Ekonomi, Politika & Finans Araştırmaları Dergisi, 2025, 10(2): 709-727
Journal of Research in Economics, Politics & Finance, 2025, 10(2): 709-727
Araştırma Makalesi / Research Article, https://doi.org/10.30784/epfad.1653390

PERFORMANCE ANOMALIES AND DETERMINANTS OF EQUITY FUNDS: EVIDENCE FROM TÜRKİYE*

Hisse Senedi Fonların Performans Anomalileri ve Belirleyicileri: Türkiye'den Kanıtlar

Aykan COŞKUN**

Keywords:
Equity Funds, Efficient Markets Hypothesis, Logistic Regression Analysis

JEL Codes:
G02, G10, G15

Abstract

This study aims to contribute to the literature by examining whether the returns of equity funds represent a new source of anomaly within the framework of the Efficient Markets Hypothesis. Equity funds traded under the equity umbrella on the Turkish Electronic Fund Trading Platform have been among the highest-performing funds over the past five years. The analysis was conducted using data from 48 equity funds over the period from February 4, 2019 to January 31, 2024. In this study, the situation where equity funds outperform the BIST 100 index is defined as an "anomaly". The dependent variable is the anomaly status, while the independent variables include the number of investors in the fund, the fund's duration of activity, fund risk, total fund value, expense ratio, and the number of shares in circulation. The findings suggest that equity funds with a higher number of investors tend to have a lower likelihood of outperforming the market. Conversely, longer activity duration, larger total fund value, and higher expense ratios are positively associated with the likelihood of exceeding market returns. However, these results should be interpreted as associations rather than causal effects due to the observational nature of the study.

Anahtar Kelimeler:
Hisse Senedi Fonlar, Etkin Piyasalar Hipotezi, Lojistik Regresyon Analizi

JEL Kodları:
G02, G10, G15

Öz

Bu çalışma, hisse senedi fonlarının getirilerinin Etkin Piyasalar Hipotezi çerçevesinde yeni bir anomali kaynağı olup olmadığını inceleyerek literatüre katkıda bulunmayı amaçlamaktadır. Türkiye Elektronik Fon Alım Satım Platformu'nda, hisse senedi şemsiyesi altında işlem gören fonlar, son beş yıl içinde en yüksek performans gösteren fonlar arasında yer almıştır. Analiz, 4 Şubat 2019 ile 31 Ocak 2024 tarihleri arasındaki dönemde 48 hisse senedi fonuna ait veriler kullanılarak gerçekleştirilmiştir. Bu çalışmada, hisse senedi fonlarının BIST 100 endeksinin getirisini aşma durumu "anomali" olarak tanımlanmıştır. Bağımlı değişken anomali durumu iken, bağımsız değişkenler fondaki yatırımcı sayısı, faaliyet süresi, fon riski, toplam fon değeri, gider oranı ve tedavüldeki pay sayısını içermektedir. Bulgular, yatırımcı sayısı yüksek olan fonların piyasayı yenme olasılığının daha düşük olduğunu ortaya koymaktadır. Öte yandan, daha uzun faaliyet süresine, daha yüksek toplam değere ve daha yüksek gider oranına sahip fonlar, piyasayı yenme olasılığıyla pozitif ilişki göstermektedir. Ancak çalışmanın gözlemsel doğası gereği, bu sonuçlar nedensel etkiler değil, yalnızca ilişkisel bulgular olarak yorumlanmalıdır.

* This study is derived from the paper titled "A New Proposal for Testing Market Efficiency: Analyzing Equity-Heavy Fund Returns Using Logistic Regression", which was presented at the 11th International Congress on Accounting and Finance Research hosted by Bartın University.

** Dr., Ankara Medipol University, Faculty of Health Sciences, Türkiye, aykan.coskun@ankaramedipol.edu.tr

Received Date (Makale Geliş Tarihi): 07.03.2025 Accepted Date (Makale Kabul Tarihi): 08.06.2025

1. Introduction

Mutual funds are important financial instruments that allow individual and institutional investors to evaluate their savings in different asset classes (Aksoy and Tanrıöven, 2014; Münyas, 2015). In Türkiye, mutual funds operate under umbrella funds (Coşkun, 2021: 12). An umbrella fund is an investment vehicle that includes all sub-funds whose participation units are issued under a single internal statute. Among these, equity funds (EFs) stand out by offering high return potential through allocating a significant portion of their portfolios to equities. EFs are defined as umbrella funds that continuously invest at least 80% of their total value in the shares of domestic and/or foreign issuers (Capital Markets Board of Türkiye, 2024). In recent years, interest in EFs has increased in Türkiye, and these funds have begun to play an important role in meeting investors' portfolio diversification and professional management needs. As of July 2024, a total of 99 EFs were listed on the Turkish Electronic Fund Trading Platform (TEFAS), and the total size of these funds has reached approximately USD 6 billion. As illustrated in Figure 1, EFs traded under the stock umbrella category on TEFAS have delivered the highest returns over the past five years, underscoring their growing prominence in Türkiye’s capital markets.

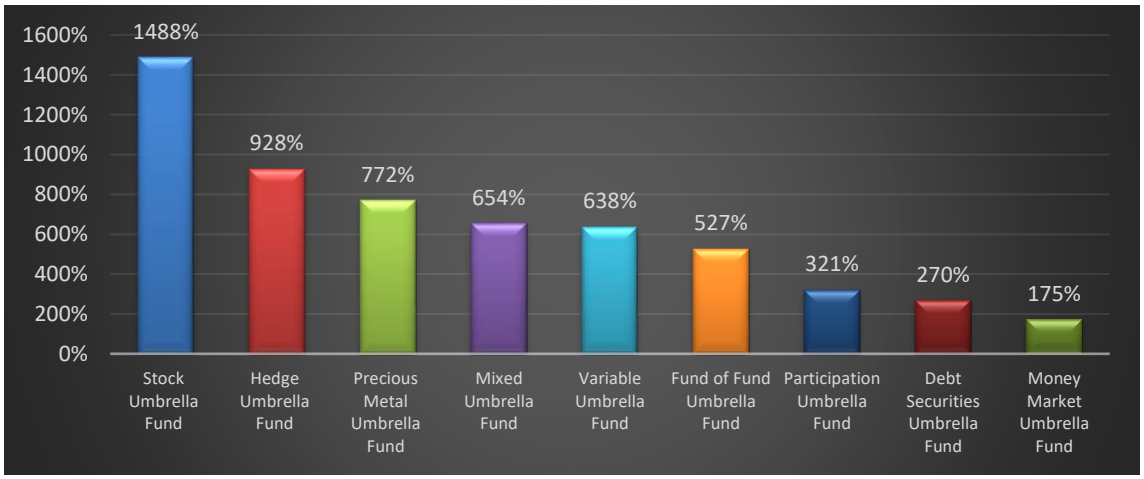

Figure 1. Cumulative Average Returns of Funds Traded on TEFAS from February 2019 to January 2024

The Efficient Markets Hypothesis (EMH) suggests that market prices reflect all available information, making it difficult to earn abnormal returns (Coşkun and Aypek, 2024). While this study evaluates anomalies through the lens of excess returns over the benchmark index (BIST 100), it also acknowledges that the term “anomaly” in the financial literature encompasses a broader set of concepts. These include risk-adjusted anomalies—such as Jensen’s Alpha and the Sharpe Ratio (Jensen, 1968; Sharpe, 1966)—calendar anomalies (e.g., day-of-the-week and January effects) (French, 1980; Lakonishok and Smidt, 1988), and behavioral anomalies arising from investor irrationality (De Bondt and Thaler, 1985). Incorporating this broader conceptual framework, the present study focuses on performance-based anomalies and investigates whether EFs traded on TEFAS consistently generate abnormal returns. Such findings would present a challenge to the notion of market efficiency. Furthermore, the study explores whether these high-performing funds, despite their strong performance over the past five years, conform to

EMH principles and whether their structural characteristics influence their return behavior. This research thereby contributes to the literature by evaluating whether EFs represent a new source of market anomaly.

Mutual funds can be managed under two main strategies: active and passive management. Actively managed funds aim to outperform the market by selecting assets through various analytical techniques (Bogle, 2007), whereas passively managed funds seek to replicate the performance of a particular index with minimal tracking error (Elton et al., 1996). In this context, EFs traded on TEFAS are generally considered passively managed funds, as their primary goal is to mirror a selected benchmark index as closely as possible rather than to generate alpha (Sharpe, 1991). For such funds, performance deviations from the index—whether positive or negative—are considered tracking error rather than indicators of managerial skill (Amenc and Le Sourd, 2003). Therefore, any evidence of excess returns among EFs must be interpreted within the context of their passive investment strategy.

Previous studies on market efficiency have generally focused on weak-form efficiency and examined calendar anomalies (Karan and Uygur, 2001; Kiymaz and Berument, 2003; Zilca, 2017; Karcıoğlu, and Özer 2017). This study offers a novel perspective by analyzing the performance of EFs and investigating whether they constitute a new source of anomalies. In particular, the returns of EFs belonging to portfolio management companies and banks will be examined comparatively. In addition, BIST-KYD Government Domestic Debt Securities (GDS) All Index will be used as the risk-free return rate, and the effect of the characteristic features of EFs on excess returns will be evaluated by logistic regression analysis.

This study presents an empirical analysis using EF data obtained from the TEFAS database. The main reason for choosing logistic regression analysis is that the dependent variable is a binary (presence/absence) variable and this method is suitable for this type of data. The basic hypothesis of the study is that EFs behave in line with the market efficiency hypothesis; in other words, they do not generate excess returns. However, the possibility that some EFs may achieve excess returns if they have certain characteristic features has also been taken into consideration.

One of the main limitations of the study is the restrictions on data access. Since hedge funds do not have a daily reporting requirement, EFs belonging to these funds could not be included in the analysis. In addition, the analysis was limited to EFs traded only on the TEFAS platform, and funds on other platforms were excluded. In future studies, these results can be validated using different markets, alternative time periods, and broader datasets. In addition, more complex relationships can be examined using more advanced methods such as machine learning.

The results of this study may have important implications for investors, portfolio managers and regulators. In particular, a better understanding of the factors affecting the performance of EFs may help investors make more informed decisions.

The rest of the study is structured as follows: In the second section, the literature review on market efficiency and mutual funds is presented and the theoretical framework of the study is established. In the third section, the data set and methodology used are explained in detail. In the fourth section, the results of the empirical analysis are presented and interpreted. In the fifth

section, the main findings of the study are summarized, theoretical and practical implications are discussed, limitations are stated, and suggestions for future research are presented.

2. Summary of Literature

The literature on market efficiency and mutual funds has extensively examined the presence of anomalies and the determinants of fund performance across diverse market contexts. Among the most widely studied market irregularities is the day of the week effect, which posits that stock returns vary systematically across weekdays, thereby challenging the assumptions of the EMH. In the context of Borsa Istanbul, several studies have consistently documented abnormal returns toward the end of the trading week. Karan and Uygur (2001), analyzing data from 1991 to 1998, found that positive returns were more pronounced on Thursdays and Fridays, particularly among large-cap firms. Tunçel (2007), confirmed this pattern during the post-2001 crisis recovery period (2002–2005), reporting the highest returns on Fridays and the lowest on Mondays and Tuesdays. Atakan (2008), using ARCH-GARCH models to examine this phenomenon over a longer period (1987–2008), attributed higher Friday returns to firms' tendency to announce positive news during the week and negative developments near the weekend. These findings point to behavioral patterns among market participants that deviate from the notion of fully rational pricing.

Comparative evidence from other emerging markets presents a more nuanced picture regarding the persistence of such anomalies. Raza et al. (2015), in their analysis of the Pakistan Stock Exchange between 1997 and 2014, observed that while the day of the week effect was present in some periods, it tended to diminish over time, indicating increasing market efficiency. Similarly, Arı and Yüksel (2017), employing GARCH and EGARCH models to the BIST100 Index (2003–2016), argued that improvements in individual financial literacy and technological access to information have led to more rational investor behavior, thereby weakening the anomaly. However, Güneş (2021), found that while the BIST100 Index no longer displayed significant weekday effects between 2011 and 2020, the KAT30 Index still exhibited negative returns on Mondays and Wednesdays, suggesting that these anomalies may persist in specific market segments.

Alongside these studies on anomalies, another strand of literature has focused on mutual fund performance as a lens to assess market efficiency and manager skill. Carhart (1997), developed a four-factor model incorporating momentum as an extension of the Fama-French three-factor model and showed that much of the persistence in mutual fund returns could be explained by factor exposures rather than superior manager skill. This model became a standard for evaluating mutual fund performance by controlling for known risk factors, including momentum, which has itself been interpreted as a market anomaly. However, despite the model's wide usage, Carhart (1997) also noted that R^2 values were generally low, implying that a significant portion of mutual fund returns remained unexplained by the model's factors. This limitation has led to the identification of fund-specific characteristics, behavioral biases, or market frictions that are not captured by traditional risk factors. Similar results in subsequent studies have reinforced the notion that fund performance is only partially attributable to systematic risks, pointing to the importance of exploring additional explanatory variables. Carhart et al. (2002), revealed that mutual fund prices tended to inflate at quarter and yearend, indicating potential window dressing practices by managers. Kaminsky et al. (2004), analyzed

Latin American funds between 1993 and 1999, finding that managers engaged in momentum strategies—buying recent winners and selling losers—especially during periods of heightened volatility. These behaviors suggest strategic timing rather than purely passive investing, raising questions about the actual efficiency of fund operations.

Subsequent studies have explored how fund characteristics influence performance. Varamini and Kalash (2008), found that mutual funds with larger capitalizations tended to yield lower returns over the 1994–2007 period, a finding that challenges the assumption that larger funds benefit from economies of scale. In the Polish context, Białkowski and Otten (2011), found that domestic funds outperformed international counterparts from 2000 to 2008, likely due to superior local information. Babalos et al. (2012), employed Data Envelopment Analysis on Greek funds and found that large funds underperformed and suffered periodic productivity losses between 2003 and 2009. In Turkey, Korkmaz and Uygurturk (2014), assessed fund performance between 2006 and 2009 using multiple risk-adjusted return measures and observed that returns across funds were relatively homogeneous, and fund managers exhibited weak market timing skills.

More recent studies have incorporated environmental and thematic perspectives into fund performance analysis. Wagner and Margaritis (2017), found that domestic Chinese funds delivered superior returns compared to foreign funds between 1992 and 2012, again underlining the advantages of local expertise. Umar et al. (2022), showed that carbon-intensive funds in China generated abnormal returns, while Ji et al. (2021), categorized funds in BRICS countries by their carbon neutrality, discovering that environmentally focused funds outperformed others. During the COVID-19 crisis, Mirza et al. (2022), demonstrated that Islamic EFs offered greater resilience compared to conventional funds, acting as safe havens during peak uncertainty. These results highlight how specific fund mandates, such as ethical, environmental, or religious criteria, can influence risk-return profiles, sometimes contradicting traditional efficiency theories.

In the Turkish mutual fund context, Çömlekçi et al. (2024), examined the performance persistence of equity-heavy funds listed on the TEFAS platform between 2010 and 2023. Their results indicate significant return continuity over three- to five-year periods, challenging the efficient market assumption that past performance is not indicative of future results. This finding suggests that in the Turkish market, at least some degree of performance predictability remains, possibly due to structural or behavioral factors not yet fully arbitraged away.

In summary, the reviewed literature indicates that while certain market anomalies—such as the day of the week effect—tend to weaken over time with increasing market maturity, they are not entirely absent. Similarly, the performance of mutual funds is influenced by a combination of manager skill, market structure, fund size, and thematic orientation. Despite the breadth of research, a comprehensive analysis combining these themes, particularly in the context of Turkish EFs, remains limited. This study aims to bridge that gap by offering an integrated assessment of fund performance anomalies and their determinants in an emerging market setting.

3. Data Set and Method

3.1. Data Set

EF participation share prices, number of shares in circulation, number of people in the fund and total fund values were obtained from the TEFAS database; portfolio management fees and activity periods were obtained from the current prospectuses on the Public Disclosure Platform; BIST100 Index and BIST-KYD GDS All Index data were obtained from the Borsa Istanbul database.

3.2. Universe and Sample

Since data from a maximum of 5 years ago can be downloaded from the TEFAS database, this study analyzed a total of 2.880 monthly observations covering 60 months for 48 EFs belonging to 28 banks and 20 portfolio management companies that consistently reported daily data between February 4, 2019, and January 31, 2024.

3.3. Data Analysis

Excel and STATA/IC 15.0 were used in the analyses. Initially, the data structure was evaluated for suitability for panel logistic regression analysis. To determine the presence of random effects, the Breusch-Pagan Lagrangian Multiplier (LM) test was applied. The LM test results are presented in Table 1.

Table 1. Breusch-Pagan LM Test for Random Effects

Component	Variance	Std. Dev.
Presence/Absence of Anomaly	0.2280302	0.4775251
e (id, t error)	0.2228356	0.4720546
u (id effect)	0.0005738	0.0239535
Test: Var(u) = 0 chibar2(01) = 0.24 Prob> chibar2 = 0.3135		

As shown in Table 1, the test statistics (chibar2(01) = 0.24, p = 0.3135) indicate that the variance of the unobserved individual-specific effect (u) is not significantly different from zero (p> 0.05). Specifically, the estimated variance component for the panel-level effects was very small (0.0005738), with a standard deviation of only 0.0239535. This suggests minimal heterogeneity across the EFs that is not captured by the independent variables in the model. Consequently, a pooled logistic regression approach was deemed more appropriate, as a panel model would not provide efficiency gains or account for unobserved heterogeneity. Odds ratios were calculated, and robust standard errors were used to correct for heteroskedasticity. A significance threshold of p <0.05 was applied.

3.4. EF Performance Calculation

Participation shares from the TEFAS database were used to calculate EF returns, while index closing prices from Borsa Istanbul were used to calculate market returns.

$$Ri = (Rt - Rt - 1) / Rt - 1 \quad (1)$$

In Equation (1), R_i denotes the monthly return of the fund, R_t is the participation share price on the last business day of the month, and R_{t-1} is the participation share price on the first business day of the month.

$$Rm = (Rm, t - Rm, t - 1) / Rm, t - 1 \quad (2)$$

In Equation (2), represents the monthly return of the BIST100 Index, where $R_{m,t}$ is the index closing price on the last business day of the month and $R_{m,t-1}$ is the closing on the first business day of the month.

Figure 2 illustrates the average return performance of the BIST100 Index, EFs operated by portfolio management companies, EFs operated by banks, and all EFs combined for the period between February 4, 2019, and January 31, 2024.

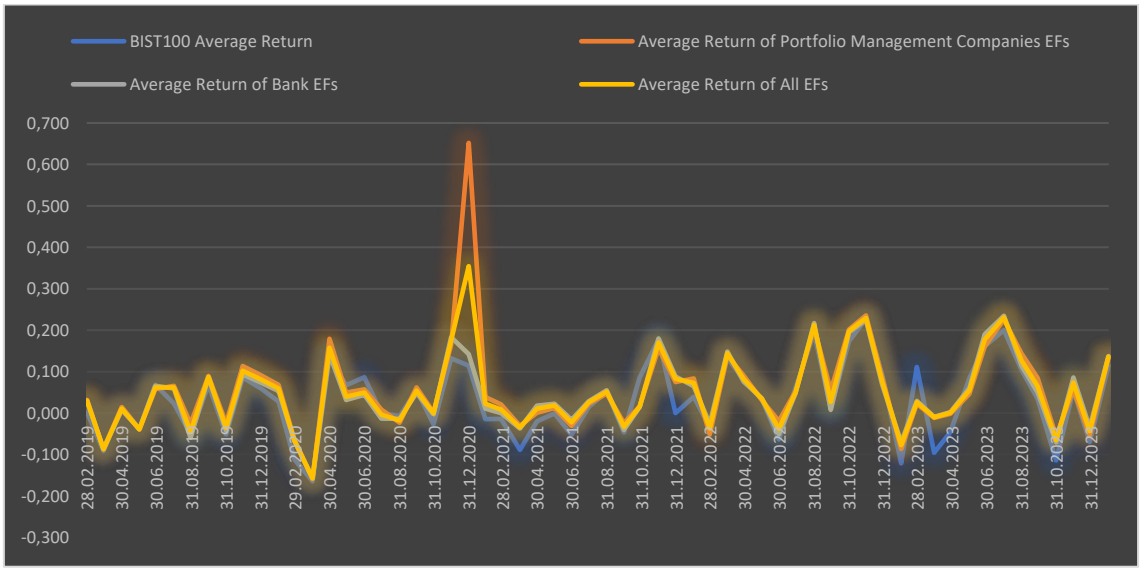

Figure 2. Average Return of BIST100 Index and EFs

As shown in Figure 2, the return trends of all groups were generally parallel over the observed period. However, a sharp increase in the average returns of EFs managed by portfolio management companies is evident toward the end of 2020. This pattern may suggest that these funds were more responsive to prevailing market conditions or that the active management strategies employed by portfolio management companies were particularly effective during that period.

Correlation analysis was conducted to determine the suitability of BIST100 Index as a performance benchmark for EF returns. The results of the correlation analysis are presented in Table 2.

Table 2. Correlation Matrix of BIST100 Index and EF Returns

Variable/Probability	BIST 100 Return	Bank EFs Return	Portfolio Management Companies EFs Return	All EFs Return
BIST 100 Return	1.000000			
Bank EFs Return	0.941653 0.0000	1.000000 -----		
Portfolio Management Company EFs Return	0.758294 0.0000	0.805295 0.0000	1.000000 -----	
All EFs Return	0.896415 0.0000	0.951986 0.0000	0.948133 0.0000	1.000000 -----

As shown in Table 2, the BIST100 Index return is strongly correlated with all EF categories: approximately 0.94 with bank EFs, 0.76 with portfolio management company EFs, and 0.90 with all EFs combined. These results indicate that the BIST100 Index is a suitable benchmark for evaluating EF returns.

Based on this, and in line with previous studies such as Korkmaz and Uygurturk (2014), Ji et al. (2021), and Mirza et al. (2022), Jensen's Alpha and the M^2 ratio were calculated using the market return, allowing fund performances to be assessed in relation to systematic risk.

Jensen's Alpha, proposed by Jensen (1968), is calculated based on the Capital Asset Pricing Model (CAPM) as follows:

$$R_{i-}R_f = \alpha_i + \beta_i (R_m - R_f) + \varepsilon_{it} \quad (3)$$

In Equation (3), R_i represents the return of the EF, R_f is the risk-free return (represented by the BIST-KYD GDS All Index), α_i is the fund's alpha coefficient, β_i is the beta coefficient, R_m is the return of BIST100 Index and ε_{it} is the error term.

The M^2 ratio, developed by Modigliani and Modigliani (1997), is calculated by adjusting the Sharpe ratio to the market's risk level as follows:

$$M^2 = R_f + \frac{R_i - R_f}{\sigma_i} x\, \sigma_m \quad (4)$$

In Equation (4), R_f denotes the average return of the BIST-KYD GDS All Index, R_i is the average return of the EF, σ_i is the standard deviation of EF return, σ_m is the standard deviation of BIST100 Index return.

Descriptive statistics of the performance indicators (M^2 and Jensen's Alpha) for bank EFs and portfolio management company EFs, reported annually, are presented in Table 3. According to Table 3, bank EFs generally exhibit positive average values for M^2 across all years. However, their average Jensen's Alpha was slightly negative in 2019 (–0.0003), indicating underperformance relative to the market. In contrast, EFs operated by portfolio management companies displayed positive average values for both M^2 and Jensen's Alpha in each year, suggesting better risk-adjusted and market-relative performance.

Table 3. Descriptive Statistics of Performance Rates of EFs by Year

		M^2		Jensen's Alpha	
Years		**Bank EFs**	**Portfolio Management Company EFs**	**Bank EFs**	**Portfolio Management Company EFs**
2019	Min	0.0087	0.0142	-0.0155	-0.0100
	Max	0.0527	0.0528	0.0194	0.0194
	Mean	0.0232	0.0277	-0.0003	0.0045
	SD	0.0103	0.0099	0.0104	0.0096
2020	Min	0.0131	0.0205	0.0079	0.0119
	Max	0.0562	0.0564	0.8810	0.8751
	Mean	0.0339	0.0377	0.0582	0.0777
	SD	0.0113	0.0111	0.1588	0.1936
2021	Min	-0.0042	0.0146	0.0031	0.0202
	Max	0.0484	0.0483	0.0523	0.0408
	Mean	0.0305	0.0301	0.0333	0.0326
	SD	0.0107	0.0076	0.0094	0.0060
2022	Min	0.0604	0.0604	0.0203	0.02034
	Max	0.1037	0.1037	0.1237	0.1236
	Mean	0.0855	0.0876	0.0509	0.0544
	SD	0.0106	0.0109	0.0195	0.0223
2023	Min	0.0225	0.0225	0.0422	0.0513
	Max	0.0751	0.0751	0.0870	0.0870
	Mean	0.0513	0.0495	0.0640	0.0632
	SD	0.0142	0.0155	0.0106	0.0098

In this part of the study, it was examined whether the performance differences observed in Table 3 are statistically significant. For this purpose, the average annual performance values of each EF over the five-year period were used. A t-test was conducted to determine whether there is a statistically significant difference in performance between bank EFs and portfolio management company EFs. Descriptive group statistics for M^2 and Jensen's Alpha are presented in Table 4.

Table 4. Statistics of Performance Rates by Groups

Metric	**Fund Type**	**N**	**Mean**	**SD**	**SE Mean**
M^2	Bank EFs	140	0.0449	0.0251	0.0021
	Portfolio Management Company EFs	100	0.0465	0.0246	0.0025
Jensen's Alpha	Bank EFs	140	0.0412	0.0747	0.0062
	Portfolio Management Company EFs	100	0.0465	0.0893	0.0091

Following the group statistics, an independent samples t-test was conducted to compare the performance of EFs operated by portfolio management companies and banks. The results are presented in Table 5. As illustrated in Table 5, the comparison of the M^2 measure ($F = 0.064$, $p = 0.801$; $t(238) = –0.504$, $p = 0.615$) and Jensen's Alpha ($F = 0.076$, $p = 0.782$; $t(238) = –0.491$, $p = 0.624$), assuming equal variances, reveals no statistically significant differences between EFs managed by portfolio management companies and those managed by banks. Moreover, the 95% confidence intervals for both mean differences include zero, indicating that any observed differences in performance are statistically negligible.

Table 5. Comparison of EF Performance Between Portfolio Management Companies and Banks

Metric	Equal Variances	F	p	t	df	Sig. (2-tailed)	Mean Difference	SE Difference	95% Confidence Interval of the Difference	
									Lower	Upper
M^2	Assumed	0.064	0.801	-0.504	238	0.615	-0.0016	0.0032	-0.0081	0.0048
Jensen's Alpha	Assumed	0.076	0.782	-0.491	238	0.624	-0.0052	0.01066	-0.0262	0.0157

3.5. Variables Used in the Study

All variables used in the analysis were constructed on a monthly basis. Detailed descriptions are provided in Table 6. As shown in Table 6, several independent variables—specifically, the Number of People in the Fund (NPF), Activity Period (AP), and Total Fund Value (TFV)—were transformed using the natural logarithm. This transformation was performed to (i) correct for positive skewness, (ii) stabilize variance and mitigate heteroskedasticity, (iii) reduce the impact of extreme values by compressing their scale, and (iv) facilitate the economic interpretation of coefficients as elasticities (i.e., a 1% change in the predictor implies an approximate percentage change in the odds of observing an anomaly).

Table 6. Variables Used in the Study

Variable	Abbreviation	Description of the Variable
Presence of Anomaly	PA	It is coded as 0 = not present, 1 = present
Number of People in the Fund	NPF	Natural logarithm of the number of investors in the fund
Net Return of the Fund	NRF	Subtracting fund expenses from fund returns
Fund Risk	FR	Standard deviation of weekly fund returns within each month
Activity Period	AP	Natural logarithm of the number of months the fund has been active
Total Fund Value	TFV	Natural logarithm of the fund's total asset value
Expense Ratio	ER	Total fund expenses divided by total fund value
Number of Shares in Circulation	NSC	Natural logarithm of the number of shares in circulation

3.6. Research Model and Hypotheses

In this study, within the framework of the EMH, it was investigated whether the net returns of EFs deviated from the return of the BIST100 Index and whether such deviations indicated the presence of an anomaly. To this end, the dependent variable—Presence of Anomaly (PA)—was defined as follows: when an EF's net return was lower than the BIST100 Index return, it was coded as 0 (no anomaly); when the net return exceeded the BIST100 Index return, indicating excess return, it was coded as 1 (anomaly). Based on this definition, the following hypotheses were formulated to test whether specific fund characteristics are associated with the likelihood of achieving excess returns:

$H_{1.1}$: There is a statistically significant relationship between the number of investors in the EF and the likelihood of generating excess return.

$H_{1.2}$: There is a statistically significant relationship between the risk level of the EF and the likelihood of generating excess return.

$H_{1.3}$: There is a statistically significant relationship between the number of months the EF has been active and the likelihood of generating excess return.

$H_{1.4}$: There is a statistically significant relationship between the total asset value of the EF and the likelihood of generating excess return.

$H_{1.5}$: There is a statistically significant relationship between the expense ratio of the EF and the likelihood of generating excess return.

$H_{1.6}$: There is a statistically significant relationship between the number of shares in circulation of the EF and the likelihood of generating excess return.

The research model was specified as follows:

$$PA = \beta 0 + \beta 1\, NPFit + \beta 2\, FRit + \beta 3\, APit + \beta 4\, TFVit + \beta 5\, ERit + \beta 6\, NSCit + \varepsilon_{it} \quad (5)$$

3.7. Multiple Logistic Regression Analysis and Its Application

Logistic regression analysis is widely used in the social sciences, particularly when the dependent variable is binary—such as success/failure or presence/absence. Therefore, it was deemed an appropriate method for this study. The odds ratio in logistic regression is defined as the ratio of the probability of an event occurring to the probability of it not occurring.

Let the independent variable vector be defined as x= (x_1, x_2, …x_p) where p is the number of predictors. The multiple logistic regression model is expressed as follows:

$$\pi(x) = \frac{e^{(\beta_0+\beta_1 X_{1+}\ldots+\beta_p X_p)}}{1+e^{(\beta_0+\beta_1 X_{1+}\ldots+\beta_p X_p)}} = \frac{1}{1+e^{-(\beta_0+\beta_1 X_{1+}\ldots+\beta_p X_p)}} \quad (6)$$

The logistic regression model can also be expressed in terms of odds as follows:

$$\frac{\pi(x)}{1-\pi(x)} = e^{\beta_0+\beta_1 X_{1+}\ldots+\beta_p X_p} \quad (7)$$

Taking the natural logarithm of the odds results in the logit transformation:

$$lojit\ \pi(x) = ln(\frac{\pi(x)}{1-\pi(x)}) \quad (8)$$

This transformation converts the model into a linear form:

$$g(x) = \ln(\frac{\pi(x)}{1-\pi(x)}) = \beta_0+\beta_1 X_{1+} \ldots + \beta_p X_p \quad (9)$$

4. Findings

The monthly average return of the EFs in the sample is 6.59%, its standard deviation is 0.9328499, its monthly minimum return is -22.22%, and its monthly maximum return is 1.050.16%. Other descriptive statistics are shown in Table 7.

Table 7. Descriptive Statistics

Variable	N	Mean	SD	Min	Max
BIST100 Monthly Return	2.880	3.09%	0.0876068	-16.46%	22.76%
Fund Risk	2.880	0.0316338	0.0824274	-0.05243	4.318956
Activity Period	2.880	80.79132	19.93912	21 month	121 month
Total Fund Value	2.880	₺366 million	₺901 million	₺317,346	₺11.1 billion
Number of People in the Fund	2.880	3.287.85	5.734.522	2	73.611
EF Monthly Return	2.880	6.59%	0.9328499	-22.22%	1.050.16%
Expense Ratio	2.880	0.0020859	0.000533	0.0004167	0.0029583
Number of Shares in Circulation	2.880	844.84 million	1.86 billion	524.348	14.64 billion

As shown in Table 7, the descriptive statistics reveal considerable variation across EFs, particularly in fund size, number of investors, and monthly returns. The wide range in EF returns and total fund value indicates high heterogeneity among the EFs, which supports the application of logistic regression analysis to examine the determinants of market outperformance.

In this part of the study, the significance of the logistic regression models was assessed using the Omnibus Test of Model Coefficients, and the results are presented in Table 8. According to the test results, the chi-square value was 47.012 ($df = 6$, $p < 0.01$) for all EFs and 45.619 ($df = 6$, $p < 0.01$) for bank EFs, indicating that the models are statistically significant for these groups. However, for portfolio management company EFs, the chi-square value was 6.118 ($df = 6$, $p = 0.410$), suggesting that the model is not statistically significant for this subgroup.

Table 8. Omnibus Tests of Model Coefficients

Fund Group	Chi-square	df	p
All EFs	47.012	6	0.000***
Bank EFs	45.619	6	0.000***
Portfolio Management Company EFs	6.118	6	0.410

Note: ***, ** and * symbols refer to 1%, 5% and 10%.

As shown in Table 8, the models for all EFs and bank EFs are statistically significant, meaning that the independent variables collectively help explain the likelihood of anomaly occurrence in these groups. In contrast, the model for portfolio management company EFs is not significant, indicating that the included predictors do not sufficiently account for anomaly presence in that subgroup.

The model summary, in which the dependent variable is explained by the independent variables, is presented in Table 9. The -2 Log Likelihood Value showing the significance of unexplained variance in the dependent variable was found to be 3.686.34 in all EFs. According to Cox&Snell R Square statistics, 1.6% of the dependent variable and 2.2% according to Nagelkerke R Square statistics were explained by the independent variables. The -2 Log likelihood value was found to be 2.172.28 in bank EFs. According to Cox&Snell R Square statistics, 2.7% of the dependent variable and 3.7% according to Nagelkerke R Square statistics were explained by the independent variables. The -2 Log likelihood value was found to be 1.498.37 in portfolio management company EFs. According to Cox&Snell R Square statistics, 05% of the dependent variable and 07% according to Nagelkerke R Square statistics were explained by the independent variables.

Table 9. Model Summary

Fund Group	-2 Log Likelihood	Cox & Snell R^2	Nagelkerke R^2
All EFs	3.686.34	0.016	0.022
Bank EFs	2.172.28	0.027	0.037
Portfolio Management Company EFs	1.498.37	0.005	0.007

As presented in Table 9, the pseudo R^2 values derived from the logistic regression models—specifically the Cox & Snell and Nagelkerke statistics—are relatively low across all fund groups. This suggests that the independent variables explain a limited portion of the variation in the presence of excess return. However, this is not uncommon in financial models, where dependent variables such as excess returns are influenced by a wide range of observable and unobservable factors. As noted by Menard (2000) and Hosmer et al. (2013), even models with low pseudo R^2 values can provide meaningful insights, particularly when individual predictors are statistically significant. Therefore, although the models explain only a small portion of the variation in the presence of excess returns, the statistically significant effects of certain fund characteristics suggest relevant and potentially actionable relationships that warrant further investigation.

It is recommended to work with at least 400 observations to apply the Hosmer–Lemeshow test for assessing model goodness of fit (Alpar, 2017:621). Since this study includes 2.880 observations for all EFs, 1.680 for bank EFs, and 1.200 for portfolio management company EFs, the use of the Hosmer–Lemeshow test is considered appropriate.

The results of the Hosmer–Lemeshow test, applied to evaluate how well the logistic regression models fit the data, are presented in Table 10. The significance values were found to be 0.134 for all EFs, 0.447 for bank EFs, and 0.373 for portfolio management company EFs. As all p-values exceed 0.05, it can be concluded that the models provide a good fit to the data for each group.

Table 10. Hosmer–Lemeshow Goodness-of-Fit Test

Fund Group	Chi-square	p
All EFs	12.414	0.134
Bank EFs	7.865	0.447
Portfolio Management Company EFs	8.651	0.373

Note: ***, ** and * symbols refer to 1%, 5% and 10%.

As presented in Table 10, the Hosmer–Lemeshow test results indicate that the logistic regression models fit the data well for all fund groups, as evidenced by p-values exceeding the 0.05 significance level. This suggests no significant difference between observed and predicted values, supporting the adequacy of the model fit.

In multivariate linear regression analyses, multicollinearity among independent variables can pose significant challenges, potentially distorting the estimated coefficients and compromising the reliability of the model (Gamgam and Altunkaynak, 2017: 227). Various methods are used to detect multicollinearity, one of which is the Variance Inflation Factor (VIF) (Zor and Coşkun, 2021: 338). A VIF value less than 5 is generally considered acceptable, indicating that multicollinearity is not a concern (Alpar, 2017: 508). Table 11 presents the VIF

values for the independent variables across all EFs, bank EFs, and portfolio management company EFs.

Table 11. VIF Test Results

Fund Group	Variable	VIF	1/VIF
All EFs	NPF	3.06	0.326968
	FR	1	0.998572
	AP	1.79	0.558247
	TFV	3.06	0.326968
	ER	1.17	0.853898
	NSC	1.35	0.743346
Bank EFs	NPF	2.18	0.458874
	FR	1.04	0.965505
	AP	2.76	0.3623
	TFV	3.29	0.304321
	ER	1.42	0.706234
	NSC	1.44	0.693298
Portfolio Management Company EFs	NPF	3.18	0.31424
	FR	1	0.999198
	AP	1.7	0.589426
	TFV	3.42	0.292217
	ER	1.08	0.928287
	NSC	1.39	0.718313

As shown in Table 11, all VIF values for the independent variables are below the commonly accepted threshold of 5, indicating that multicollinearity is not a concern in the models. This suggests that the independent variables included in the regression analyses do not exhibit strong linear relationships with one another, thus supporting the reliability of the regression coefficients.

In this part of the study, multiple logistic regression analysis was conducted, and the significance levels of the variables are presented in Table 12. In all EFs, a negative and statistically significant relationship was found between the number of people in the fund and excess return (Odds Ratio: 0.651, z: -5.79, $p < 0.01$). Positive and statistically significant relationships were found between the activity period of the fund (Odds Ratio: 2.424, z: 2.01, $p < 0.05$), total value of the fund (Odds Ratio: 1.294, z: 3.07, $p < 0.01$), and expense ratio (Odds Ratio: 4.35E+96, z: 2.77, $p < 0.01$) with excess return.

In bank EFs, negative and statistically significant relationships were observed between the number of fund participants and excess return (Odds Ratio: 0.582, z: -4.74, $p < 0.01$), and between the number of shares in circulation and excess return (Odds Ratio: 0.867, z: -2.41, $p < 0.05$). In this fund group, positive and statistically significant relationships were observed between activity period (Odds Ratio: 13.375, z: 3.59, $p < 0.01$) and expense ratio (Odds Ratio: 1.20E+114, z: 2.62, $p < 0.01$) with excess return.

Table 12. Logistic Regression Analysis Results

Fund Group	Variable	Odds Ratio	Robust SE	z	p	[95% Conf.	Interval]
All EFs (N: 2.880)	NPF	0.6511577	0.048211	-5.79	0.000***	0.563202	0.752849
	FR	1.015585	0.339447	0.05	0.963	0.527488	1.95533
	AP	2.423565	1.065002	2.01	0.044**	1.02425	5.734602
	TFV	1.29409	0.108843	3.07	0.002***	1.097417	1.52601
	ER	4.35E+96	3.50E+98	2.77	0.006***	1.98E+28	9.60E+164
	NSC	0.9378253	0.037299	-1.61	0.107	0.867497	1.013855
	_cons	0.1716467	0.117	-2.59	0.010	0.045126	0.6528907
Bank EFs (N: 1.680)	NPF	0.5821692	0.0664962	-4.74	0.000***	0.4653971	0.7282404
	FR	0.0793971	0.1963629	-1.02	0.306	0.0006232	10.1152
	AP	13.3753	9.660133	3.59	0.000***	3.247393	55.08997
	TFV	1.148961	0.137221	1.16	0.245	0.9091718	1.451994
	ER	1.20E+114	1.20E+116	2.62	0.009***	4.20E+28	3.50E+199
	NSC	0.8675066	0.0510589	-2.41	0.016**	0.7729894	0.9735809
	_cons	0.0487715	0.0417981	-3.52	0.000	0.0090922	0.2616144
Portfolio Management Company EFs (N: 1.200)	NPF	0.8160694	0.1217059	-1.36	0.173	0.6092306	1.093132
	FR	1.194631	0.3586755	0.59	0.554	0.6632383	2.151782
	AP	0.5698986	0.3897157	-0.82	0.411	0.1491824	2.177096
	TFV	1.243395	0.1756694	1.54	0.123	0.942648	1.640093
	ER	6.10E+105	1.10E+108	1.33	0.183	1.72E-50	2.10E+261
	NSC	0.9560433	0.0589697	-0.73	0.466	0.8471779	1.078898
	_cons	1.590544	2.170882	0.34	0.734	0.1095894	23.08463

Note: ***, ** and * symbols refer to 1%, 5% and 10%.

According to the findings in Table 12, the following comments can be made for all EFs and bank.

Number of People in the Fund (NPF): The NPF coefficient is negative and statistically significant for all EFs and banks. This indicates that the probability of anomalies decreases as the number of people in the fund increases. In other words, funds with more investors are less likely to achieve excessive returns.

Fund Risk (FR): The FR is not statistically significant for any fund group. This indicates that fund risk does not have a significant effect on excessive returns.

Activity Period (AP): The AP coefficient is positive and statistically significant for all EFs and banks. This indicates that the probability of anomalies increases as the duration of the fund increases. In other words, funds that have been in operation for a longer period are more likely to achieve excessive returns.

Total Fund Value (TFV): The TFV coefficient is positive and statistically significant for all EFs. This indicates that the probability of anomalies increases as the total value of the fund increases. In other words, larger funds are more likely to achieve excessive returns.

Expense Ratio (ER): The coefficient for ER is positive and statistically significant for all EFs and banks. This indicates that the probability of anomalies increases as the expense ratio increases. In other words, funds with higher expenses are more likely to generate excess returns.

Number of Shares in Circulation (NSC): The coefficient for NSC is negative and statistically significant for bank EFs. This indicates that the probability of anomalies decreases as the number of shares outstanding increases. In other words, funds with more shares outstanding are less likely to generate excess returns.

5. Conclusion

This study examined whether the returns of EFs in Türkiye represent a potential anomaly within the framework of the EMH. Using logistic regression analysis, the relationship between various EF characteristics and excess returns was empirically investigated. To account for heterogeneity, the analysis categorized EFs based on their ownership structure as either bank-owned or portfolio management company-operated.

A negative and statistically significant relationship was found between the number of people in the fund and excess returns for all EFs and bank-owned EFs. This finding indicates that funds with more investors are less likely to be associated with excess returns. However, no such relationship was observed between the number of people and excess returns for portfolio management companies-owned EFs. A positive and statistically significant relationship was found between the duration of activity and excess returns for all EFs and bank EFs. This association suggests that longer-established funds may be linked with a higher probability of excess returns. Again, no relationship was found between the duration of activity and excess returns for portfolio management companies-owned EFs.

For all EFs, a positive and statistically significant relationship was found between the total fund value and excess return. This may imply that larger funds are associated with better performance, possibly reflecting advantages such as economies of scale, although causality cannot be inferred. However, this relationship was not found for bank-owned EFs and portfolio management company EFs. For all EFs and bank EFs, a positive and statistically significant relationship was found between the expense ratio and excess return. This association may reflect that funds with higher expense ratios are more likely to adopt active management strategies and incur additional costs, which may be linked with higher returns in certain cases. For bank EFs, a negative and statistically significant relationship was found between the number of shares in circulation and excess return. This may indicate that as these funds grow in popularity, their likelihood of being associated with excess returns decreases. No significant relationship was found between EF risk and excess return.

The findings of this study provide important insights into the market efficiency of EFs in Türkiye. The negative correlation between the number of investors and excess returns is consistent with Białkowski and Otten (2011), who argued that greater investor participation—due to higher liquidity constraints and herding behavior—may reduce fund performance. Similarly, the positive relationship between operational duration and excess returns aligns with Kaminsky et al. (2004), who found that longer-established funds benefit from experience and greater stability in their investment strategies.

The positive association between the total fund value and excess returns suggests that larger funds can benefit from economies of scale and have access to more favorable investment opportunities, which is consistent with the findings of Wagner and Margaritis (2017). The significant positive relationship between the expense ratio and excess returns is consistent with Carhart (1997), who argues that actively managed funds may generate superior returns despite incurring higher costs. At this point, it is important to distinguish between active and passive fund management strategies. Most EFs traded on the TEFAS platform are managed passively. These funds aim to mirror the performance of a benchmark index rather than outperform it. Therefore, returns close to the benchmark are expected, and any deviation from the benchmark—whether positive or negative—is considered a tracking error rather than a

reflection of fund manager skill. In this context, the absence of consistent excess returns in many EFs aligns with the core principles of passive management. On the other hand, funds with higher expense ratios may employ more active strategies and thus take on additional risk and transaction costs, which could help explain the observed associations. This distinction is essential for properly interpreting performance differences among funds and assessing market efficiency.

Overall, these results contribute to the ongoing debate on market efficiency by highlighting how the structural characteristics of investment funds influence excess returns in Türkiye's stock-intensive fund market. While certain funds appear to deviate from the predictions of the EMH, such deviations should be interpreted as statistical associations rather than definitive causal relationships. Given the observational nature of the data, the relationships identified in this study should be interpreted strictly as correlations rather than causal effects.

This study suggests that the weak form of the EMH is not always valid for investment funds in Türkiye. In particular, it has been found that factors such as the number of people, duration of activity, total value, and expense ratio of the fund have a statistically significant association with excess returns. These findings offer important practical implications for investors, fund managers, and regulators. Investors should consider the ownership structure, operational history, fund size, and expense ratio when choosing a fund. Notably, funds with a longer track record, greater total value, and higher expense ratios tend to be associated with superior performance, though no causal inference can be made. Fund managers should take into account the number of investors, operational duration, fund size, and cost structure to enhance performance. In particular, employing experienced managers and increasing the fund's scale may be strategies worth exploring, even though this study does not establish causality. Regulators should regularly monitor the performance of investment funds to ensure transparency and investor protection. In addition, regulations could be introduced to enhance the clarity and accessibility of information on expense ratios and other costs.

The dataset is limited to EFs traded on the TEFAS platform. Funds and hedge funds on other platforms are excluded. The analysis is restricted to data from the period [Specified Period], and the robustness of the findings can be assessed using longer-term datasets. Logistic regression analysis was employed in this study; however, the results can be further validated using alternative econometric approaches and market efficiency tests (e.g., event study, GARCH models). For future research, the performance of EFs across different markets and time periods can be explored. Additionally, more sophisticated relationships could be investigated using advanced techniques such as machine learning. Research could also incorporate dimensions of behavioral finance.

Declaration of Research and Publication Ethics
This study which does not require ethics committee approval and/or legal/specific permission complies with the research and publication ethics.

Researcher's Contribution Rate Statement
I am a single author of this paper. My contribution is 100%.

Declaration of Researcher's Conflict of Interest
There is no potential conflicts of interest in this study.

References

Aksoy, A. and Tanrıöven, C. (2014). *Sermaye piyasası yatırım araçları ve analizi (5th edition).* Ankara: Detay Yayıncılık.

Alpar, R. (2017). *Çok değişkenli istatistiksel yöntemler (5th edition).* Ankara: Detay Yayıncılık.

Amenc, N. and Le Sourd, V. (2003). *Portfolio theory and performance analysis*. Wiley.

Arı, A. and Yüksel, Ö. (2017). BİST 100’de haftanın günü anomalisi: Ekonometrik bir analiz. *Finans Politik ve Ekonomik Yorumlar*, 632, 77-89. Retrieved from https://dergipark.org.tr/tr/fpeyd

Atakan, T. (2008). İstanbul Menkul Kıymetler Borsası'nda haftanın günü etkisi ve Ocak ayı anomalilerinin ARCH-GARCH modelleri ile test edilmesi. *İstanbul Üniversitesi İşletme Fakültesi Dergisi*, 37(2), 98-110. Retrieved from https://dergipark.org.tr/tr/ibr

Babalos, V., Caporaleb, G.M. and Philippasc, N. (2012). Efficiency evaluation of Greek equity funds. *Research in International Business and Finance,* 26, 317–333. https://doi.org/10.1016/j.ribaf.2012.01.003

Białkowskia, J. and Otten, R. (2011). Emerging market mutual fund performance: Evidence for Poland. *North American Journal of Economics and Finance*, 22, 118–130. https://doi.org/10.1016/j.najef.2010.11.001

Bogle, J.C. (2007). *The little book of common sense investing: The only way to guarantee your fair share of stock market returns.* New York: Wiley.

Capital Markets Board of Türkiye. (2024). *Investment funds: Investor information booklet*. Retrieved from https://www.spk.gov.tr/

Carhart, M.M. (1997). On persistence in mutual fund performance. *The Journal of Finance*, 52(1), 57–82. https://doi.org/10.1111/j.1540-6261.1997.tb03808.x

Carhart, M.M., Kaniel, R., Musto, D.K. and Reed, A.V. (2002). Leaning for the tape: Evidence of gaming behavior in equity mutual funds. *The Journal of Finance*, 57(2), 661-692. https://doi.org/10.1111/1540-6261

Coşkun, A. (2021). *Hedge fonlar, yatırım stratejileri: Türkiye ve Dünya performansları*. Ankara: Iksad Publications.

Coşkun, A. and Aypek, N. (2024). Gelişmekte olan piyasaların zayıf formda etkinliği: Koşullu değişen varyans modellerle haftanın günü etkisi üzerine ampirik analiz. *Cumhuriyet Üniversitesi İktisadi Ve İdari Bilimler Dergisi*, 25(1), 142-154. https://doi.org/10.37880/cumuiibf.1331463

Çömlekçi, İ., Ünal, S. and Çepni, K. (2024). TEFAS’da işlem gören hisse senedi fonlarının getirilerinin sürekliliği. *Eskişehir Osmangazi Üniversitesi İİBF Dergisi*, 19(2), 401 – 414. https://doi.org/ 10.17153/oguiibf.1393399

De Bondt, W.F.M. and Thaler, R.H. (1985). Does the stock market overreact? *Journal of Finance*, 40(3), 793–805. https://doi.org/10.2307/2327804

Elton, E.J., Gruber, M.J. and Blake, C.R. (1996). The persistence of risk-adjusted mutual fund performance. *The Journal of Business*, 69(2), 133–157. Retrieved from http://www.jstor.org/stable/2353461

French, K.R. (1980). Stock returns and the weekend effect. *Journal of Financial Economics*, 8(1), 55–69. https://doi.org/10.1016/0304-405X(80)90021-5

Gamgam, H. and Altunkaynak B. (2017). *Regresyon analizi.* Ankara: Seçkin Yayıncılık

Güneş, H. (2021). Haftanın günü ve Ocak ayı anomalilerinin BIST 100 ile KAT 30 Endekslerinde tespiti. *Afyon Kocatepe Üniversitesi Sosyal Bilimler Dergisi*, 23(1), 236-248. https://doi.org/10.32709/akusosbil.789742

Hosmer, D.W., Lemeshow, S. and Sturdivant, R.X. (2013). *Applied logistic regression (3rd ed.).* Hoboken, NJ: John Wiley & Sons.

Jensen, M.C. (1968). The performance of mutual funds in the period 1945-1964. *The Journal of Finance*, 23(2), 389-416. https://doi.org/10.2307/2325404

Ji, X, Zhang, Y., Mirza, N., Umar, M. and Rizvi, S.K.A. (2021). The impact of carbon neutrality on the investment performance: Evidence from the equity mutual funds in BRICS. *Journal of Environmental Management*, 297, 1-7. https://doi.org/10.1016/j.jenvman.2021.113228

Kaminsky, G., Lyons, R.K. and Schmukler, S.L. (2004). Managers, investors, and crises: Mutual fund strategies in emerging markets. *Journal of International Economics*, 64, 113–134. https://doi.org/10.1016/S0022-1996(03)00075-8

Karan, M.B. and Uygur, A. (2001). İstanbul Menkul Kıymetler Borsası'nda haftanın günleri ve Ocak ayı etkilerinin firma büyüklüğü açısından değerlendirilmesi. *Ankara Üniversitesi SBF Dergisi*, 56(02), 103-115. https://doi.org/10.1501/SBFder_0000001828

Karcıoğlu, R. and Özer, N. (2017). BİST'de haftanin günü ve tatil etkisi anomalilerinin getiri ve oynaklık üzerindeki etkisinin incelenmesi. *Karadeniz Teknik Üniversitesi Sosyal Bilimler Enstitüsü Sosyal Bilimler Dergisi*, 7 (14), 457-483. Retrieved from https://dergipark.org.tr/tr/sbed

Kiymaz, H. and Berument, H. (2003). The day of the week effect on stock market volatility and volume: International evidence. *Review of Financial Economics*, 12(4), 363-380. https://doi.org/10.1016/S1058-3300(03)00038-7

Korkmaz, T. and Uygurtürk, H. (2014). Türkiye'de işlem gören hisse senedi ağırlıklı yatırım fonlarının performans karşılaştırması. *Akademik Araştırmalar ve Çalışmalar Dergisi* (AKAD), 1(1), 1-15. https://doi.org/10.20990/aacd.43183

Lakonishok, J. and Smidt, S. (1988). Are seasonal anomalies real? A ninety-year perspective. *Review of Financial Studies*, 1(4), 403–425. https://doi.org/10.1093/rfs/1.4.403

Menard, S. (2000). *Applied logistic regression analysis (2nd ed.).* New York: Sage Publications.

Mirza, N., Rizvi, S.K.A., Saba, I., Naqvi, B. and Yarovaya, L. (2022). The resilience of Islamic equity funds during COVID-19: Evidence from risk adjusted performance, investment styles and volatility timing. *International Review of Economics and Finance*. 77, 276–295. https://doi.org/10.1016/j.iref.2021.09.019

Modigliani, F. and Modigliani, L. (1997). Risk-adjusted performance: How to measure it and why. *Journal of Portfolio Management*, 23, 45–54. https://doi.org/10.3905/jpm.23.2.45

Münyas, T. (2015). *Türkiye'de sermaye piyasasının yapısı ve işleyişi*. Bursa: Ekin Kitabevi.

Raza, H., Shah, S. and Malik, A. (2015). Day of the week anomaly and market efficiency: Evidence from KSE-Pakistan. *International Journal of Business and Social Science*, 6, 9(1), 69-75. https://ijbssnet.com/

Sharpe, W.F. (1966). Mutual fund performance. *Journal of Business*, 39(1), 119–138. https://doi.org/10.1086/294846

Sharpe, W.F. (1991). The arithmetic of active management. *Financial Analysts Journal*, 47(1), 7–9. https://doi.org/10.2469/faj.v47.n1.7

Tunçel, A.K. (2007). İMKB'de haftanın günü etkisi. *Akdeniz İİBF Dergisi*, 7(13), 252-265. Retrieved from https://dergipark.org.tr/auiibfd

Umar, M., Ji, X., Mirza, N. and Li, H. (2022). Crypto swings and the performance of carbon-intensive equity funds in China. *Resources Policy*, 78, 1-6 https://doi.org/10.1016/j.resourpol.2022.102786

Varamini, H. and Kalash, S. (2008). Testing market efficiency for different market capitalization funds. *American Journal Business*, 23(2), 17-26. https://doi.org/10.1108/19355181200800006

Wagner, M. and Margaritis, D. (2017). All about fun(ds) in emerging markets? The case of equity mutual funds. *Emerging Markets Review*, 33, 62–78. https://doi.org/10.1016/j.ememar.2017.08.004

Zilca, S. (2017). The evolution and cross-section of the day of the week effect. *Financial Innovation*, 3(29), 1-12. https://doi.org/10.1186/s40854-017-0077-6

Zor, İ. and Coşkun, A. (2021). Makroekonomik değişkenlerin hedge fon getirilerine etkisi. *International Journal of Disciplines Economics & Administrative Scienves Studies*, 7(29), 333-349. https://dx.doi.org/10.26728/ideas.421