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The Interaction of Mutual Fund Flows and Stock Returns: Evidence From The Turkish Capital Market

Yatırım Fonları ile Hisse Senedi Piyasasının Etkileşimi: Türk Sermaye Piyasasından Bulgular

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ABSTRACT

The substantial growth and popularity of mutual funds as an investment tool has risen the need for an understanding of the significant implications for the financial markets. This paper examines the dynamic interaction between mutual fund flows and stock returns for an emerging capital market, namely Turkey and more specifically, analyzes the possibility of a causal mechanism whether mutual fund flows influence stock returns and vice versa. Long run dynamic relationship is examined by using cointegration tests, short-run dynamic causal relationship through vector error correction model. The results of cointegration test show that there is cointegrating relationship among each category of mutual fund flows and stock index. Moreover, the statistical evidence indicates that there is bidirectional causality between all categories of mutual fund flows and stock returns. Thus, the empirical findings will prove to be extremely useful information for investors who need to understand these dynamic interactions.

Keywords: Mutual funds flows, stock markets, causality

ÖZET

Günümüzde büyüklüğü ve popülerliği hızla artan yatırım fonlarının finansal piyasalar üzerindeki etkilerini anlamak yatırımcılar için oldukça önemlidir. Bu çalışma, Türkiye'deki yatırım fonları ile hisse senetleri arasındaki uzun ve kısa dönemli dinamik ilişkiyi incelemektedir. Seriler arasındaki uzun dönemli dinamik ilişki standart eşbütünleşme testleri ile kısa dönemli nedensellik ilişkisi ise Vektör Hata Düzeltme Modeli (VECM) kullanılarak test edilmiştir. Ampirik bulgular, tüm yatırım fonu tipleri ile hisse senedi getirileri arasında uzun dönemli bir ilişki olduğunu ortaya koymaktadır. Vektör Hata Düzeltme Modeli kullanılarak yapılan Granger nedensellik testleri, tüm yatırım fonu tipleri ile hisse senedi getirileri arasında kısa dönemde çift yönlü nedensellik ilişkisi olduğunu göstermektedir.

Anahtar Kelimler: Yatırım fonları, hisse senedi piyasası, nedensellik

1. INTRODUCTION

Mutual funds have experienced a considerable growth in number of funds, investors and the volume of capital managed with well-functioning stock markets in most countries over the last two decades. The rise of investments in mutual funds has come about as a result of providing liquidity, portfolio diversification opportunities, and professional asset management with reduced portfolio costs. This unprecedented growth has prompted researchers to investigate whether mutual fund flows have any relevance to the stock market's direction. With regard to the impact of mutual fund flows on stock markets, the theoretical literature has suggested several alternative motivations that could drive this relationship. Most of the existing studies concentrate on the dynamic interaction between mutual fund flows and stock returns in developed and some emerging countries. Despite the growing interest of researchers in mutual funds over the world, surprisingly Turkey's mutual fund industry has failed to attract the attention.

In Turkey, the evolution of the mutual funds market has been phenomenal. In 1987, there were only 7 privately-controlled mutual funds, which managed 52 million dollars. Today, there exist 592 funds of all types managing more than 16 billion dollars. This study takes this substantial development as its starting point, and sheds some light on the investigation of the mutual fund industry in such an emerging market. Therefore, the main aim of this paper is to empirically examine the dynamic interaction between mutual fund flows and stock returns for an emerging capital market, namely Turkey and more specifically, to analyze the possibility of a causal mechanism whether mutual fund flows influence stock returns and vice versa. Appropriate econometric techniques

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that check cointegrating relationship - standard Engle and Granger (1987) and the Johansen and Juselius (1990) tests - and the possibility of causality mechanism - vector error correction model- are employed.

The contribution of this paper to the literature on the dynamics of mutual fund in relation to stock market is two-fold: First, to the authors' best knowledge, this is one of the pioneering studies that investigates the existence of the relationship between mutual fund flows and stock returns as well as causality in Turkish capital market by employing a comprehensive data set over the period 2005-2012. As opposed to other studies that primarily analyze the impact of mutual funds in stock markets by using monthly or weekly data, this research aims to unveil this connection by using daily data in Turkey, which is one of the growing and dynamic emerging markets with an increasing value of mutual fund's portfolio and stock market capitalization. It is worth noticing that daily data produces much more efficient estimates of the volatility and dynamic interaction between mutual fund flows and stock returns than less frequent data (monthly, quarterly etc.) (Lehmann and Modest (1987); Chevalier and Ellison (1997); Busse (2001))[1]. Since mutual fund investors are considered as the least informed investors by many practitioners and academicians (Warther, (1995)), the studies employing high frequency data are more informative for investors.

Moreover, aggregate mutual funds are divided into four different categories with the highest portfolio net asset values to observe what extent the portfolios of different type of mutual funds follow or replicate the investment in Turkish stock index. Secondly, this study considers the explanation of the causality structure with the assistance of several theoretical hypotheses about the dynamic interaction between mutual fund flows and stock returns, which are momentum trading or feedback, price pressure and information revelation. Therefore, this study provides insight into the importance of the institutional framework on the relationship between mutual fund flows and stock markets.

The layout of the paper is organized as follows. Section 2 describes the development of the mutual fund industry in Turkey. Section 3 provides a brief literature review about the interaction between mutual fund flows and stock returns, followed by data set. Section 5 describes the econometric methodology used in this study. Empirical results are presented in section 6. Finally, last section provides a summary of the main findings and presents conclusions of this study.

2. THE TURKISH MUTUAL FUNDS INDUSTRY

The history of mutual funds industry in Turkey dates back to 1987 when the first mutual fund was established by a private bank. However, political and economic instabilities delayed the growth of mutual funds industry in Turkey. In 1998, the portfolio values of mutual funds were $ 1.1 Billion. With the introduction of money market funds and tax advantage of these funds created by Corporate and Income Tax Law, mutual funds industry experienced a considerable increase in terms of their numbers, types and net asset values. After the crisis in 2001, the explosive growth of mutual funds, represente in Figure 1, has been largely due to the flexibility of those instruments for the investor and close substitutability to time deposits. Compared to the previous year, the total value of mutual funds' portfolios in 2011 decreased by 2.26% from $ 20.1 Billion to $ 16 Billion, which is approximately 2 % of GDP. Besides, there are 55 foreign mutual funds whose total value of participation certificates in circulation in Turkey is $ 28 million as of 2011-end.

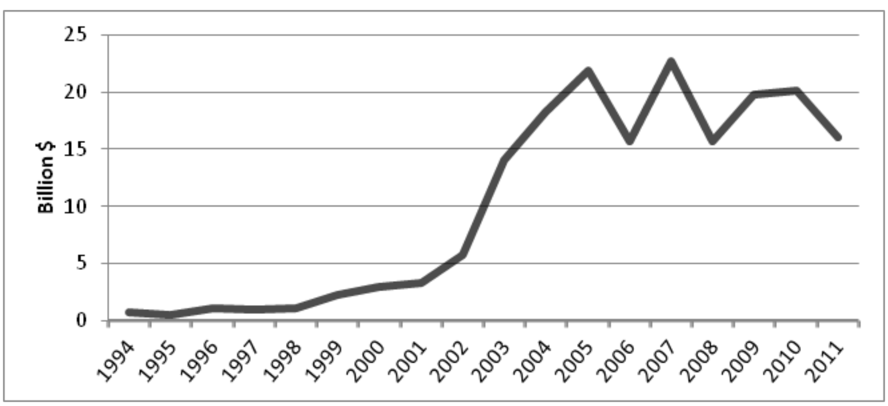
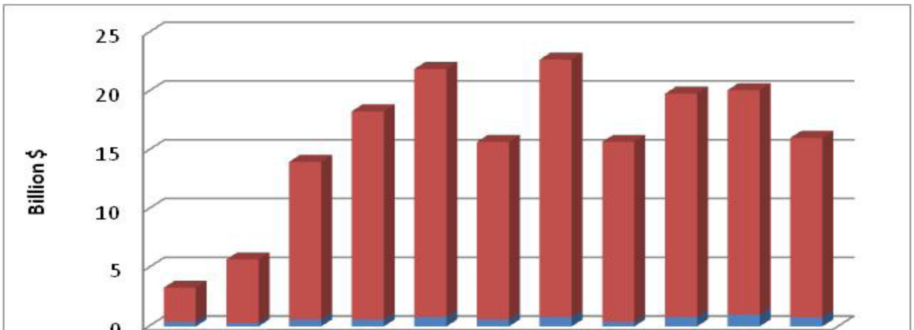


Figure1: Total Portfolio Value of Mutual Funds

(**Source:** Capital Markets Board of Turkey Annual Report, 2011)

There are 591 mutual funds at the end of 2011 which are classified into two different types, Type A and Type B, in Turkish capital markets. Type A mutual funds are required to invest at least 25 % of their assets in equities issued by Turkish companies, while Type B mutual funds do not have such obligations. These two main groups of funds are subdivided into 17 categories which are classified according to the financial instruments that the fund portfolio includes. Among these, the most widespread funds are variable, liquid, protected funds and notes and bonds funds which account for 71.5 % of the total mutual funds. Fourth and fifth major categories are capital guaranteed funds with 4.9 % share, index funds with 4.1 % share.

As far, much of the growth in Turkish mutual funds industry can be attributed to the popularity of Type B mutual funds, as seen in Figure 2. When the portfolio value composition of A and B types of funds are considered together, 95.1 % of the portfolios consisted of Type B and the remaining consisted of Type A mutual funds in dollar terms as of 2011.



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
B-type	2,9	5,4	13,4	17,7	21,1	15,1	21,9	15,3	19	19,1	15,26
A-type	0,4	0,3	0,6	0,6	0,8	0,6	0,8	0,4	0,8	1	0,78

Figure 2: Portfolio Value Composition of A and B Types of Funds
(**Source:** Capital Markets Board of Turkey Annual Report, 2011)

Among Type B mutual funds, protected funds are the most pervasive mutual fund with 39.9 % share. A closer evaluation of mutual funds shows that asset allocation objectives focus more on fixed income securities than equity securities. In 2011, it is seen that, 46.6 % of A and B types mutual funds' portfolios are composed of reverse repo, 23.38 % composed of T-bill and government bonds, 3.59 % composed of stocks. While B-type funds take the advantage of having invested freely on T-bills and government bonds, A-type funds better reflect the performance of the stock exchange market (Özlale and İmisiker (2008)). Therefore, considering A-type mutual funds for the possible relationship with the stock market is of great value.

3. LITERATURE REVIEW

The growth of institutional investors and the stock market has encouraged both academicians and practitioners to assess the relations between mutual fund flows and stock returns. Although numerous studies on the mutual funds industry have recently been carried out, only a limited number of them addresses the issue of the dynamic interaction between stock returns and mutual fund flows. Some empirical studies that investigate the interaction between stock returns and mutual fund flows support the assumption that mutual fund flows drives market returns whereas the others find evidence that stock returns affect mutual fund flows.

With regard to the relationship between stock returns and mutual fund flows, researchers have focused on a number of factors that could drive this relationship. In the case of momentum trading or feedback trading hypothesis (Davidson and Dutia (1989); Hendricks et al. (1993)), investors may be feedback traders who follow the stock market. An implication of this is that when security prices increase in one period, it should be followed by a corresponding increase in mutual funds flow in the near future. Therefore, it should be expected that relative rates of return on securities will be useful to predict money flows into alternative assets, and the returns of those securities will cause fund flows. In order for this hypothesis to hold, there must be a significantly positive relationship between lagged stock price index and current mutual fund flows. As for the price pressure hypothesis (Harris and Gurel (1986); Shleifer, (1986)), increased inflows into equity mutual funds encourage investors' demand to hold more stock, and this leads share prices to increase. Finally, the information revelation hypothesis (Lee et al. (1991); Warther (1995)) suggests that both stock and mutual funds investors trade on new information. Under this hypothesis, if mutual fund investors are well informed, their trades will indicate a signal to buy stocks and the market, in this case, will react efficiently to new information. Therefore, according to these hypotheses, a positive relation between fund flow and lagged returns indicates short-term positive feedback trading, a positive contemporaneous relation mostly supports the price pressure hypothesis, while a positive relation between returns and lagged fund flows suggests prices being driven by informed trading.

The pioneering study by Warther (1995) has been the reference framework for many of the contemporary studies determining the linkage between stock returns and aggregate mutual fund flows. Although he documented strong correlations between market returns and aggregate mutual fund flows using monthly data in US, he rejected both sides of feedback trading, arguing that stok returns neither lag nor lead mutual fund flows. Potter and Schneeweis's (1998) empirical results provided the evidence that stock returns are useful in predicting flows into aggressive growth funds. However, they rejected the hypothesis that equity fund flows lead stok returns. Edwards and Zhang (1998) investigated the relationship between aggregate monthly mutual fund flows and stock and bond monthly returns employing Granger causality test. Consistent with previous studies, Cha and Lee (2001) also failed to uncover empirical support for the hypothesis that fund flows directly affect aggregate stock prices. In summary, the existing body of research is not supportive of the hypothesis that mutual fund flows, measured on a monthly basis, drive subsequent returns.

Some studies indicate that dynamic feedback relationship exists between stock returns and fund flows. Remolona et al. (1997) examined the effects of market returns on aggregate mutual fund flows. Their findings are consistent with those of Warther (1995) in that aggregate mutual fund flows are highly correlated with market returns. However, they found that there was bidirectional causality between fund flows and returns, in which fund investors react to market movements while the market itself moves in response to the investors' behavior. Fortune (1998) used a VAR methodology and supported a positive correlation between fund flows and contemporaneous returns for securities similar to those held by the fund using monthly data for the period 1984-1996. Furthermore, he reported the evidence that while stock returns affect future fund flows, some fund flows affect future stock returns. His results were challenged with the conclusions of Warther (1995) which states that flows do not appear to be affected by past security returns. Mosebach and Najand (1999) also verified bidirectional causal relationship between the level of the stock market and flow of funds.

The study of Boyer and Zheng (2004) documented a significant and positive contemporaneous relation between stock market returns and mutual funds flows over a long period of time from 1952 to 2004. Their findings suggested that mutual funds may exert price pressure on the market through their demand for stocks.

The studies on the relationship between mutual fund flows and stock returns in emerging countries have recently surged. Papadamou and Siriopoulos (2003), Caporale et al. (2004) and Alexakis et al. (2005) reported statistical evidence that there is bidirectional causality between mutual fund flows and stock returns and the cointegration results indicated that mutual fund flows cause stock returns to rise or fall in Greece. These results support the evidence for the "feedback-trading" hypothesis. Oh and Parwada (2007) also analyzed this relationship in Korea and determined that there is a positive correlation between stock market returns and mutual fund flows. The causality test results suggested that it is predominantly returns that contain information on flows. Investigating the causal relationship between mutual fund flows and market returns, Thenmozhi and Kumar (2009) found the negative feedback trading hypothesis in Indian market.

Majority of the pertinent studies (Warther (1995); Remelona et al. (1997); Edwards and Zhang (1998); Potter and Schneeweis (1998); Mosebach and Najand (1999); Papadamou and Siriopoulos (2003)) used monthly data to examine the relationship between mutual fund flows and stock returns. However, a limited number of studies (Edelen and Warner (2001); Caporale et al. (2004) and Alexakis et al. (2005)) have used daily data. The use of daily data for emerging market is of paramount importance for the results to be more informative for investors.

4. DATA

The sample data consists of daily closing prices of the Borsa Istanbul (BIST-100) and the aggregate net flows in A-type mutual funds. Funds are divided into four categories with the highest portfolio net asset values. These funds are stock funds, which invest at least 51% of the market value in Turkish stocks; index funds, which invest in at least 80% of the securities of a designated index; mixed funds, which invest at least 20% of its portfolio to stocks, bonds, precious metals and their derivative instruments and portfolio should consist at least two of those securities; variable fund, which are not included in any of these categories. The data set covers the period from June 2, 2005 through August 31, 2012, thereby providing a sample size of 1812 observations for each series. The index data were retrieved from the BIST database and mutual fund data from the Capital Markets Board of Turkey. All data were transformed to natural logarithms for use in the analysis. Aggregate net flows in mutual funds denoted as $NF_{i,t}$ is expressed as follows[2]:

$$NF_{i,t} = \sum_{i=1}^{n} \frac{TNA_{i,t} - TNA_{i,t-1} * (1 + r_{i,t})}{TNA_{i,t-1}} \quad (1)$$

where $TNA_{i,t}$ represents the total asset values of fund *i* at time *t*, $TNA_{i,t-1}$ denotes the total asset values of fund *i* at time *t-1*, r is the return of the mutual fund over the previous period, and *n* is the number of mutual funds.

5. METHODOLOGY

To investigate the dynamic short and long run interaction between mutual fund flows and stock returns, firstly the order of integration of the variables is tested using Augmented Dickey Fuller (Dickey and Fuller (1979)) (ADF test) and Philips Perron (Philips and Perron (1988)) (PP test) tests. For the series that are integrated of the same order, the existence of any long run relationship between variables is performed by the use of conventional Engle and Granger (1987) and Johansen and Juselius (1990) methods, respectively.

The conventional Engle and Granger cointegration methodology is based on the stationarity of error terms series. The prerequisite condition for the cointegration is that the nonstationary series have the same order of integration. If the error term series are stationary, this implies a cointegrating relationship between the two times series. For the confirmatory analysis, Johansen's method based on vector autoregressive (VAR) analysis utilizes the maximum likelihood estimates and allows testing and estimation of more than one cointegrating vector in the multivariate system.

$$y_t = A_1 y_{t1} + A_2 y_{t2} + ... + A_p y_{tp} + Bx_t + \varepsilon_t \quad (2)$$

where y_t is a k vector of nonstationary I(1) variables, x_t is a vector of deterministic variables and ε_t is a vector of innovations. The VAR representation is also written as follows

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + Bx_t + \varepsilon_t \quad (3)$$

where

$$\Pi = \sum_{i=1}^{p} \boldsymbol{A_i} - \boldsymbol{I} \quad , \quad \Gamma_i = -\sum_{j=i+1}^{p} \boldsymbol{A_j} \quad (4)$$

If the coefficient matrix Π has reduced rank r<k, then there exist k x r matrices α and β each with rank such that $\Pi = \alpha \beta'$ and $\beta' y_t$ is I(0). r is the number of cointegrating relations (the cointegrating rank) and each column of β is the cointegrating vector. The elements of α are known as the adjustment parameters in the vector error correction model. Johansen's method is to estimate the Π matrix from an unrestricted VAR and to test whether we can reject the restrictions implied by the reduced rank of Π.

In determining the rank of matrix Π (number of cointegrating vectors), the characteristic roots or eigenvalues, $\hat{\lambda}_i$ of Π are calculated. The hypothesis of the existence of r cointegrating vectors can be tested by using the maximum likelihood-based trace (λ_{trace}) and maximum eigenvalue (λ_{max}). λ_{trace} is based on the null hypothesis that the number of cointegrating vectors is less than or equal to r against a general alternative, while λ_{max} is based on the null hypothesis that the number of cointegrating vectors is r against the alternative r + 1 cointegrating vectors. If the computed values of λ_{trace} and λ_{max} are less than critical values provided by Osterwald-Lenum (1992), then the null hypothesis cannot be rejected. The optimal system lag length is determined by employing the Akaike Information Criteria.

Granger's causality test (Granger (1969)) is used in testing the direction of the relationship between the same set of variables. A time series X_t causes another time series Y_t in the Granger sense if current Y can be predicted better by the including lagged values of X and lagged values of Y, as well. When the two variables are cointegrated, the standard Granger's approach is not valid to determine the possibility of a causality mechanism among the variables, therefore, the appropriate model to test the short-run causality is the "vector error correction model" (VECM). VECM approach permits the distinction between causality based on short-run dynamics of VAR and on the disequilibrium adjustment of ECT.

$$\Delta y_t = \alpha_y + \sum_{i=1}^{n} \beta_{y,i} \Delta y_{t-i} + \sum_{i=1}^{n} \gamma_{y,i} \Delta x_{t-i} + \varphi_y ECT_{y,t-i} + \varepsilon_{y,t} \quad (5)$$

$$\Delta x_t = \alpha_x + \sum_{i=1}^{n} \beta_{x,i} \Delta x_{t-i} + \sum_{i=1}^{n} \gamma_{x,i} \Delta y_{t-i} + \varphi_x ECT_{x,t-i} + \varepsilon_{x,t} \quad (6)$$

where ECT represents the vector of error correction terms presenting the deviation from the long-run relationships at time t and φ_x and φ_y are the parameters of the ECT, estimating the response of the dependent variable to departures from equilibrium[3]. From Equations 5 and 6, the short-run dynamics are provided by the lagged values of the difference terms.

6. EMPIRICAL RESULTS

Table 1 presents descriptive statistics for BIST-100 stock price index and different categories of mutual fund flows. The stock mutual fund flows show higher standard deviation and higher mean returns than other types of fund flows and stock return series. The Jarque-Bera statistic reveals that series have non-normal distribution, therefore we have to reject normality at one percent level.

Table 1: Descriptive Statistics

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	JB
BIST-100 stock return	0.00053	0.00084	0.12127	-0.09013	0.01849	82.30*
Variable fund	0.00071	-0.00033	0.08442	-0.05121	0.01137	482.65*
Index fund	0.00057	-0.000007	0.11265	-0.06385	0.01432	220.46*
Stock fund	0.00088	-0.00021	0.24726	-0.16167	0.02393	379.35*
Mixed fund	0.00024	-0.00014	0.09052	-0.07320	0.00987	415.65*

(**Note:** * denotes significance level at 1%.)

As a necessary condition for the existence of cointegrating relationship between two variables, both series must have the same order of integration. To detect the stationarity of the series, ADF and PP statistical unit root tests have been conducted. The results reveal that each series are integrated of order one, I(1) as shown in Table 2.

Table 2: The Results of Unit Root Tests

	ADF			Philips-Perron		
	No Trend	Trend	None	No Trend	Trend	None
BIST-100 stock	-41.140*	-41.129*	-41.121*	-41.142*	-41.130*	-41.129*
Variable fund	-13.460*	-13.520*	-13.282*	-43.940*	-43.918*	-44.046*
Index fund	-11.269*	-11.270*	-11.196*	-34.654*	-34.644*	-34.645*
Stock fund	-41.148*	-41.141*	-41.105*	-41.155*	-41.151*	-41.120*
Mixed fund	-7.422*	-7.421*	-7.389*	-37.104*	-37.093*	-37.096*

(**Note:** * denotes significance level at 1%.)

The possibility of cointegrating relationship between two variables in the long run is tested by employing conventional Engle and Granger two-step procedure and Johansen and Juselius cointegration tests. The findings of the Engle and Granger test are presented in Table 3.

Table 3: Long Run Equations For The Funds Cointegrated With BIST-100 Index –Engle and Granger Cointegration Test

Models	ADF	k
BIST-100 = $\alpha + \beta$ Variable fund + ε	-10.564*	12
BIST-100 = $\alpha + \beta$ Index fund + ε	-10.640*	12
BIST-100 = $\alpha + \beta$ Stock fund + ε	-10.576*	12
BIST-100 = $\alpha + \beta$ Mixed fund + ε	-10.512*	12

(**Note:** * denotes statistically significant coefficient at 1%.)

Based on the results, the null hypothesis of no cointegration is rejected at 1% significance level for all categories of mutual fund flows and stock index pairs. This implies that most commonly used A-type mutual funds are cointegrated with the stock index in the long-run. The results of the Johansen's cointegration test are reported in Table 4. Trace and maximum eigenvalue test statistics show that there is one cointegrating relationship among each category of mutual fund flows and stock index. Hence, the statistical evidence supports the results obtained through the conventional Engle-Granger two step procedures. This statistically significant long-run relationship between fund flows and stock index pairs confirms that these are the A-type funds in which the investors who want their portfolio to replicate the behavior of the Turkish stock market might invest. Moreover, it is noted that there are no benefits from portfolio diversification in terms of reduction in risk in the existence of cointegration.

Table 4: Johansen-Juselius Maximum Likelihood Cointegration Tests

Variable fund							
Trace test				Maximum Eigenvalue test			
Null	Alternative	Statistic	95% Critical Value	Null	Alternative	Statistic	95% Critical Value
r = 0	r = 1	591.077*	15.494	r = 0	r = 1	327.951*	14.264
r ≤ 1	r = 2	263.125*	3.841	r ≤ 1	r = 2	263.125*	3.841
Index fund							
Trace test				Maximum Eigenvalue test			
Null	Alternative	Statistic	95% Critical Value	Null	Alternative	Statistic	95% Critical Value
r = 0	r = 1	631.505*	15.494	r = 0	r = 1	410.191*	14.264
r ≤ 1	r = 2	221.313*	3.841	r ≤ 1	r = 2	221.313*	3.841
Stock fund							
Trace test				Maximum Eigenvalue test			
Null	Alternative	Statistic	95% Critical Value	Null	Alternative	Statistic	95% Critical Value
r = 0	r = 1	645.535*	15.494	r = 0	r = 1	337.523*	14.264
r ≤ 1	r = 2	308.012*	3.841	r ≤ 1	r = 2	308.012*	3.841
Mixed fund							
Trace test				Maximum Eigenvalue test			
Null	Alternative	Statistic	95% Critical Value	Null	Alternative	Statistic	95% Critical Value
r = 0	r = 1	648.394*	15.494	r = 0	r = 1	341.519*	14.264
r ≤ 1	r = 2	306.875*	3.841	r ≤ 1	r = 2	306.875*	3.841

(**Note:** The notation "r" denotes the number of cointegrating vectors. * implies significance of 5%.)

Having a cointegrating relation between each mutual fund flow and stock return, VECM is conducted to investigate the short term distortion to long term equilibrium condition and the empirical findings are shown in Table 5. The coefficient of the error correction term (ECM), which shows how quickly variables return to equilibrium, should have a statistically significant coefficient with a negative sign. Based on the vector error correction "causality" results, in all cases the coefficient of the error correction term is negative and statistically significant at 1% level except for cases when the variable fund and mixed fund flows are used as the dependent variable. These results point out that there is feedback relationship and bidirectional causality between mutual fund flows and stock returns. Additionally, the coefficients of the lagged variables are found statistically significant. This dynamic causal relationship between stock returns and mutual fund flows can be explained in several theoretical hypotheses. One of these is the "momentum trading or feedback hypothesis", which is related to investors' behavior and is originated on a belief that high (low) past stock returns prompt mutual fund investors to buy (sell) mutual fund shares. Accordingly, an increase in stock index levels would be followed by mutual fund inflows. This theoretical hypothesis requires a statistically significant positive relationship between lagged stock index returns and contemporary mutual fund flows.

Table 5: Vector Error Correction "Causality" Results

Dependent Variable: Δ(Stock price)			Dependent Variable:Δ (Variable fund flows)		
Variable	Coefficient	"t"-statistic	Variable	Coefficient	"t"-statistic
Constant	0.00001	0.03253	Constant	-0.000002	-0.0080
ECT	-0.71291	-20.1604*	ECT	0.27390	12.0381*
Δ(Stock price)$_{t-1}$	-0.14834	-4.79037*	Δ(Variable Fund flows)$_{t-1}$	-0.51491	-20.1545*
Δ(Stock price)$_{t-2}$	-0.05709	-2.38710*	Δ(Variable Fund flows)$_{t-2}$	-0.25461	-11.4123*
Δ(Variable Fund flows)$_{t-1}$	-0.51311	-12.9225*	Δ(Stock price)$_{t-1}$	-0.22358	-11.2211*
Δ(Variable Fund flows)$_{t-2}$	-0.25641	-7.39481*	Δ(Stock price)$_{t-2}$	-0.07197	-4.6771*
R-square	0.42853		R-square	0.40826	
Dependent Variable: Δ(Stock price)			Dependent Variable: Δ (Index fund flows)		
Variable	Coefficient	t-statistic	Variable	Coefficient	t-statistic
Constant	0.000001	0.0261	Constant	0.00001	-0.05986
ECT	-0.72848	-15.5167*	ECT	-0.46396	-13.3221*
Δ(Stock price)$_{t-1}$	-0.16155	-3.6956*	Δ(Index Fund flows)$_{t-1}$	-0.37113	-12.7178*
Δ(Stock price)$_{t-2}$	-0.10601	-2.7206*	Δ(Index Fund flows)$_{t-2}$	-0.31376	-11.0144*
Δ(Stock price)$_{t-3}$	-0.07202	-2.1524**	Δ(Index Fund flows)$_{t-3}$	-0.21397	-8.0653*
Δ(Stock price)$_{t-4}$	-0.02009	-0.8158	Δ(Index Fund flows)$_{t-4}$	-0.10726	-4.7944*
Δ(Index Fund flows)$_{t-1}$	0.43075	10.9497*	Δ(Stock price)$_{t-1}$	0.37989	11.7153*
Δ(Index Fund flows)$_{t-2}$	0.33669	8.7678*	Δ(Stock price)$_{t-2}$	0.36509	12.6310*
Δ(Index Fund flows)$_{t-3}$	0.25696	7.1850*	Δ(Stock price)$_{t-3}$	0.19714	7.9422*
Δ(Index Fund flows)$_{t-4}$	0.14193	4.7061*	Δ(Stock price)$_{t-4}$	0.04892	2.6781*
R-square	0.44429		R-square	0.38463	
Dependent Variable: Δ(Stock price)			Dependent variable:Δ (Stock fund flows)		
Variable	Coefficient	t-statistic	Variable	Coefficient	t-statistic
Constant	0.000005	0.01189	Constant	0.0004	0.00710
ECT	-0.61732	-16.7275*	ECT	-0.53932	-10.8736*
Δ(Stock price)$_{t-1}$	-0.25577	-7.5475*	Δ(Stock Fund flows)$_{t-1}$	-0.45806	-13.9359*
Δ(Stock price)$_{t-2}$	-0.17878	-6.0290*	Δ(Stock Fund flows)$_{t-2}$	-0.30234	-9.9604*
Δ(Stock price)$_{t-3}$	-0.10934	-4.7553*	Δ(Stock Fund flows)$_{t-3}$	-0.16066	-6.7606*
Δ(Stock Fund flows)$_{t-1}$	0.27629	11.2976*	Δ(Stock price)$_{t-1}$	0.41084	9.0206*
Δ(Stock Fund flows)$_{t-2}$	0.19004	8.4145*	Δ(Stock price)$_{t-2}$	0.39157	9.8250*
Δ(Stock Fund flows)$_{t-3}$	0.06188	3.4997*	Δ(Stock price)$_{t-3}$	0.21637	7.0015*
R-square	0.43673		R-square	0.40672	
Dependent Variable: Δ(Stock price)			Dependent variable: Δ (Mixed fund flows)		
Variable	Coefficient	t-statistic	Variable	Coefficient	t-statistic
Constant	0.00001	0.0334	Constant	-0.0000003	-0.00158
ECT	-0.31998	-13.0284*	ECT	0.25355	20.7665*
Δ(Stock price)$_{t-1}$	-0.40612	-15.0326*	Δ(Mixed Fund flows)$_{t-1}$	-0.08881	-3.1604*
Δ(Stock price)$_{t-2}$	-0.19350	-8.3515*	Δ(Mixed Fund flows)$_{t-2}$	-0.12200	-5.3358*
Δ(Mixed Fund flows)$_{t-1}$	-0.53062	-9.3865*	Δ(Stock price)$_{t-1}$	-0.19477	-14.502*
Δ(Mixed Fund flows)$_{t-2}$	-0.33289	-7.2377*	Δ(Stock price)$_{t-2}$	-0.10402	-9.0313*
R-square	0.35878		R-square	0.39622	

(**Note:** ECT represents the vector of error correction term. * implies significance of 1%.)

As shown in Table 5, the empirical evidence supports the momentum trading or feedback hypothesis for the category of index fund and stock fund.

Another theoretical explanation for the causal relationship between mutual fund flows and stock returns is the "information revelation hypothesis", according to which the well-informed mutual fund investors may signal to other less-informed investors, to buy or sell the stocks. In view of that, if mutual fund investors follow the well-informed investors, then there will be a positive and significant relationship between past fund flows and current stock index returns. In the results of the Granger causality structure, coefficients of lagged index fund and stock fund flows indicate that the findings are consistent with the information revelation hypothesis. Additionally, "the temporary price pressure hypothesis", which is another theoretical explanation in affecting mutual fund flows and stock market movements, suggests that increase in mutual fund inflows motivate investors to invest in stocks, thereby causing stock prices to raise. In order for this hypothesis to hold, there must be both a strong correlation between current stock index returns and mutual fund flows and a significantly negative relationship between lagged mutual fund flows and contemporary stock price index. In view of the strong long run relationship based on the cointegration test results as well as the negative significant coefficients of the lagged mutual fund flows and contemporary stock price index in the causality tests supports this price pressure hypothesis for the categories of variable fund and mixed fund.

7. CONCLUSION

This paper examines the dynamic interactions between mutual fund flows and and stock returns for the Turkish capital market. The empirical results from the conventional Engle and Granger and Johansen-Juselius cointegration tests indicate that there exists a long run relationship between all categories of mutual fund flows and stock returns. The implication of this finding for investors is that there are no potential long-run portfolio diversification benefits of passive and active investment strategies. Moreover, the statistical evidence based on the vector error correction "causality" test results suggest bidirectional causality between all categories fund flows and stock returns, meaning that the lagged stock returns Granger cause the mutual fund flows and vice versa. Within the framework of the momentum trading or feedback hypothesis, the findings suggest that investor's expectations lead them to buy or sell index funds or stock funds after a decrease or an increase in stock prices. This may be explained by the fact that stock funds are obliged to invest at least 51% of the market value in Turkish stocks and index funds to invest in at least 80% of the securities of a designated index in Turkey. Moreover, the information revelation hypothesis appears to play a major role in the explanation of the causal relationship between lagged index and stock fund flows and stock index returns whereas price pressure hypothesis may be a relevant factor for the dynamic relationship between stock returns and variable fund and mixed fund flows. These results may guide potential and current institutional and individual investors as well as the researchers to understand the shareholders' behavior and the fund

END NOTES

managers' assessment.

[1] The main drawback of employing less frequent data is that the paucity of data does not allow to estimate volatility efficiently.

[2] See Caporale, et al. (2004)

[3] Since the results of the Granger causality test is very sensitive with respect to the selected lag length, Schwarz Bayesian Criterion is used in determining the appropriate lag length because it is considered theoretically to be superior to the Akaike Information Criterion and penalizes for inclusion of higher number of lags in the regression.

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