFs) trading on the Istanbul Stock Exchange. R_m-R_f is the beta coefficient for the excess return on the market portfolio. The last two columns show standard error and t-statistics for each beta coefficient, respectively. t-statistics for this test is calculated as (Rm-Rf – 1)/standard error. If a beta coefficient is greater than 1, then upper tail test (H_{null}: b≥1) is conducted and vice versa. All tests are done at 5% significance level.