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Investors' Trading Activity and Information Asymmetry: Evidence from the Romanian Stock Market

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Abstract: This paper examines the problem of information asymmetry between foreign, local, institutional and individual investors on the Bucharest Stock Exchange (BVB) for the period 2004–2011. Using monthly returns for individual companies listed on BVB, stock market indices during the seven years period, as well as aggregate data on foreign and domestic investors (both institutional and individual) sales and purchases on the Romanian stock market, this research intends to provide an answer to the following question: Are foreign investors better informed than the domestic ones and continually achieve higher rates of return on the Romanian stock market? We compare the information advantage of the different investors' categories by separating the stock in our data sample into two categories, namely blue-chips stocks (mostly stocks that are part of the BET index, and also containing one international stock, Erste Bank), and "regular" stocks. Subsequently, we study the explanatory power for stock returns of potential impact factors, which reflect the monthly net position of four groups of investors on the Romanian Stock market (Purchases-Sales) by employing multivariate regression models and a five variable VAR system. Ultimately, we are interested in whether investors in one particular category are consistently net buyers just before stock returns increase and are net sellers before stock returns decrease, thus suggesting they have an information advantage as compared to the domestic ones. Our aim is to provide robust empirical evidence on the nature of investors' information asymmetry by utilising a unique data set and directly assessing relevant inter-relationships.

Keywords: market efficiency; information asymmetry; foreign investors; institutional investors; vector autoregression; Bucharest Stock Exchange

JEL Classification: G11; G12; G15

1. Introduction and Related Literature

Emerging and frontier equity markets, including post-communist Eastern European markets, have increasingly focused investors' attention due to attractive returns and diversification benefits (Ajayi and Mehdian 1995; Bowman and Comer 2000). Nonetheless, these markets generally present lower liquidity and higher volatility than their mature counterparts (Peranginangin et al. 2016). As such, a deeper knowledge of these markets' microstructure and influence factors is important for different stakeholders, from market participants to academic researchers and policy makers.

This paper addresses the subject of the Romanian stock market efficiency by focusing on possible information asymmetry between local and foreign investors and also between institutional and individual investors. In particular, we address the question of whether foreign and/or institutional investors promote higher informational efficiency in narrow frontier markets.

To our knowledge, this investigation has not been done before for the Romanian stock market. If one group of investors seems to be better informed and continually achieve higher profits, then we acknowledge this situation as being a proof of information

asymmetry and therefore a contradiction to Fama's (1970). Previous studies on other aspects on the Romanian capital market's efficiency brought mixed results (Pele and Voineagu (2008), Dragota et al. (2009) or Tudor (2009)). This research therefore adds to the existing literature by elucidating another aspect of market efficiency, i.e., the problem of information asymmetry and its association with superior returns, an aspect that is particularly sensible for narrow capital markets such as those in the post-communist Eastern European area, where "big" foreign professional investors could dispose of the potential to "make the market".

The literature offers two opposing findings to the question of whether foreign or local investors are more informed. The first explanation is in favour of local investors and claims that they face fewer investment barriers than foreign investors, and lead to easier access to local firm-specific information. For example, Hau (2001) studies the equity trades of 756 professional traders located in 23 different cities and eight European countries performed on the German Xetra trading system. He finds that traders located outside Germany in non-German-speaking cities show lower proprietary trading profit and their underperformance is not only statistically significant, but is also of economically significant magnitude and occurs for the 11 largest German blue-chip stocks.

Dvořák (2005) uses transaction data from Indonesia and also finds that domestic investors have higher profits than foreign investors. In addition, he also shows that clients of global brokerages have higher long-term and smaller medium (intramonth) and short (intraday) term profits than clients of local brokerages, which suggests that clients of local brokerages have a short-lived information advantage, but that clients of global brokerages are better at picking long-term winners. Finally, the same study finds that domestic clients of global brokerages have higher profits than foreign clients of global brokerages, suggesting that the combination of local information and global expertise leads to higher profits.

Choe et al. (2005) investigate whether domestic investors have an edge over foreign investors on the Korean stock market. They show that foreign money managers pay more than domestic money managers when they buy and receive less when they sell for medium and large trades: the sample average daily trade-weighted disadvantage of foreign money managers is of 21 basis points for purchases and 16 basis points for sales. Moreover, they find that there is evidence that domestic individual investors have an edge over foreign investors. The explanation for these results is that prices move more against foreign investors than against domestic investors before trades. Brennan and Cao (1997) argue that a foreign investor informational disadvantage will cause foreign investors to be rational trend followers, buying when the market rises and selling when it falls. Brennan et al. (2005) also confirm the foreign informational disadvantage hypothesis on the Japanese market.

The alternative argument supports foreign investors' trading advantage by arguing that they are sophisticated investors with superior investment skills, which they employ to analyse market conditions and make informed investment decisions (Seasholes 2000; Froot and Ramadorai 2008; Grinblatt and Keloharju 2000; Froot et al. 2001; Karolyi 2002, among others). In addition, foreign investors are usually actively monitoring their investments (Vo 2017), which leads to superior investment results. Nonetheless, there are also studies that report no informational differences between the two categories of investors (i.e., Liljeblom and Löflund 2005 for the Finish market).

However, price discovery and information asymmetry among stock market participants could be country specific and depend on political institutions (Fernandes and Ferreira 2009; Ben-Nasr and Cosset 2014). Consequently, studying and reporting results from a specific frontier Eastern European market clearly has important contributions for extending the existing literature. The choice of the particular market is also based on the fact that the Romanian capital market has been recently promoted (in September 2020) to the status of "secondary emerging market", following a historic decision taken by the financial evaluation agency FTSE Russell. This promotion has important implications for market microstructure, because bigger institutional foreign players that beforehand were restricted,

by prospectus, to invest in frontier markets are expected to enter the Romanian market in the following years. This expectation is backed by the results of a recent research study undertaken by the World Federation of Exchanges (WFE) with the support of the European Bank for Reconstruction and Development (EBRD)[1] that showed that investors either exclude (explicitly or implicitly) or invest less in smaller (frontier) markets than in larger emerging markets. The same study also shows that by mid-2017 foreign investors directly held at least USD 100 billion worth of public equity investments in more than 1000 companies across the EBRD countries of operation, with foreign investors accounting for over 50% of the total institutional investment in more than half the countries reviewed. Moreover, World Bank statistics reflect the dramatic increase in net international portfolio equity inflows into emerging markets, which have surpassed USD 955 billion over the 2000–2017 period. This attests that, for foreign investors emerging markets offer attractive benefits, such as access to fast-growing economies and portfolio diversification opportunities.

Additionally, another important aspect related to the recent promotion of the Romanian stock market is that, for a market to be classified as Emerging (Secondary or Advanced) or Developed by FTSE Russell, it must have at least three securities that meet the minimum threshold criteria for inclusion in the FTSE Global Equity Index. Consequently, the shares of three Romanian companies (i.e., Banca Transilvania and Nuclearelectrica) have been included in All-Cap, while the shares of TeraPlast and, as of March 2021, Bittnet Systems were included in the Micro-Cap index. These inclusions have a further significant impact on the market's ability to attract portfolio investments, due to the growth of passive investing via tracking strategies or other passive investment vehicles (such as ETFs) employed by big foreign institutional players. The aforementioned WFE study further shows that the increasingly adopted passive portfolio management by foreign asset managers (a trend that is visible worldwide) makes the inclusion of a company in a benchmark index determinant of capital allocation at a global level. Consequently, the foreign investors' already significant presence on the Romanian stock market (approximately 40% of the total market share), is expected to further increase in the near future as a result of these recent developments, most probably at a fast pace.

As such, a clear understanding of foreign institutional investors' trading activity and its impact on future stock returns is even more important, and of particularly special interest for exchange operators and policymakers in emerging markets.

We thus add to the literature by providing further insight into the informational advantage of foreign investors and their role, in the context of Romania, with consequences for market efficiency. A deeper understanding of foreign investors' trading activity also has important implications for the policy formulation process in a newly emerging market. Moreover, in addition to previous works, the current paper comparatively studies the trading strategy of all categories of investors on the Romanian stock market (domestic, foreign, institutional and individual) and sheds light on their specific role for price discovery. Finally, we employ a unique database, albeit out-dated, which allows us to provide new and specific answers to the research question.

As such, we address the question of information asymmetry between local and foreign investors by investigating the relationship between foreign and local investors' net buying position and future stock returns on the Bucharest Stock Exchange (BSE) on a data sample covering the period 2004 to 2011. We are interested in whether foreign investors are net buyers just before stock return increase and net sellers before stock return decrease, thus suggesting they have an information advantage as compared to the domestic ones. In addition, we undergo the same investigation for institutional and individual investors. Our aim is to provide robust empirical evidence on the nature of information asymmetry by utilising a unique data set and directly assessing the inter-relationships between investors' trading activity and stock returns on the Romanian stock exchange.

The remainder of the paper is organized as follows. Section 2 describes our unique data set that has not been used by the previous literature and provides some descriptive statistics. Section 3 presents the methods employed in our investigation, while Section 4 reports the results. Lastly, Section 5 concludes the paper with a summary of our findings.

2. Data and Descriptive Statistics

Foreign investors have a significant presence on the Romanian stock market. For example, 6.259 foreign investors (individual + institutions) held at the end of 2019 approximately 40% of the financial instruments listed on Bucharest Stock Exchange, according to a statistic presented by the Central Depositary[2]. At that point, a ranking of the top countries as a share of non-resident holdings in total holdings indicates Austria in the first place with 24.61%, followed by France (12.60%), USA (12.11%), UK (11.00%) and Holland (8.15%). Most non-resident holders, from the 90 states present on the Romanian capital market at the end of 2019, are Germans (1.207), followed by Americans (830) and Canadians (616). Looking at these data, it emerges that, while portfolio investments originated in as many as 90 source countries, the bulk of the foreign investment (approx. 70%) originated from relatively few (5) advanced economies. The poll position of Austria when it comes to portfolio investments in Romanian listed companies is most probably explained, among other factors, by the geographical proximity to the investment destinations. On the other hand, the United States is a traditional investor in emerging economies: according to World Bank data, the United States (US) alone accounted for over 42% of the funds invested in EBRD markets as of mid-2017, with over USD 45 billion holdings[3]. The recent promotion of the Romanian stock market to the "emerging" status surely constitutes an important explanatory factor for increasing future US portfolio investments into the Romanian market.

In this study we proceed to compare the performance and trading advantages of foreign and local investors by separating the companies comprised in our data sample into two categories, namely blue-chips stocks (15 stocks which are part of the BET and BET-FI indices, and one international and liquid stock, respectively Erste Bank), and "regular" stocks (10 other domestic stocks listed on BVB). For each individual stock we compute the monthly logarithmic returns during January 2004–April 2011 time interval, for a maximum of 87 monthly observations for each series. Furthermore, we employ monthly returns of two Romanian stock market indices, namely the official "blue-chip" index BET and the composite index BET-C for the same time interval.

In addition, we identify four main groups of investors present on the Romanian stock market: domestic individual investors or domestic physical persons (DFP), domestic institutional investors or domestic juridical persons (DJP), foreign individual investors or foreign physical persons (FFP) and finally foreign institutional investors or foreign juridical persons (FJP). For each group, we collect data on total purchases, total sales and net purchases corresponding to each month in our data sample. Data on stock market indices are retrieved from the Bucharest Stock Exchange website (www.bvb.ro, accessed on 15 May 2011), while data on individual stocks listed on the Romanian stock market and investors' trading positions were retrieved from Smart Trade Consult, an investment consultancy company authorized by the Romanian SEC.

Table 1 shows the list of stocks included in our sample, divided in the three categories, while Table A1 in Appendix A shows some descriptive statistics for each series.

Table 1. List of stocks included in the analysis and their membership to Romanian stock market indices.

"Blue-Chips" Liquid Stocks			Other Domestic Stocks		
SYMBOL	Field of Activity	Indices	SYMBOL	Field of Activity	Indices
AZO	Manufacture of fertilisers and nitrogen compounds	BET, BET-C, BET-XT	ALR	Aluminium production	BET-C
BIO	Manufacture of pharmaceutical preparations	BET, BET-C, BET-XT	AMO	Production of electricity	BET-C
BRD	Other monetary intermediation	BET, BET-C, BET-XT	ART	Manufacture of other rubber products	BET-C
BRK	Security and commodity contracts brokerage	BET, BET-C, BET-XT	BRM	Manufacture of beer	BET-C
BVB	Administration of financial markets	BET, BET-C, BET-XT	COMI	Construction of utility projects for fluids	BET-C, BET-XT, BET-NG
FP	Trusts, funds and similar financial entities	BET, BET-C, BET-XT	DAFR	Support activities for petroleum and natural gas extraction	BET-C, BET-XT, BET-NG
SNP	Extraction of crude petroleum	BET, BET-C, BET-XT, BET-NG	IMP	Development of building projects	BET-C, BET-XT
TEL	Transmission of electricity	BET, BET-C, BET-XT, BET-NG	PPL	Manufacture of other plastic products	BET-C
TGN	Transport via pipeline	BET, BET-C, BET-XT, BET-NG	SOCP	Cargo handling	BET-C, BET-XT
TLV	Other monetary intermediation	BET, BET-C, BET-XT	TBM	Manufacture of air and spacecraft and related machinery	BET-C
SIF1	Other financial service activities, except insurance and pension funding n.e.c.	BET-FI, BET-XT			
SIF2	Other financial service activities, except insurance and pension funding n.e.c.	BET-FI, BET-XT			
SIF3	Other financial service activities, except insurance and pension funding n.e.c.	BET-FI, BET-XT			
SIF4	Other financial service activities, except insurance and pension funding n.e.c.	BET-FI, BET-XT			
SIF5	Other financial service activities, except insurance and pension funding n.e.c.	BET-FI, BET-XT			
EBS	Other monetary intermediation	ROTX			

Table 2 shows some aggregate statistics on the trading activity of each group of investors, as defined above. A total net trading position is found by aggregating the monthly net trading positions. We find that institutional investors were net buyers on the Romanian stock market during the analysed time period, while individual investors were net sellers. Comparing the foreign investors with the domestic ones, with find that the buying net position of foreign institutional investors was bigger than the buying net position of corresponding domestic investors, while domestic individual investors had a bigger selling position than individual foreign investors present on BVB. Therefore, we have

an indication that individual investors (both domestic and foreign) seem to have different views than institutional investors and therefore tend to trade in opposite directions.

Table 2. Total net trading position of different investor groups on BVB.

Investor Group	Total Net Trading Position (January 2004–April 2011)–Romanian Lei (RON)
Domestic individual investors (DFP)	−2.976.565.948
Domestic institutional investors (DJP)	687.746.303
Foreign individual investors (FFP)	−119.290.447.3
Foreign institutional investors (FJP)	2.444.817.485

Table 3 shows the correlation matrix among the four variables that represent the trading positions of the four investor groups and the two stock market indices, also indicating its statistical significance. Foreign institutional investors' net buy position is strongly negatively related to net buys of domestic institutions and individuals. Additionally, the correlation coefficient of foreign individual investors with domestic institutional investors is negative and large in terms of magnitude. These findings suggest that generally domestic investors tend to trade in an opposite direction to that of foreigners.

Table 3. Correlation matrix.

	FFP	DFP	FJP	DJP	BET	BET-C
FFP	1					
DFP	0.050322	1				
FJP	−0.05729 ***	−0.84378 ***	1			
DJP	−0.33195	−0.05437	−0.44593 ***	1		
BET	−0.01617	−0.2144 **	0.140309	0.092301	1	
BET-C	−0.00258	−0.23988 **	0.163819	0.084158	0.979188 ***	1

Note: *** denotes significance at 1%, ** denotes significance at 5%.

3. Method

We estimate the following regression models for our dataset:

$$Y_{i_t} = \beta_1 + \beta_2 X_{2_t} + \beta_3 X_{3_t} + \beta_4 X_{4_t} + \beta_5 X_{5_t} + u_{i,t} \tag{1}$$

and

$$Y_{i_{t+1}} = \beta_1 + \sum_{i=1}^{I} \beta_2 X_{2_{t-i}} + \sum_{i=1}^{I} \beta_3 X_{3_{t-i}} + \sum_{i=1}^{I} \beta_4 X_{4_{t-i}} + \sum_{i=1}^{I} \beta_5 X_{5_{t-i}} + u_{i,t} \tag{2}$$

where i is alternatively the cross-section identifier (the monthly return for each individual stock) and also the market index (BET and BET-C) monthly return, t is the time identifier (month) and X_{2-5} are the four independent variables, i.e., the change in net buying position of the four investor groups—DFP, DJP, FFP, FJP), while u are the model's residuals. We are interested in both contemporaneous relationships and lagged relationships between the independent and dependent variables. Thus, Equations (1) and (2) will allow us to estimate the marginal effects of the four predictor variables on the overall market (as represented by its two most important indices) and on a sample of relevant individual listed stocks, i.e., the trading activity of the four different categories of investors. Thus, the coefficients measure the marginal effects of the predictor variables. However, setting prior expectations regarding the direction of the potential impact (from investors' trading activity to market/stock returns) may deceive us. As such, a further investigation is needed to overcome this peril.

In a subsequent investigation, we use five variable VAR (Vector Autoregression) models to examine relations among the stock market return (BET), the net buy position of

domestic individual investors or domestic physical persons (DFP), the net buy position of domestic institutional investors or domestic juridical persons (DJP), the net buy position of foreign individual investors or foreign physical persons (FFP) and finally the net buy position of foreign institutional investors or foreign juridical persons (FJP).

The vector autoregression (VAR) model, a natural extension of the univariate autoregressive model, is one of the most successful, flexible, and easy to use models for the analysis of multivariate time series and has proven to be especially useful for describing the dynamic behaviour of economic and financial time series.[4] The VAR system allows us to investigate interactions among endogenous variables and, at the same time, to incorporate autocorrelation structures for each variable.

The VAR model can be expressed as follows:

$$y_t = A + \sum_{p=1}^{P} B_p Y_{t-p} + u_t \tag{3}$$

where y_t is a $n \times 1$ vector of variables, and A and B_p are $n \times 1$ and $n \times n$ matrices of parameters.

P is the lag length for the VAR and u_t is a column vector of errors uncorrelated with the lagged values of all the right-hand side variables.

In other words, a VAR model is a generalization of the univariate autoregressive model for a vector of time series and consequently in the VAR system of simultaneous equations, we regress the y_t vector of time series variables on lagged vectors of these variables (Athanasopoulos et al. 2012). As a result, the system comprises one equation per each variable included in the estimations, where the right-hand side of each equation includes a constant and lags of all of the variables in the system.

More precisely, a VAR(p) model will take the following form:

$$Y_t = a + B_1 Y_{t-1} + B_2 Y_{t-2} + \ldots + B_p Y_{t-p} + u_t \tag{4}$$

where:

$Y_t = (y_{1t}, y_{2t}, \ldots, y_{nt})'$ represents an $n \times 1$ vector of time series variables
a: is an $n \times 1$ vector of intercepts
Bi ($i = 1, 2, \ldots, p$) are $n \times n$ coefficient matrices

and

ut is an $n \times 1$ vector of unobservable *i.i.d.* zero mean error term (white noise)

As such, in the current analysis we estimate a VAR(*p*) model with the five variables (i.e., BET, DFP, DJP, FFP and FJP respectively). For each of the five equations the right-hand side will contain a constant (i.e., the intercept a in Equation (4) and *p* lags of its own and each of the other four variables, for a maximum of $p \times p$ estimated coefficients. We will identify the optimal structure of *p* with formal testing. See Hasbrouck (1991) and Vo (2017) for similar approaches.

This flexible method allows us to better understand the inter-connections between investors' trading activity and stock market returns. This also offers the advantage of surpassing important limitations of the prior methods employed in our previous empirical investigation (i.e., Equations (1) and (2)) where we impose a unidirectional relationship between investors' trading activity and common stock returns. However, the reverse hypothesis might also be true—so that in fact investor's trading activity might be a response to, and not a predictor of, the market evolution as reflected in individual stocks and/or market indices returns.

4. Results and Discussion

4.1. Estimation Results

The results of the estimation of Equation (1) are reported in Table 4. Two of the stocks initially included in our dataset, respectively BVB and FP have been excluded due to an

insufficient number of observations. Not surprisingly, Column 1 shows that returns for all stocks listed at BVB are significantly positively correlated with the evolution of the overall market, represented by the composite index BET-C. No other contemporaneous relationship is apparent from estimation results: there does not seem to exist any connection between investors trading positions and same month stock returns.

Table 4. Contemporaneous relationships between stock returns and investors trading positions.

Dependent Variable	BET-C	DFP	DJP	FFP	FJP	Adjusted R-Squared	F-Statistic	Residual Standard Error
Liquid stocks (BET + BET-FI)								
AZO	0.8976 *	0.1784	0.1704	0.2827	0.1555	0.2118	27.26 ***	1.432
BIO	1.4196 *	−0.0344	−0.0643	−0.0348	−0.0447	0.2543	21.13 ***	0.492
BRD	1.2486 *	0.00195	0.0255	−0.0664	0.00811	0.3764	17.97 ***	0.765
BRK	1.6645 *	−0.3257	−0.3402	−0.2351	−0.3460	0.2116	15.26 ***	0.347
SNP	1.201516 *	0.104324	0.070903	0.074717	0.084570	0.2743	17.18 ***	0.823
TEL	0.800072 *	−0.136111	−0.115473	−0.111529	−0.110060	0.1742	14.59 ***	1.264
TGN	0.586913 *	−0.040662	−0.005597	−0.049334	0.006961	0.1246	9.12 ***	1.116
TLV	1.002647 *	0.007691	−0.002010	0.140207	−0.012020	0.1895	14.45 ***	1.089
SIF1	1.381845 *	0.080500	0.074237	0.062635	0.072007	0.2398	23.18 ***	0.965
SIF2	1.543244 *	−0.069553	−0.064250	−0.087937	−0.065184	0.1425	11.15 ***	0.768
SIF3	1.386284 *	0.058535	0.022480	0.045398	0.040369	0.1115	15.69 ***	1.103
SIF4	1.050949 *	−0.044626	−0.015317	−0.016464	−0.032091	0.0954	25.66 ***	0.805
SIF5	1.453761 *	0.039231	0.051613	0.037846	0.046198	0.1231	29.05 ***	1.269
EBS	1.244643 *	0.129178	0.158255	0.281684	0.125781	0.0642	33.60 ***	1.004
Other BVB listed stocks								
ALR	1.035496 *	−0.025548	0.008194	−0.022667	−0.008330	0.2847	11.72 ***	0.896
AMO	1.089359 *	0.199018	0.152670	0.153843	0.172014	0.3145	13.90 ***	1.143
ART	1.055078 *	−0.065752	−0.011148	−0.042170	−0.020793	0.2865	18.62 ***	1.097
BRM	0.997282 *	−0.397545 **	−0.367335 ***	−0.313129	−0.388118 **	0.2254	19.93 ***	1.854
COMI	1.416780 *	−0.116406	−0.137888	−0.116143	−0.103304	0.2538	27.61 ***	1.543
DAFR	1.735073 *	0.047123	−0.127635	−0.617571	0.010061	0.1987	21.19 ***	1.263
IMP	0.962726 **	−0.196080	−0.075023	−0.049637	−0.141811	0.1432	19.61 ***	1.094
PPL	0.999297 ***	0.150407	0.207687	0.708801	0.096375	0.1690	13.04 ***	0.854
SOCP	0.465593 *	−0.071684	−0.074496	−0.213334	−0.064352	0.3754	12.85 ***	0.987
TBM	1.096508 *	−0.056494	−0.234358	−0.289413	−0.111412	0.2432	34.63 ***	0.694

Note: *** denotes significance at 1%, ** denotes significance at 5%, * denotes significance at 10%.

Table 5 presents lagged relationships between individual stock returns and the four-investor groups net buy positions. An initial ARMA investigation suggests that we should consider both a lag of 1 and a lag of 12 for the independent variables in Equation (2). In the case of the group comprised of blue-chip stocks, we find that investor's net buy positions are explanatory factors for stocks returns twelve months into the future. The positive and significant relationship is present for all categories of investors, being the most powerful in the case of foreign institutional investors (FJP). This is the only investors' group that also determines future returns for the EBS company, the only international stock listed on the Romanian stock market. Almost all coefficients of FJP(-12) are very high and statistically significant. These findings suggest that investors are interested mainly in the liquid stocks traded on BVB, which also explains the lack of relationships found between stock returns from the second category (the less liquid stocks) and investors' trading positions.

Table 5. Lagged relationships between stock returns and investors trading positions.

Dependent Variable	BET-C(-1)	DFP(-1)	DJP(-1)	FFP(-1)	FJP(-1)	BET-C(-12)	DFP(-12)	DJP(-12)	FFP(-12)	FJP(-12)	Adjusted R-Squared	F-Statistic	RSE
Liquid stocks (BET + BET-FI)													
AZO	0.08	0.67 **	0.67 **	0.75 **	0.71 **	−0.18	0.06	0.12	0.02	0.133710	0.3023	27.13 ***	1.126
BIO	0.36	0.08	−0.007	−0.01	0.11	0.04	1.25 *	1.14 **	1.08 **	1.23 *	0.2678	31.87 ***	1.115
BRD	0.18	−0.18	−0.26	−0.21	−0.12	0.08	0.71	0.65	0.70	0.70	0.0976	21.37 ***	1.348
BRK	0.37	0.07	0.006	0.13	0.15	0.005	1.34 **	1.11 **	1.34 **	1.32 **	0.3457	29.81 ***	1.853
SNP	0.17	0.05	−0.04	−0.01	0.08	0.08	0.58 **	0.54	0.52	0.59 ***	0.2678	19.98 ***	1.645
TEL	0.14	0.00	−0.08	−0.04	0.04	0.01	0.62 **	0.56 **	0.60 **	0.62 **	0.3841	30.71 ***	1.923
TGN	0.10	−0.02	−0.006	0.06	0.05	0.06	0.40	0.31	0.30	0.41 ***	0.1897	22.75 ***	0.973
TLV	0.45	−0.59 ***	−0.682 ***	−0.56	−0.61 ***	0.17	0.79	0.92	0.92	0.73	0.4276	19.74 ***	0.895
SIF1	0.17	0.007	−0.11	−0.27	0.05	−0.11	1.30 *	1.15 *	1.23 *	1.32 *	0.4236	42.81 ***	0.794
SIF2	0.21	−0.05	−0.15	−0.21	−0.009	−0.06	1.40 *	1.24 *	1.36 *	1.41 *	0.4769	43.07 ***	0.143
SIF3	0.24	0.11	−0.02	−0.12	0.14	−0.13	0.97 **	0.87 ***	0.91 ***	0.99 **	0.5132	27.18 ***	1.768
SIF4	0.08	0.01	−0.07	−0.18	0.06	−0.01	0.66 ***	0.54	0.62	0.66 ***	0.5512	41.17 ***	1.314
SIF5	0.34 ***	−0.04	−0.13	−0.23	−0.01	−0.001	1.29 *	1.15 *	1.28 *	1.31 *	0.5879	37.02 ***	1.067
EBS	0.28	0.08	0.07	0.61	0.15	0.08	0.85	0.80	0.84	0.88 ***	0.1289	19.37 ***	1.821

Table 5. *Cont.*

Dependent Variable	BET-C(-1)	DFP(-1)	DJP(-1)	FFP(-1)	FJP(-1)	BET-C(-12)	DFP(-12)	DJP(-12)	FFP(-12)	FJP(-12)	Adjusted R-Squared	F-Statistic	RSE
Other BVB listed stocks													
ALR	−0.03	−0.08	−0.08	0.21	−0.009	−0.14	0.64	0.56	0.39	0.68	0.1197	22.88 ***	0.780
AMO	0.43 ***	0.10	0.06	−0.03	0.10	0.20	0.31	0.31	0.15	0.32	0.1432	17.39 ***	1.104
ART	1.00 *	−0.31	−0.33	−0.27	−0.24	−0.07	0.27	0.30	0.25	0.26	0.1812	14.97 ***	0.162
BRM	0.30	−0.08	−0.13	−0.07	−0.03	−0.00	0.77 ***	0.62	0.67 ***	0.30	0.1901	19.77 ***	1.213
COMI	0.36	0.27	0.22	0.19	0.35	−0.18	0.80 ***	0.69	0.65	0.14	0.1645	16.89 ***	1.582
DAFR	0.49	0.15	0.01	−0.42	0.19	−0.08	0.85	0.61	0.42	0.12	0.0853	31.10 ***	1.832
IMP	0.22	0.19	0.07	0.25	0.31	−1.06 **	0.60	0.34	0.31	0.22	0.1345	40.03 ***	1.101
PPL	−0.67	0.07	−0.01	−0.03	0.12	−0.3	1.07	0.92	0.74	0.21	0.0957	29.08 ***	0.375
SOCP	0.06	0.20	0.16	0.40 ***	0.21	−0.05	0.25	0.23	0.25	0.31	0.2653	33.32 ***	0.732
TBM	1.07 **	0.02	−0.09	−0.08	0.02	0.32	1.04	0.98	1.97 ***	0.99	0.2768	18.36 ***	1.287

Note: *** denotes significance at 1%, ** denotes significance at 5%, * denotes significance at 10%.

Furthermore, before proceeding with the VAR estimations, the stationarity or unit root properties of our five series were investigated. The estimated Augmented Dickey-Fuller (ADF)) unit root test confirmed that the five variables are stationary in levels or I(0) as the null hypothesis of unit root is strongly rejected. Results are presented in Table 6.

Table 6. Results of unit root tests.

Variable	ADF t-Statistics	Prob.
FFP	−9.3174 ***	0.0003
DFP	−4.8592 ***	0.0000
FJP	−8.5747 ***	0.0000
DJP	−4.9357 ***	0.0001
BET	−32.0365 ***	0.0000

Note: *** indicates rejection at the 1% level.

Nonetheless, Sims (1980) and Sims et al. (1990) show that stationarity is not required when the goal of a VAR analysis is to determine the interrelationships among the variables, as is the case with the present study. However, our data does not have a problem with non-stationarity and hence we can safely proceed with our empirical investigation. The stationarity of series pertaining to investors' trading activity has nonetheless important implications for practitioners and for policymakers. In fact, if the series representing investor's trading activity would show the presence of a unit root, this would suggest that this series does not revert to its equilibrium level after being hit by a shock (Kula et al. 2012). Consequently, any shock to investors' trading activity (i.e., new regulation, COVID-19 etc.) is likely to be permanent. Therefore, testing the stationarity of such series is essential to any effective capital market policy (Magazzino 2016).

The results of the five variable VAR models are reported in Table 7. First, we have computed lag exclusion tests for each lag in the VAR (we used until 12 lags for these tests). For each lag, the Wald statistic was computed to test the joint significance of all endogenous variables reported in each equation of the VAR model separately and jointly. These preliminary tests indicated an optimal structure of three lags, respectively 1, 11 and 12. Only in the case of the market official index BET, was its own first lag coefficient positive and significant.

Table 7. VAR estimation output.

Dependent Variable	BET	DFP	DJP	FFP	FJP
BET(-1)	0.266343	0.282833	0.148364	−0.165489	−0.123470
	(0.11026)	(0.69537)	(0.57113)	(0.21288)	(0.94234)
	[2.41555]	[0.40674]	[0.25977]	[−0.77738]	[−0.13103]
BET(-11)	0.027779	−0.346192	−0.253057	0.059616	0.496570
	(0.11036)	(0.69601)	(0.57166)	(0.21308)	(0.94321)
	[0.25170]	[−0.49739]	[−0.44267]	[0.27979]	[0.52647]
BET(-12)	−0.062901	0.275729	−0.336754	−0.066393	0.097323
	(0.10143)	(0.63964)	(0.52537)	(0.19582)	(0.86683)
	[−0.62016]	[0.43107]	[−0.64099]	[−0.33905]	[0.11227]
DFP(-1)	0.025652	0.540410	−0.879664	−0.021576	0.612608
	(0.13751)	(0.86718)	(0.71225)	(0.26548)	(1.17518)
	[0.18655]	[0.62318]	[−1.23505]	[−0.08127]	[0.52129]

Table 7. *Cont.*

Dependent Variable	BET	DFP	DJP	FFP	FJP
DFP(-11)	0.656388	1.767208	0.821576	0.055805	−2.198168
	(0.24121)	(1.52121)	(1.24943)	(0.46571)	(2.06150)
	[2.72119]	[1.16171]	[0.65756]	[0.11983]	[−1.06630]
DFP(-12)	0.543366	−0.930308	−0.365372	−0.118987	1.321562
	(0.25668)	(1.61874)	(1.32954)	(0.49557)	(2.19367)
	[2.11691]	[−0.57471]	[−0.27481]	[−0.24010]	[0.60244]
DJP(-1)	−0.035076	0.045048	−1.045138	0.096724	1.136572
	(0.13868)	(0.87456)	(0.71831)	(0.26774)	(1.18517)
	[−0.25294]	[0.05151]	[−1.45499]	[0.36126]	[0.95899]
DJP(-11)	0.695158	1.987437	0.634588	0.038143	−2.180597
	(0.24127)	(1.52160)	(1.24975)	(0.46583)	(2.06202)
	[2.88119]	[1.30615]	[0.50777]	[0.08188]	[−1.05751]
DJP(-12)	0.483767	−0.908277	−0.177802	−0.036313	1.041215
	(0.25556)	(1.61171)	(1.32376)	(0.49341)	(2.18414)
	[1.89295]	[−0.56355]	[−0.13432]	[−0.07360]	[0.47672]
FFP(-1)	0.039606	−0.583021	−0.804536	−0.067434	1.703781
	(0.15518)	(0.97862)	(0.80378)	(0.29960)	(1.32619)
	[0.25523]	[−0.59576]	[−1.00094]	[−0.22508]	[1.28472]
FFP(-11)	0.627329	3.099740	0.322213	−0.029363	−2.929006
	(0.25037)	(1.57893)	(1.29684)	(0.48338)	(2.13972)
	[2.50565]	[1.96319]	[0.24846]	[−0.06075]	[−1.36888]
FFP(-12)	0.467380	−1.761790	0.137849	−0.015431	1.577244
	(0.27132)	(1.71108)	(1.40538)	(0.52383)	(2.31880)
	[1.72261]	[−1.02963]	[0.09809]	[−0.02946]	[0.68020]
FJP(-1)	0.072673	−0.147857	−0.806350	0.002259	1.203568
	(0.13533)	(0.85346)	(0.70098)	(0.26128)	(1.15658)
	[0.53701]	[−0.17324]	[−1.15031]	[0.00865]	[1.04062]
FJP(-11)	0.706037	1.820362	0.763751	0.041302	−2.180140
	(0.23911)	(1.50794)	(1.23853)	(0.46164)	(2.04351)
	[2.95280]	[1.20719]	[0.61666]	[0.08947]	[−1.06686]
FJP(-12)	0.519372	−1.028635	−0.257535	−0.058362	1.250323
	(0.25576)	(1.61292)	(1.32476)	(0.49378)	(2.18578)
	[2.03074]	[−0.63775]	[−0.19440]	[−0.11819]	[0.57203]
C	−2.839547	−13.86464	9.494647	−6.286791	10.52998
	(1.53337)	(9.67017)	(7.94251)	(2.96045)	(13.1047)
	[−1.85184]	[−1.43375]	[1.19542]	[−2.12359]	[0.80353]
R-squared	0.502262	0.522056	0.152276	0.135652	0.333167
Adj. R-squared	0.373537	0.398450	−0.066963	−0.087886	0.160710
F-statistic	17.19 ***	19.45 ***	23.75 ***	19.07 ***	21.14 ***
Residual standard error	1.124	1.358	1.142	1.213	1.097

Note: *** denotes significance at 1%.

In the first column for the BET equation, BET(-1), DFP(-11), DFP(-12), DJP(-11), FFP(-11), FJP(-11) and FJP(-12) are all statistically significant, indicating that the market return is serially correlated with a one-month lag, and that an increase in the net buy positions for all categories of investors is positively associated with the market return with an 11 month lag, and for individual domestic investors and foreign juridical persons also with a 12 month lag. The highest coefficient is found for FJP(-11) and equals 0.70, but nonetheless all other statistically significant coefficients have values comprised in the interval [0.5;0.7].

To confidently confirm model fit, before continuing with an in-depth analysis of the estimation results, we performed some diagnostic tests on residuals of each of the calibrated models in the VAR system (See Pfaff 2008). Firstly, we checked the assumption that the residuals are white noise using a Portmanteau test. Estimation results with multiple lag orders (max lag = 20) cannot reject the null hypothesis that there is no autocorrelation in the residuals for any of the 20 orders tested (all resulting p-values of the Q-test take values higher that 0.263), thus confirming that residuals pass the test for serial correlation.

Furthermore, to test for heteroscedasticity in the residuals we performed a multivariate ARCH Lagrange-Multiplier test (here the null hypothesis is that the squared residuals are a sequence of white noise). Again, the residual homoscedasticity is rejected, which confirms the absence of residual heteroscedasticity. We subsequently verified that residuals were approximately normally distributed around a mean of zero by means of the Jarque-Berra test. The null hypothesis of normality cannot be rejected in our models, the high resulting *p*-value indicating that the residuals are fairly normally distributed.

In conclusion, all diagnostic tests confirm that all models have been well specified, which allows us to confidently proceed with a discussion of results.

4.2. Discussion

We find that the trading activities of domestic institutions, domestic individuals, foreign individual and foreign institutional investors have a significant effect on the market return, and it takes eleven or twelve months for this impact to become apparent. When foreign institutions are net buyers, they will see their investment appreciate in eleven months. This in turn suggests that there seems to be some sort of information asymmetry between local and foreign investors on the Romanian stock market. Our findings agree with those of Bohn and Tesar (1996), which employ monthly data and show a positive contemporaneous relation between US investors' equity investments in emerging markets and stock returns. However, for foreign investors, exchange rate volatility may reduce the benefits of portfolio diversification, as currency risk is a known major issue for foreign investors in frontier and emerging markets (Karolyi and Stulz 2003; Carrieri and Majerbi 2006). Foreign investments in stocks issued by Romanian companies are subject to currency risk, which could affect return volatility. Nonetheless, this risk can be either hedged or eliminated from the international holdings, and also currency volatility generally plays a lesser role long term for international equity portfolios (Vanguard 2019).[5]

As our findings reveal that net purchases of foreign institutions are followed by higher stock/market returns, this is an indication that these are sophisticated investors, with superior knowledge, analysis skills and experience in financial markets. Our findings support those of Kamesaka et al. (2003), which show that foreign investors are overperforming in the Japanese stock market.

Overall, similar to Vo (2017) in the case of the Vietnam market, our results support the view that foreign investors influence the Romanian market return in a significant way, which was expected due to their significant presence on the Romanian stock market and, more importantly, the positive influence spans a long time. If the effect of foreign investors' trading activity was reflected immediately in market returns, this would have also implied that they could also have a dangerous destabilizing effect on this narrow market. As the short-term impact on market returns is insignificant, we report no evidence that foreign investors play a destabilizing role. Moreover, this is further confirmed by

the fact that foreign investors do not trade in response to market movements and thus do not withdraw from the Romanian stock market during distressed market periods characterized by decreasing returns. This is in line with results of Choe et al. (1999) that study foreign investors' activity on Korea's stock market over the sample period spanning 30 November 1996, to the end of 1997 and find no evidence that trades by foreign investors had a destabilizing effect and Schuppli and Bohl (2010) that analyse the Chinese stock markets and report strong evidence that foreign institutions have a stabilizing effect and contribute to market efficiency.

This finding in turn has important policy implications, as policymakers in frontier and emerging markets are often concerned with the presence of foreigners, as they can withdraw their capital from a country rapidly, with important potential negative consequences. As a result, these countries impose explicit barriers to foreign portfolio investment such as capital controls and ownership restrictions. However, our results confirm that sales by foreign investors do not have a destabilizing impact on the Romanian market, which should be considered in future policy issuance.

The results also confirm that investors' trading activity is in fact a predictor of market movements in the long run, and not a response to evolutions of the market index. This further implies that international presence positively impacts the Romanian stock market (new purchases by foreign investors lead to higher returns, confirming the findings of (Dahlquist and Robertsson 2004)) and the benefits for the local market go beyond increasing returns. The presence of foreign investors helps to reduce the usually high concentration of frontier and emerging markets, serving to counterbalance local investor activity, facilitate price discovery and enhance price stability (Merton 1987).

In the equations for foreign institutional and individual investors, domestic institutions, and domestic individuals, it is apparent that these investor groups trade differently in response to an increase in BET(-1), the one-month lag market return. Foreign investors decrease net purchases as the market goes up, therefore having a contrarian trading strategy. On the other hand, domestic institutions and domestic individuals increase net purchases when the market rises, being momentum traders. The coefficient estimates are -0.16 and -0.12 for FFP and FJP, and 0.28 and 0.14 for the net buy of domestic individuals (DFP) and domestic institutions (DJP), but none are statistically significant at one percent. These findings confirm previous results from the investigation of the correlation matrix that generally domestic and foreign investors tend to trade in opposite directions.

5. Conclusions

Foreign investors have a significant presence on the Romanian stock market (approximately 40% of the shares traded on Bucharest Stock Exchange at the end of 2019, and this presence has been more or less constant in the aftermath of the country's EU integration in 2007) and influence the market return in a significant way. Given their importance for the development of the young post-transition stock markets in Eastern Europe, such as Romania, we address the question of information asymmetry between local and foreign investors by investigating the relationship between local and foreign investors' net buying positions and future stock returns on the Bucharest Stock Exchange (BSE) for the period 2004 to 2011. In addition, we assess potential informational asymmetry between institutional and individual investors on the Romanian market.

Our results attest that, for blue-chip stocks (both domestic and international) foreign investors' net buying positions are significant explanatory factors for stock returns twelve months into the future. Although the positive and significant relationship is present for all categories of investors, it is substantially stronger for foreign institutional investors. As such, foreign investors seem to possess an information advantage that translates into superior future portfolio returns, or at least that their financial power/position is able to lead future stock returns on the Romanian stock market. Our findings thus support those of Huang and Shiu (2009), which conclude that foreign investors enjoy a long-run information advantage over domestic investors. On the other hand, we did not

encounter any informational asymmetry between institutional and individual investors on the Romanian stock exchange.

Another finding is that foreign institutional and individual investors, domestic institutions, and domestic individuals, trade differently in response to an increase in BET(-1), the one-month lag market return. Foreign investors decrease net purchases as the market goes up, therefore having a contrarian trading strategy. On the other hand, domestic institutions and domestic individuals increase net purchases when the market rises, being momentum traders. In addition, the significantly higher net purchases of foreign institutions as compared to domestic institutions (i.e., approximately 4x times higher over the sample period) is an indication that international investors tend to follow each other in their trading activity and thus exhibit herding behaviour, which might increase their impact on the market and thus explain the resulting relationship.

Through these findings, the current paper offers a number of contributions to the literature. Our first contribution lies with the impact of foreign investors' trading activities on stock and market returns in emerging and frontier markets. This strand of the literature remains rather narrow (mostly because of the lack of relevant data availability) despite the importance of the subject for both developed countries' institutions that bring capital inflows to smaller economies and for the host markets, which are significantly impacted by their presence, albeit the direction of this impact is country specific, as the extant literature shows. More importantly, to the best of our knowledge, this paper is among the first to investigate the trading activity of foreign investors on the Romanian stock exchange and their impact on market/stock returns. Thirdly, we explore the link between foreign investors' trading activity and stock returns in a dynamic context by allowing for a system of robust equations with lagged variables. Finally, the findings of this study are even more important in the aftermath of the recent historical promotion of the Romanian stock market to the emerging markets status as per FTSE Russel classification, an event which will increase foreign investors' presence in the market due to the elimination of previous barriers for investment in frontier markets (enforced either formally or by choice) and through passive investment vehicles, which following promotion now direct foreign capital to five Romanian stocks included in international benchmark indices within the FTSE Global Equity Index Series, namely the FTSE Global All Cap Index and FTSE Global Micro Cap Index.

In addition to this unique country-specific factor is the overall revival of the world capital markets in the post-pandemic era—as such, we can reasonably expect foreign portfolio investment to make up the majority of the capital invested in the Romanian market in the close future. Consequently, an understanding of trading behaviour and the impact on the local stock exchange is paramount for market operators and policy issuers in the country.

Contrary to usual expectations and fears of market regulators in narrow markets, our study found no evidence that foreign investors play a destabilizing role on the Romanian stock exchange and, moreover, we found that actually foreign investors' trading activity has a positive impact on future evolution of the market over the long run. In addition, as it has been previously demonstrated that foreign institutional presence contributes to price discovery and price stability in emerging markets, the benefits of their presence are further expanded by increased liquidity and market attractiveness for new issuers, which further contributes to new foreign portfolio investments and increased volumes and liquidity. Moreover, Forbes and Warnock (2012) showed that foreign inflows to emerging markets increased after a slowdown during the 2007–2009 financial crisis period, and these portfolio flows have significantly contributed to the emerging markets' GDP and capital accounts in the post-crisis period (Ahmed and Zlate 2014).

In light of the above-mentioned findings, market operators and policy issuers in Romania should encourage foreign portfolio investments and facilitate foreign investors' presence on the market. Some potential measures, among others, should envisage reducing frictions such as higher transaction costs and investment-related taxes, elimination

of explicit barriers to investment such as ownership restrictions, improved Corporate Governance standards and promotion of sound Corporate Governance practices, reducing fiscal burden and enforcement of disclosure in English language. Furthermore, our results confirming the stationarity of series pertaining to investors' trading activity have further important implications for the policy issuance process, as the presence of a unit root in the data would suggest any shock to investors' trading activity (i.e., new regulation, COVID-19 etc.) would likely be permanent, whereas stationarity implies reversal. As such, policymakers should be cautious, paying attention to the series' properties, as different characteristics conduct to different policies.

However, we also acknowledge several limitations of the present study. The most important one is likely the out-dated data on which the investigation is based. Unfortunately, more current data on investors' trading activity on the Romanian stock market is not publicly available. Nonetheless, as the market presence of foreign investors remained rather constant over the last decades (according to data from the Central Depository, foreign investors held 40% market share as of the end of 2008, 49% as of the end of 2011, 43% as of the end of 2015 and again 40% as of the end of 2019) and thus market micro-structure is stable from this point of view at least until year 2020, we argue that the data sample still has value and results are therefore relevant. Another shortcoming is that the empirical investigation was only completed on a single market, whereas it would surely benefit the results to be validated on other similar Eastern European frontier/emerging stock markets. As this empirical research serves as an initial investigation, the advent of new and updated data would constitute good opportunities for future research.

Appendix A

Table A1. Descriptive statistics for individual companies listed at Bucharest Stock Exchange (monthly returns for January 2004–April 2011).

	ALR	AMO	ART	AZO	BIO
Mean	0.009306	0.000862	0.006032	0.007084	−0.014875
Median	0.000000	0.005354	0.003413	−0.004368	0.009641
Maximum	0.533517	0.648695	0.545990	1.332685	0.654433
Minimum	−0.681359	−0.458954	−1.105833	−0.552790	−0.674219
Std. Dev.	0.179950	0.218289	0.211128	0.215847	0.194660
Skewness	−0.203856	0.310913	−1.687649	2.480703	−0.161201
Kurtosis	5.306629	3.439504	11.12428	18.42693	5.867258
Jarque-Bera	18.51783	2.077731	277.3377	941.0034	22.20029
Probability	0.000095	0.353856	0.000000	0.000000	0.000015

Table A1. *Cont.*

	BRD	BRK	BRM	BVB	COMI
Mean	0.022501	−0.036244	−0.009583	0.062503	0.003480
Median	0.037743	−0.006410	−0.004988	0.063262	0.013793
Maximum	0.896746	0.748063	0.427444	0.233024	0.454255
Minimum	−0.407700	−0.810930	−0.547295	−0.057003	−0.912201
Std. Dev.	0.166768	0.238793	0.172961	0.089818	0.206742
Skewness	1.094726	−0.322932	−0.296239	0.524381	−1.242880
Kurtosis	11.76649	5.005790	4.225046	2.577070	7.510573
Jarque-Bera	285.7577	13.32100	6.635500	0.479540	76.25727
Probability	0.000000	0.001281	0.036234	0.786809	0.000000

	DAFR	EBS	FP	IMP	PPL
Mean	−0.021228	0.003043	−0.028919	0.000405	−0.033398
Median	0.000000	0.017160	−0.028919	0.000000	−0.003506
Maximum	0.895671	0.528788	−0.016182	2.264666	0.394994
Minimum	−1.203973	−0.533143	−0.041656	−1.399004	−2.489462
Std. Dev.	0.324582	0.186236	0.018013	0.358857	0.372660
Skewness	−0.871607	−0.343929	0.000000	2.275885	−4.770254
Kurtosis	6.942310	5.097253	1.000000	23.55745	31.83702
Jarque-Bera	46.45151	7.510414	0.333333	1496.229	2383.370
Probability	0.000000	0.023396	0.846482	0.000000	0.000000

	SIF1	SIF2	SIF3	SIF4	SIF5
Mean	0.009897	0.016583	0.002045	0.006584	0.017833
Median	0.008266	0.026207	0.007896	0.009427	0.023358
Maximum	0.658231	0.540140	0.412154	0.375543	0.592266
Minimum	−0.932164	−0.918293	−0.934573	−0.563935	−0.826679
Std. Dev.	0.190608	0.198715	0.191820	0.149028	0.190197
Skewness	−1.005679	−1.071902	−1.571203	−0.636273	−0.932252
Kurtosis	9.714487	7.793342	9.133974	4.787188	7.309991
Jarque−Bera	176.0488	98.79975	170.2096	17.24806	79.02109
Probability	0.000000	0.000000	0.000000	0.000180	0.000000

	SNP	SOCP	TBM	TEL	TGN	
Mean	0.010961	0.002273	−0.043583	−0.000924	−0.000523	
Median	0.004662	0.007576	−0.005277	−0.007547	0.000000	0.013699
Maximum	0.314069	0.431026	0.700598	0.235314	0.231654	1.333185
Minimum	−0.606136	−0.368221	−3.232121	−0.311213	−0.252175	−0.606715
Std. Dev.	0.138706	0.130048	0.388452	0.116506	0.099693	0.218637
Skewness	−1.060935	0.039824	−6.520659	−0.243404	0.003320	2.051858
Kurtosis	6.903375	4.629309	54.92478	3.108410	3.104284	18.25897
Jarque-Bera	70.73023	7.650352	10151.33	0.570015	0.017289	863.4649
Probability	0.000000	0.021815	0.000000	0.752008	0.991393	0.000000

Notes

1 https://www.world-exchanges.org/storage/app/media/research/Studies_Reports/WFE%20Investing%20in%20EM%20and%20 frontier%20markets%20investor%20viewpoint%20report%20-%20FINAL%20VERSION%202021.01.19.pdf (accessed on 21 July 2021).

2 https://spark.adobe.com/page/ZDaKJ4tskXZeM/ (accessed on 21 July 2021).

3 https://www.world-exchanges.org/storage/app/media/research/Studies_Reports/WFE%20Investing%20in%20EM%20and%20 frontier%20markets%20investor%20viewpoint%20report%20-%20FINAL%20VERSION%202021.01.19.pdf (accessed on 21 July 2021).

4 https://faculty.washington.edu/ezivot/econ584/notes/varModels.pdf (accessed on 21 July 2021).

5 https://www.vanguard.com/pdf/ISGGEB.pdf (accessed on 21 July 2021).

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