THE EFFECT OF INVESTOR'S BEHAVIORAL BIASES ON TRADING VOLUME OF G7 AND BRICS CAPITAL MARKETS

Lamis ALSHALABI
Master of International Finance Student
Istanbul Commerce University, Graduate School of Finance,
lamosa.shalabi@gmail.com, ORCID ID: 0000-0002-4416-1696

Assoc. Prof. Serkan ÇANKAYA
Istanbul Commerce University, Graduate School of Finance
scankaya@ticaret.edu.tr, ORCID ID: 0000-0003-3010-0697

ABSTRACT

This study aims to test the effect of investor's behavioral biases on trading volume in G7 and BRICS countries stock markets. A linear regression model is used to test the relationship between trading volume and the rational expectations, overconfidence, excessive optimism, and excessive pessimism. We found that there are certain similarities and differences among developed and developing capital markets. Our analysis revealed that the rationality hypothesis can be rejected for all the markets except Germany. The Italian and Russian markets show no influence of investor's biases on trading volume. We found that six of the markets have the similar behavioral characteristics. Excessive optimism and excessive pessimism have a significant effect on trading volume in Canada, France, United Kingdom, United States, Brazil and South Africa.

YATIRIMCILARIN DAVRANIŞSAL YANILGILARININ G7 VE BRICS SERMAYE PİYASALARI İŞLEM HACİMLERİ ÜZERİNE ETKİSİ

ÖZ

Bu çalışmanın amacı borsada alım satım kararlarını verirken G7 ve BRICS ülkelerinde yatırımcıların davranışsal önyargılarının işlem hacmine etkisini test etmektir. Bu ilişkiyi test etmek için doğrusal regresyon modelinden faydalınılarak işlem hacmi ve bağımsız değişken olarak rasyonel beklenti, aşırı güven, aşırı iyimserlik ve aşırı kötümserlik, her bir ülkenin piyasa endeksinin günlük getirileri ile test edilmektedir. Çalışma neticesinde gelişmiş ve gelişmekte olan ülke piyasaları arasında benzerlik ve farklılıklar tespit edilmektedir. Rasyonalite hipotezinin Almanya haricindeki tüm pazarlar için reddedilebileceğini, İtalyan ve Rus piyasalarının da yatırımcıların rasyonalite üzerinde herhangi bir etkisinin olmadığı tespit edilmiştir. Altı ülke piyasasının benzer sonuçlar elde dildiği ve aşırı iyimserlik ve aşırı kötümserlik yanılgılarının Kanada, Fransa, Birleşik Krallık, ABD, Brezilya ve Güney Afrika'da işlem hacmi üzerinde belirgin etkiye sahip olduğu tespit edilmektedir.

1. Introduction

In financial markets, the changes in return effect the trading decision of investors on a daily basis. The academic literature investigates vast amount of different psychological factors that effect their financial decisions. This paper focuses on three behavioral biases; overconfidence, excessive optimism, and excessive pessimism. We also added the rational expectation factor in the analysis to give empirical evidence of the irrationality hypothesis. The model used in this study is based on the studies of Dhaoui (2015:20), Oprean (2015:66), and Galanidis (2015:19). The unique advantage of this paper is that it includes a comprehensive and updated data of a sample including the top advanced economies counties globally "G7 and BRICS countries", especially after the noticeable growth of BRICS countries and the rise of BRICS stock markets being an alternative opportunity for international investments.

This paper aims to help individual and institutional investors by identifying the behavioral biases in selected country capital markets that leads them to irrational choices. The findings are also relevant for financial advisors and aims to help them to make better and more efficient recommendations.

This paper is designed in five sections; the next second section is the literature review of the behavioral finance field and the related studies of this paper, the third section is describing the data and methodology, sample and the model used, the fourth section is discussing the empirical results, and the last section concludes the research.

2. Literature review:

For long period the economic and financial literature based on standard market theories that states markets are efficient, investors are rational and for whom are irrationals; randomly decisions cancel each other without affecting the prices. The investors are building their portfolios based on mean-variance, and the expected return is always related to the risk. Behavioral finance offered and alternative for each of these theories and provided a relevant explanation for each one which are based on real world observations. The main idea is that the investors are normal and investors might not behave rationally all the time hence the markets are not fully efficient.

The roots of this field go back to the theory of moral sentiment and wealth of nations by Smith (1759:38 & 1776:9). He mentioned that the morality of individuals leads them when making social economic and financial decisions. Keynes (1936:35) mentioned the role of animal spirits of individuals in economic decisions. The field became more popular when Kahneman & Tversky (1979:269) introduced the prospect theory for their analysis of decisions making under risk. The rapid growth of the behavioral finance continued by the studies of Shefrin (1994:18) who proposed an alternative to CAPM, called the BAPM (behavioral asset pricing model) which explains the market transactions by dividing the traders into two groups, the rational traders who build their decisions based on CAPM and the noise traders whom are not following the CAPM and their expected return on securities is calculated by their behavioral betas. Shefrin et al (1999:16) also contributed to the field by developing an alternative to the Markowitz portfolio theory called the BPT "behavioral portfolio theory". The main difference is that in Markowitz theory investors build their decisions by choosing the assets regarding the mean-variance

of the portfolio but in BPT investors are building their portfolios as pyramids taking into account the behavior of investors when they estimate the expected return and the risk of each asset.

Many other researchers discussed the fact that no human being can be completely informed or has the knowledge to maximize his utility when taking any investment decisions. Therefore, their decisions are built on other factors that drive their behavior. Sheffrin (2005:6) and others tried to categories these factors into biases and heuristics simplifications. In this study we focused on three main biases: overconfidence, excessive optimism and excessive pessimism. Shefrin (2005:184) defines a bias as ''a predisposition toward error'', and overconfidence as people's predisposition towards believing and viewing themselves as better than average person.

Many empirical studies have been done about investor's behavioral biases, depending on our scope we will start with the effect of overconfidence on stock prices. Daniel, et al. (1998:15) shows how overconfidence is negatively correlated with stock prices and leads to excess volatility and stock mispricing. Gervais et al. (2000:23) claims that the main reason behind overconfidence behavior is the success. They showed that when investors are having past success, it will lead them to overconfidence behavior so they will underestimate the risk and increase the trading volume in their future trades. Glaser et al. (2006:17) found that *''investors who think that they are above average in terms of investment skills or past performance (but who did not have above-average performance in the past) trade more''*. Chou et al. (2011:9) used a model to predict the overconfidence behavior of traders when they trade in futures contracts and divided traders into three main panels; all traders, international traders and domestic traders. They found that at the account level, domestic institutions and individual traders are more likely to buy (sell), and to do so more aggressively when they have experienced gains from their prior long (short) positions.

Other researchers Isidore et al. (2018:13) tested the overconfidence behavior of the individuals. By using a questionnaire, they found that investors with higher income are more likely to trade with overconfidence than those with lower income.

Excessive optimism is a positive view of the future that occurs when investors expect an increase in the return and vice versa when they are pessimistic. Suto & Toshino (2005:466) optimistic investors select only the good news when they make their decisions, and this will have a negative effect not only on the investors return but also on the market because as has been discussed by Shefrin (2011:32). Dhaoui (2015:12) showed that the US stock market reacts more significantly following an excessively pessimistic shock than to an excessively optimistic shock and his results were in line with Chen et al. (2013:14) who showed that investors overweight bad news and underweight good news.

Dhaoui (2011:13) tested the three previously introduced biases for several international markets during the global financial crisis and showed that even when markets are in a bad situations and unhealthy conditions during volatility period investors continue to trade. Dhaoui et al. (2013) also tested the French capital market and found that pessimistic investors have more influence on trading volume. Another empirical finding conducted by Dhaoui (2014:18) is that, he added a fourth variable to the model that is related to irrationality, considering randomly decisions and testing several markets. Another study by Oprean et al. (2015:26) tested Brazilian and Romanian markets for overconfidence, excessive

optimism and excessive pessimism. Their findings showed that pessimistic investors have the greatest influence on the trading volume for both markets. Galanidis (2015:24) tested the behavioral biases of PIIGS (Portugal, Italy, Ireland, Greece, Spain) countries and his results showed investors behave in non-rational way. The results for Italy and Ireland show that pessimism cause fluctuations in trading volume. The trading volume in Portugal on the other hand is affected positively by confidence. Excessive optimism positively affects the capital market of Spain and the results of investor's rational expectation for all markets fail to explain the trading volume variability.

This paper aims to contribute to the field of behavioral finance by providing empirical evidence for G7 and BRICS countries. The finding can be useful also for financial advisors, market regulators, and individual investors might benefit from this study in order to make better financial choices.

3. Data and methodology.

This section explains the data sources, the sample period and the methodology used, in addition to the mathematical steps of computing each of the variables in the analysis and the final linear regression model.

3.1 Sample period and data collection

The sample contains twelve market's indices for G7 countries (Canada France Germany Italy Japan United Kingdom and the united states) and BRICS countries (Brazil, Russia, India, China, and South Africa).

The main market indices for each of the countries are included for the period of five years from 01.01.2015 to 01.01.2020. (S&P/TSX for the Canadian market, CAC_40 for the French market, DAX for the German market, FTSE MIB for the Italian market, NKKEI 225 for the Japanese market, S&P 500 for the American market, FTSE 100 for the British market, IBOVESPA for the Brazilian market, MOEX for the Russian market, NIFTY 50 for the Indian market, SSEC for the Chinese market, and FTSE/JSE for the South African market.)

The historical data are collected mainly from Bloomberg and Yahoo Finance. After eliminating the non-trading days for each market our sample includes 1253 observations for the Canadian market, 1277 observations for the French market, 1266 for the German market, 1268 for the Italian market, 1238 for the Japanese market, 1257 for the American market, 1263 for the British market, 1242 for the Brazilian market, 1247 for the Russian market, 1229 for the Indian market, 1218 for the Chinese market and 1247 for the South African market.

3.2 Methodology

The study aims to investigate the behavioral factors that may explain the trading volume fluctuations in G7 and BRICS capital markets. The mathematical methods to test the physiological phenomena are presented in Table 1. The following

sections briefly explain the computational steps of the variables. Then we show the descriptive statistics, the stationarity tests and finally the linear regression analysis conducted by using E-views statistical program.

3.3 The variables

This section briefly explains the mathematical methods of computing each of the variables used in the analysis.

Table 1. Variable Descriptions

Variables	Measurement method	Description
Trading	*Log (daily time series data of trading volume each market index)*	Dependent variable(output)
Overconfidence	*If Rt-1 ≥ 0 → Transaction will occur ; Dummy variable value = 1* *If Rt-1 < 0 →Transaction will not occur ;Dummy variable value=0*	Independent variable (input)
Excessive optimism	*If Rt-1 ≥ $\bar{R}$+σ → Transaction will occur ;Dummy variable value =1* *If Rt-1 <$\bar{R}$ +σ→Transaction will not occur; Dummy variable value =0*	Independent variable (input)
Excessive pessimism	*If Rt-1 ≥$\bar{R}$ - σ→Transaction will occur ;Dummy variable value = 1* *If Rt-1<$\bar{R}$ - σ→ Transaction will not occur ;Dummy variable value = 0*	Independent variable (input)
Rational expectations	*E(Rt) = Rt-1 + ε (t-1)*	Independent variable (input)
Residual	*Residual = Observed value – predicted value* *(automatically estimated as Constant)*	Represent the error term

3.3.1 Overconfidence

The proxy of conducting overconfidence has been used previously by Khcherem & Bouri (2009). The relationship between the trading volume and overconfidence while taking into consideration the effect of the previous return R_{t-1} and the current trading volume TV_{t+1} .If the return increased in the last period, investors respond overconfidently and increase their trading transactions. In this paper, we used Operan et al. (2015:7)'s model which explain overconfidence behavior by if security returns are positive including the value of zero, a transaction will occur, if the security return is negative then the transaction will not occur.

We created a dummy variable while conducting the regression model. When a transaction occurs the dummy variable recorded the value of one and the value of zero when the transaction fails to occur. As represented below:

If R_{t-1} ≥ 0 → Transaction will occur ; Dummy variable value = 1

If R_{t-1} < 0 → Transaction will not occur ; Dummy variable value = 0

To calculate the return, we used natural log function for calculating index returns as explained in the following formula; $R_t = log(p_t / p_{t-1})$ while p_t is the stock market index price at time t, and p_{t-1} is the previous stock market index price.

3.3.2 Excessive optimism

According to Ackert & Deaves (2010:6) "Excessive optimism is present when people assign probabilities to favorable/unfavorable outcomes that are just too high/low given historical experience or reasoned analysis". To compute the excessively optimistic investor behavior we used Dhaoui (2011:5)'s method. When excessively optimistic investors reach a certain minimum level of profit they will actively increase their trading transaction and when the returns are lower than the minimum level, they will react or decide to cancel the trading transaction. To compute the values in the regression we created a dummy variable that recorded the value of zero when the transaction fails to occur and vice versa for the value of one when the transaction occurred. As described in the following;

If $R_{t-1} \geq \bar{R} + \sigma \rightarrow$ Transaction will occur ; Dummy variable value = 1

If $R_{t-1} < \bar{R} + \sigma \rightarrow$ Transaction will not occur ; Dummy variable value = 0

3.3.3 Excessive pessimism

Excessive pessimism occurs when investors reach a minimum level of loss on the previous day and limit their trading transactions. If the return is above that minimum level they will participate in the trading transaction. We created a dummy variable that recorded the value of 1 when the transaction occurred and the value of 0 when the transaction fall to occur, as described below ;

If $R_{t-1} \geq \bar{R} - \sigma \rightarrow$ Transaction will occur; Dummy variable value = 1

If $R_{t-1} < \bar{R} - \sigma \rightarrow$ Transaction will not occur ; Dummy variable value = 0

3.3.4 Rational expectations

Rational expectation theory that has been formulated by Muth (1961:23), in the line with the efficient market hypothesis (Fama,1970:13) that suggest the current price of securities is close the fundamental value regarding the rationality of investors. The irrational choices are eliminated by arbitrage and random transaction cancels each other. In our analysis we used;

$P(t+1) = E t P(t+1) + \varepsilon(t+1)$

where P_{t+1} is the security price at time $t+1$, and ε_{t+1} is the estimation error. The only term in the equation above, randomly determined by new information (unknown to any of the investors), is the residual factor.

In our case we determined the expected return by rational investors is by taking into consideration the return that has been made on the previous date R_{t-1} and the residual factor **ε (t-1)** is related to the previous moment as follows;

$$E(Rt) = R_{t-1} + ε_{(t-1)}$$

3.4 The model

After computing the independent variables as mentioned above, and to test the influence of each independent variable on the dependent variable which is the trading volume, we computed the natural logarithm of the trading volume of each market index, and then we run the linear regression model for each market.

$log(TV)=β_0+β_1Overconfidence+β_2excessiveoptimism+β_3excessivepessimism+β_4$
rationalexpectations+$ε_t$

Where;

log(TV); represents the natural logarithm of the trading volume in the time t

Overconfidence; represents the return expected by overconfident investors in the time t, considering the gains they notice in the time (t-1).

Excessive optimism; represents the return expected by optimistic investors in the time t considering available information in the time (t-1).

Excessive pessimism; represents the return expected by pessimistic investors in the time t considering available information in the time (t-1).

Rational expectations; represents the return that are expected by rational investors in the time t considering available information in the time (t-1).

$ε_t$: is the residual factor that represents the error term.

4. Empirical findings and discussions:

This section shows the descriptive statistics, data stationary tests and the regression results respectively in tables 2,3, and 4.

Table 2 presents the summary statistics of return and trading volume for twelve different capital markets tested in our analysis.

Table 2. Summary statistics for return and trading volume

Market	Variables	Obs.	Mean	Max	Min	Sd	Skewness	Kurtosis
Canada	Return	1253	0.000116	0.028963	-0.031745	0.006788	-0.343866	5.423345
	Trading volume	1251	19.13315	20.57115	16.84388	0.305681	-1.020344	12.11689
France	Return	1277	0.00267	0.040604	-0.08344	0.01063	-0.563163	7.944651
	Trading volume	1276	18.33788	19.84566	16.3365	0.337822	-0.23042	5.13266

Germany	Returns	1266	0.000241	0.048521	-0.070673	0.011076	-0.401774	5.620112
	Trading volume	1266	18.31248	20.4814	16.12631	0.323511	0.523897	14.2876
Italy	Returns	1268	0.000162	0.056987	-0.133314	0.013646	-0.851468	11.59456
	Trading volume	1268	19.94157	20.72315	18.3063	0.478153	-1.120328	4.793565
Japan	Returns	1238	0.000263	10.33966	-10.34022	0.611485	0.133846	173.5094
	Trading volume	1228	11.54165	15.87793	9.655026	0.455255	1.221543	11.27781
UK	Returns	1263	0.000112	0.03515	-0.047795	0.008705	-0.216187	5.49532
	Trading volume	1263	20.8223	20.72323	18.42068	0.629792	-1.987751	5.488252
U.S	Returns	1257	0.00359	0.048403	-0.041843	0.00848	-0.524812	6.836647
	Trading volume	1257	21.9518	22.7526	20.98297	0.180398	-0.159476	7.078397
Brazil	Returns	1242	0.000702	0.442137	-0.446945	0.022909	-0.267542	229.6249
	Trading volume	1242	15.12609	16.21764	12.92781	0.30036	-0.478084	7.097713
Russia	Returns	1247	0.000521	6.12811	-6.137454	0.397706	1.931954	178.1674
	Trading volume	1247	20.096663	22.33759	17.9321	0.355432	-0.199189	7.912792
India	Returns	1229	0.000303	4.520748	-4.514899	0.224942	-0.002307	301.072
	Trading volume	1215	12.33155	15.87117	6.214608	0.571783	-2.256989	34.4144
China	Returns	1218	-7.71E-05	0.05636	-0.088729	0.015084	-1.201836	9.9965084
	Trading volume	1218	23.73865	25.17424	22.67771	0.457092	0.930787	3.32118
S.A	Return	1247	0.000121	0.038977	-0.040493	0.010289	-0.217739	4.1255
	Trading volume	1221	18.67574	20.20486	17.13658	0.357255	0.346799	6.202409

Results in the table show that the most liquid markets depending on Max, Mean, Min trading volume statistical measures are as recorded in order from the highest to lowest liquidity as; China, US, Russia, UK, Italy, South Africa, Germany, France, Brazil, Japan, India. The highest volatile market is the Chinese market recording the highest number of trading transactions while the Indian market is the lowest volatile market.

From the table, we can also notice that the highest degree standard deviation of return is observed in the Japanese market and the lowest degree of standard deviation is observed in the Canadian market.

The negative values of skewness in return is observed in most of the countries except Russia and India. High kurtosis in returns for investors means that they will experience occasional extreme returns (positive or positive), when the kurtosis value is – or + three times the standard deviation from the mean of normal distribution returns.

We continue to test the stationary of the data used by applying ADF and PP tests. Since three of the independent variables, overconfidence, excessive optimism and excessive pessimism are in the form of dummy variables, there is no need to apply the stationary test for these dummy variables. Stationary test is applied only for trading volume and rational expectations.

Table 3. ADF and PP unit root test for Trading volume and Rational expectations

(1% Critical value : -3.4344) (5% Critical value : -2.8632) (10 % Critical value : -2.5677)				
Capital Market	ADF*		PP**	
	Trading volume	Rational Expectation	Trading Volume	Rational Expectation

Canada	-10.07848	-32.40681	-31.45678	-32.30654
France	-7.7177908	-34.85602	-25.19183	-34.97442
Germany	-10.97524	-35.659	-28.05466	-35.68005
Italy	-9.909514	-37.92996	-29.73769	-37.98903
Japan	-4.962701	-16.66696	-26.4729	-226.7409
UK	-29.33866	-34.74614	-29.6596	-3.21531
U.S	-14.31779	-36.34448	-22.24068	-36.34448
Brazil	-7.68993	-31.78284	-29.57192	-53.10022
Russia	-33.28379	-31.50155	-33.28777	-671.2291
India	-18.15747	-17.86674	-23.75026	-617.7701
China	-4.539875	-33.25581	-5.97282	-33.25798
South Africa	-10.41538	-36.260700	-22.69159	-36.30844

*ADF refers to "Augmented Dickey-Fuller" unit root tests, PP** refers to "Phillips-Perron" unit root tests.

The results of ADF and PP unit root tests indicate that all tested data of all different markets are stationary at 1% critical level. After testing the stationary of our data, we continue to estimate the final results of our analysis using a linear regression model. The results are observed in table 4 bellow.

Table 4: Regression results

Capital Market	Independent variables	Coefficient	Std.Error	Prob.	Adjusted R-squared
Canada	Overconfidence	-0.011415	0.026187	0.663	
	Excessive optimism	0.0694	0.037638	0.0654*	
	Excessive pessimism	-0.15477	0.04057	0.0001***	0.02105
	Rational Expectations	3.26331	3.021745	0.1941	
	Constant	19.2674	0.044508	0	
France	Overconfidence	0.007636	0.026873	0.7763	
	Excessive optimism	0.188163	0.039254	0.0000***	
	Excessive pessimism	-0.229097	0.043192	0.0000***	0.067883
	Rational Expectations	-1.001187	1.93793	0.6139	
	Constant	18.51445	0.046817	0	
Germany	Overconfidence	0.054832	0.026502	0.0388**	
	Excessive optimism	0.197174	0.03782	0.0000***	
	Excessive pessimism	-0.230052	0.040639	0.0000***	0.092213
	Rational Expectations	-3.61744	1.944303	0.0630*	
	Constant	18.45907	0.044627	0.0000	
Italy	Overconfidence	0.02295	0.039267	0.5590	
	Excessive optimism	-0.010232	0.056526	0.8564	
	Excessive pessimism	-0.064134	0.061254	0.2953	0.000468
	Rational Expectations	-0.140089	2.195343	0.6036	
	Constant	19.98789	0.066313	0	
	Overconfidence	0.01021	0.025639	0.6931	

	Excessive optimism	1.055491	0.162552	0.000***	
Japan	Excessive pessimism	-0.190505	0.44476	0.6685	0.047045
	Rational Expectations	0.004983	0.025039	0.8423	
	Constant	11.71711	0.445156	0	
	Overconfidence	0.025316	0.053514	0.6362	
	Excessive optimism	-0.242684	0.077229	0.0017***	
UK	Excessive pessimism	0.144956	0.079937	0.0700*	0.016015
	Rational Expectations	2.900875	4.800147	0.5457	
	Constant	20.07074	0.08796	0	
	Overconfidence	-0.01441	0.013714	0.3061	
	Excessive optimism	0.092774	0.01981	0.000***	
U.S	Excessive pessimism	-0.188673	0.025563	0.000***	0.180398
	Rational Expectations constant	0.339977	1.327187	0.7979	
		22.16028	0.027512	0	
	Overconfidence	0.009274	0.019356	0.6319	
	Excessive optimism	0.22295	0.039643	0.0000***	
Brazil	Excessive pessimism	-0.171729	0.041983	0.0000***	0.300360
	Rational Expectations	0.000565	0.472594	0.9990	
	Constant	15.27178	0.041496	0	
	Overconfidence	0.025741	0.020262	0.2042	
	Excessive optimism	-0.504236	0.429064	0.2401	
Russia	Excessive pessimism	-0.404472	0.298361	0.1755	0.000352
	Rational Expectations	0.093962	0.076264	0.2182	
	Constant	20.48746	0.298511	0	
	Overconfidence	0.068862	0.039739	0.0830*	
	Excessive optimism	-0.056628	0.43722	0.8985	
India	Excessive pessimism	-0.152184	0.047911	0.0015***	0.007121
	Rational Expectations	0.140553	0.097916	0.1514	
	Constant	12.41369	0.035016	0	
	Overconfidence	0.09657	0.03156	0.0023***	
	Excessive optimism	0.707169	0.047992	0.0000***	
China	Excessive pessimism	-0.697669	0.420777	0.0976*	0.154248
	Rational Expectations	-8.758204	1.198226	0.0000	
	Constant	24.30974	0.420422	0	
	Overconfidence	-0.061841	0.033896	0.6830	
	Excessive optimism	0.106404	0.04259	0.0126**	
South Africa	Excessive pessimism	-0.155407	0.054218	0.0042***	0.02311
	Rational Expectations	0.625349	2.482807	0.8012	
	Constant	18.83588	0.062361	0	

*** indicate 1% significant level, ** state for 5% level of significant, * represent 10% level of significant.

Results in table 4 indicate that the rationality hypothesis of investor's behavior can be rejected for all the markets except the case of Germany.

The results for G7 countries can be summarized as follows. In Canada, the result reveals that excessive pessimism has a negative and significant effect on the trading volume at a 1% level of significance. Excessive optimism has a positive and significant effect on the volume of trade at a 10% level of significance. Other variables show no significant effect on the volume of trade in the Canadian stock market. In the case of France, the results indicate that excessive optimism has a positive significant impact on the trading volume in the French stock market at 1% significant level. Excessive pessimism has a negative influence on the trading volume in the French market at 1% levels of significance. The results for Germany was interesting being the only market in our study that shows a significant effect of all tested variables on the trading volume. Excessive optimism has a positive influence on the trading volume in the German stock market at 1 % significant level. Excessive pessimism has a negative impact on the trading volume at 1% significant level. Overconfidence has a positive effect on the trading volume in the German stock market at a 5% level of significance. Rational expectations have a negative impact on the trading volume at a 10% level of significance in the German stock market and that is interesting because the rational expectation hypothesis can't be rejected only for the German market in our analysis. In Italy, the results were surprising being the only market in our analysis that shows no significant effect on the trading volume for all tested variables. The rational expectations hypothesis can be rejected and all other tested variables excessive optimism, excessive pessimism and over overconfidence are not effecting the investors' decisions. In Japan the rationality hypothesis can be rejected, excessive optimism has a significant impact on trading volume in the Japanese market at a 1% level of significance. Other variables show no effect on the trading volume, and this implies that in Japan investors are influenced by excessive optimism biases while taking any trading decision. United Kingdom results indicate that excessive optimism has a negative impact on the trading volume in the British stock market at 1 % levels of significance. Excessive pessimism has a positive effect on the trading volume at a 10% level of significance, other variables show no significant effect on the trading volume, rational expectations hypothesis can be rejected. United States results show that rational expectations hypothesis can be rejected, optimistic investors have positive influence on the trading volume at 1% significant level, pessimistic investors have negative impact on the trading volume at a 1% level of significance.

The BRICS results can be summarized as follows. In Brazil, optimistic investors have a positive influence on the trading volume at 1% significant level. Pessimistic investors have a negative impact on the trading volume at a 1% significant level. Russian results were surprising in similar way to Italy. It also showed no significant effect on the trading volume for all tested variables. The rational expectations hypothesis can be rejected, all other tested variables are not affecting the investor's decisions. In India, pessimistic investors have a negative influence on the trading volume at a 1% level of significance. Overconfidence has a positive impact on the trading volume at a 10% level of significance. Other variables have no significant effect on the trading volume. In China, the rationality hypothesis can be rejected, over overconfidence investors have a positive significant effect on the trading volume at a 1% significant level. Excessive optimism has a positive influence on the trading volume in the Chinese stock market at 1% significant level. Excessive pessimism has a negative influence on the trading volume at a 10% level of

significance. Finally, the South African stock market, rationality hypothesis can be rejected, pessimistic investors have a negative influence on the trading volume at a 1% level of significance. Excessive optimism investors have a positive impact on the volume of trade at a 5% level of significance. Other tested variables have no significant effect on the trading volume.

5. Conclusion

The findings of this research are mostly in line with the previous papers. The reject the rationality hypothesis for trading decisions for all the countries in this research except for the case of Germany which shows a significant effect of rationality at 10% level. This might be a sign that investors in Germany made more rational decisions than other tested markets but this alone cannot imply that they are less affected by behavioral biases than other country markets because as the results indicate, German investors are also affected by the three behavioral biases we have included in our analysis. The overconfidence behavior in Germany is already tested by Glaser et al (2012) and found that financial stability and the increase in age might be the reasons behind higher degree of overconfidence. In our analysis, Overconfidence biases is found on only two markets that are Germany and Indian markets.

In the case of Russia and Italy, we found out that trading volume is not influenced by any of tested biases, neither by the rationality factor. We recommend further research could focus on other factors or reasons to explain the trading volume behavior in these two unique markets.

There are certain similarities among the tested markets. We found that six of the markets have the similar behavioral characteristics. In Canada, France, United Kingdom, United States, Brazil and South Africa excessive optimism and excessive pessimism has a significant effect on trading volume.

The Japanese market shows only one influence which is the excessive optimism behavior. The stability in Japanese markets might be a reason behind the effect of optimistic investors (Solis & Urata, 2018).

To conclude our point of view, investors play a key role in the financial markets all around the world. There are certain characteristic differences and similarities among developed and developing countries capital markets. This paper contributes to the literature in underlining these behavioral similarities and differences. It aims to help individual, institutional investors and financial advisors to make more sound financial choices and recommendations.

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