

The Relationship between Parasocial breakup and Investor Behaviours *

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Abstract Parasocial breakup is concerning with the ending of psychological or emotional relationship between viewers and the TV persona/personae. The purpose of study is to investigate the effect of parasocial breakups on the investor behaviours in Turkish stock market. We use regression and transfer function analysis to examine the effect of mood on stock demands. Findings show that the negative mood increases the demand for stocks by domestic investors. The main contribution of paper is to capture the effect of parasocial breakup on stock demands outside the US by taking into consideration the types of the series and TV channels. As a result of the analysis, the effect on stock demands varies by the types of the TV series and the TV channels. The findings of this paper may have a practical implication for diligent investors in Turkey as an emerging market. Investors can use the TV series finales in order to predict the stock market performance in Turkey.

Key words TV Series, parasocial breakup, negative mood, stock demand, Turkish Stock Market

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1. Introduction

In a latest study, Lepori (2015), for the first time in the literature, considered the number of individuals experiencing a parasocial breakup¹ as a mood proxy to identify the effect of exogenous variations in investors' moods on their daily demands for risky assets (stocks). He states that with the increase of the viewers of TV series finales, the negative mood dominates over the society, which kills the risk-taking attitude of investors and plunges the demand for risky assets. In default of data related with the viewers of TV series finales in Turkey, we adopt the episodes of TV series that reached their finales as a proxy of the power of parasocial relationship. Briefly stated, the negative effect of parasocial breakup on the mood of the society stems from the power of parasocial relationship. The sad mood evoked by parasocial breakup is more intense when the parasocial relationship is stronger (Cohen, 2003, 2004; Eyal and Cohen, 2006). The power of parasocial relationships grows stronger in long-running TV serials which control society psyche and impacts deeply by the tragic end of their popular characters or, happy ending. The more the viewer watches the character, the more he/she builds the attachment and the parasocial relationship becomes stronger (Rubin and McHugh, 1987).

This study considers the number of episodes in popular Turkish TV series finales to analyze its effect on the stock buying-selling decisions of the domestic investors in Borsa Istanbul (BIST). There are three major contributions of this paper. First, this study considers the number of episodes related to TV series that reached their finales. Second, this study analyses the effects of parasocial breakups on the stock buying-selling behaviour of the domestic investors². Third, this study has robust findings that are coherent

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¹Parasocial relationship is a kind of psychological and emotional relationship that viewers create between themselves and the TV persona/personae. The ending of this relationship is a parasocial breakup.

² This is because 65% of the investors in BIST are foreigners, but the TV series in Turkey are only viewed by domestic investors because related TV series are Turkish.

with few studies in psychology, but incoherent with studies in behavioural finance involving alternative mood proxies.

2. Literature review and hypothesis

In the literature of behavioural finance; full moon (Bozkurt, 2015), daylight (Hirshleifer and Shumway, 2003), earthquakes (Shan and Gong, 2011) and a number of similar factors are considered as exogenous mood proxy variables to determine the effects of mood variations on investors' demand for risky assets. In this study, the parasocial breakup is used as negative mood proxy variable, because such breakup causes a psychological impact similar in the loss of a close friend (Cohen, 2004). These impacts may appear as negative moods such as depression, anxiety, loneliness, and stress.

Most of the prior studies in behavioural finance literature have reported plausible results showing that negative (positive) mood increases (decreases) the investor's risk perception and reduces (enhances) demand for stocks. In addition, these results are coherent with many studies in psychology. However, relatively few studies in psychology reject this positive relationship between mood and tendency to take the risk (e.g., Isen and Patrick, 1983; Leith and Baumeister, 1996; Bruyneel, Dewitte, Franses and Dekimpe, 2009) and report opposite relationships between these factors. According to this notion, the positive mood avoids risk as a potential loss will ruin the positive mood of the stakeholder (Hockey, John Maule, Clough and Bdzola, 2000). The negative mood, on the other hand, takes higher risks in order to gain more to repair their negative feelings (Mittal and Ross, 1998).

In the light of two contradictory ideas stated in psychology, the hypotheses of this paper are determined as follows:

H_{1a}: The negative mood caused by parasocial breakup decreases the demand for risky assets.

H_{1b}: The negative mood caused by parasocial breakup increases the demand for risky assets.

3. Methodology of research

3.1. Data

As data, this study uses the daily logarithmic changes " s_t^d " in ratios of the total number³ of stocks in portfolios of domestic investors in the BIST to the total number of stocks outstanding (Eq. 1).

$$s_t^d = \ln\left(\frac{\#Share_t^d}{\#Share_t^M} / \frac{\#Share_{t-1}^d}{\#Share_{t-1}^M}\right) \quad (1)$$

Where: #Share = the total number of stocks; d = the domestic investor portfolio; M = market portfolio and t represents the day. The daily stock numbers that domestic investors have between November 2005 and April 2015 are obtained from Turkish Central Securities Depository "CSD"⁴.

Another data set used in the study consists of information related to 129 Turkish TV series⁵ ended between November 2005 and April 2015 (e.g., types of series, dates of finales, episode numbers and the TV channels that broadcast these series). The information related to series that reached finales was obtained

³ The major reason that stock prices or returns are not used in this study is, foreign investor operations specifically determine the price formation of the stocks in BIST. If Turkish TV series finales can affect mood, they can only have an effect on the mood of domestic investors. The daily increases (decrease) in the number of stocks owned by domestic investors indicate the sign of daily buying (selling) behavior in the market.

⁴ The data were obtained by e-mail in 06.05.2015 from CSD following a letter of application in 15.04.2015.

⁵ Selection criteria of TV series in this paper are as follows: (i) their finales must have minimum rating 1% and share 2%. (ii) They must have reached their finales during the period between the opening and the former closing of the BIST. (iii) They must be broadcasted for at least 20 episodes to have enough parasocial relationship with viewers. In Turkey, the seasonal broadcasting of TV series is nearly 35-36 episodes. (iv) Finally, the TV series finales, broadcasted at the time of the Turkish National Team matches, are excluded from the study.

from several sources⁶ by cross-checking to ensure the reliability of the data. The finale dates of TV series represent the dates when the negative mood dominates on investors and this study assumes that negative mood will affect the investor behaviours on the trading day following the date of the finale⁷. Table 1 presents the statistical summary related to the data used in the study.

Table 1. Summary statistics

	Mean	St. Deviation	Median	Max.	Min.
Episode Numbers	68.61	52.30	52	375	20
Ratings of TV Series (%)	4.51	4.08	3.28	23.41	1
#Share _t ^d (million number)	15,616.56	6,535.83	14,395.10	25,620.67	5,310.42
(#Share _t ^d ÷ #Share _t ^M) (%)	49.39	4.70	49.16	56.28	39.97
s_t^d	0.0000585	0.0027288	0.0000489	0.0254823	-0.0324426

Not: Some information related to TV series that reached their finales is as follows: 1- The TV series with number of highest episode is “A woman - A man” (375 episodes). 2- The highest rating of finale is “Aşk-ı Memnu” (rating = 23.41%, Share = 58.55%). 3- The series that was broadcasted at the latest hour is “Fatih Harbiye” (at 02:00). 4- Four of the series reached their finales the same day (the ratings and episode numbers of these series are united and considered as one series).

3.2. Model specification

To test the H_{1a} and H_{1b} hypotheses of the study, the model shown by Equation 2 is estimated using OLS regression analysis. In this regression model, the dependent variable “s_t” is thought to follow an autoregressive path, and therefore the study includes it to Eq. 2 as an independent variable until the 6th lag length⁸. Such analyses are known as transfer function analyses (Enders, 1995).

$$\begin{aligned}
 s_t^d = & \alpha + \sum_{i=1}^6 \ell_i s_{t-i}^d + \beta_1 Z_{t-1} + \beta_2 Z_{t-1} \times \ln(\text{EPISODE}_{t-1}) + \omega_1 \text{PRE}_t + \omega_2 \text{POST}_t \\
 & + \sum_{n=1}^{11} \gamma_n M_{nt} + \sum_{k=1}^4 \rho_k W_{kt} + \delta_1 \text{GOLD}_{t-1} + \delta_2 \text{OIL}_{t-1} + \delta_3 s_t^f + \sum_{m=1}^{13} \lambda_m \text{ANNOUNCE}_{mt} \\
 & + \xi_1 \text{AUT}_t + \xi_2 \text{SAD}_t + \xi_3 \text{NMOON}_t + \xi_4 \text{FMOON}_t + \xi_5 \text{TEMP}_t + \xi_6 \text{CLOUD}_t \\
 & + \xi_7 \text{PRECIPITATION}_t + \varepsilon_t
 \end{aligned} \tag{2}$$

Where: Z_{t-1} = the dummy variable set related to the TV series that finales after the closure of the exchange on day t-1 (Table 2). EPISODE_{t-1} = the number of episodes related to series ended on day t-1. The other variables are included to Eq. 2 in order to control the well-known calendar anomalies (Oprea and Tilica, 2014; Angelovska, 2013; Gharaibeh, 2017), macroeconomic factors, and alternative mood proxies. This establishes the robustness of the analysis results. Here, PRE_t (POST_t) = the holiday and observances immediately before (after) the trading day; M_{nt} = the eleven months of the year (except December); W_{kt} = the four days of the weekday (except Wednesday); NMOON_t (FMOON_t) = the three calendar days immediately before and after new the (full) moon; PRECIPITATION_t = the rainy days in Istanbul and AUT_t = the autumn days. These dummy variables take the value of 1 on the related days and 0 on the other days.

⁶ All the information (except ratings) related to the TV series was obtained from the web sites <http://www.bizimhikayelerimiz.com/forum/forumdisplay.php?108-D%C4%B0Z%C4%B0-AR%C5%9E%C4%B0V%C4%B0>, http://tr.wikipedia.org/wiki/Kategori:T%C3%BCrk_telemizyon_dizileri and http://www.imdb.com/search/title?countries=tr&start=1&title_type=tv_series, <http://www.ddizi1.com/>; the ratings were obtained from the web sites <http://www.ucankus.com/ratingler>, <http://www.canlitv.com/rating/> and <http://www.tvaktuel.com/tv/tv-rating/> between 01.04.2015 – 07.06.2015.

⁷ For example, it is supposed that the effect of a TV series that reached its finale on Saturday on investors’ psychology and behaviors will be observed on Monday.

⁸ The related lag length is determined according to the FPE (Final Predict Error) criterion. If there is an autocorrelation between error terms in a regression model, the reliability of the model decreases. At this point FPE criterion determines the lag length that diminishes the autocorrelation between error terms. The results were found robust, but not shown here due to space limitation.

$GOLD_{t-1}$ (OIL_{t-1}) is the logarithmic change of the prices of gold (Brent oil) in dollars on day $t-1$. S_t^f is the change in the number of stocks owned by foreign investors on day t . $ANNOUNCE_{mt}$ is the set of dummies that take the value of 1 in case a macroeconomic announcement is made on day t , and otherwise 0 for each of thirteen macroeconomic indicators⁹ dealt in this study. $TEMP_t$ is the daily logarithmic changes in Istanbul's temperature ($^{\circ}C$); $CLOUD_t$ is the rate of cloudiness in Istanbul, and finally SAD_t is the standardised value of mean night time in Istanbul on day t ¹⁰.

The dummy variables related to the TV series finales in the 9 model specifications considered in this paper are demonstrated in Table 2, where Specification 1 is the most general model. Subsequent specifications are designed to take the TV Channels and types of TV series into account in order to ensure the robustness of the analysis results. This type of specification is often used in the literature (Berument, 2005).

Table 2. Specifications of Dummy Variables Related to TV Series Finales

Specification 1	Z = FINALE	= The day when a TV Series finishes = 1; other days = 0
Specification 2	Z = FINALE _{Drama}	= The day when a Drama TV Series finishes = 1; 0
Specification 3	Z = FINALE _{Action}	= The day when an Action TV Series finishes = 1; 0
Specification 4	Z = FINALE _{Comedy}	= The day when a Comedy TV Series finishes = 1; 0
Specification 5	Z = FINALE _{ATV}	= The day when a TV series finishes on A-TV = 1; 0
Specification 6	Z = FINALE _{Channel-D}	= The day when a TV series finishes on Channel D = 1; 0
Specification 7	Z = FINALE _{Show-TV}	= The day when a TV series finishes on Show TV = 1; 0
Specification 8	Z = FINALE _{Star-TV}	= The day when a TV series finishes on Star TV = 1; 0
Specification 9	Z = FINALE _{Other}	= The day when a TV series finishes on Other Channels = 1; 0

The models presented in Eq. (2) and the Specifications 1–9 in Table 2 are estimated using the ordinary least squares technique¹¹. In Eq. 2, s_t follows an autoregressive path cut by Z_{t-1} in each period. β_1 and β_2 coefficients are tested under the null hypothesis ($H_0: \beta_1 = \beta_2 = 0$) and both of them simultaneously measure the effect of TV series finales (parasocial breakup, in other words, negative mood) on buying-selling decisions of investors.

4. Estimation results

The results showing the relationship between TV series finales (negative mood) and demands of domestic investors for risky assets are summarized in Table 3.

Specification 1 of Table 3 shows statistically significant evidence that domestic investors react positively to TV series finales. β_1 is estimated to be negative and statistically significant at 1% level (the null hypothesis " $H_0: \beta_1 = 0$ " is rejected). β_2 is also statistically significant at 5% level, but positive. The Wald test result shows that the null hypothesis ($H_0: \beta_1 = \beta_2 = 0$) must be rejected at 1% level.

Regression coefficient β_2 suggests that negative changes in the moods of domestic investors, caused at the end of a long-episode TV series (which has a stronger parasocial relationship), increase the number of stocks in their portfolios in the next trading day. When everything is stable, it is forecasted that a domestic investor will response to the ending of a TV series with 25% more episodes by increasing his

⁹ These indicators are: CPI, Foreign Trade Statistics, Labor Statistics, GDP, Industrial Production Index, Retail Sales Volume Index, Economic Confidence Index, Consumer Confidence Index, Construction Turnover and Production Index, Building Permits Statistics, Decision of the Monetary Policy Committee, Reel Sector Confidence Index and Monthly Price Developments Report (<http://www.tuik.gov.tr/takvim/tkvim.zul#tb2>; <http://www.tcmb.gov.tr/>).

¹⁰ SAD is calculated as shown by Kamstra, Kramer and Levi (2003). H_t = the time from sunset to sunrise.

$$SAD_t = \begin{cases} H_t - 12 & \text{for months in the fall and winter} \\ 0 & \text{otherwise} \end{cases}$$

¹¹ OLS Regression analyses are made using Newey-West estimator. Newey-West method gives robust standard errors in case there is a possibility that error terms in regression equations may have heteroskedastic and autocorrelation problems and provides coherent coefficient predictions.

portfolio stock quantity nearly 0.01 basis point on the next trading day¹². A quick glance at these findings shows that the first results are coherent with the H_{1b} hypothesis of the study.

Table 3. Results of Regression Analysis (Eq. 2 and Specification 1 – 9).

Explanatory Variables ^e	Specifications ^d								
	1	2	3	4	5	6	7	8	9
S_{t-6}	0.03138 ^b	0.03123 ^c	0.03107 ^c	0.03147 ^c	0.03172 ^b	0.03087 ^c	0.03187 ^c	0.03126 ^c	0.03136 ^c
β_1 Finale	-0.00211 ^a								
β_2 Finale \times ln(Epis)	0.00045 ^b								
β_1 Finale ^{Drama}		-0.00297 ^b							
β_2 Finale ^{Drama} \times ln(Epis)		0.00066 ^b							
β_1 Finale ^{Action}			-0.00059						
β_2 Finale ^{Action} \times ln(Epis)			0.00018						
β_1 Finale ^{Comedy}				-0.00155 ^b					
β_2 Finale ^{Comedy} \times ln(Epis)				0.00030 ^c					
β_1 Finale ^{ATV}					-0.00331 ^a				
β_2 Finale ^{ATV} \times ln(Epis)					0.00079 ^a				
β_1 Finale ^{Channel-D}						-0.00390 ^b			
β_2 Finale ^{Channel-D} \times ln(Epis)						0.00095 ^c			
β_1 Finale ^{Show-TV}							-0.00139		
β_2 Finale ^{Show-TV} \times ln(Epis)							0.00023		
β_1 Finale ^{Star-TV}								0.00034	
β_2 Finale ^{Star-TV} \times ln(Epis)								-0.00015	
β_1 Finale ^{Other}									-0.00183 ^a
β_2 Finale ^{Other} \times ln(Epis)									0.00029 ^b
Monday	0.00027 ^c	0.00027 ^c	0.00027 ^c	0.00027 ^c	0.00027 ^c	0.00026 ^c	0.00027 ^c	0.00027 ^c	0.00027 ^c
Announcement ^{Employment}	-0.00022 ^b	-0.00021 ^c	-0.00021 ^c	-0.00022 ^c	-0.00021 ^c	-0.00021 ^c	-0.00022 ^c	-0.00022 ^c	-0.00022 ^b
Gold	0.00765 ^c	0.00772 ^c	0.00748 ^c	0.00741 ^c	0.00762 ^c	0.00754 ^c	0.00746 ^c	0.00752 ^c	0.00764 ^c
S_t^f	-0.54495 ^a	-0.54496 ^a	-0.54484 ^a	-0.54513 ^a	-0.54474 ^a	-0.54483 ^a	-0.54507 ^a	-0.54502 ^a	-0.54517 ^a
Temp	0.00033 ^b	0.00033 ^b	0.00033 ^b	0.00032 ^b	0.00033 ^b	0.00033 ^b	0.00033 ^b	0.00033 ^b	0.00033 ^b
Cloud	0.00003 ^c	0.00003 ^c	0.00003 ^c	0.00003 ^c	0.00003 ^c	0.00003 ^c	0.00003 ^c	0.00003 ^c	0.00003 ^c
Constant	0.000086	0.000060	0.000060	0.000069	0.000072	0.000063	0.000079	0.000069	0.000038
Observations	2,333	2,333	2,333	2,333	2,333	2,333	2,333	2,333	2,333
Adj. R ²	0.518	0.518	0.517	0.517	0.518	0.518	0.517	0.517	0.517
F-statistic	53.2740 ^a	53.2781 ^a	53.0395 ^a	53.0856 ^a	53.1154 ^a	53.2058 ^a	53.1024 ^a	53.0529 ^a	53.1055 ^a
Wald-Test									
($H_0: \beta_1 = \beta_2 = 0$)	0.0004 ^a	0.0004 ^a	0.7549	0.0437 ^b	0.0002 ^a	0.1000 ^c	0.0649 ^b	0.0192 ^b	0.0000 ^a

Note: (a), (b) and (c) indicate that estimated coefficients are statistically significant at 1%, 5%, and 10% levels respectively. (d) Newey-West method has been used in the analysis. (e) Because of space limitations, only statistically significant coefficients are given here.

Specifications 2-4 are designed to test if the findings related to specification 1 will stay the same after the ended series are grouped according to types. For the same purpose, specifications 5-9 also group the ended series according to TV channels. The purpose of this grouping is to establish the robustness of the study results. When coefficients (β_2) of the specifications 2-9 in Table 3 are considered, it is seen that the results related to specification 1 are still valid. Domestic investors respond positively to the finales of dramas and comedies and the finales of series broadcasted on ATV and Channel D, specifically.

The findings in Table 3 which are not coherent with the results of studies in behavioural finance literature can make some readers suspicious because they are fairly interesting and surprising. Establishing the robustness of the results can eliminate probable suspicions¹³.

¹² In fact, the intensity of the response changes according to a baseline episode count. In this calculation, the baseline number of the episodes has been supposed to be equal to the average episode count "69". According to this supposition, a 25% increase in the episode count causes an increase in the stock numbers of domestic investors on the day after related TV series finales, which is $E(S_{T+1}) - E(S_T) = [\beta_2 \times \text{Finale} \times \ln(\text{Episode}_{T+1})] - [\beta_2 \times \text{Finale} \times \ln(\text{Episode}_T)] = [0.00045 \times 1 \times \ln(69 \times 1.25)] - [0.00045 \times 1 \times \ln(69)] = 0.0001$

¹³ To establish the robustness of the results, the dummy variables were grouped as in Table 2 and all of the control variables were included in the model, respectively. Moreover, all of the control variables were placed in the model respectively prior to the analysis. It was observed that the results were still coherent with each other (because of space limitations, the results were not given here). The following interesting findings are obtained: Table 2 shows that when everything is stable, a 1% point increase in Istanbul's cloudiness causes a 0.000039% increase in stock numbers. CLOUD is supposed to be a proxy for negative mood. A lot of

5. Robustness Checks

5.1. Quartile Analysis

The relationship stated in Table 3, between the negative mood and demand for stocks, is also supported by quartile analysis. Fig. 1 shows the quartile limits¹⁴ calculated based on the episode numbers of ended TV series.

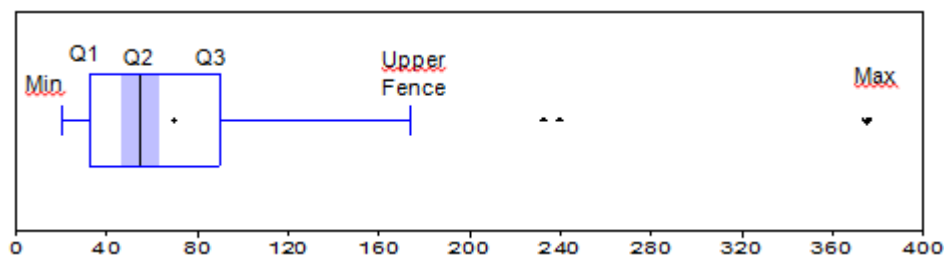


Figure 1. Box-Plot Graphics Related to length of TV Series on Episode Number

In the quartile analysis, first the TV series are divided into four groups, depending on the episode numbers in Fig. 1. Thereafter, the mean changes in the number of stocks owned by domestic investors are calculated for each group on the trading days following the finales (Fig. 2). Fig. 2a shows the average changes in the stock numbers for each of the quartiles. Fig. 2b shows the cumulative average changes in the stock numbers.

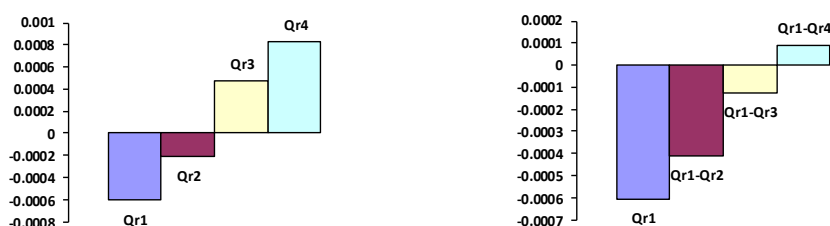


Figure 2. Changes in the Numbers of Stocks Owned by Domestic Investor on Quartiles Basis

Figure 2 shows that stock numbers rise when the long-episode TV series end (i.e. negative mood dominates over the society). This relationship between the stock numbers and the negative mood is also statistically significant (Table 4). Table 4 shows that the changes in stock numbers are different from one another on quartiles basis.

Table 4. Summary Statistics of the Changes in the Numbers of Stocks on Quartiles Basis

PANEL A ^d	Qr1(low)	Qr2	Qr3	Qr4(high)
Mean	-0.000605	-0.000215	0.000475	0.000826
Maximum	0.001054	0.002735	0.004879	0.007609
Minimum	-0.003621	-0.003317	-0.003032	-0.001963
Std. Dev.	0.001237	0.001365	0.00197	0.002108

studies present evidences that the negative mood in a cloudy day decreases stock demands (e.g. Hirshleifer & Shumway, 2003). The CLOUD result of this study is interestingly different from those in the literature, but establishes the robustness of the positive relationship between negative mood and stock demands specifically at BIST. This means that cloudy weather that affects mood negatively increases the stock buying of investors, just as the parasocial breakup does. Similarly, the dependent variable also responds positively to the TEMP variable, a proxy of the negative mood.

¹⁴ Min.=20 episodes; Qr1 (Lower Quartile)=33 episodes; Qr2 (Median)=55 episodes; Qr3 (Upper Quartile)=90 episodes; Maximum=325 episodes and Upper Fence=175.5 episodes. The episode counts of “Çocuklar Duymasın”, “Sihirli Annem” and “Bir Kadın Bir Erkek” TV series are outliers (233, 240 and 375, respectively).

Jarque-Bera	3.315583	0.056396	3.621047	30.76262 ^f
F-Statistic	4.429905 ^a			
Kruskal-Wallis Stat.	8.323085 ^b			
PANEL B ^e		Qr3		Qr4(high)
	<i>t-Statistic</i>	<i>Wilcoxon/Mann-Wh.</i>	<i>t-Statistic</i>	<i>Wilcoxon/Mann-Wh.</i>
Qr1(low)	-2.60 ^b	1.97 ^b	-3.25 ^a	2.52 ^b
Qr2	-1.61	1.06	-2.29 ^b	1.95 ^b

Note: (a), (b) and (c) have been used to indicate that the coefficient estimations are statistically significant at 1%, 5% and 10% level, respectively. This means, (a), (b) and (c) imply that there is a statistically significant difference between the average changes of the stock numbers belonging to the quartiles. (d) Panel A presents the summary statistics related to the changes in stock numbers for each quartile. Moreover, it includes the statistics which show whether or not the average changes differ on the quartiles basis. (e) Panel B presents the statistical values related to differences between the changes in the stock numbers related to groups of TV series which have the most (Qr3 and Qr4) and the least (Qr1 and Qr2) episodes. (f) The null hypothesis “the related sample presents a normal distribution” cannot be accepted. Thus in this table, both parametric (F and t tests) and non-parametric (Kruskal-Wallis and Wilcoxon/Mann-Wh.) test results are given.

5.2. The Effect of Staying Up Late

Since some TV series finales are shown until late hours, viewers (potential investors) may stay sleepless. Staying sleepless decreases the demand for risky assets (Kamstra, Kramer, and Levi 2000). The model defined by Eq. 3 is designed to test if the proposed relationship between parasocial breakup (negative mood) and demand for stocks is still valid considering this sleepless state.

$$\begin{aligned}
 s_t^d = & \alpha + \sum_{i=1}^6 \ell_i s_{t-i} + \beta_1 \text{FINALE}_{t-1} + \beta_2 \text{FINALE}_{t-1} \times \ln(\text{EPISODE}_{t-1}) \\
 & + \beta_3 \text{FINALE}_{t-1, \text{LATE}} + \beta_4 \text{FINALE}_{t-1, \text{LATE}} \times \ln(\text{EPISODE}_{t-1}) \\
 & + \Phi + \varepsilon_t
 \end{aligned} \tag{3}$$

Where: $\text{FINALE}_{t-1, \text{LATE}}$ is the dummy variable that takes the value of 1 for TV series finales¹⁵ end after 23:30 and 0, otherwise. Φ represents all of the other variables in Eq. 2.

Table 5. Results of Regression Analysis (Eq. 3)

β_1 Finale	β_2 Finale × ln(Epis)	β_3 Finale _{LATE}	β_4 Finale _{LATE} × ln(Epis)	Obs.	Adj. R ²	F statistic	Wald-Test p-value H ₀ : $\beta_1=\beta_2=0$	Wald-Test p-value H ₀ : $\beta_3=\beta_4=0$
-0.0035 ^a	0.00081 ^a	0.0032 ^a	-0.00086 ^a	2333	0,52	51.21 ^a	0.001 ^a	0.016 ^b

Note:(1) ^{a, b} and ^c indicate that estimated coefficients are statistically significant at 1%, 5%, and 10% levels respectively. (2) Newey-West method has been used in the analysis. (3) Because of space limitations, the coefficient results of the other control variables in Eq. 3 are not given here.

In Table 5, coefficient β_3 is positive, whereas coefficient β_4 is negative. Moreover, both coefficients are statistically significant, individually and jointly. The results related to coefficients β_3 and β_4 reveal that TV series ended at late hours negatively affect demands for stocks on the following trading day. This is coherent with the results of the studies that analyze the effects of lack of sleep. Table 5 shows that even if the TV series that end late hours are controlled, parasocial breakup (negative mood) still increases the demand for stocks.

¹⁵ The ending hour of some TV series that reached their finales could not be obtained. Only of 85 of 129 TV series' ending hours were obtained. 42 of them ended their finale broadcasts after 23:30.

5.3. The Alternative Representative of Parasocial Breakup (Ratings)

In one part of his study, Lepori (2015) analyses the relationship between stock returns and ratings of TV series that reached finales. It is intriguing to learn if the relationship found in this study between negative mood and demands for stocks still continues after considering the ratings of the TV series that reached finales. Eq. 4 is designed to satisfy one's curiosity.

$$s_t^d = \alpha + \sum_{i=1}^6 \ell_i s_{t-i} + \beta_1 \text{FINALE}_{t-1} + \beta_2 \text{FINALE}_{t-1} \times \ln(\text{RATING}_{t-1}) + \Phi + \varepsilon_t \quad (4)$$

Where: RATING_{t-1} stands for TV series rating measurement results.

Table 6. Results of Regression Analysis (Eq. 4)

β_1 Finale	β_2 Finale \times ln(Rating)	Obs.	Adj. R^2	F-statistic	Wald-Test p-value ($H_0: \beta_1 = \beta_2 = 0$)
-0.0007 ^a	0.00034 ^c	2333	0.51	53.22 ^a	0.000 ^a

Note: (1) ^a, ^b and ^c indicate that estimated coefficients are statistically significant at 1%, 5%, and 10% levels respectively. (2) Newey-West method has been used in the analysis. (3) Because of space limitations, the coefficient results of the other control variables in Eq. 4 are not given here.

Table 6 shows a 20% increase in the rating of a TV series finale causes a 0.006 (0.00034*ln(1.2)) basis point increase in the stock quantity in domestic investor's portfolio on the following trading day. In short, the results in Table 6 are coherent with the results of former analyses.

5.4. Consideration of Outliers

To avoid deviant and incoherent results in OLS regression analysis, outliers¹⁶ are excluded from the OLS regression model in Eq. 2. The analysis results, where outliers are excluded from the sample, are also coherent with the results of former analyses (Table 7).

Table 7. Results of Regression Analysis (Without Outliers)

β_1 Finale	β_2 Finale \times ln(Epis)	Obs.	Adj. R^2	F-statistic	Wald-Test p-value ($H_0: \beta_1 = \beta_2 = 0$)
-0.0013 ^a	0.00025 ^b	2202	0,48	43.11 ^a	0.0012 ^a

Note: (1) ^a, ^b and ^c indicate that estimated coefficients are statistically significant at 1%, 5%, and 10% levels respectively. (2) Newey-West method has been used in the analysis. (3) Because of space limitations, the coefficient results of the other control variables in Eq. 2 are not given here.

6. Conclusions

The parasocial breakups and consequent mood swings in a human being are evident from psychological studies on TV series, movies, theatre. However, its effect on the risk-taking attitude of investors in the stock market is yet not analyzed for a great number of stock markets and well understood. This paper uses parasocial breakup as the proxy variable of negative mood and analyses how such variable affects the demands of domestic investors in BIST for risky assets (stocks). This study presents robust evidences in support of the increase in the number of stocks in domestic investors' portfolios depending on

¹⁶ The outliers related to the indexes were determined manually by the help of Iglewicz and Hoaglin's (1993) modified Z score (M). The modified Z score (M) is calculated as follows: $M_i = 0.6745(x_i - \tilde{x}) / MAD$. In this equation x_i , is the value of period i; \tilde{x} , is the median of the series and $MAD = \text{median} \left\{ \left| x_i - \tilde{x} \right| \right\}$.

their strong parasocial relationship with the long episode TV series. The domestic investors of Turkey have been surprisingly found to increase their stock purchases during their negative mood in contrast to the findings in the behavioural finance literature. The negative mood may lead the investors to risky assets (which have high return potential) to repair their mood by rewarding themselves, which is an instinct of “mood repair” (Isen and Geva, 1987).

The outcomes of this paper summarized as follows: (i) negative mood (i.e. parasocial breakup) has been surprisingly found to increase stock demands in the next trading day; (ii) the other negative mood proxies such as Monday and cloudy weather and temperature also affect the stock demands positively and (iii) the effect of parasocial breakup on stock demands depends on the types of the TV series and the channels they are broadcasted on. Domestic investors respond positively to the finales of dramas and comedies and the finales of series broadcasted on ATV and Channel D, specifically.

To the best of our knowledge, this is the first paper to examine the effect of parasocial breakup on stock demands outside the US. This study also analyses the effect of parasocial breakups on stock demands in Turkey as an emerging market, taking into consideration the types of the series and TV channels. As a result of the analysis, the effect on stock demands varies by the types of the TV series and the TV channels. This paper is the first to employ the episode counts of the TV series that reached their finales to quantify the negative mood.

The findings of this paper may have a practical implication for diligent investors in Turkey as an emerging market. Investors can use the TV series finales in order to predict the stock market performance in Turkey. In addition, the contributions have a theoretical implication for future researches. It would be interesting to investigate the effect of long-running TV series finales on excess demand for stocks in BIST. If excess demands can be achieved by regarding the long-running TV series finales and adopting the appropriate investment strategy, we would indicate another implication relevant to policy makers. Excess demands specify some degree of market inefficiency. Towards the end of long-running TV series, if policy makers can get TV personae act in commercial films accord with his/her role by exercising their power, market inefficiency can be reduced. Continuance of a TV persona by commercial films can minimise the negative psychological effects of parasocial breakup and thus chips away at the effect of TV series finales (i.e. negative mood) on the stock demands.

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