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AN EMPIRICAL ANALYSIS OF STOCK PRICE-VOLUME RELATIONSHIP: A CASE STUDY IN AMERICAN COUNTRIES

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ABSTRACT

In this paper examines the relationship between stock returns and trading volume for six American country indices. For this purpose, Unit root test, correlation, Granger Causality Tests, VAR and GARCH (1,1) have been used. There is no evidence of asymmetry in the relationship between the volatilities and trading volume; trading volume is not important in predicting their future dynamics as well as those of the return. The Granger-causality test shows the evidence of unidirectional causality running from return to volume for almost indices. This study also shows that data related to return, trading volume and volatilities are stationarity. According to GARCH model values of parameters indicates that old news has more effect. It also concludes that lagged trading volume does not contain information which can be useful in predicting stock returns.

KEYWORDS

American country indices, Stock price-volume relationship.

1. INTRODUCTION

The relationship between stock returns and volume has been widely documented in finance literature. The concept of the volume impact is built on the fact that price needs volume to move, thus, the high volatility of stock prices may be produced as consequence of volume volatility and trading activities. However, since investors are heterogeneous when interpreting new information, stock returns may stay unchanged even though new information is brought to the market. On the other hand, stock returns may only change if there is positive trading volume. As it happens with returns, trading volume and its changes mainly reflect the available set of relevant information perceived by the market. A large segment of the finance literature investigates the link between information and prices.

Understanding the relationship between returns, volatility and trading volume in financial markets is equally important for traders, researchers and policy makers. The distribution of returns has implications for various financial models and risk management practices. The dynamic relationship between returns and trading volume helps to understand the market clearing process and frictions in the market. Also, implications trading volume in forecasting volatility help segments like traders, with a very short term investment horizon and many portfolio managers that have a medium to long term investment horizon. This paper reports an empirical study for American Stock markets.

2. LITERATURE

There have been number of empirical studies in developed markets that provide evidence on their relationship between trading volume and stock returns. In the sequential information arrival model (arrival model and distribution model), the flow of information to the market participants is considered to be asymmetric (i.e. the new information is not disseminated to all market participants simultaneously); the model allows several intermediate equilibrium positions before the final market equilibrium is reached. Due to this sequential information flow, lagged trading volume may contain information that can be useful in predicting current stock returns and lagged stock returns may contain information that can be useful in predicting current trading volume. This suggests a positive causality between trading volume and stock returns running from either direction. The mixture of distribution model suggests a unidirectional causality from trading volume to stock returns. In this model, Epps (1976) uses trading volume to measure disagreement among traders; investors revise their reservation prices when the new information reaches the market and the level of trading volume increases as the degree of disagreement among market participants widens. Karpoff (1987) provides a comprehensive review of theoretical and empirical work together with reasons for the importance of understanding this relationship. Researchers in this area have examined the volume-price/return relationship in a variety of contexts by employing a range of analytical techniques. Chordia and Swaminathan (2000) examine the interrelationship between trading volume and the predictability of short-term stock returns. They find that daily and weekly returns of high volume portfolios lead returns of low volume portfolios. The authors attribute these findings to the differences in the speed of price adjustment to information between the two types of stocks; stocks in low volume portfolios respond slowly to market-wide information while their high volume counterparts responding promptly to such information. Sarika and Balwinder (2008) found the causality test support the sequentially arrival of information hypothesis, which implies that new information is not simultaneously available to all traders and it takes time to absorb, which hamper the price discovery efficiency of the market. Thus, volume provides information on the precision and dispersion of information signals rather than saving as a proxy for the information signal itself. This paper investigates the causal and dynamic relationship between stock returns and trading volume for nine indices.

3. HYPOTHESIS

The main purpose of this study is to test the long as well as short term relation between return and volume of European country indices. To address the objective of the study and after the review of literature, the following hypotheses are formulated and put on test using collected data.

Hypothesis 1: Existence of Unit Root (non stationarity) in stock indices;

Hypothesis 2: No causality is found between returns and volume (return and volatility);

Hypothesis 3: There is no correlation among return, volume and return;

Hypothesis 4: No dynamic relationship is measured between returns and trading volume and volatility and trading volume;

Hypothesis 5: There is no effect of conditional volatility; and

Hypothesis 6: There is no lagged relation between return (volatilities) and volume.

4. DATA AND RESEARCH METHODOLOGY

This paper investigates the relationship between stock indices trading volume, returns and volume and volatilities of six country indices. Daily price (High, Low) of all the sample countries are obtained over a period of five years. For this purpose, the data for indices are retrieved from econstats website. The dataset used in this study comprises of the equity indices and the corresponding trading volume series. Share price of each stock index is obtained as:

$$\text{Share Price} = (P_H + P_L) / 2$$

P_H = Highest market price during the day; and

P_L = Lowest market price during the day.

The **daily return** of the stock markets is calculated as:

$$R_t = \ln (P_t - P_{t-1})$$

Following methods have been applied for this paper:

- Testing for stationarity is done by using both the Augmented Dickey- Fuller and the Phillips-Perron tests. Augmented Dickey–Fuller (ADF) test is most frequently used test of unit root. It is based on simple logic. A non-stationary process has infinite memory as it does not show decay in a shock that takes place in the process. Every random shock carries away the process from its earlier level not to return back again unless another random shock push it towards its previous level. PP Test performs a Phillips-Perron univariate unit root test. This test assumes that the true underlying process is a unit root process with drift.
- A statistical approach proposed by Clive W Granger (1969) to infer cause and affect relationship between two or more time series is known as Granger causality. Granger Causality is based on the simple logic that effect cannot precede cause. It is important to note that the statement “ x Granger causes y ” does not imply that y is the effect or the result of x . Granger causality measures precedence and information contents. For causality Test, Granger test is used.
- Co integration is a statistical property of time series variables. If two or more series are individually integrated (in the time series sense) but some linear combination of them has a lower order of integration, then the series are said to be co integrated. Johansen Co-integration test is used for pinpointing the long run relationship among the markets under study.
- For testing the positive contemporaneous relationship between volume and return GARCH (1, 1) model has been used. In which one day lag return and volume is taken as dependent variable. Thus, to investigate whether trading volume explains the GARCH effects for returns, GARCH (1, 1) model with a volume parameter in the variance equation is applied.
- The vector auto regression (VAR) test is commonly used for forecasting systems of interrelated time series and for analyzing the dynamic impact of random disturbances on the system of variables. VAR process assumes that white noise is independently distributed with zero mean. Where each variable linearly depends upon its lagged values and lagged values of other variables in the vector, which implies that future value of the process are a weighted sum of the past and present value plus some noise and possible exogenous variables.

5. RESULT AND DISCUSSION

An augmented Dickey–Fuller test (ADF) is a test for a unit root in a time series sample. The augmented Dickey–Fuller (ADF) statistic, used in the test, is a negative number. ADF test statistic and test critical value at one, five and ten per cent for six indices is presented in tables-1. The more negative it is, the stronger the rejection of the hypothesis that there is a unit root at some level of confidence. It is cited from table that with using intercept term at the level form all ADF statics are negative and significant at one and five per cent level. It reveals that null hypothesis is rejected and all American countries indices data are stationary. ADF test is also used with intercept and trend that is shown in table-2. It indicates the same result as with intercept, so it can be depicting that all indices data are stationary in their level forms.

The Phillips-Perron test provides an alternative way for checking the stationary of a time series. Tables-3 and 4 shows the output related to PP test. The results of this test indicate that alternative hypotheses are accepted, statistics are negative and significant at one and five per cent level. It reveals that the time series of various stock indices under study are stationary at their level form. Both tests with intercept and intercept and trend are supporting the stationary of six indices during the period of five years both separately and combined.

Correlation presents the picture of degree of relation between variables. For measuring the relation between among return, volume and volatilities have been used correlation. The results of this test have been presented in table-3. It can be said after analysis the table-5 that there is very less degree of relation exist among these three variables. Most of the observation shows negative correlation. It reveals that return, volume and volatilities of American indices are not correlated together.

Co-integration test is a property of two or more variables moving together through time but does not represent the correlation among them. Johansen’s co integration test is suitable for measuring the long run co-integration. For this purpose, trace statistics and Max-Eigen statistics have been measured between return and volume. Trace statistic and Eigen values are presented in tables-7 which state the four co-integrating vectors exist at one and five per cent level. Max-Eigen statistic and Eigen value also tells long run co integration exists between return and volume which is states in table-8. Therefore, both the tests conclude that return and volatility of six American country indices is co-integrated. It means that return has a long run co-integration with the trading volume.

Granger causality test has been used for lagged values of one series have significant explanatory power for another series. For knowing the cause and effect variables such as return and volume Granger causality test results have been presented in Table-9. This study reveals that volume of all indices have not significant effect on return, it means volume is not cause for return fluctuating. This study also states there are many observations which return has significant effect on volume. This test result supports the one-way causality.

For knowing the degree and the direction of correlation among volatilities and volume pair-wise Granger Causality tests have been conducted. Table-10 presents the results, when analysis is done on volatility and trading volume. It states that there are some observation shows one-way causality between volatility and trading volume of all indices. In which volume is cause and volatilities is effect. But majority of observation depicts no causality found between volume and volatilities. It can be said that proceeding information related to volume has significant effect in a very few cases. But proceeding return information has not significant effect.

In order to investigate the effect of trading volume and conditional volatilities, time series of all stock returns are using GARCH (1, 1) model with a volume parameter in the mean equation. The results of this model are reported in table-11. It indicates that contemporaneous relationship only exists in IBC. Thus, Canada and Brazil stock markets show significant relation. It can be reveals that return and trading volume relation does not exist in American countries except in few cases (six cases out of thirty-four cases).

It can be seen from table-11 that conditional variance is affected by lagged variance, which shows that previous information significantly affects current returns. This study also presents that in all observation past conditional variance have a greater impact on volatilities of sport market returns than recent news announcement. It reveals that country indices are more affected by old news and less by current news.

For investigate the volume explains the GARCH effects for return, GARCH (1, 1) model with a volume parameter in the variance equation is measured. It can be cited from table-12 that coefficient of volume is significant in all stock markets shows positive volume coefficient. It reveals that in all stock markets volume explains the GARCH effect. This study also present that persistence of volatility is decline, when volume is included in variance equation.

VAR has been also applying for testing the effect of lagged volatilities with trading volume. It can be seen from tables-13 and 14 that volatilities have not been affected by lagged volume. Therefore, lagged return has no significant effect on volume. It can be cited that lagged volume has not effect on risk of all indices.

6. CONCLUSION

This study investigates relationship between the stock price and trading volume. The findings of the present study are as follows:

- All country indices data are stationarity;
- There is no strong degree of correlation found between return and volume as well as return, volatilities and volume;
- Results of co-integration test indicates that long term relation are predicting between return and volume;
- This study reveals that volume is not cause for return fluctuating. But states that return has significant effect on volume. This test result supports the one way causality.
- There is no contemporaneous relationship between return and volume according to GARCH (1,1) model;
- current news has less effect as compared to old news on stock markets;
- Return and volatilities have not been affected by lagged volume.

On comparing the present study with the previous studies, it has been found that there is some variation in the results. The result of American country indices does not fully support the other country indices such as return, volume and volatilities relation.

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ANNEXURE

TABLE 1: AUGMENTED DICKEY-FULLER TEST (INTERCEPT)

Name of Country Indices	Years	First		Second		Third		Fourth		Fifth		First to Fifth	
		Test critical values	ADF test statistic	P	ADF test statistic	P	ADF test statistic	PV	ADF test statistic	P	ADF test statistic	P	ADF test statistic
Dow Jones Composites	ADF test statistic	-11.48729	0	-12.95406	0	-13.95803	0	-12.33063	0	-13.45139	0	-26.21102	0
	1% level	-3.456622		-3.45673		-3.456514		-3.456408		-3.456408		-3.435356	
	5% level	-2.872998		-2.873045		-2.87295		-2.872904		-2.872904		-2.863638	
	10% level	-2.572951		-2.572976		-2.572925		-2.5729		-2.5729		-2.567937	
	ADF test statistic	-7.982171	0	-8.266299	0	-8.834218	0	-4.224266	0	-6.565492	0	-3.846714	0
	1% level	-3.456514		-3.45673		-3.45673		-3.456408		-3.456408		-3.435369	
	5% level	-2.87295		-2.873045		-2.873045		-2.872904		-2.872904		-2.863644	
	10% level	-2.572925		-2.572976		-2.572976		-2.5729		-2.5729		-2.56794	
	ADF test statistic	-13.03589	0	-13.25961	0	-11.72015	0	-6.517718	0	-5.655502	0	-4.575422	0
	1% level	-3.456514		-3.45673		-3.456514		-3.456408		-3.45695		-3.435436	
	5% level	-2.87295		-2.873045		-2.87295		-2.872904		-2.873142		-2.863674	
	10% level	-2.572925		-2.572976		-2.572925		-2.5729		-2.573028		-2.567956	
IPC All-Share	ADF test statistic	-11.54154	0	-10.51079	0	-13.07097	0	-11.08302	0	-11.49636	0	-24.62727	0
	1% level	-3.455887		-3.45684		-3.45684		-3.456514		-3.454626		-3.435271	
	5% level	-2.872675		-2.873093		-2.873093		-2.87295		-2.872121		-2.863601	
	10% level	-2.572778		-2.573002		-2.573002		-2.572925		-2.572482		-2.567917	
	ADF test statistic	-9.218451	0	-9.824495	0	-9.852177	0	-6.25061	0	-10.73946	0	-7.51569	0
	1% level	-3.455887		-3.45673		-3.45684		-3.456514		-3.454534		-3.435283	
	5% level	-2.872675		-2.873045		-2.873093		-2.87295		-2.872081		-2.863606	
	10% level	-2.572778		-2.572976		-2.573002		-2.572925		-2.57246		-2.56792	
	ADF test statistic	-13.07134	0	-5.334211	0	-12.70102	0	-3.09787	0	-13.0564	0	-5.654531	0
	1% level	-3.455887		-3.45695		-3.45684		-3.45695		-3.454534		-3.435352	
	5% level	-2.872675		-2.873142		-2.873093		-2.873142		-2.872081		-2.863637	
	10% level	-2.572778		-2.573028		-2.573002		-2.573028		-2.57246		-2.567936	
S&P TSX Index Compo	ADF test statistic	-11.81111	0	-12.38585	0	-12.41946	0	-13.66301	0	-11.29203	0	-28.68848	0
	1% level	-3.460173		-3.45695		-3.457286		-3.456622		-3.456622		-3.435532	
	5% level	-2.874556		-2.873142		-2.873289		-2.872998		-2.872998		-2.863716	
	10% level	-2.573784		-2.573028		-2.573106		-2.572951		-2.572951		-2.567979	
	ADF test statistic	-3.206486	0	-10.06064	0	-10.12756	0	-8.366059	0	-6.607251	0	-4.427504	0
	1% level	-3.460596		-3.45695		-3.457286		-3.456622		-3.456622		-3.435572	
	5% level	-2.874741		-2.873142		-2.873289		-2.872998		-2.872998		-2.863734	
	10% level	-2.573883		-2.573028		-2.573106		-2.572951		-2.572951		-2.567988	
	ADF test statistic	-13.7395	0	-7.392389	0	-6.014855	0	-2.908331	0	-14.04902	0	-3.21184	0.02
	1% level	-3.460173		-3.457061		-3.457515		-3.457061		-3.456514		-3.435636	
	5% level	-2.874556		-2.87319		-2.87339		-2.87319		-2.87295		-2.863762	
	10% level	-2.573784		-2.573054		-2.57316		-2.573054		-2.572925		-2.568003	
IBC	ADF test statistic	-11.35018	0	-7.794141	0	-10.13481	0	-8.817378	0	-12.16006	0	-11.35091	0
	1% level	-3.437152		-3.457865		-3.458347		-3.4574		-3.460453		-3.437145	
	5% level	-2.864432		-2.873543		-2.873755		-2.873339		-2.874679		-2.864429	
	10% level	-2.568363		-2.573242		-2.573355		-2.573133		-2.57385		-2.568361	
	ADF test statistic	-4.774053	0	-11.88661	0	-5.489504	0	-12.29448	0	-15.11683	0	-6.770298	0
	1% level	-3.43716		-3.45763		-3.45847		-3.457286		-3.460453		-3.437137	
	5% level	-2.864435		-2.87344		-2.873809		-2.873289		-2.874679		-2.864425	
	10% level	-2.568364		-2.573187		-2.573384		-2.573106		-2.57385		-2.568359	
	ADF test statistic	-6.758792	0	-5.183407	0	-9.98836	0	-10.84238	0	-9.699194	0	-6.760109	0
	1% level	-3.437167		-3.457747		-3.458347		-3.457286		-3.460453		-3.43716	
	5% level	-2.864439		-2.873492		-2.873755		-2.873289		-2.874679		-2.864435	
	10% level	-2.568366		-2.573215		-2.573355		-2.573106		-2.57385		-2.568364	
S&P 500	ADF test statistic	-11.7438	0	-12.09596	0	-12.77088	0	-12.70021	0	-12.77715	0	-26.78395	0
	1% level	-3.456408		-3.456622		-3.456622		-3.456408		-3.456408		-3.435352	
	5% level	-2.872904		-2.872998		-2.872998		-2.872904		-2.872904		-2.863637	
	10% level	-2.5729		-2.572951		-2.572951		-2.5729		-2.5729		-2.567936	
	ADF test statistic	-7.952085	0	-8.274563	0	-3.351489	0	-4.200383	0	-6.560958	0	-3.839428	0
1% level	-3.456408		-3.456622		-3.45695		-3.456408		-3.456408		-3.435365		

	5% level	-2.872904		-2.872998		-2.873142		-2.872904		-2.872904		-2.863642	
	10% level	-2.5729		-2.572951		-2.573028		-2.5729		-2.5729		-2.567939	
	ADF test statistic	-12.69339	0	-13.16368	0	-13.06813	0	-3.452013	0	-18.57597	0	-3.42563	0.01
	1% level	-3.456408		-3.456622		-3.456622		-3.45673		-3.456408		-3.435453	
	5% level	-2.872904		-2.872998		-2.872998		-2.873045		-2.872904		-2.863681	
	10% level	-2.5729		-2.572951		-2.572951		-2.572976		-2.5729		-2.56796	
	ADF test statistic	-	-	-	-	-12.49045	0	-12.11662	0	-11.9985	0	-19.59529	0
	1% level	-	-	-	-	-3.45847		-3.45673		-3.457286		-3.439142	
	5% level	-	-	-	-	-2.873809		-2.873045		-2.873289		-2.86531	
	10% level	-	-	-	-	-2.573384		-2.572976		-2.573106		-2.568834	
Bovespa	ADF test statistic	-	-	-	-	-2.203871	0.2	-3.269686	0	-9.661854	0	-3.350945	0.01
	1% level	-	-	-	-	-3.458973		-3.457061		-3.457286		-3.439398	
	5% level	-	-	-	-	-2.874029		-2.87319		-2.873289		-2.865423	
	10% level	-	-	-	-	-2.573502		-2.573054		-2.573106		-2.568894	
	ADF test statistic	-	-	-	-	-12.38074	0	-3.16391	0	-16.22898	0	-5.338304	0
	1% level	-	-	-	-	-3.45847		-3.457061		-3.457286		-3.43918	
	5% level	-	-	-	-	-2.873809		-2.87319		-2.873289		-2.865327	
	10% level	-	-	-	-	-2.573384		-2.573054		-2.573106		-2.568843	

PV: P Value

Exogenous: Level; and Lag Length: Automatic based on SIC, MAXLAG=25

TABLE 2: AUGMENTED DICKEY-FULLER TEST (TREND AND INTERCEPT)

Name of Country Indices	Years	First		Second		Third		Fourth		Fifth		First to Fifth	
		ADF test statistic	P V	ADF test statistic	P V	ADF test statistic	PV	ADF test statistic	PV	ADF test statistic	P V	ADF test statistic	PV
Dow Jones Composites	ADF test statistic	-11.49391	0	-12.93144	0	-13.97084	0	-12.32127	0	-13.42993	0	-26.20598	0
	1% level	-3.995492		-3.995645		-3.99534		-3.995189		-3.995189		-3.965387	
	5% level	-3.428049		-3.428123		-3.427975		-3.427902		-3.427902		-3.413402	
	10% level	-3.137397		-3.13744		-3.137353		-3.13731		-3.13731		-3.128737	
	ADF test statistic	-8.970338	0	-9.2942	0	-4.616176	0	-5.152286	0.0001	-7.956892	0	-6.274281	0
	1% level	-3.99534		-3.995645		-3.995645		-3.995189		-3.995189		-3.965404	
	5% level	-3.427975		-3.428123		-3.428123		-3.427902		-3.427902		-3.41341	
	10% level	-3.137353		-3.13744		-3.13744		-3.13731		-3.13731		-3.128743	
	ADF test statistic	-13.19235	0	-13.42507	0	-12.15675	0	-6.669428	0	-22.17203	0	-4.754284	0.0006
	1% level	-3.99534		-3.995645		-3.99534		-3.995189		-3.995189		-3.9655	
5% level	-3.427975		-3.428123		-3.427975		-3.427902		-3.427902		-3.413457		
10% level	-3.137353		-3.13744		-3.137353		-3.13731		-3.13731		-3.12877		
IPC All-Share	ADF test statistic	-11.51758	0	-10.52787	0	-13.04198	0	-11.06853	0	-11.64928	0	-24.64375	0
	1% level	-3.994453		-3.9958		-3.9958		-3.99534		-3.99267		-3.965265	
	5% level	-3.427546		-3.428198		-3.428198		-3.427975		-3.426682		-3.413342	
	10% level	-3.1371		-3.137485		-3.137485		-3.137353		-3.13659		-3.128702	
	ADF test statistic	-10.19931	0	-9.87605	0	-10.04469	0	-6.481183	0	-10.70638	0	-10.11006	0
	1% level	-3.994453		-3.995645		-3.9958		-3.99534		-3.99254		-3.965282	
	5% level	-3.427546		-3.428123		-3.428198		-3.427975		-3.426619		-3.413351	
	10% level	-3.1371		-3.13744		-3.137485		-3.137353		-3.136553		-3.128707	
	ADF test statistic	-13.13353	0	-5.565782	0	-12.89529	0	-3.130276	0.1016	-13.77151	0	-5.727942	0
	1% level	-3.994453		-3.995956		-3.9958		-3.995956		-3.99254		-3.965381	
5% level	-3.427546		-3.428273		-3.428198		-3.428273		-3.426619		-3.413399		
10% level	-3.1371		-3.137529		-3.137485		-3.137529		-3.136553		-3.128736		
S&P TSX Index Compo	ADF test statistic	-11.79634	0	-12.40409	0	-12.41652	0	-13.63628	0	-11.33454	0	-28.68606	0
	1% level	-4.000511		-3.995956		-3.996431		-3.995492		-3.995492		-3.965636	
	5% level	-3.430477		-3.428273		-3.428503		-3.428049		-3.428049		-3.413524	
	10% level	-3.138828		-3.137529		-3.137665		-3.137397		-3.137397		-3.12881	
	ADF test statistic	-11.31665	0	-10.16656	0	-10.25425	0	-8.627038	0	-10.67353	0	-7.495607	0
	1% level	-4.000511		-3.995956		-3.996431		-3.995492		-3.99534		-3.965661	
	5% level	-3.430477		-3.428273		-3.428503		-3.428049		-3.427975		-3.413536	
	10% level	-3.138828		-3.137529		-3.137665		-3.137397		-3.137353		-3.128817	
	ADF test statistic	-13.83988	0	-7.617578	0	-6.351644	0	-2.939485	0.152	-15.46527	0	-3.28927	0.0685
	1% level	-4.000511		-3.996113		-3.996754		-3.996113		-3.99534		-3.965783	
5% level	-3.430477		-3.428349		-3.42866		-3.428349		-3.427975		-3.413596		
10% level	-3.138828		-3.137574		-3.137757		-3.137574		-3.137353		-3.128852		

IBC	ADF test statistic	-11.34529	0	-7.783227	0	-10.15065	0	-8.941883	0	-12.13196	0	-11.34777	0
	1% level	-3.967937		-3.99725		-3.99793		-3.996592		-4.000907		-3.967926	
	5% level	-3.414648		-3.4289		-3.429229		-3.428581		-3.430669		-3.414643	
	10% level	-3.129476		-3.137898		-3.138092		-3.137711		-3.138941		-3.129473	
	ADF test statistic	-11.88858	0	-11.84888	0	-6.93229	0	-12.70402	0	-15.10069	0	-9.096161	0
	1% level	-3.967905		-3.996918		-3.998104		-3.996431		-4.000907		-3.967916	
	5% level	-3.414633		-3.428739		-3.429313		-3.428503		-3.430669		-3.414638	
	10% level	-3.129467		-3.137804		-3.138142		-3.137665		-3.138941		-3.12947	
	ADF test statistic	-6.821037	0	-5.383075	0	-10.43777	0	-10.78422	0	-9.752081	0	-6.837949	0
	1% level	-3.967958		-3.997083		-3.99793		-3.996431		-4.000907		-3.967948	
	5% level	-3.414659		-3.428819		-3.429229		-3.428503		-3.430669		-3.414653	
	10% level	-3.129482		-3.137851		-3.138092		-3.137665		-3.138941		-3.129479	
S&P 500	ADF test statistic	-11.72482	0	-12.08028	0	-12.82654	0	-12.67567	0	-12.76479	0	-26.77487	0
	1% level	-3.995189		-3.995492		-3.995492		-3.995189		-3.995189		-3.965381	
	5% level	-3.427902		-3.428049		-3.428049		-3.427902		-3.427902		-3.413399	
	10% level	-3.13731		-3.137397		-3.137397		-3.13731		-3.13731		-3.128736	
	ADF test statistic	-8.940396	0	-9.306125	0	-4.821852	0	-5.139357	0.0002	-7.935924	0	-6.291544	0
	1% level	-3.995189		-3.995492		-3.9958		-3.995189		-3.995189		-3.965398	
	5% level	-3.427902		-3.428049		-3.428198		-3.427902		-3.427902		-3.413408	
	10% level	-3.13731		-3.137397		-3.137485		-3.13731		-3.13731		-3.128741	
	ADF test statistic	-12.73338	0	-13.16194	0	-14.28547	0	-3.537928	0.0376	-19.8236	0	-3.54737	0.0349
	1% level	-3.995189		-3.995492		-3.995492		-3.995645		-3.995189		-3.965524	
	5% level	-3.427902		-3.428049		-3.428049		-3.428123		-3.427902		-3.413469	
	10% level	-3.13731		-3.137397		-3.137397		-3.13744		-3.13731		-3.128777	
Bovespa	ADF test statistic	-	-	-	-	-12.5203	0	-12.10512	0	-12.02165	0	-19.58425	0
	1% level	-	-	-	-	-3.998104		-3.995645		-3.996431		-3.970761	
	5% level	-	-	-	-	-3.429313		-3.428123		-3.428503		-3.416027	
	10% level	-	-	-	-	-3.138142		-3.13744		-3.137665		-3.130293	
	ADF test statistic	-	-	-	-	-2.919996	0.16	-6.320282	0	-9.646125	0	-2.534162	0.314
	1% level	-	-	-	-	-3.998815		-3.995645		-3.996431		-3.971123	
	5% level	-	-	-	-	-3.429657		-3.428123		-3.428503		-3.416204	
	10% level	-	-	-	-	-3.138345		-3.13744		-3.137665		-3.130397	
	ADF test statistic	-	-	-	-	-12.63636	0	-3.145878	0.0982	-16.47037	0	-5.338229	0
	1% level	-	-	-	-	-3.998104		-3.996113		-3.996431		-3.970814	
	5% level	-	-	-	-	-3.429313		-3.428349		-3.428503		-3.416053	
	10% level	-	-	-	-	-3.138142		-3.137574		-3.137665		-3.130308	

PV: P Value

Exogenous: Level; and Lag Length: Automatic based on SIC, MAXLAG=25

TABLE 3: PHILLIPS-PERRON TEST STATISTIC (INTERCEPT)

Name of Country Indices	Years	First		Second		Third		Fourth		Fifth		First to Fifth	
		Test critical values	PP test statistic	P	PP test statistic	P	PP test statistic	P	PP test statistic	P	PP test statistic	P	PP test statistic
Dow Jones Composites	PP test statistic	-12.5354	0	-12.9125	0	-13.9668	0	-13.9463	0	-13.4359	0	-30.222	0
	1% level	-3.45651		-3.45673		-3.45651		-3.4563		-3.45641		-3.43535	
	5% level	-2.87295		-2.87305		-2.87295		-2.87286		-2.8729		-2.86364	
	10% level	-2.57293		-2.57298		-2.57293		-2.57288		-2.5729		-2.56794	
	PP test statistic	-8.10957	0	-8.42533	0	-7.2605	0	-5.18256	0	-6.37865	0	-6.73401	0
	1% level	-3.45651		-3.45673		-3.45651		-3.4563		-3.45641		-3.43535	
	5% level	-2.87295		-2.87305		-2.87295		-2.87286		-2.8729		-2.86364	
	10% level	-2.57293		-2.57298		-2.57293		-2.57288		-2.5729		-2.56794	
	PP test statistic	-13.0359	0	-13.2575	0	-12.243	0	-12.1785	0	-19.6999	0	-32.7051	0
	1% level	-3.45651		-3.45673		-3.45651		-3.4563		-3.45641		-3.43535	
	5% level	-2.87295		-2.87305		-2.87295		-2.87286		-2.8729		-2.86364	
	10% level	-2.57293		-2.57298		-2.57293		-2.57288		-2.5729		-2.56794	
IPC All-Share	PP test statistic	-10.9831	0	-10.5761	0	-13.0111	0	-11.0958	0	-11.4376	0	-25.0928	0
	1% level	-3.45589		-3.45673		-3.45684		-3.45641		-3.45453		-3.43527	
	5% level	-2.87268		-2.87305		-2.87309		-2.8729		-2.87208		-2.8636	
	10% level	-2.57278		-2.57298		-2.573		-2.5729		-2.57246		-2.56792	
	PP test statistic	-9.41048	0	-9.74609	0	-9.81779	0	-9.81246	0	-11.0117	0	-24.9807	0
	1% level	-3.45589		-3.45673		-3.45684		-3.45641		-3.45453		-3.43527	
	5% level	-2.87268		-2.87305		-2.87309		-2.8729		-2.87208		-2.8636	
	10% level	-2.57278		-2.57298		-2.573		-2.5729		-2.57246		-2.56792	

	PP test statistic	-13.0367	0	-12.2805	0	-13.2158	0	-10.5002	0	-13.0866	0	-32.2124	0
	1% level	-3.45589		-3.45673		-3.45684		-3.45641		-3.45453		-3.43527	
	5% level	-2.87268		-2.87305		-2.87309		-2.8729		-2.87208		-2.8636	
	10% level	-2.57278		-2.57298		-2.573		-2.5729		-2.57246		-2.56792	
S&P TSX Index Compo	PP test statistic	-11.8111	0	-12.3347	0	-12.2465	0	-13.6159	0	-11.4088	0	-28.4304	0
	1% level	-3.46017		-3.45695		-3.45729		-3.45662		-3.45651		-3.43553	
	5% level	-2.87456		-2.87314		-2.87329		-2.873		-2.87295		-2.86372	
	10% level	-2.57378		-2.57303		-2.57311		-2.57295		-2.57293		-2.56798	
	PP test statistic	-9.13825	0	-10.6529	0	-10.2155	0	-8.32872	0	-9.89141	0	-20.5626	0
	1% level	-3.46017		-3.45695		-3.45729		-3.45662		-3.45651		-3.43553	
	5% level	-2.87456		-2.87314		-2.87329		-2.873		-2.87295		-2.86372	
	10% level	-2.57378		-2.57303		-2.57311		-2.57295		-2.57293		-2.56798	
	PP test statistic	-13.7623	0	-13.5531	0	-12.1629	0	-15.276	0	-14.2418	0	-39.3502	0
	1% level	-3.46017		-3.45695		-3.45729		-3.45662		-3.45651		-3.43553	
	5% level	-2.87456		-2.87314		-2.87329		-2.873		-2.87295		-2.86372	
	10% level	-2.57378		-2.57303		-2.57311		-2.57295		-2.57293		-2.56798	
IBC	PP test statistic	-21.8949	0	-10.4969	0	-10.0261	0	-12.6651	0	-12.158	0	-21.9197	0
	1% level	-3.43712		-3.45763		-3.45835		-3.45729		-3.46045		-3.43711	
	5% level	-2.86442		-2.87344		-2.87376		-2.87329		-2.87468		-2.86441	
	10% level	-2.56835		-2.57319		-2.57336		-2.57311		-2.57385		-2.56835	
	PP test statistic	-24.5829	0	-12.1698	0	-9.62322	0	-12.5988	0	-15.1163	0	-24.9965	0
	1% level	-3.43712		-3.45763		-3.45835		-3.45729		-3.46045		-3.43711	
	5% level	-2.86442		-2.87344		-2.87376		-2.87329		-2.87468		-2.86441	
	10% level	-2.56835		-2.57319		-2.57336		-2.57311		-2.57385		-2.56835	
	PP test statistic	-22.207	0	-10.0386	0	-10.3577	0	-10.8873	0	-9.69919	0	-22.2203	0
	1% level	-3.43712		-3.45763		-3.45835		-3.45729		-3.46045		-3.43711	
	5% level	-2.86442		-2.87344		-2.87376		-2.87329		-2.87468		-2.86441	
	10% level	-2.56835		-2.57319		-2.57336		-2.57311		-2.57385		-2.56835	
S&P 500	PP test statistic	-11.6165	0	-12.096	0	-12.5563	0	-13.4409	0	-12.8316	0	-28.6097	0
	1% level	-3.45641		-3.45662		-3.45662		-3.4563		-3.45641		-3.43535	
	5% level	-2.8729		-2.873		-2.873		-2.87286		-2.8729		-2.86364	
	10% level	-2.5729		-2.57295		-2.57295		-2.57288		-2.5729		-2.56794	
	PP test statistic	-8.07125	0	-8.43231	0	-8.7452	0	-5.38742	0	-6.3785	0	-7.61807	0
	1% level	-3.45641		-3.45662		-3.45662		-3.4563		-3.45641		-3.43535	
	5% level	-2.8729		-2.873		-2.873		-2.87286		-2.8729		-2.86364	
	10% level	-2.5729		-2.57295		-2.57295		-2.57288		-2.5729		-2.56794	
	PP test statistic	-12.5963	0	-13.3925	0	-14.2618	0	-13.3832	0	-18.181	0	-35.795	0
	1% level	-3.45641		-3.45662		-3.45662		-3.4563		-3.45641		-3.43535	
	5% level	-2.8729		-2.873		-2.873		-2.87286		-2.8729		-2.86364	
	10% level	-2.5729		-2.57295		-2.57295		-2.57288		-2.5729		-2.56794	
Bovespa	PP test statistic	-	-	-	-	-12.4464	0	-12.5317	0	-11.7398	0	-21.109	0
	1% level	-	-	-	-	-3.45847		-3.45662		-3.45729		-3.43913	
	5% level	-	-	-	-	-2.87381		-2.873		-2.87329		-2.86531	
	10% level	-	-	-	-	-2.57338		-2.57295		-2.57311		-2.56883	
	PP test statistic	-	-	-	-	-4.27997	0	-6.99841	0	-9.66185	0	-7.07068	0
	1% level	-	-	-	-	-3.45847		-3.45662		-3.45729		-3.43913	
	5% level	-	-	-	-	-2.87381		-2.873		-2.87329		-2.86531	
	10% level	-	-	-	-	-2.57338		-2.57295		-2.57311		-2.56883	
	PP test statistic	-	-	-	-	-12.9123	0	-12.6062	0	-16.2215	0	-25.5925	0
	1% level	-	-	-	-	-3.45847		-3.45662		-3.45729		-3.43913	
	5% level	-	-	-	-	-2.87381		-2.873		-2.87329		-2.86531	
	10% level	-	-	-	-	-2.57338		-2.57295		-2.57311		-2.56883	

PV: P Value

Exogenous: Level; and Bandwidth: Newey-West using Bartlett Kernel.

TABLE 4: PHILLIP-PERRON TEST STATISTIC (TREND AND INTERCEPT)

Name of Country Indices	Years	First		Second		Third		Fourth		Fifth		First to Fifth	
		Test critical values	PP test statistic	P	PP test statistic	P	PP test statistic	P	PP test statistic	P	PP test statistic	P	PP test statistic
Dow Jones Composites	PP test statistic	-12.52357	0	-12.86757	0	-13.93411	0	-13.92568	0	-13.40001	0	-30.21085	0
	1% level	-3.99534		-3.995645		-3.99534		-3.99504		-3.995189		-3.965381	
	5% level	-3.427975		-3.428123		-3.427975		-3.42783		-3.427902		-3.413399	
	10% level	-3.137353		-3.13744		-3.137353		-3.137268		-3.13731		-3.128736	
	PP test statistic	-9.180961	0	-9.365328	0	-8.955698	0	-6.528352	0	-8.107831	0	-15.01239	0
	1% level	-3.99534		-3.995645		-3.99534		-3.99504		-3.995189		-3.965381	
	5% level	-3.427975		-3.428123		-3.427975		-3.42783		-3.427902		-3.413399	
	10% level	-3.137353		-3.13744		-3.137353		-3.137268		-3.13731		-3.128736	
	PP test statistic	-13.16635	0	-13.42461	0	-12.54004	0	-12.3653	0	-22.7251	0	-32.74403	0
	1% level	-3.99534		-3.995645		-3.99534		-3.99504		-3.995189		-3.965381	
	5% level	-3.427975		-3.428123		-3.427975		-3.42783		-3.427902		-3.413399	
	10% level	-3.137353		-3.13744		-3.137353		-3.137268		-3.13731		-3.128736	
IPC All-Share	PP test statistic	-10.94678	0	-10.56723	0	-12.98121	0	-11.07716	0	-11.45497	0	-25.06906	0

	1% level	-3.994453	-3.995645	-3.9958	-3.995189	-3.99254	-3.96526						
	5% level	-3.427546	-3.428123	-3.428198	-3.427902	-3.426619	-3.41334						
	10% level	-3.1371	-3.13744	-3.137485	-3.13731	-3.136553	-3.128701						
	PP test statistic	-10.12682	0	-9.747336	0	-10.02501	0	-10.98219	0	-25.52296	0		
	1% level	-3.994453	-3.995645	-3.9958	-3.995189	-3.99254	-3.96526						
	5% level	-3.427546	-3.428123	-3.428198	-3.427902	-3.426619	-3.41334						
	10% level	-3.1371	-3.13744	-3.137485	-3.13731	-3.136553	-3.128701						
	PP test statistic	-13.152	0	-12.29887	0	-13.31989	0	-10.66874	0	-13.77358	0	-32.22429	0
	1% level	-3.994453	-3.995645	-3.9958	-3.995189	-3.99254	-3.96526						
	5% level	-3.427546	-3.428123	-3.428198	-3.427902	-3.426619	-3.41334						
	10% level	-3.1371	-3.13744	-3.137485	-3.13731	-3.136553	-3.128701						
S&P TSX Index Compo	PP test statistic	-11.79634	0	-12.35084	0	-12.23806	0	-13.58846	0	-11.3871	0	-28.42029	0
	1% level	-4.000511	-3.995956	-3.996431	-3.995492	-3.99534	-3.965636						
	5% level	-3.430477	-3.428273	-3.428503	-3.428049	-3.427975	-3.413524						
	10% level	-3.138828	-3.137529	-3.137665	-3.137397	-3.137353	-3.12881						
	PP test statistic	-11.39669	0	-10.7268	0	-10.29055	0	-8.638512	0	-10.84607	0	-22.24537	0
	1% level	-4.000511	-3.995956	-3.996431	-3.995492	-3.99534	-3.965636						
	5% level	-3.430477	-3.428273	-3.428503	-3.428049	-3.427975	-3.413524						
	10% level	-3.138828	-3.137529	-3.137665	-3.137397	-3.137353	-3.12881						
	PP test statistic	-13.83988	0	-13.72699	0	-12.39159	0	-15.17773	0	-15.4653	0	-39.43243	0
	1% level	-4.000511	-3.995956	-3.996431	-3.995492	-3.99534	-3.965636						
	5% level	-3.430477	-3.428273	-3.428503	-3.428049	-3.427975	-3.413524						
	10% level	-3.138828	-3.137529	-3.137665	-3.137397	-3.137353	-3.12881						
IBC	PP test statistic	-21.88264	0	-10.4764	0	-10.01005	0	-12.62401	0	-12.12987	0	-21.90898	0
	1% level	-3.967884	-3.996918	-3.99793	-3.996431	-4.000907	-3.967873						
	5% level	-3.414622	-3.428739	-3.429229	-3.428503	-3.430669	-3.414617						
	10% level	-3.129461	-3.137804	-3.138092	-3.137665	-3.138941	-3.129458						
	PP test statistic	-26.34879	0	-12.12985	0	-11.06938	0	-12.90722	0	-15.10062	0	-26.36133	0
	1% level	-3.967884	-3.996918	-3.99793	-3.996431	-4.000907	-3.967873						
	5% level	-3.414622	-3.428739	-3.429229	-3.428503	-3.430669	-3.414617						
	10% level	-3.129461	-3.137804	-3.138092	-3.137665	-3.138941	-3.129458						
	PP test statistic	-22.14228	0	-10.38489	0	-10.73828	0	-10.86529	0	-9.752081	0	-22.15077	0
	1% level	-3.967884	-3.996918	-3.99793	-3.996431	-4.000907	-3.967873						
	5% level	-3.414622	-3.428739	-3.429229	-3.428503	-3.430669	-3.414617						
	10% level	-3.129461	-3.137804	-3.138092	-3.137665	-3.138941	-3.129458						
S&P 500	PP test statistic	-11.59476	0	-12.08028	0	-12.60274	0	-13.41426	0	-12.73228	0	-28.59723	0
	1% level	-3.995189	-3.995492	-3.995492	-3.99504	-3.995189	-3.965375						
	5% level	-3.427902	-3.428049	-3.428049	-3.42783	-3.427902	-3.413396						
	10% level	-3.13731	-3.137397	-3.137397	-3.137268	-3.13731	-3.128734						
	PP test statistic	-8.971783	0	-9.433305	0	-10.48439	0	-6.858998	0	-8.085413	0	-16.24368	0
	1% level	-3.995189	-3.995492	-3.995492	-3.99504	-3.995189	-3.965375						
	5% level	-3.427902	-3.428049	-3.428049	-3.42783	-3.427902	-3.413396						
	10% level	-3.13731	-3.137397	-3.137397	-3.137268	-3.13731	-3.128734						
	PP test statistic	-12.61787	0	-13.3833	0	-14.59538	0	-13.59374	0	-19.86187	0	-35.58122	0
	1% level	-3.995189	-3.995492	-3.995492	-3.99504	-3.995189	-3.965375						
	5% level	-3.427902	-3.428049	-3.428049	-3.42783	-3.427902	-3.413396						
	10% level	-3.13731	-3.137397	-3.137397	-3.137268	-3.13731	-3.128734						
Bovespa	PP test statistic	-	-	-	-12.47031	0	-12.51006	0	-11.75178	0	-21.09158	0	
	1% level	-	-	-	-3.998104	-3.995492	-3.996431	-3.970743					
	5% level	-	-	-	-3.429313	-3.428049	-3.428503	-3.416019					
	10% level	-	-	-	-3.138142	-3.137397	-3.137665	-3.130288					
	PP test statistic	-	-	-	-7.494954	0	-8.396766	0	-9.646125	0	-7.437361	0	
	1% level	-	-	-	-3.998104	-3.995492	-3.996431	-3.970743					
	5% level	-	-	-	-3.429313	-3.428049	-3.428503	-3.416019					
	10% level	-	-	-	-3.138142	-3.137397	-3.137665	-3.130288					
	PP test statistic	-	-	-	-12.92067	0	-12.64809	0	-16.47037	0	-25.58629	0	
	1% level	-	-	-	-3.998104	-3.995492	-3.996431	-3.970743					
	5% level	-	-	-	-3.429313	-3.428049	-3.428503	-3.416019					
	10% level	-	-	-	-3.138142	-3.137397	-3.137665	-3.130288					

PV: P Value

Exogenous: Level; and Bandwidth: Newey-West using Bartlett Kernel.

TABLE 5: CONTEMPORANEOUS CORRELATIONS COEFFICIENTS AMONG RETURN, VOLUME AND VOLATILITIES

Name of Country Indices		First			Second			Third		
		R	V	RR	R	V	RR	R	V	RR
Dow Jones Composites	R	1	-0.019	0.017	1	-0.089	-0.161	1	-0.194	0.135
	V	-0.019	1	0.248	-0.089	1	0.295	-0.194	1	0.481
	RR	0.017	0.248	1	-0.161	0.295	1	0.135	0.481	1
IPC All-Share	R	1	0.088	-0.030	1	-0.059	-0.011	1	0.043	0.014
	V	0.088	1	0.389	-0.059	1	0.350	0.043	1	0.395
	RR	-0.030	0.389	1	-0.011	0.350	1	0.014	0.395	1
S&P TSX Index Compo	R	1	0.010	-0.043	1	-0.094	-0.162	1	-0.027	-0.028
	V	0.010	1	0.125	-0.094	1	0.199	-0.027	1	0.265
	RR	-0.043	0.125	1	-0.162	0.199	1	-0.028	0.265	1
IBC	R	1	-0.049	0.041	1	0.129	-0.140	1	0.180	-0.114
	V	-0.049	1	0.126	0.129	1	0.116	0.180	1	0.072
	RR	0.041	0.126	1	-0.140	0.116	1	-0.114	0.072	1
S&P 500	R	1	-0.021	-0.024	1	-0.087	-0.105	1	-0.257	0.069
	V	-0.021	1	0.315	-0.087	1	0.366	-0.257	1	0.523
	RR	-0.024	0.315	1	-0.105	0.366	1	0.069	0.523	1
Bovespa	-	-	-	-	-	-	-	1	0.015	-0.009
	-	-	-	-	-	-	-	0.015	1	.240
	-	-	-	-	-	-	-	-0.009	.240	1
		Fourth			Fifth			First to fifth		
		R	V	RR	R	V	RR	R	V	RR
Dow Jones Composites	R	1	-0.107	-0.072	1	0.026	0.278	1	-0.084	-0.051
	V	-0.107	1	0.416	0.026	1	0.304	-0.084	1	0.394
	RR	-0.072	0.416	1	0.278	0.304	1	-0.051	0.394	1
IPC All-Share	R	1	0.039	-0.022	1	0.076	0.104	1	0.016	-0.026
	V	0.039	1	0.544	0.076	1	0.317	0.016	1	0.407
	RR	-0.022	0.544	1	0.104	0.317	1	-0.026	0.407	1
S&P TSX Index Compo	R	1	-0.141	-0.248	1	0.075	0.102	1	-0.101	-0.202
	V	-0.141	1	0.397	0.075	1	0.336	-0.101	1	0.372
	RR	-0.248	0.397	1	0.102	0.336	1	-0.202	0.372	1
IBC	R	1	0.053	0.415	1	-0.067	0.228	1	0.100	-0.041
	V	0.053	1	0.071	-0.067	1	0.125	0.100	1	0.139
	RR	0.415	0.071	1	0.228	0.125	1	-0.041	0.139	1
S&P 500	R	1	-0.099	-0.031	1	0.024	0.213	1	-0.084	-0.037
	V	-0.099	1	0.439	0.024	1	0.325	-0.084	1	0.409
	RR	-0.031	0.439	1	0.213	0.325	1	-0.037	0.409	1
Bovespa	R	1	0.010	-0.171	1	0.010	0.023	1	0.017	-0.168
	V	0.010	1	0.442	0.010	1	0.429	0.017	1	-0.068
	RR	-0.171	0.442	1	0.023	0.429	1	-0.168	-0.068	1

R-Return;
V- Volume; and
RR- Volatilities.

TABLE 6: DESCRIPTIVE STATISTICS OF INDEX RETURN OF DIFFERENT AMERICAN COUNTRIES

Name of Country Indices		First			Second			Third			Fourth			First to Fifth						
		RETURN	VOLUME	VOLATILITIE	RETURN	VOLUME	VOLATILITIE	RETURN	VOLUME	VOLATILITIE	RETURN	VOLUME	VOLATILITIE	RETURN	VOLUME	VOLATILITIE				
Dow Jones Composites	Mean	0.00049	2082617	3.07E-05	0.00045	2536207	4.04E-05	-8.08E-05	3599973	8.63E-05	-0.002	5553493	0.00038	0.0014	5099389	9.21E-05	7.42E-05	3781038	0.0001	
	Median	0.00048	2088095	1.03E-05	0.00046	2544415	1.18E-05	-0.0006	3417765	3.74E-05	-0.0019	5410895	0.00011	0.00152	4963200	3.97E-05	0.00026	3398150	2.82E-05	
	Maximum	0.01746	3152470	0.00031	0.01767	4065230	0.00074	0.03197	6544690	0.00102	0.07778	1.1E+07	0.00623	0.04421	9120100	0.00195	0.07778	1.1E+07	0.0062	
	Minimum	-0.0177	724940	1.70E-08	-0.0273	832550	5.39E-11	-0.0286	2600	1.08E-08	-0.0789	1219310	2.46E-08	-0.0297	1267710	2.22E-09	-0.0789	2600	5.39E-11	
	Std. Dev.	0.00553	325651	5.21E-05	0.00635	444313	7.37E-05	0.00931	916848	0.00014	0.01934	1608455	0.00084	0.00952	1152030	0.00018	0.01122	1698041	0.0004	
	Skewness	-0.1464	0.1088	3.06293	-0.4357	0.10466	4.71822	0.24277	0.46927	3.66902	0.04489	0.50153	4.43711	0.25318	0.32793	6.06228	-0.1798	0.87288	9.1728	
	Kurtosis	3.93818	3.7359	13.4706	4.45037	5.04356	37.4726	3.78407	4.01256	19.575	6.01106	3.34679	25.2752	4.64516	3.89627	54.4781	11.6875	3.35707	107.45	
	Jarque-Bera	10.0614	6.13437	1532.9	29.5847	43.6061	13199.9	8.85963	19.8554	3422.68	95.2828	11.827	6036.81	30.9877	12.8998	2925.19	3953.38	166.037	588063	
	Probability	0.00653	0.04655	0	0	0	0	0.01192	4.9E-05	0	0	0.0027	0	0	0.00158	0	0	0	0	
	Sum	0.12122	5.21E+08	0.00767	0.11031	6.29E+08	0.01002	-0.0202	9.00E+08	0.02157	-5.5004	1.40E+09	0.09491	0.3512	1.28E+09	0.02313	0.09315	4.75E+09	0.1579	
	Sum Sq. Dev.	0.00761	2.64E+13	6.76E-07	0.00997	4.88E+13	1.34E-06	0.02157	2.09E+14	5.17E-06	0.09391	6.49E+14	0.00018	0.02263	3.32E+14	7.92E-06	0.15786	3.62E+15	0.0002	
	Observations	250	250	250	248	248	248	250	250	250	252	252	252	251	251	251	1255	1255	1255	
	IPC All-Share	Mean	0.0016	97473.1	8.21E-05	0.00155	124193	0.00016	0.00021	132093	0.00017	-0.0019	169008	0.00038	0.00192	172873	0.00012	0.00074	139714	0.0002
		Median	0.00252	96104.4	3.75E-05	0.0025	121816	4.93E-05	0.00041	126508	8.14E-05	-0.002	159416	9.62E-05	0.00255	164131	3.69E-05	0.0016	134679	5.18E-05
Maximum		0.02124	199007	0.00078	0.04176	332634	0.00174	0.04564	361514	0.00208	0.07321	434799	0.00627	0.03634	447963	0.00132	0.07321	447963	0.0063	
Minimum		-0.028	4037.5	5.72E-11	-0.0417	12896	5.58E-09	-0.0436	12445.6	1.69E-09	-0.0792	17653.2	5.59E-11	-0.0289	27257.4	3.70E-10	-0.0792	4037.5	5.59E-11	
Std. Dev.		0.00893	37369.7	0.00012	0.01248	43083.7	0.00028	0.01309	45076.9	0.00028	0.01955	63202.6	0.00085	0.01064	55038.5	0.00019	0.01345	57541.9	0.0004	
Skewness		-0.4005	0.0282	2.48537	-0.269	0.90967	3.42368	-0.0092	0.82458	3.58769	0.14307	0.81488	3.90413	-0.1898	0.64871	2.72422	-0.1734	0.88258	6.9185	
Kurtosis		3.25662	8.34328	10.7084	4.23548	6.11279	16.5129	3.6714	5.83016	19.4917	5.9836	5.15436	20.4004	3.73685	5.61833	12.0177	6.92784	5.29893	68.115	
Jarque-Bera		7.54742	0.32695	897.365	18.7635	134.328	2371.35	4.64276	110.425	3328.96	93.955	76.3186	3804.14	7.72895	96.063	1248.79	826.642	446.646	235606	
Probability		0.02297	0.84919	0	8.4E-05	0	0	0.09814	0	0	0	0	0	0.02097	0	0	0	0	0	
Sum		0.40825	2.5E+07	0.02101	0.38448	3.1E+07	0.03906	0.05201	3.3E+07	0.04213	-0.4689	4.2E+07	0.09642	0.51771	4.7E+07	0.03145	0.94846	1.78E+08	0.2314	
Sum Sq. Dev.		0.02035	3.56E+11	3.40E-06	0.03846	4.58E+11	1.89E-05	0.04212	5.00E+11	1.92E-05	0.09554	9.99E+11	0.00018	0.03046	8.15E+11	9.38E-06	0.23069	4.22E+12	0.0002	
Observations		256	256	256	248	248	248	247	247	247	251	251	251	270	270	270	1276	1276	1276	
S&P TSX Index Comp		Mean	0.00105	140097	3.76E-05	0.00032	187623	5.01E-05	7.33E-06	222853	8.39E-05	-0.0017	254023	0.00039	0.00126	190341	9.59E-05	0.00018	200220	0.0001
		Median	0.00135	138655	1.21E-05	0.00059	187666	1.77E-05	0.00079	219872	3.53E-05	-0.0014	245330	0.00011	0.0022	186238	4.04E-05	0.00117	197405	3.20E-05
	Maximum	0.01835	298064	0.00065	0.02594	348967	0.00067	0.04092	422722	0.00168	0.06894	599756	0.00664	0.02931	369938	0.00086	0.06894	599756	0.0066	
	Minimum	-0.0254	28665.1	2.43E-11	-0.0227	56502.9	2.39E-09	-0.0329	57123.4	3.53E-09	-0.0815	78237.2	2.17E-09	-0.026	47051.5	1.11E-09	-0.0815	28665.1	2.43E-11	
	Std. Dev.	0.00605	37154.1	6.69E-05	0.00708	43998.5	8.41E-05	0.00918	50797.1	0.00017	0.01981	69967	0.00085	0.00973	46970.8	0.00014	0.0116	63475.4	0.0004	
	Skewness	-0.4259	0.60934	4.69784	-0.3618	-0.0231	3.68924	-0.0588	0.09107	5.43484	-0.3622	1.49227	4.25357	-0.1089	0.28737	2.68998	-0.6603	0.91898	8.7700	
	Kurtosis	4.52354	3.39422	35.9585	3.88036	4.44194	21.2855	5.03333	5.00757	42.012	5.5121	8.41287	24.1105	3.18486	4.85617	11.5553	10.7767	6.64431	100.84	
	Jarque-Bera	27.9289	81.4328	10766.6	13.3115	21.3336	3985.2	42.0011	41.1432	16605.8	70.9161	396.395	5374.52	0.84974	39.3301	1063.93	3144.72	844.977	499396	
	Probability	1E-06	0	0	0.00129	2.3E-05	0	0	0	0	0	0	0	0.65386	0	0	0	0	0	
	Sum	0.23022	3.1E+07	0.00827	0.07843	4.6E+07	0.01232	0.00178	5.4E+07	0.02039	-0.4293	6.3E+07	0.09808	0.31514	4.8E+07	0.02398	0.22105	2.43E+08	0.1632	
	Sum Sq. Dev.	0.00803	3.02E+11	9.81E-07	0.01229	4.74E+11	1.73E-06	0.02039	6.24E+11	6.90E-06	0.09734	1.21E+12	0.00018	0.02358	5.49E+11	4.88E-06	0.16319	4.88E+12	0.0002	
	Observations	220	220	220	246	246	246	243	243	243	249	249	249	250	250	250	1213	1213	1213	
	IBC	Mean	-0.0007	2857.95	0.00014	0.0019	6415.17	0.00028	-0.0014	4240.99	0.0001	0.00091	429.862	0.00012	0.00128	119.466	6.48E-05	0.00067	2846.75	0.0001
		Median	-0.0006	569	2.78E-05	0.00168	4134.8	2.60E-05	-0.0007	1922.6	2.88E-05	0.00012	179.6	2.96E-05	0.00146	50.4	2.41E-05	0.00061	566.6	2.78E-05
Maximum		0.08667	44593.6	0.00921	0.09597	44593.6	0.00921	0.03056	32663.6	0.00118	0.04433	6703.4	0.00197	0.02611	3522.2	0.00068	0.09597	44593.6	0.0092	
Minimum		-0.096	1.2	9.32E-13	-0.0867	427.2	1.85E-11	-0.0344	23.2	2.44E-10	-0.0285	1.2	1.92E-12	-0.0191	1.4	9.32E-13	-0.0867	1.2	9.32E-13	
Std. Dev.		0.01194	5164.62	0.00056	0.01662	6574.9	0.00104	0.01003	5817.76	0.00018	0.0108	753.443	0.00026	0.00797	270.567	0.00011	0.01193	5160.96	0.0006	
Skewness		0.27187	3.28925	10.8917	-0.7554	2.49725	6.10931	0.07294	2.37199	2.90318	0.75403	4.30491	4.93048	0.0779	9.49189	2.86729	-0.2722	3.29798	10.8917	
Kurtosis		16.3135	17.3079	147.132	15.4582	11.5395	44.3723	4.08919	9.15284	12.7613	5.64804	27.9878	31.3729	3.89951	116.436	11.8996	16.3308	17.3665	147.28	
Jarque-Bera		6931.64	9682.09	829579	1574.88	978.672	18609.6	11.7743	588.537	1257.71	94.0244	7072.5	9135.41	7.57002	120155	1017.17	6957.12	9766.99	832159	
Probability		0	0	0	0	0	0	0.00278	0	0	0	0	0	0.02271	0	0	0	0	0	
Sum		-0.6277	2677903	0.13379	0.45577	1539641	0.06689	-0.3211	992391	0.02388	0.22005	104456	0.02844	0.27827	26043.6	0.01414	0.62916	2670255	0.1338	
Sum Sq. Dev.		0.13337	2.50E+10	0.00029	0.06603	1.03E+10	0.00026	0.02344	7.89E+09	7.34E-06	0.02824	1.37E+08	1.62E-05	0.01378	1.6E+07	2.66E-06	0.13337	2.50E+10	0.0003	
Observations		937	937	937	240	240	240	234	234	234	243	243	243	218	218	218	938	938	938	
S&P 500		Mean	0.00041	2082604	2.02E-05	0.00034	2536970	2.69E-05	-0.0003	3589036	8.34E-05	-0.0021	5540851	0.00042	0.00152	5096335	8.62E-05	-2.04E-06	3773673	0.0001
		Median	0.00043	2082360	8.44E-06	0.00016	2545760	8.85E-06	-0.0006	3401300	3.56E-05	-0.0019	5388115	0.0001	0.00212	4963200	3.35E-05	0.00014	3368080	2.28E-05
	Maximum	0.01359	3152470	0.0002	0.01535	4065230	0.00049	0.03032	6544690	0.00092	0.07771	1.1E+07	0.							

TABLE 7: UNRESTRICTED CO- INTEGRATION RANK TEST (TRACE) BETWEEN RETURN AND VOLUME

Name of country Indices		Dow Jones Composites		IPC All-Share		S&P TSX Index Compo		IBC		S&P 500		BOVESPA	
Years	Hypothesised No. of CE(s)	None *	At most 1 *	None *	At most 1 *	None *	At most 1 *	None *	At most 1 *	None *	At most 1 *	None *	At most 1 *
First	Eigen Value	0.2	0.06	0.18	0.05	0.17	0.04	0.11	0.04	0.18	0.05	-	-
	Trace Statistic	70.71	14.54	63.66	14.09	47.33	8.15	149.52	38.42	61.75	13.76	-	-
	0.05 Critical value	15.49	3.84	15.49	3.84	15.49	3.84	15.49	3.84	15.49	3.84	-	-
	Prob.	0	0	0	0	0	0	0	0	0	0	-	-
Second	Eigen Value	0.22	0.08	0.16	0.1	0.18	0.08	0.12	0.1	0.23	0.09	-	-
	Trace Statistic	82.48	21.34	67.47	24.7	66.77	19.88	56.54	25.79	86.13	21.8	-	-
	0.05 Critical value	15.49	3.84	15.49	3.84	15.49	3.84	15.49	3.84	15.49	3.84	-	-
	Prob.	0	0	0	0	0	0	0	0	0	0	-	-
Third	Eigen Value	0.22	0.04	0.2	0.08	0.2	0.11	0.15	0.05	0.25	0.04	0.2	0.02
	Trace Statistic	69.16	9.43	75.58	20.29	78.83	27.01	47.52	10.9	81.27	9.82	55.97	4.96
	0.05 Critical value	15.49	3.84	15.49	3.84	15.49	3.84	15.49	3.84	15.49	3.84	15.49	3.84
	Prob.	0	0	0	0	0	0	0	0	0	0	0	0.03
Forth	Eigen Value	0.19	0.04	0.17	0.05	0.2	0.08	0.15	0.12	0.2	0.04	0.19	0.04
	Trace Statistic	62.67	9.46	59.16	12.73	74.24	19.36	69.11	29.94	63.51	9.37	61.44	9.82
	0.05 Critical value	15.49	3.84	15.49	3.84	15.49	3.84	15.49	3.84	15.49	3.84	15.49	3.84
	Prob.	0	0	0	0	0	0	0	0	0	0	0	0
Fifth	Eigen Value	0.14	0.05	0.17	0.08	0.16	0.07	0.18	0.12	0.15	0.05	0.18	0.11
	Trace Statistic	47.7	11.59	69.43	21.18	60.34	17.4	69.47	26.57	51.14	11.69	76.29	28.52
	0.05 Critical value	15.49	3.84	15.49	3.84	15.49	3.84	15.49	3.84	15.49	3.84	15.49	3.84
	Prob.	0	0	0	0	0	0	0	0	0	0	0	0
First to Fifth	Eigen Value	0.18	0.01	0.17	0.04	0.18	0.04	0.11	0.05	0.18	0.01	0.18	0.02
	Trace Statistic	256.94	14.7	286.09	53.15	287.82	45.65	156.4	45.29	266.6	14.59	162.54	17.64
	0.05 Critical value	15.49	3.84	15.49	3.84	15.49	3.84	15.49	3.84	15.49	3.84	15.49	3.84
	Prob.	0	0	0	0	0	0	0	0	0	0	0	0

Trace test indicates 4 co-integration eqn (s) at the 0.05 level ; Trend assumption: Linear deterministic trend ; a nd Lag interval: 1 to 4.

TABLE 8: UNRESTRICTED CO- INTEGRATION RANK TEST (MAXIMUM EIGEN VALUE) BETWEEN VOLATILITIES AND VOLUME

Name of country Indices		Dow Jones Composites		IPC All-Share		S&P TSX Index Compo		IBC		S&P 500		BOVESPA	
Years	Hypothesised No. of CE(s)	None *	At most 1 *	None *	At most 1 *	None *	At most 1 *	None *	At most 1 *	None *	At most 1 *	None *	At most 1 *
First	Eigen Value	0.2	0.06	0.18	0.05	0.17	0.04	0.11	0.04	0.18	0.05	-	-
	Max.Eigen Statistic	56.17	14.54	49.56	14.09	39.18	8.15	111.1	38.42	47.99	13.76	-	-
	0.05 Critical value	14.26	3.84	14.26	3.84	14.26	3.84	14.26	3.84	14.26	3.84	-	-
	Prob.	0	0	0	0	0	0	0	0	0	0	-	-
Second	Eigen Value	0.22	0.08	0.16	0.1	0.18	0.08	0.12	0.1	0.23	0.09	-	-
	Max.Eigen Statistic	61.14	21.34	42.77	24.7	46.89	19.88	30.74	25.79	64.33	21.8	-	-
	0.05 Critical value	14.26	3.84	14.26	3.84	14.26	3.84	14.26	3.84	14.26	3.84	-	-
	Prob.	0	0	0	0	0	0	0	0	0	0	-	-
Third	Eigen Value	0.22	0.04	0.2	0.08	0.2	0.11	0.15	0.05	0.25	0.04	0.2	0.02
	Max.Eigen Statistic	59.73	9.43	55.29	20.29	51.82	27.01	36.62	10.9	71.45	9.82	51.01	4.96
	0.05 Critical value	14.26	3.84	14.26	3.84	14.26	3.84	14.26	3.84	14.26	3.84	14.26	3.84
	Prob.	0	0	0	0	0	0	0	0	0	0	0	0.03
Forth	Eigen Value	0.19	0.04	0.17	0.05	0.2	0.08	0.15	0.12	0.2	0.04	0.19	0.04
	Max.Eigen Statistic	53.21	9.46	46.42	12.73	54.88	19.36	39.17	29.94	54.14	9.37	51.63	9.82
	0.05 Critical value	14.26	3.84	14.26	3.84	14.26	3.84	14.26	3.84	14.26	3.84	14.26	3.84
	Prob.	0	0	0	0	0	0	0	0	0	0	0	0
Fifth	Eigen Value	0.14	0.05	0.17	0.08	0.16	0.07	0.18	0.12	0.15	0.05	0.18	0.11
	Max.Eigen Statistic	36.11	11.59	48.25	21.18	42.94	17.4	42.9	26.57	39.45	11.69	47.76	28.52
	0.05 Critical value	14.26	3.84	14.26	3.84	14.26	3.84	14.26	3.84	14.26	3.84	14.26	3.84
	Prob.	0	0	0	0	0	0	0	0	0	0	0	0
First to Fifth	Eigen Value	0.18	0.01	0.17	0.04	0.18	0.04	0.11	0.05	0.18	0.01	0.18	0.02
	Max.Eigen Statistic	242.24	14.7	232.94	53.15	242.17	45.65	111.1	45.29	252.01	14.59	144.9	17.64
	0.05 Critical value	14.26	3.84	14.26	3.84	14.26	3.84	14.26	3.84	14.26	3.84	14.26	3.84
	Prob.	0	0	0	0	0	0	0	0	0	0	0	0

Max-eigenvalue test indicates 4 co-integration eqn (s) at the 0.05 level

TABLE 9: GRANGER CAUSALITY TESTS BETWEEN RETURN AND VOLUME

Name of Country Indices	Years	First			Second			Third			Fourth			Fifth			First to Fifth		
		Null Hypothesis:	Obs	F-Statistic	Prob.	Obs	F-Statistic	Prob.	Obs	F-Statistic	Prob.	Obs	F-Statistic	Prob.	Obs	F-Statistic	Prob.	Obs	F-Statistic
Dow Jones Composites	V does not Granger Cause R	249	249	0.7017	247	1.15734	0.2831	249	0.05135	0.8209	251	1.29248	0.2567	250	3.84427	0.051	1254	0.15572	0.6932
	R does not Granger Cause V			0.2554		0.00101	0.9747		0.25233	0.6159		3.22805	0.0736		0.00362	0.9521		3.39822	0.0655
IPC All-Share	V does not Granger Cause R	255	255	0.6346	247	1.12408	0.2901	246	3.45214	0.0644	250	2.83361	0.0936	269	3.1461	0.0773	1275	1.59114	0.2074
	R does not Granger Cause V			0.6194		6.68737	0.0103		3.41158	0.066		0.00231	0.9617		0.00033	0.9856		5.25414	0.0221
S&P TSX Index Compo	V does not Granger Cause R	219	219	0.4895	245	0.14591	0.7028	242	0.97524	0.3244	248	1.7656	0.1852	249	1.01444	0.3148	1212	0.00155	0.9686
	R does not Granger Cause V			0.2924		3.18773	0.0754		4.35253	0.038		4.8236	0.029		0.56799	0.4518		9.82461	0.0018
IBC	V does not Granger Cause R	936	936	0.0057	239	0.01327	0.9084	233	1.45696	0.2287	242	1.46979	0.2266	217	0.24579	0.6206	937	0.27692	0.5989
	R does not Granger Cause V			0.0165		0.21591	0.6426		0.12608	0.7229		2.01412	0.1571		1.21214	0.2721		0.77062	0.3802
S&P 500	V does not Granger Cause R	250	250	0.5491	248	1.25572	0.2636	248	0.09432	0.759	251	2.75914	0.098	250	3.26279	0.0721	1255	0.04875	0.8253
	R does not Granger Cause V			0.1858		0.14196	0.7067		4.92937	0.0273		4.00102	0.0466		0.35714	0.5506		5.21372	0.0226
Bovespa	V does not Granger Cause R	-	-	-	-	-	-	232	0.07391	0.786	248	1.93535	0.1654	242	0.01771	0.8942	726	0.18524	0.667
	R does not Granger Cause V	-	-	-	-	-	-		0.01903	0.8904		0.29351	0.5885		0.83053	0.363		0.00319	0.955

R-Return, V-Volume.

Trace test indicates 4 co-integration eqn (s) at the 0.05 level; Trend assumption: Linear deterministic trend; and Lag interval: 1 to 4.

TABLE 10: GRANGER CAUSALITY TESTS BETWEEN VOLATILITIES AND VOLUME

Name of Countries	Years	First			Second			Third			Fourth			Fifth			First to Fifth		
		Obs	F-Statistic	Prob.	Obs	F-Statistic	Prob.	Obs	F-Statistic	Prob.	Obs	F-Statistic	Prob.	Obs	F-Statistic	Prob.	Obs	F-Statistic	Prob.
Dow Jones Composites	V does not Granger Cause RR	249	3.18921	0.0754	247	0.23831	0.6259	249	32.3316	4.00E-08	251	21.4639	6.00E-06	250	13.2134	0.0003	1254	85.6545	9.00E-20
	RR does not Granger Cause V		0.47979	0.4892		0.71626	0.3982		2.90706	0.0895		0.89913	0.3439		1.93483	0.1655		7.97202	0.0048
IPC All-Share	V does not Granger Cause RR	255	1.55077	0.2142	247	0.00159	0.9682	246	11.0021	0.001	250	18.6130	2.00E-05	269	1.36393	0.2439	1275	31.5289	2.00E-08
	RR does not Granger Cause V		0.00337	0.9537		0.02991	0.8628		0.15411	0.695		3.86681	0.0504		0.61412	0.4339		1.99361	0.1582
S&P TSX Index Compo	V does not Granger Cause RR	219	2.20982	0.1386	245	1.31175	0.2532	246	14.5956	0.0002	248	8.26323	0.0044	249	1.33277	0.2494	1212	55.2419	2.00E-13
	RR does not Granger Cause V		1.03897	0.3092		4.37387	0.0375		1.36376	0.2441		3.58825	0.0594		0.09095	0.7632		10.5932	0.0012
IBC	V does not Granger Cause RR	936	7.28259	0.0071	239	0.56981	0.4511	233	1.04875	0.3069	242	1.35137	0.2462	217	0.50913	0.4763	937	4.17914	0.0412
	RR does not Granger Cause V		8.33164	0.004		5.36774	0.0214		7.1582	0.008		1.92589	0.1665		0.09023	0.7642		16.3506	6.00E-05
S&P 500	V does not Granger Cause RR	250	5.93891	0.0155	248	0.94725	0.3314	248	55.7501	1.00E-12	251	23.0318	3.00E-06	250	8.18215	0.0046	1255	93.7339	2.00E-21
	RR does not Granger Cause V		1.83041	0.1773		0.01066	0.9179		3.79234	0.0526		0.64196	0.4238		3.04724	0.0821		6.54236	0.0107
Bovespa	V does not Granger Cause RR	-	-	-	-	-	-	232	1.65367	0.1998	248	14.6459	0.0002	242	12.3656	0.0005	726	1.50594	0.2202
	RR does not Granger Cause V	-	-	-	-	-	-		1.80653	0.1803		3.41398	0.0659		0.52329	0.4701		0.57957	0.4467

RR-Volatilities, V-Volume.

Trace test indicates 4 co-integration eqn (s) at the 0.05 level ; Trend assumption: Linear deterministic trend ; and Lag interval: 1 to 4.

TABLE 11: GARCH (1, 1) IN VOLUME-RETURN RELATIONSHIP

NAME OF COUNTRY INDICES	YEARS	First				Second				Third				Fourth				Fifth				First to Fifth				
		Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	
Dow Jones Composites	Variable																									
	C	-0.001	0.002	-0.340	0.73	0.002	0.003	0.911	0.36	0.005	0.002	2.316	0.02	0.000	0.002	0.137	0.89	0.005	0.002	2.101	0.04	0.001	0.000	1.856	0.06	
	R(-1)	0.214	0.063	3.410	0.00	0.195	0.068	2.865	0.00	0.106	0.068	1.550	0.12	0.150	0.071	2.105	0.04	0.210	0.056	3.775	0.00	0.182	0.029	6.248	0.00	
	V	0.000	0.000	0.560	0.58	0.000	0.000	-0.783	0.43	0.000	0.000	-2.324	0.02	0.000	0.000	-0.422	0.67	0.000	0.000	-1.824	0.07	0.000	0.000	-1.018	0.31	
		Variance Equation				Variance Equation				Variance Equation				Variance Equation				Variance Equation								
	C	0.000	0.000	4.249	0.00	0.000	0.000	1.243	0.21	0.000	0.000	1.349	0.18	0.000	0.000	1.580	0.11	0.000	0.000	-0.936	0.35	0.000	0.000	3.640	0.00	
	RESID(-1) ²	0.162	0.093	1.737	0.08	0.050	0.032	1.558	0.12	0.172	0.072	2.401	0.02	0.122	0.046	2.660	0.01	0.000	0.008	-0.016	0.99	0.105	0.018	5.865	0.00	
	GARCH(-1)	-0.522	0.285	-1.835	0.07	0.909	0.059	15.440	0.00	0.782	0.093	8.375	0.00	0.881	0.042	20.953	0.00	1.000	0.013	74.236	0.00	0.883	0.019	46.371	0.00	
	Variable																									
	IPC All-Share	Variable																								
C		-0.001	0.001	-0.602	0.55	0.000	0.002	0.250	0.80	-0.003	0.002	-1.260	0.21	-0.001	0.002	-0.275	0.78	0.000	0.002	0.171	0.86	0.000	0.001	0.463	0.64	
R(-1)		0.314	0.069	4.575	0.00	0.281	0.072	3.910	0.00	0.194	0.071	2.737	0.01	0.322	0.069	4.690	0.00	0.347	0.061	5.721	0.00	0.316	0.029	10.983	0.00	
V		0.000	0.000	1.912	0.06	0.000	0.000	0.905	0.37	0.000	0.000	1.906	0.06	0.000	0.000	-0.292	0.77	0.000	0.000	0.466	0.64	0.000	0.000	1.317	0.19	
		Variance Equation				Variance Equation				Variance Equation				Variance Equation				Variance Equation								
C		0.000	0.000	1.245	0.21	0.000	0.000	2.509	0.01	0.000	0.000	1.490	0.14	0.000	0.000	1.534	0.13	0.000	0.000	1.270	0.20	0.000	0.000	3.511	0.00	
RESID(-1) ²		0.118	0.066	1.803	0.07	0.371	0.147	2.532	0.01	0.163	0.071	2.279	0.02	0.173	0.041	4.256	0.00	0.196	0.072	2.724	0.01	0.162	0.024	6.804	0.00	
GARCH(-1)		0.799	0.105	7.636	0.00	0.504	0.143	3.523	0.00	0.742	0.112	6.620	0.00	0.835	0.039	21.329	0.00	0.767	0.083	9.281	0.00	0.809	0.027	30.006	0.00	
Variable																										
S&P TSX Index Comp		Variable																								
	C	0.001	0.002	0.681	0.50	0.002	0.002	0.974	0.33	0.000	0.002	-0.065	0.95	0.006	0.003	2.029	0.04	0.001	0.002	0.397	0.69	0.002	0.001	2.522	0.01	
	R(-1)	0.192	0.078	2.465	0.01	0.231	0.067	3.477	0.00	0.260	0.065	3.967	0.00	0.224	0.074	3.041	0.00	0.341	0.050	6.771	0.00	0.249	0.029	8.568	0.00	
	V	0.000	0.000	0.294	0.77	0.000	0.000	-0.788	0.43	0.000	0.000	0.383	0.70	0.000	0.000	-2.156	0.03	0.000	0.000	-0.025	0.98	0.000	0.000	-1.757	0.08	
		Variance Equation				Variance Equation				Variance Equation				Variance Equation				Variance Equation								
	C	0.000	0.000	2.263	0.02	0.000	0.000	1.845	0.07	0.000	0.000	1.831	0.07	0.000	0.000	0.925	0.35	0.000	0.000	-1.480	0.14	0.000	0.000	4.399	0.00	
	RESID(-1) ²	0.401	0.121	3.312	0.00	0.207	0.106	1.957	0.05	0.215	0.055	3.948	0.00	0.150	0.055	2.732	0.01	0.000	0.012	-0.007	0.99	0.166	0.024	7.040	0.00	
	GARCH(-1)	0.232	0.234	0.993	0.32	0.606	0.178	3.412	0.00	0.769	0.056	13.771	0.00	0.859	0.049	17.413	0.00	1.009	0.020	49.303	0.00	0.813	0.025	32.985	0.00	
	Variable																									
	IBC	Variable																								
C		0.000	0.000	-0.088	0.93	0.001	0.001	0.990	0.32	-0.002	0.001	-2.213	0.03	0.000	0.001	-0.660	0.51	0.001	0.001	2.286	0.02	0.000	0.000	-0.540	0.59	
R(-1)		0.260	0.036	7.203	0.00	0.283	0.053	5.373	0.00	0.321	0.059	5.468	0.00	0.187	0.077	2.437	0.01	0.068	0.076	0.899	0.37	0.220	0.032	6.870	0.00	
V		0.000	0.000	-2.398	0.02	0.000	0.000	1.350	0.18	0.000	0.000	2.329	0.02	0.000	0.000	-0.087	0.93	0.000	0.000	-1.548	0.12	0.000	0.000	2.557	0.01	
		Variance Equation				Variance Equation				Variance Equation				Variance Equation				Variance Equation								
C		0.000	0.000	9.892	0.00	0.000	0.000	3.647	0.00	0.000	0.000	2.418	0.02	0.000	0.000	3.366	0.00	0.000	0.000	5.606	0.00	0.000	0.000	6.765	0.00	
RESID(-1) ²		0.393	0.046	8.551	0.00	0.413	0.068	6.045	0.00	0.099	0.041	2.397	0.02	0.356	0.109	3.259	0.00	0.408	0.119	3.438	0.00	0.374	0.047	8.002	0.00	
GARCH(-1)		0.395	0.037	10.562	0.00	0.576	0.046	12.435	0.00	0.813	0.050	16.272	0.00	0.216	0.166	1.298	0.19	-0.201	0.094	-2.145	0.03	0.397	0.060	6.581	0.00	
Variable																										
S&P 500		Variable																								
	C	0.000	0.002	-0.214	0.83	0.002	0.002	0.749	0.45	0.006	0.002	3.228	0.00	-0.001	0.002	-0.649	0.52	0.005	0.002	1.934	0.05	0.001	0.000	1.322	0.19	
	R(-1)	0.288	0.069	4.187	0.00	0.270	0.073	3.695	0.00	0.174	0.068	2.563	0.01	0.160	0.070	2.275	0.02	0.296	0.053	5.562	0.00	0.248	0.029	8.494	0.00	
	V	0.000	0.000	0.366	0.71	0.000	0.000	-0.578	0.56	0.000	0.000	-3.302	0.00	0.000	0.000	0.476	0.63	0.000	0.000	-1.619	0.11	0.000	0.000	-0.379	0.70	
		Variance Equation				Variance Equation				Variance Equation				Variance Equation				Variance Equation								
	C	0.000	0.000	1.917	0.06	0.000	0.000	1.472	0.14	0.000	0.000	1.323	0.19	0.000	0.000	1.080	0.28	0.000	0.000	-0.759	0.45	0.000	0.000	3.913	0.00	
	RESID(-1) ²	0.203	0.090	2.268	0.02	0.062	0.036	1.697	0.09	0.077	0.032	2.383	0.02	0.120	0.046	2.623	0.01	-0.005	0.008	-0.593	0.55	0.111	0.017	6.417	0.00	
	GARCH(-1)	0.226	0.308	0.732	0.46	0.878	0.068	12.980	0.00	0.922	0.031	29.465	0.00	0.888	0.042	20.949	0.00	1.008	0.016	62.889	0.00	0.882	0.018	49.959	0.00	
	Variable																									
	Bovespa	Variable																								
C		-	-	-	-	-	-	-	-	0.001	0.001	0.818	0.41	-0.008	0.004	-2.128	0.03	0.005	0.003	1.336	0.18	0.001	0.001	1.695	0.09	
R(-1)		-	-	-	-	-	-	-	-	0.175	0.067	2.627	0.01	0.276	0.065	4.247	0.00	0.297	0.063	4.741	0.00	0.253	0.037	6.805	0.00	
V		-	-	-	-	-	-	-	-	0.000	0.000	0.863	0.39	0.000	0.000	2.349	0.02	0.000	0.000	-1.121	0.26	0.000	0.000	1.103	0.27	
		Variance Equation				Variance Equation				Variance Equation				Variance Equation				Variance Equation								
C		-	-	-	-	-	-	-	-	0.000	0.000	1.315	0.19	0.000	0.000	1.333	0.18	0.000	0.000	1.022	0.31	0.000	0.000	2.393	0.02	
RESID(-1) ²	-	-	-	-	-	-	-	-	0.130	0.058	2.227	0.03	0.170	0.057	2.989	0.00	0.074	0.048	1.551	0.20	0.125	0.026	4.738	0.00		
GARCH(-1)	-	-	-	-	-	-	-	-	0.842	0.071	11.933	0.00	0.821	0.052	15.649	0.00	0.866	0.089	9.699	0.00	0.857	0.029	29.647	0.00		

V- Volume

TABLE 12: GARCH (1, 1) IN VOLUME AND VOLATILITY RELATIONSHIP

NAME OF COUNTRY INDICES	YEARS	First				Second				Third				Fourth				Fifth				First to Fifth				
		Variable	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.
Dow Jones Composites	C	0.000	0.000	1.403	0.161	0.000	0.000	0.577	0.564	0.000	0.001	-0.219	0.827	-0.001	0.001	-1.168	0.243	0.001	0.001	1.808	0.071	0.000	0.000	2.068	0.039	
	R(-1)	0.214	0.066	3.240	0.001	0.183	0.072	2.536	0.401	0.120	0.053	2.246	0.025	0.170	0.071	2.386	0.017	0.199	0.077	2.591	0.010	0.182	0.029	6.197	0.000	
		Variance Equation				Variance Equation				Variance Equation				Variance Equation				Variance Equation								
	C	0.000	0.000	-1.948	0.051	0.000	0.000	-1.160	0.246	0.000	0.000	13.492	0.000	0.000	0.000	-7.332	0.000	0.000	0.000	-1.931	0.054	0.000	0.000	-1.889	0.059	
	RESID(-1)^2	0.183	0.099	1.844	0.065	0.137	0.082	1.682	0.093	0.150	0.030	5.049	0.000	0.095	0.044	2.148	0.032	0.150	0.106	1.414	0.157	0.103	0.018	5.669	0.000	
	GARCH(-1)	0.043	0.287	0.151	0.880	-0.075	0.288	-0.259	0.796	0.600	0.088	6.802	0.000	0.842	0.043	19.549	0.000	0.600	0.206	2.918	0.004	0.856	0.023	37.718	0.000	
V	0.000	0.000	3.622	0.000	0.000	0.000	5.800	0.000	0.000	0.000	-112.925	0.000	0.000	0.000	7.163	0.000	0.000	0.000	1.855	0.064	0.000	0.000	3.587	0.000		
IPC All Share	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	
	C	0.001	0.000	2.317	0.021	0.001	0.001	0.879	0.380	0.000	0.001	-0.114	0.910	-0.001	0.001	-1.080	0.280	0.001	0.001	1.875	0.061	0.001	0.000	3.726	0.000	
	R(-1)	0.254	0.066	3.822	0.000	0.336	0.089	3.790	0.000	0.204	0.067	3.056	0.002	0.308	0.066	4.683	0.000	0.326	0.063	5.205	0.000	0.304	0.030	10.070	0.000	
		Variance Equation				Variance Equation				Variance Equation				Variance Equation				Variance Equation								
	C	0.000	0.000	-0.610	0.542	0.000	0.000	4.691	0.000	0.000	-1.315	0.188	0.000	0.000	-6.868	0.000	0.000	0.000	-2.083	0.037	0.000	0.000	-2.604	0.009		
	RESID(-1)^2	0.099	0.098	1.011	0.312	0.150	0.106	1.409	0.159	0.155	0.108	1.437	0.151	0.116	0.045	2.587	0.010	0.216	0.096	2.248	0.025	0.233	0.039	6.008	0.000	
GARCH(-1)	0.156	0.145	1.074	0.283	0.600	0.200	3.006	0.003	0.308	0.203	1.520	0.129	0.818	0.044	18.444	0.000	0.587	0.128	4.572	0.000	0.638	0.043	14.813	0.000		
V	0.000	0.000	5.083	0.000	0.000	0.000	####	0.000	0.000	0.000	2.966	0.003	0.000	0.000	6.590	0.000	0.000	0.000	2.887	0.004	0.000	0.000	6.177	0.000		
S&P TSX Index Compo	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	
	C	0.001	0.000	3.544	0.000	0.001	0.000	1.494	0.135	0.001	0.000	1.288	0.198	0.000	0.001	0.147	0.883	0.001	0.001	1.767	0.077	0.001	0.000	3.720	0.000	
	R(-1)	0.211	0.078	2.706	0.007	0.249	0.068	3.645	0.000	0.266	0.062	4.298	0.000	0.241	0.072	3.336	0.001	0.297	0.067	4.415	0.000	0.255	0.029	8.705	0.000	
		Variance Equation				Variance Equation				Variance Equation				Variance Equation				Variance Equation								
	C	0.000	0.000	-1.300	0.194	0.000	0.000	-1.158	0.247	0.000	0.000	-1.732	0.083	0.000	0.000	-0.382	0.702	0.000	0.000	-1.942	0.052	0.000	0.000	-1.635	0.102	
	RESID(-1)^2	0.205	0.074	2.788	0.005	0.274	0.123	2.227	0.026	0.200	0.054	3.704	0.000	0.155	0.056	2.748	0.006	0.150	0.091	1.655	0.098	0.165	0.025	6.674	0.000	
GARCH(-1)	0.307	0.216	1.423	0.155	0.417	0.143	2.925	0.003	0.765	0.046	16.726	0.000	0.847	0.052	16.360	0.000	0.600	0.183	3.285	0.001	0.792	0.027	29.177	0.000		
V	0.000	0.000	2.692	0.007	0.000	0.000	2.213	0.027	0.000	0.000	2.200	0.028	0.000	0.000	0.469	0.639	0.000	0.000	1.975	0.048	0.000	0.000	3.436	0.001		
IBC	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	
	C	0.000	0.000	-1.251	0.211	0.001	0.002	0.510	0.610	-0.001	0.001	-0.714	0.475	0.001	0.001	0.557	0.578	0.001	0.000	1.956	0.051	0.000	0.001	0.491	0.624	
	R(-1)	0.255	0.036	7.093	0.000	0.353	0.103	3.418	0.001	0.387	0.100	3.858	0.000	0.241	0.090	2.658	0.008	0.069	0.076	0.903	0.367	0.318	0.055	5.753	0.000	
		Variance Equation				Variance Equation				Variance Equation				Variance Equation				Variance Equation								
	C	0.000	0.000	8.980	0.000	0.000	0.000	4.785	0.000	0.000	0.000	3.199	0.001	0.000	0.000	1.759	0.079	0.000	0.000	4.343	0.000	0.000	0.000	4.507	0.000	
	RESID(-1)^2	0.391	0.046	8.418	0.000	0.150	0.082	1.829	0.067	0.150	0.110	1.366	0.172	0.150	0.072	2.084	0.037	0.415	0.123	3.372	0.001	0.150	0.042	3.540	0.000	
GARCH(-1)	0.397	0.038	10.365	0.000	0.600	0.142	4.236	0.000	0.600	0.146	4.097	0.000	0.600	0.237	2.536	0.011	-0.182	0.102	-1.780	0.075	0.600	0.095	6.338	0.000		
V	0.000	0.000	0.778	0.436	0.000	0.000	-12.208	0.000	0.000	0.000	-7.505	0.000	0.000	0.000	-3.784	0.000	0.000	0.000	1.390	0.165	0.000	0.000	-9.938	0.000		
S&P 500	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	
	C	0.000	0.000	0.993	0.321	0.000	0.000	1.062	0.288	0.001	0.000	1.445	0.149	-0.001	0.001	-0.998	0.318	0.001	0.001	2.060	0.039	0.000	0.000	-0.037	0.971	
	R(-1)	0.287	0.071	4.015	0.000	0.254	0.078	3.265	0.001	0.204	0.066	3.092	0.002	0.170	0.068	2.490	0.013	0.240	0.081	2.983	0.003	0.196	0.029	6.773	0.000	
		Variance Equation				Variance Equation				Variance Equation				Variance Equation				Variance Equation								
	C	0.000	0.000	-2.186	0.029	0.000	0.000	-4.692	0.000	0.000	0.000	-15.223	0.000	0.000	0.000	-19.243	0.000	0.000	0.000	-2.322	0.020	0.000	0.000	-18.538	0.000	
	RESID(-1)^2	0.150	0.073	2.058	0.040	0.150	0.093	1.618	0.106	0.150	0.074	2.029	0.043	0.094	0.042	2.248	0.025	0.150	0.097	1.545	0.122	0.150	0.024	6.319	0.000	
GARCH(-1)	0.600	0.174	3.451	0.001	0.600	0.156	3.856	0.000	0.600	0.068	8.865	0.000	0.832	0.043	19.494	0.000	0.600	0.186	3.226	0.001	0.600	0.026	22.870	0.000		
V	0.000	0.000	2.375	0.018	0.000	0.000	7.250	0.000	0.000	0.000	209.344	0.000	0.000	0.000	19.516	0.000	0.000	0.000	2.323	0.020	0.000	0.000	502.742	0.000		
Bo-vespa	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	Coefficient	Std. Error	z-Statistic	Prob.	
	C	-	-	-	-	-	-	-	-	-	0.002	0.001	2.151	0.032	0.000	0.001	-0.353	0.724	0.001	0.001	2.032	0.042	0.001	0.001	2.558	0.011
	R(-1)	-	-	-	-	-	-	-	-	-	0.184	0.069	2.673	0.008	0.276	0.070	3.947	0.000	0.278	0.077	3.616	0.000	0.254	0.037	6.840	0.000
		Variance Equation				Variance Equation				Variance Equation				Variance Equation												
	C	-	-	-	-	-	-	-	-	-	0.000	0.000	1.025	0.305	0.000	0.000	-1.058	0.290	0.000	0.000	-2.454	0.014	0.000	0.000	2.133	0.033
	RESID(-1)^2	-	-	-	-	-	-	-	-	-	0.159	0.100	1.591	0.112	0.174	0.073	2.392	0.017	0.145	0.107	1.361	0.174	0.125	0.027	4.648	0.000
GARCH(-1)	-	-	-	-	-	-	-	-	-	0.717	0.205	3.488	0.001	0.761	0.067	11.371	0.000	0.600	0.120	5.016	0.000	0.853	0.031	27.660	0.000	
V	-	-	-	-	-	-	-	-	-	0.000	0.000	-0.911	0.363	0.000	0.000	1.368	0.171	0.000	0.000	3.070	0.002	0.000	0.000	-0.273	0.785	

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TABLE 13: LEAD –LAG RELATIONSHIP BETWEEN VOLUME AND RETURN
VECTOR AUTOREGRESSION ESTIMATES
t-statistics in []

NAME OF COUNTRY INDICES	First		Second		Third		Fourth		Fifth		First to Fifth		
	R	V	R	V	R	V	R	V	R	V	R	V	
Dow Jones Composites	R(-1)	0.232506	-3935330	0.20316	645187.4	0.127683	-5441244	0.1612	-8584381	0.23396	2343139	0.170042	-5763011
		-0.06333	-3090506	-0.06485	-3746577	-0.06603	-4606226	-0.0647	-3294170	-0.06386	-5623150	-0.02834	-1746537
		[3.67133]	[-1.27336]	[3.13301]	[0.17221]	[1.93362]	[-1.18128]	[2.49168]	[-2.60593]	[3.66344]	[0.41670]	[5.99947]	[-3.29968]
	R(-2)	-0.14966	1883267	-0.02623	-9093569	-0.08947	228059.7	-0.1599	-1118031	-0.10608	8554560	-0.12886	1031676
		-0.06333	-3090292	-0.06435	-3717858	-0.065	-4533893	-0.06359	-3238111	-0.06049	-5325735	-0.02816	-1735077
		[-2.36333]	[0.60941]	[-0.40758]	[-2.44592]	[-1.37653]	[0.05030]	[-2.51442]	[-0.34527]	[-1.75372]	[1.60627]	[-4.57660]	[0.59460]
	V(-1)	-5.86E-10	0.522124	1.53E-09	0.487649	-1.29E-10	0.492701	1.80E-09	0.574682	-1.58E-09	0.585224	3.70E-10	0.63939
		-1.30E-09	-0.06364	-1.10E-09	-0.06368	-9.20E-10	-0.06396	-1.20E-09	-0.06363	-7.10E-10	-0.06267	-4.40E-10	-0.02736
		[-0.44950]	[8.20423]	[1.38395]	[7.65820]	[-0.14069]	[7.70382]	[1.43844]	[9.03111]	[-2.21881]	[9.33758]	[0.83431]	[23.3700]
	V(-2)	1.42E-09	0.11533	-9.09E-10	0.126389	2.20E-10	0.266491	-1.51E-09	0.248436	8.68E-10	0.184871	-5.65E-10	0.292736
		-1.30E-09	-0.06352	-1.10E-09	-0.06376	-9.10E-10	-0.06335	-1.20E-09	-0.0631	-7.10E-10	-0.06271	-4.40E-10	-0.02725
		[1.09155]	[1.81557]	[-0.82380]	[1.98211]	[0.24261]	[4.20697]	[-1.21788]	[3.93737]	[2.94823]	[-1.27672]	[10.7441]	
C	-0.00132	758018.3	-0.00124	985026.1	-0.00045	873611.3	-0.00364	973045.3	0.004667	1147597	0.000797	259698.5	
	-0.00248	-121017	-0.00263	-151708	-0.00264	-184084	-0.00459	-233657	-0.00277	-243892	-0.00078	-47979.9	
	[-0.53248]	[6.26372]	[-0.47024]	[6.49291]	[-0.17217]	[4.74573]	[-0.79219]	[4.16442]	[1.68503]	[4.40355]	[1.02395]	[5.41266]	
IPC All-Share	R(-1)	0.350849	-7509.74	0.396197	-395197	0.195802	-389322	0.389162	41875.42	0.415178	142499.4	0.355767	-154925
		-0.06247	-241797	-0.06345	-209472	-0.06444	-211341	-0.06225	-183823	-0.06075	-316566	-0.02763	-100514
		[5.61593]	[-0.03106]	[6.24456]	[-1.88663]	[3.03831]	[-1.84215]	[6.25208]	[0.22780]	[6.83435]	[0.45014]	[12.8761]	[-1.54133]
	R(-2)	-0.14161	-326575	-0.1513	-324018	-0.10523	27171.44	-0.19142	-350474	-0.19257	-342979	-0.15285	-281646
		-0.0625	-241897	-0.06422	-212029	-0.06428	-210798	-0.062	-183107	-0.05943	-309710	-0.02767	-100668
		[-2.26582]	[-1.35006]	[-2.35594]	[-1.52817]	[-1.63711]	[0.12890]	[-3.08724]	[-1.91403]	[-3.24013]	[-1.10742]	[-5.52365]	[-2.79778]
	V(-1)	1.64E-08	0.48206	2.43E-08	0.43199	3.61E-08	0.358796	5.40E-08	0.402558	-2.37E-08	0.378254	1.92E-08	0.495498
		-1.60E-08	-0.06332	-1.90E-08	-0.06406	-2.10E-08	-0.06936	-2.10E-08	-0.06218	-1.20E-08	-0.06219	-7.60E-09	-0.02773
		[1.00221]	[7.61351]	[1.25079]	[6.74322]	[1.70462]	[5.17269]	[2.56250]	[6.47444]	[-1.98257]	[6.08196]	[2.51432]	[17.8709]
	V(-2)	-2.23E-08	0.039319	-2.88E-08	-0.0482	-9.69E-09	0.048789	-4.31E-08	0.212195	8.98E-09	0.051622	-2.26E-08	0.153524
		-1.60E-08	-0.06322	-1.90E-08	-0.06348	-2.10E-08	-0.06964	-2.10E-08	-0.06258	-1.20E-08	-0.06197	-7.60E-09	-0.0277
		[-1.36553]	[0.62193]	[-1.49919]	[-0.75932]	[-0.45609]	[0.70058]	[-2.03325]	[3.39102]	[0.75508]	[0.83296]	[-2.96569]	[5.54147]
C	0.00191	47329.67	0.001691	77596.25	-0.00329	78949.61	-0.00332	64790.78	0.003872	98591.07	0.001082	49518.31	
	-0.00167	-6473.95	-0.00267	-8829.71	-0.00315	-10318.9	-0.00375	-11060.5	-0.00231	-12041.6	-0.00103	-3744.75	
	[1.14164]	[7.31079]	[0.63213]	[8.78809]	[-1.04623]	[7.65099]	[-0.88642]	[5.85785]	[1.67551]	[8.18755]	[1.05068]	[13.2234]	
S&P TSX Index Compo	R(-1)	0.219225	497028.7	0.243142	-564104	0.222683	-695894	0.170998	-420441	0.370787	160842.2	0.206846	-412573
		-0.06862	-362803	-0.06447	-371559	-0.06496	-334675	-0.06527	-193239	-0.06297	-278176	-0.02882	-117193
		[3.19485]	[1.36997]	[3.77154]	[-1.51821]	[3.42784]	[-2.07931]	[2.61993]	[-2.17575]	[5.88835]	[0.57820]	[7.17804]	[-3.52045]
	R(-2)	-0.04998	-394439	-0.08389	-445776	0.004473	-111605	-0.05435	-55199.6	-0.19316	340700	-0.06854	-18651
		-0.069	-364835	-0.06483	-373676	-0.06533	-336578	-0.06516	-192929	-0.06194	-273606	-0.02887	-117429
		[-0.72432]	[-1.08114]	[-1.29393]	[-1.19295]	[0.06847]	[-0.33159]	[-0.83411]	[-0.28611]	[1.24522]	[-2.37372]	[-0.15883]	
	V(-1)	3.17E-09	0.455157	-3.52E-09	0.383454	1.71E-08	0.355731	3.84E-08	0.519929	-1.40E-08	0.376699	9.65E-09	0.534617
		-1.30E-08	-0.06766	-1.10E-08	-0.06455	-1.30E-08	-0.06477	-2.20E-08	-0.06554	-1.40E-08	-0.06271	-7.00E-09	-0.02844
		[0.24761]	[6.72691]	[-0.31433]	[5.94010]	[1.35640]	[5.49209]	[1.73314]	[7.93268]	[0.98494]	[6.00668]	[1.38002]	[18.8012]
	V(-2)	-1.99E-08	0.142753	1.25E-08	0.0372	-1.40E-08	0.09903	-2.98E-08	0.030342	1.05E-08	0.200923	-1.68E-08	0.186258
		-1.30E-08	-0.06793	-1.10E-08	-0.06392	-1.20E-08	-0.06437	-2.20E-08	-0.06474	-1.40E-08	-0.06211	-6.90E-09	-0.02822
		[-1.54819]	[2.10144]	[1.13092]	[0.58198]	[-1.12233]	[1.53834]	[-1.36311]	[0.46868]	[0.74894]	[3.23499]	[-2.42136]	[6.60116]
C	0.003202	56569.92	-0.00144	109003.7	-0.00072	121598.2	-0.00375	113377.8	0.001606	79228.18	0.00159	56075.91	
	-0.0018	-9526.42	-0.00232	-13347.7	-0.00311	-16019.5	-0.00537	-15909.4	-0.00277	-12221.4	-0.00119	-4822.73	
	[1.77705]	[5.93822]	[-0.62132]	[8.16645]	[-0.23245]	[7.59063]	[-0.69847]	[7.12649]	[0.58041]	[6.48274]	[1.34051]	[11.6274]	
IBC	R(-1)	0.359184	38066.17	0.482182	-10827.1	0.389859	24684.51	0.135191	3706.435	0.178451	2598.28	0.357052	-5780.64
		-0.03248	-12500.5	-0.06098	-27280.8	-0.06684	-34568.8	-0.06191	-4619.16	-0.0687	-2379.71	-0.03256	-12510.7
		[11.0575]	[3.04516]	[7.90672]	[-0.39688]	[5.83285]	[0.71407]	[2.18381]	[0.80240]	[2.59768]	[1.09185]	[10.9666]	[-0.46206]
	R(-2)	-0.12746	-421.125	-0.35307	-5592.41	-0.04479	-59486.6	0.222301	6272.136	0.005099	-168.18	-0.12811	-15975.8
		-0.03244	-12485.1	-0.061	-27287.1	-0.06681	-34552.1	-0.06007	-4482.12	-0.06919	-2396.84	-0.03259	-12521.4
		[-3.92861]	[0.03373]	[-5.78830]	[-0.20495]	[-0.67040]	[-1.72165]	[3.70075]	[1.39937]	[0.07369]	[-0.07017]	[-3.93149]	[-1.27609]
	V(-1)	-2.46E-07	0.372891	3.50E-08	0.191029	1.13E-07	0.349946	-1.71E-06	0.171052	-1.05E-06	-0.02459	1.22E-07	0.369269
		-8.20E-08	-0.03162	-1.60E-07	-0.06997	-1.20E-07	-0.06336	-8.00E-07	-0.06353	-2.00E-06	-0.06907	-8.30E-08	-0.03178
		[-2.99021]	[11.7940]	[0.22377]	[2.73007]	[0.92431]	[5.52295]	[-2.00568]	[2.69265]	[-0.52878]	[-0.35605]	[1.47773]	[11.6188]
	V(-2)	1.31E-07	0.267254	-3.12E-07	0.05705	3.68E-08	0.317383	8.52E-07	0.171643	-2.87E-06	0.020842	-1.73E-07	0.2618
		-8.30E-08	-0.03176	-1.60E-07	-0.06969	-1.20E-07	-0.06356	-8.50E-07	-0.06334	-2.00E-06	-0.06879	-8.30E-08	-0.03171
		[1.58247]	[8.41360]	[-2.00285]	[0.81861]	[0.29983]	[4.99342]	[1.00338]	[2.71000]	[1.44511]	[0.30299]	[-2.09628]	[8.25688]
C	-0.00017	1063.673	0.003357	4832.04	-0.00149	1361.468	0.000618	265.0234	0.001502	117.7327	0.000648	1043.607	
	-0.00043	-167.139	-0.00153	-686.082	-0.00083	-428.277	-0.00077	-57.3834	-0.00065	-22.4799	-0.00043	-166.905	
	[-0.39513]	[6.36400]	[2.18900]	[7.04295]	[-1.80231]	[3.17894]	[0.80398]	[4.61847]	[2.31423]	[2.53725]	[1.49075]	[6.25269]	
S&P 500	R(-1)	0.316018	-4947237	0.293866	114804.4	0.241014	-1.6E+07	0.233996	-1E+07	0.301472	5588909	0.240331	-7884419
		-0.06372	-3881751	-0.06428	-4634956	-0.06628	-5031835	-0.06403	-3209287	-0.06317	-5816559	-0.02815	-1791596
		[4.95934]	[-1.27449]	[4.57163]	[0.02477]	[3.63616]	[3.25002]	[3.65469]	[-3.14353]	[4.77259]	[0.96086]	[8.53721]	[-4.40078]
	R(-2)	-0.11247	-535164	-0.10893	-1.1E+07	-0.11435	6644836	-0.21055	-399797	-0.15963	8673056	-0.17675	2607807
		-0.06373	-3882415	-0.06383	-4602841	-0.0661	-5017697	-0.06265	-3140272	-0.06048	-5569443	-0.02789	-1774915
		[-1.76465]	[-0.13784]	[-1.70643]	[-2.48943]	[-1.72999]	[1.32428]	[-3.36071]	[-0.12731]	[-2.63925]	[1.55726]	[-6.33752]	[1.46926]
	V(-1)	2.76E-10	0.52811	1.10E-09	0.483437	7.28E-10	0.390615	2.67E-09	0.5208	-1.45E-09	0.579154	9.37E-10	0.603231
		-1.00E-09	-0.06364	-8.80E-10	-0.06345	-8.40E-10	-0.06345	-1.30E-09	-0.06283	-6.80E-10	-0.06246	-4.30E-10	-0.0271
		[0.26460]	[8.29876]	[1.									

	-	-	-	-	-	-0.06604	-97352.1	-0.06301	-782.917	-0.06462	-1792.88	-0.03679	-24223.9
R(-2)	-	-	-	-	-	[2.91301]	[-0.39983]	[0.86320]	[-0.71474]	[4.72779]	[0.43918]	[6.76759]	[-0.32784]
	-	-	-	-	-	-0.02455	118319.1	-0.19948	-503.594	-0.12434	2805.54	-0.15227	24059.75
	-	-	-	-	-	-0.06608	-97404.3	-0.06267	-778.705	-0.06301	-1748.23	-0.03678	-24221.5
V(-1)	-	-	-	-	-	[-0.37155]	[1.21472]	[-3.18312]	[-0.64671]	[-1.97317]	[1.60479]	[-4.13975]	[0.99332]
	-	-	-	-	-	-6.33E-08	0.636191	7.32E-06	0.51213	4.39E-08	0.434557	0.646E-08	0.64674
	-	-	-	-	-	-4.20E-08	-0.06247	-5.10E-06	-0.06291	-2.30E-06	-0.06483	-5.30E-08	-0.0349
V(-2)	-	-	-	-	-	[-1.49463]	[10.1836]	[1.44518]	[8.14120]	[0.01877]	[6.70328]	[-1.14415]	[18.5300]
	-	-	-	-	-	7.46E-08	0.274198	-3.25E-06	0.207278	7.02E-07	0.024813	7.44E-08	0.28481
	-	-	-	-	-	-4.10E-08	-0.06111	-5.10E-06	-0.06303	-2.30E-06	-0.064	-5.20E-08	-0.03414
	-	-	-	-	-	[1.79943]	[4.48690]	[-0.64167]	[3.28865]	[0.30423]	[0.38772]	[1.43526]	[8.34350]
C	-	-	-	-	-	0.000421	2785.027	-0.00767	416.1008	0.00043	818.0783	0.000297	703.6484
	-	-	-	-	-	-0.00129	-1908.41	-0.00649	-80.6131	-0.00378	-104.997	-0.00077	-505.216
	-	-	-	-	-	[0.32553]	[1.45935]	[-1.18292]	[5.16170]	[0.11369]	[7.79143]	[0.38649]	[1.39277]

R- Return and V-Volume.

TABLE 14: LEAD –LAG RELATIONSHIP BETWEEN VOLUME AND VOLATILITIES
VECTOR AUTOREGRESSION ESTIMATES (2005-10)

NAME OF COUNTRY INDICES	First		Second		Third		Fourth		Fifth		First to Fifth		
	RR	V	RR	V	RR	V	RR	V	RR	V	RR	V	
Dow Jones Composites	RR(-1)	0.159371	-1.78E+08	0.14466	-2.10E+08	0.079908	-8.16E+08	0.167204	-1.21E+08	0.00393	-3.35E+08	0.216271	-1.88E+08
		-0.06537	-3.40E+08	-0.06784	-3.40E+08	-0.06669	-3.30E+08	-0.06307	-8.50E+07	-0.06502	-3.90E+08	-0.02759	-5.40E+07
		[2.43809]	[-0.53018]	[2.13228]	[-0.61936]	[1.19820]	[-2.48288]	[2.65106]	[-1.42969]	[0.06045]	[-0.86272]	[7.83962]	[-3.51600]
	RR(-2)	-0.01352	-3.30E+08	0.02709	37518435	0.041331	3.58E+08	0.269696	40610314	0.039946	4.76E+08	0.286593	56289167
		-0.06549	-3.40E+08	-0.06761	-3.40E+08	-0.06635	-3.30E+08	-0.06284	-8.40E+07	-0.04907	-2.90E+08	-0.02765	-5.40E+07
		[-0.20637]	[-0.98402]	[0.40070]	[0.11105]	[0.62288]	[1.09542]	[4.29207]	[0.48134]	[0.81411]	[1.62673]	[10.3635]	[1.04747]
	V(-1)	2.71E-11	0.526229	1.16E-11	0.499648	4.25E-11	0.565907	1.45E-10	0.637451	2.78E-11	0.606592	7.07E-11	0.668838
		-1.30E-11	-0.06497	-1.30E-11	-0.06732	-1.30E-11	-0.06466	-4.70E-11	-0.06374	-1.10E-11	-0.06361	-1.40E-11	-0.02754
		[2.14124]	[8.09944]	[0.85763]	[7.42253]	[3.23748]	[8.75231]	[3.06315]	[10.0001]	[2.60438]	[9.53649]	[4.98775]	[24.2821]
	V(-2)	-1.49E-11	0.128566	-1.10E-11	0.132621	2.35E-11	0.243377	-2.51E-11	0.210523	-2.42E-12	0.155873	-2.61E-11	0.277958
		-1.30E-11	-0.06526	-1.30E-11	-0.06715	-1.40E-11	-0.06788	-4.90E-11	-0.06545	-1.10E-11	-0.06431	-1.40E-11	-0.02789
		[-1.17055]	[1.97014]	[-0.81503]	[1.97503]	[1.70919]	[3.58527]	[-0.51575]	[3.21678]	[-0.22488]	[2.42366]	[-1.81542]	[9.96641]
C	7.34E-07	736667.9	3.19E-05	942034.4	-0.00016	733154.2	-0.00045	885288.5	-4.83E-05	1186106	-0.00011	220465	
	-2.40E-05	-122800	-3.10E-05	-155695	-4.00E-05	-196839	-0.00019	-250787	-4.20E-05	-247780	-2.60E-05	-49885.4	
	[0.03066]	[5.99895]	[1.02519]	[6.05050]	[-4.04614]	[3.72464]	[-2.43333]	[3.53004]	[-1.16359]	[4.78693]	[-4.14021]	[4.41943]	
IPC All-Share	RR(-1)	0.151033	2988677	0.263706	-2059058	0.117886	5381947	0.203011	3376830	0.334092	26245281	0.296817	1731917
		-0.06723	-2.00E+07	-0.06773	-1.00E+07	-0.0686	-1.10E+07	-0.06842	-4989152	-0.06316	-1.90E+07	-0.02896	-3460414
		[2.24636]	[0.15283]	[3.89362]	[-0.20178]	[1.171853]	[0.50265]	[2.96695]	[0.67683]	[5.28970]	[1.35180]	[10.2508]	[0.50049]
	RR(-2)	-0.02455	-9129180	0.184954	-58997.5	-0.03979	-1.7E+07	0.120216	11601651	-0.03587	-4E+07	0.180881	3874864
		-0.0671	-2.00E+07	-0.06765	-1.00E+07	-0.06806	-1.10E+07	-0.06712	-4893966	-0.05867	-1.80E+07	-0.02887	-3450429
		[-0.36582]	[-0.46778]	[2.73380]	[-0.00579]	[-0.58460]	[-1.63813]	[1.79110]	[2.37060]	[-0.61136]	[-2.21047]	[6.26495]	[1.12301]
	V(-1)	5.91E-10	0.481067	-8.91E-11	0.46488	1.48E-09	0.353102	2.85E-09	0.363148	3.11E-10	0.366427	9.72E-10	0.495199
		-2.30E-10	-0.06831	-4.60E-10	-0.06884	-4.70E-10	-0.07332	-9.30E-10	-0.06812	-2.10E-10	-0.06337	-2.40E-10	-0.0292
		[2.51463]	[7.04291]	[-0.19509]	[6.75280]	[3.15519]	[4.81579]	[3.05239]	[5.33098]	[1.50887]	[5.78274]	[3.97880]	[16.9598]
	V(-2)	-5.89E-10	0.042517	6.95E-11	-0.05953	2.71E-11	0.073194	1.92E-09	0.123021	-1.78E-10	0.079057	9.33E-11	0.135027
		-2.30E-10	-0.06771	-4.60E-10	-0.06894	-4.80E-10	-0.07459	-9.50E-10	-0.06963	-2.10E-10	-0.06336	-2.50E-10	-0.02937
		[-2.53014]	[0.62792]	[0.15180]	[-0.86349]	[0.05672]	[0.98131]	[2.00748]	[1.76689]	[-0.86409]	[1.24768]	[0.37985]	[4.59772]
C	7.10E-05	47093.93	8.98E-05	74188.19	-3.99E-05	78513.27	-0.00054	81230.75	5.53E-05	97212.4	-5.41E-05	50798.69	
	-2.30E-05	-6544.68	-5.90E-05	-8948.95	-6.90E-05	-10760.8	-0.00017	-12688.4	-3.90E-05	-12057.1	-3.30E-05	-3926.2	
	[3.15631]	[7.19576]	[1.51166]	[8.29016]	[-0.57883]	[7.29622]	[-3.11505]	[6.40198]	[1.40890]	[8.06267]	[-1.64628]	[12.9384]	
S&P TSX Index Compo	RR(-1)	0.052599	28284906	0.125104	-7.2E+07	0.205206	16150899	0.102985	8111171	0.184281	640086.5	0.153647	8276290
		-0.06855	-3.20E+07	-0.06326	-3.20E+07	-0.06589	-1.90E+07	-0.06617	-4747997	-0.06573	-3.00E+07	-0.02873	-3463676
		[0.76727]	[0.87847]	[1.97769]	[-2.25504]	[3.11420]	[0.83646]	[1.55647]	[1.70834]	[2.80352]	[0.03150]	[5.34774]	[2.38945]
	RR(-2)	0.061864	29289004	0.296398	22996125	-0.02092	3928002	0.186661	10539324	0.053828	44303964	0.226748	9814858
		-0.06866	-3.20E+07	-0.06375	-3.20E+07	-0.06459	-1.90E+07	-0.06671	-4786712	-0.06239	-1.90E+07	-0.0288	-3472355
		[0.90107]	[0.90830]	[4.64938]	[0.71893]	[-0.32385]	[0.20755]	[2.79830]	[2.20179]	[0.86277]	[2.29690]	[7.87234]	[2.82657]
	V(-1)	1.56E-10	0.4449	2.40E-10	0.434891	7.81E-10	0.355406	1.15E-09	0.498521	3.28E-11	0.380049	7.35E-10	0.52178
		-1.40E-10	-0.06795	-1.30E-10	-0.06581	-2.20E-10	-0.06573	-9.40E-10	-0.0671	-2.10E-10	-0.06474	-2.40E-10	-0.02908
		[1.07893]	[6.54704]	[1.83194]	[6.60837]	[3.48202]	[5.40728]	[1.22894]	[7.42902]	[1.05678]	[5.87060]	[3.04718]	[17.9407]
	V(-2)	2.06E-11	0.133624	-1.26E-10	0.028803	6.63E-11	0.073086	1.02E-09	-0.03742	3.48E-10	0.158906	5.10E-10	0.156613
		-1.50E-10	-0.0682	-1.30E-10	-0.06558	-2.30E-10	-0.06733	-9.20E-10	-0.06589	-2.10E-10	-0.06431	-2.40E-10	-0.02889
		[0.14199]	[1.95930]	[-0.96466]	[0.43917]	[0.28852]	[1.08542]	[-1.11071]	[-0.56793]	[1.17211]	[2.47097]	[2.12616]	[5.42111]
C	8.91E-06	57259.64	7.76E-06	103050.7	-0.00012	125750	-0.00027	129541	-1.66E-06	82869.32	-0.00017	62066.61	
	-2.00E-05	-9534.26	-2.60E-05	-13226.3	-5.70E-05	-16689.4	-0.00023	-16720.7	-4.00E-05	-12307.2	-4.20E-05	-5093.81	
	[0.43875]	[6.00567]	[0.29420]	[7.79135]	[-2.10832]	[7.53474]	[-1.15537]	[7.74733]	[-0.41176]	[6.73338]	[-3.92324]	[12.1847]	
IBC	RR(-1)	0.318672	617205.2	0.302971	860969.6	0.327528	4728961	0.366837	-18621	0.435099	34944.78	0.324179	956772.6
		-0.03072	-293980	-0.06058	-460808	-0.06553	-1927293	-0.06069	-240763	-0.06922	-184921	-0.03079	-291179
		[10.3734]	[2.09948]	[5.00158]	[1.86839]	[4.99797]	[2.45368]	[6.04451]	[-0.07734]	[6.28542]	[0.18897]	[10.5294]	[3.28586]
	RR(-2)	0.335728	-77223.8	0.376062	118664.2	0.163954	-782311	-0.05954	161435.1	-0.09707	33096.39	0.338663	-58745.4
		-0.03074	-294163	-0.06119	-465452	-0.0664	-1952877	-0.05393	-213942	-0.06943	-185467	-0.03099	-293063
		[10.9218]	[-0.24722]	[-6.14626]	[0.25494]	[2.46911]	[-0.40059]	[-1.10400]	[0.75458]	[-1.39816]	[0.17845]	[10.9291]	[-0.20045]
	V(-1)	3.37E-10	0.368691	-2.43E-09	0.169639	4.67E-10	0.352577	1.61E-08	0.177219	-1.92E-08	-0.03233	-1.12E-09	0.359643
		-3.30E-09	-0.03174	-9.10E-09	-0.06954	-2.20E-09	-0.06341	-1.60E-08	-0.06388	-2.60E-08	-0.06936	-3.40E-09	-0.03171
		[0.10146]	[11.6146]	[-0.26604]	[2.43948]	[0.21650]	[5.56045]	[0.99685]	[2.77432]	[-0.73764]	[-0.46606]	[-0.33392]	[11.3399]
	V(-2)	1.01E-08	0.2524	9.51E-09	0.041215	1.19E-09	0.292189	5.14E-09	0.168521	2.05E-08	0.015679	6.66E-09	0.25008
		-3.30E-09	-0.03182	-9.00E-09	-0.06871	-2.10E-09	-0.06261	-1.60E-08	-0.06373	-2.60E-08	-0.06943	-3.30E-09	-0.03142

	-0.06594	-5.70E+08	-0.06903	-5.20E+08	-0.06834	-3.90E+08	-0.0639	-7.80E+07	-0.06593	-4.40E+08	-0.02763	-5.00E+07
	[2.53193]	[-1.34676]	[2.04945]	[0.37802]	[-1.35456]	[-2.95224]	[1.87463]	[-1.08314]	[1.00226]	[-1.21138]	[6.67182]	[-2.79963]
RR(-2)	-0.00679	-1.7E+07	0.045556	-1.15E+08	0.048367	3.84E+08	0.256593	-2.4E+07	0.003401	4.84E+08	0.294327	-3850798
	-0.06614	-5.80E+08	-0.06871	-5.20E+08	-0.0675	-3.90E+08	-0.06382	-7.80E+07	-0.05304	-3.60E+08	-0.0277	-5.00E+07
	[-0.10266]	[-0.02925]	[0.66299]	[-0.21946]	[0.71657]	[0.98669]	[4.02072]	[-0.30798]	[0.06412]	[1.36409]	[10.6254]	[-0.07667]
V(-1)	2.25E-11	0.55441	8.46E-12	0.477671	6.79E-11	0.515534	1.54E-10	0.588741	1.91E-11	0.61746	7.62E-11	0.634856
	-7.60E-12	-0.06594	-9.00E-12	-0.0684	-1.10E-11	-0.06496	-5.20E-11	-0.06381	-9.70E-12	-0.06479	-1.50E-11	-0.02742
	[2.96418]	[8.40831]	[0.94024]	[6.98308]	[6.03072]	[7.93614]	[2.95318]	[9.22644]	[1.97580]	[9.53029]	[5.03589]	[23.1498]
V(-2)	-1.25E-11	0.104275	-3.40E-12	0.146407	5.74E-12	0.279157	-1.14E-11	0.263777	-7.73E-13	0.151584	-2.53E-11	0.31226
	-7.70E-12	-0.06661	-8.90E-12	-0.06766	-1.20E-11	-0.07082	-5.30E-11	-0.06528	-9.70E-12	-0.06502	-1.50E-11	-0.02772
	[-1.63681]	[1.56545]	[-0.38222]	[2.16401]	[0.46743]	[3.94157]	[-0.21229]	[4.04054]	[-0.07959]	[2.33144]	[-1.65678]	[11.2644]
C	-3.84E-06	728736.3	9.03E-06	953849.4	-0.00018	809515.5	-0.00053	873250.5	-1.83E-05	1168860	-0.00013	220645.1
	-1.40E-05	-123759	-2.10E-05	-159672	-3.90E-05	-226348	-0.00021	-260739	-3.70E-05	-246818	-2.90E-05	-51728.8
	[-0.27016]	[5.88836]	[0.43005]	[5.97381]	[-4.50700]	[3.57642]	[-2.48512]	[3.34914]	[-0.49622]	[4.73573]	[-4.40423]	[4.26542]
RR(-1)	-	-	-	-	0.186247	-3851773	0.187566	13860.04	-0.01929	-81436.3	0.266374	-181815
	-	-	-	-	-0.06566	-3960860	-0.06405	-14110.8	-0.06934	-98774.4	-0.03524	-483137
	-	-	-	-	[2.83660]	[-0.97246]	[2.92848]	[0.98223]	[-0.27812]	[-0.82447]	[7.55819]	[-0.37632]
RR(-2)	-	-	-	-	-0.00274	-5727548	0.279726	32767.22	0.000995	43110.77	0.322882	-256897
	-	-	-	-	-0.06589	-3974963	-0.0641	-14122	-0.06058	-86299	-0.03525	-483277
	-	-	-	-	[-0.04161]	[-1.44091]	[4.36394]	[2.32030]	[0.01642]	[0.49955]	[9.15891]	[-0.53157]
V(-1)	-	-	-	-	1.70E-09	0.62678	6.02E-07	0.479622	1.83E-07	0.461592	2.02E-09	0.646072
	-	-	-	-	-1.00E-09	-0.0624	-2.90E-07	-0.06485	-4.90E-08	-0.06956	-2.50E-09	-0.03492
	-	-	-	-	[1.64421]	[10.0450]	[2.04412]	[7.39625]	[3.74658]	[6.63630]	[0.79262]	[18.5006]
V(-2)	-	-	-	-	-2.54E-09	0.275139	1.12E-07	0.149987	-5.45E-08	0.013156	-3.01E-09	0.284651
	-	-	-	-	-1.00E-09	-0.06086	-2.90E-07	-0.06463	-4.90E-08	-0.0705	-2.50E-09	-0.03414
	-	-	-	-	[-2.52071]	[4.52118]	[0.38288]	[2.32082]	[-1.10198]	[0.18660]	[-1.20821]	[8.33708]
C	-	-	-	-	0.000229	5491.71	-0.00066	515.6236	-3.96E-05	807.8509	0.000174	894.6003
	-	-	-	-	-3.90E-05	-2338.99	-0.00039	-86.9477	-7.90E-05	-112.083	-4.00E-05	-552.141
	-	-	-	-	[5.89809]	[2.34789]	[-1.66303]	[5.93028]	[-0.50300]	[7.20764]	[4.31458]	[1.62024]

RR- Volatilities and V-Volume.

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