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RELATIONSHIP BETWEEN STOCK MARKET INDICATORS AND FOREIGN PORTFOLIO INVESTMENT (FPI): EVIDENCE FROM PAKISTAN

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ARTICLEINFO	ABSTRACT
	This research study is designed to study the relationship between stock market indicators and net foreign portfolio investment (NFPI). Long-term and short-term relationships of five stock market indicators namely stock market capitalization, market returns, market turnover, market risk and market indices with NFPI are analysed through co-integration and vector error correction models (VECM). Three co-integrated vectors are found to show long term relationships and three variables are found to have short term relationships. Similarly, past values have an impact on current values. Regression analysis displays the impact of stock market indicators on NFPI. The results demonstrate that all the stock market indicators have positive and significant impact on NFPI except the market risk which has a negative relation with NFPI. ©2019 INT TRANS J ENG MANAG SCI TECH.

1. INTRODUCTION

In the current era of globalization and trade liberalisation, borders are getting meaningless especially in terms of the stock market investment. The free movement of foreign capital across borders has increased due to trade liberalisation policies. The bilateral and multilateral trade agreements have opened the doors for investors to invest freely across the borders. Developing countries need foreign capital because they have great potential to increase their productivity, foreign exchange reserves, filling trade deficit gap and strengthening economy, etc. Through foreign investment countries can get access to foreign capital in order to fulfill their financial and economic needs.

Pakistan is the unit of analysis of the study because of its growing economy especially the booming stock market in the recent past. Pakistan was included in the next eleven countries by Goldman Sachs after the emergence of BRICS countries in 2005. The study is about foreign capital flows to Pakistan with emphasis on foreign portfolio investment (FPI). Though researchers have

worked on foreign direct investment (FDI) but no significant work is done on foreign portfolio investment (FPI) in Pakistan. Pakistan Stock Exchange (PSX) is the major stock market in Pakistan. The study has focused on the influence of FPI on the key indicators of PSX. These indicators include stock market performance, market size, market liquidity, market returns, and market risk. There are two major types of foreign capital. One is foreign direct investment (FDI) and another is foreign portfolio investment (FPI). FDI is concerned with direct control over management. There is a lasting interest in an entity in a foreign country by an entity of the home country (UNCTAD, 1999). There is a long-run relationship between the enterprise and the investor (Shah, 2017b). Direct investment is a category of cross-border investment associated with a resident in one economy having control or a significant degree of influence on the management of an enterprise that is resident in another economy. Ownership of 10 percent or more of the ordinary shares of voting stock is the criteria for determining the existence of a direct investment relationship. On other hand in FPI, the investor has no lasting relationship with the enterprise. Investment is made by investors only in equity and debt securities of that enterprise for capital gains and returns (UNCTAD, 1999). Investment is made in the securities that are traded on the stock market of a country.

In today's era, investors are investing across borders. Investors face various problems while investing in foreign capital markets. The major problem is the understanding of all those factors which may influence the investment decisions of foreign investors to invest in the stock market of any particular country. In the study, it is tried to solve this particular question in order to understand the relationship of host country factors that will help investors to make a better investment decision while investing in Pakistan stock exchange (PSX).

The primary research questions of the study are 1) What are the stock market factors of PSX which influence FPI in long, as well in the short-run? and 2) What is the degree of impact of PSX stock market factors on FPI flows?

2. LITERATURE REVIEW

Khan (1996) argued that foreign capital flows, especially portfolio investment, non-resident foreign currency deposits, and other short-term inflows are an important part of the private capital investment into Pakistan. Uncertainty and an optional risk are always associated with such type of short term investments. These hitches result in the creation of a crisis and lead to instability and higher volatility in exchange rate risk and interest rates. Due to this State Bank of Pakistan is in shortage of foreign reserves to meet the outflows, thus balance of payments crisis arises. Speculated higher economic growth rate of a country and expected higher returns for investors are the main reasons that FPI has increased in the developing countries. Khan (1996) explored the inherent problems of FPI. Due to its short-term nature, it is easily reversible thus creating a threat to the local investors' investment and the economy of the host country.

Badani and Tripathi (2009) employed the autoregressive integrated moving average (ARIMA) model to examine the relationship between foreign institutional investors (FIIs) and the Indian stock market. It was found that the past FIIs have significant impact on the current Sensex and NSE Index, but not much impact of current FIIs on the current indices was observed. A significant finding of the study was that the FIIs in India need well-calibrated policy response, whereas the daily movement of

stock market can be better explained by factors other than FIIs.

Adabag and Ornelas (2004) investigated the influence of foreign portfolio investment on the Istanbul Stock Exchange (ISE) and used a Vector Autoregressive (VAR) model. The monthly contemporaneous relationship is found between the two variables. Evidence of negative feedback trading found which is beneficial for the market as it smooths the market movements. So, foreign traders cannot be blamed for destabilisation of Turkish stock market. According to Warther (1995), if the positive feedback hypothesis is true, then there should be a higher positive correlation between monthly flows and returns from weeks at the beginning of the same month and end of the previous month.

Anayochukwu (2012) studied the relationship between Nigerian stock market returns and foreign portfolio investment and found that FPI has a positive and significant impact on stock market returns. Inflation was reported as insignificant. Halale (2014) investigated relationship of Indian stock market indicators with FPI by computing Pearson correlation coefficient and concluded that foreign investment has positive and significant impact on market index. It also has some influence on price to earnings ratio, dividend yield, and book value.

2.1 THEORETICAL BACKGROUND

Some basic theories regarding foreign portfolio investment account for the study. Markowitz (1952) portfolio investment theory explains the motives and benefits of portfolio investment. The main motive behind portfolio investment is risk diversification and maximization of the returns. Portfolio investment diversification theory says that investors make their decisions mainly on two factors that are risk associated with the return. Markowitz (1952) and Tobin (1958) worked on this theory's foundation. According to Markowitz (1952) and Tobin (1958), investors may reduce their risk level through diversification as the securities prices move with one another.

2.2 INTERNATIONAL PORTFOLIO DIVERSIFICATION

Harry Markowitz (1952) was the first who engineered the model of portfolio optimization. He established that adding an asset to a group of assets (portfolio) that have low correlation leads to the improvement of risk and return profile of assets. Moreover, studies by Evans and Archer (1968), Wagner and Lau (1971) also confirmed the advantages of optimized portfolio diversification model. Grubel (1968) reasoned that despite the criticism made by different studies regarding portfolio diversification model, it is preferred and got fame in investment management industry. Grubel (1968) tested the model in international settings in the context of claims regarding foreign currencies and the impact of the analysis made by the model. He used the stock market indices of eleven countries and came to the conclusion that US stock market has been ruled by a well-diversified international portfolio in terms of ex-post returns and risk. Grubel's work is followed by many others like Sarnat (1970), Solnik (1974), Errunza (1977, 1983). These studies have also verified the benefits of investment in internal stocks. Levy and Sarnat (1970) examined twenty-eight countries' stock market performance (indices) from 1951 to 1967. They revealed that there exists an inverse relationship (negative correlation) between Japanese and US stock market indices during the study period. Due to this reason, investments in this stock market indices will lead to an optimal portfolio. They suggested to the US investors that they can improve their risk-return profile by adding stock from countries like

Japan, South Africa, and emerging countries of South America and Asia which have negative correlation with US stocks.

2.3   FPI TO PAKISTAN

The removal of trade and investment barriers by developed and developing countries in the early 1980s and 1990s respectively had played an important role in the movement of capital across borders (Shah, 2018a). Liberalisation and market integration policies were adopted by different countries across the globe in the 1980s (Shah, 2018c). New markets and institutions emerged due to these steps towards financial liberalisation. This resulted in the huge influx of FPI to different counties and it is worth mentioning that market capitalization of emerging markets has gone up by ten times from 1986 to 1995. It is claimed that this is all because of liberalisation of financial markets and institutionalization of savings and investment (World Investment Report, 1997). In 1988, foreign investors were investing in stock market of only three countries as they have removed barriers for foreign investment. This number went to 26 in 1995 which were totally free for foreign investment, eleven were relatively free and one still closed for foreign investors (WIR, 1997). FPI strengthens local markets financially as well as legally by demanding better environment, rules, regulations, etc. It also increases liquidity of local stock market by increasing turnover and trading volume. FPI also helps domestic firms to finance their projects and business operations through primary and secondary markets. Multinational companies (MNCs) are very much supported by these improvements helping their operations. In return MNCs facilitate the country to receive more FPI. FPI flows are attracted to markets having better performance, higher degree of liquidity, international accounting standards and favourable policies and regulations (Khan, 1996). After the liberalisation policies in 1990s Pakistan opened its door for foreign investors. A foreign investor invested in Pakistan stock exchange (PSX, formally KSE i.e. Karachi Stock Exchange). PSX has performed well and has offered higher returns.

3.   RESEARCH METHODS AND ANALYSIS

The research study is quantitative in nature and secondary data is collected from the authentic sources of State Bank of Pakistan (SBP), National Clearing Company of Pakistan (NCCPL), Pakistan Bureau of Statistics, International Monetary Fund (IMF), World Bank and PSX, etc websites. Secondary data is used to find out the impact of FPI on stock market indicators. The analysis is carried out through quarterly data in order to determine short term and long term relationships among variables respectively. Quarterly data for a period of ten years from July 2007 to June 2017 that is forty observations are analysed for each variable. Most significant stock market factors derived from literature include five key stock market indicators namely stock market capitalization (SMCP) used as a proxy for stock market size, stock market turnover (SMTRNOVR) used as a proxy for stock market liquidity, stock market returns (SMRTN), stock market risk i.e. standard deviation (SMRSK) and stock market indices (SMINDX) showing the performance of the stock market.

Table 1: Independent Variables; Stock Market Indicators

Stock Market Variables	Proxy
Stock Market Size	Stock Market Capitalization (SMCP)
Stock Market Liquidity	Stock Market Turnover (SMTRNOVR)
Stock Market Return (SMRTN)	Stock Market Return (SMRTN)
Stock Market Performance	Stock Market Indices (SMINDX)
Stock Market Risk	Three quarters moving average Standard deviation of Stock Market Returns (SMRSK)

3.1 DEPENDENT VARIABLE

The dependent variable of the study will be the Net Foreign Portfolio Investment (NFPI).

3.2 INDEPENDENT VARIABLES

The independency of FPI on the set of five variables will be analysed. The set of variables includes five stock market indicators as shown in Table 1.

3.3 DATA RELIABILITY

The reliability of selected data was checked through the commonly used Cronbach's alpha statistic. Table 2, N = 6, the calculated value of the statistic is 0.578, indicating the data is fairly reliable, as a value is greater than 0.50 and could be used for further analysis.

Table 2: Reliability Statistics

Cronbach's Alpha	N of Items
0.578	6

3.4 DESCRIPTIVE ANALYSIS

The important task is to check for the data description using the descriptive analysis. The descriptive analysis gives the basic description of the data, such as mean, median, standard deviation, skewness, and kurtosis. Table 3 shows the descriptive statistics of the dependent variable (NFPI) and independent variables (stock market indicators). Skewness shows the shape of the distribution. All the variables have positive skewness except stock market turnover. This means that all variables have maximum values on right side of the mean except stock market turnover which has more observations to left of the mean. Kurtosis shows the steepness/flatness of the data. All the variables have positive kurtosis. Net portfolio investment, stock market risk and stock market returns have high peaks and leptokurtic distribution as their values are greater than 3. Stock market capitalization and stock market turnover have mesokurtic or normal distribution as they have values greater than 2 whereas stock market index has platykurtic distribution that is it is flat.

Table 3: Descriptive Statistics.

Statistic	NFPI	SMCP	SMINDX	SMRSK	SMRTN	SMTRNOVR
Mean	0.335	-1.593	9.780	0.066	-0.016	-1.252
Median	0.111	-1.647	9.610	0.046	-0.052	-1.160
Maximum	6.514	-0.832	10.796	0.286	0.544	-0.243
Minimum	-1.581	-2.105	8.698	0.003	-0.158	-2.449
Std. Dev.	1.196	0.362	0.586	0.073	0.137	0.562
Skewness	3.684	0.527	0.147	2.000	2.469	-0.636
Kurtosis	19.339	2.268	1.787	6.213	9.505	2.808
Jarque-Bera	2.398	2.747	2.596	43.871	111.155	2.757
Probability	0.290	0.253	0.273	0.000	0.000	0.252

3.5 CORRELATION

Correlation is used to access the strength of a linear association between the variables. Positive and negative correlation shows the direction of the linear relationship between two variables. As the variables are all continuous in nature the best approach is Pearson Correlation. It is computed by Eviews 9 statistical software. Table 4 presents the Pearson correlation between variables and their p-values. Stock market returns have a negative correlation with stock market turnover and stock market index. Similarly, stock market turnover has negative correlation with stock market

capitalization and stock market risk. Stock market capitalization and stock market index have also negative correlation. The stock market index has negative correlation with stock market risk.

Table 4: Pearson Correlation Between Variables

Variables	SMRTN	SMTRNOVR	SMCP	SMINDX	SMRSK
SMRTN	1	-.024	.453**	-.218	.665**
SMTRNOVR	-.024	1	-.271	.602**	-.001
SMCP	.453**	-.271	1	-.816**	.644**
SMINDX	-.218	.602**	-.816**	1	-.332*
SMRSK	.665**	-.001	.644**	-.332*	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

3.6 ECONOMETRIC TECHNIQUES

After analysing descriptive statistics and correlation, we applied the co-integration analysis technique and Vector error correction model to check the long and short-run relationship between NFPI and stock market indicators. Finally for accessing the impact of independent variables i.e. stock market indicators on the dependent variable NFPI multiple regression analysis is used.

3.7 UNIT ROOT TEST (ADF)

Usually, most of the financial variables are non-stationary in general, which is evident from the multiple graphs presented in Figure 1.
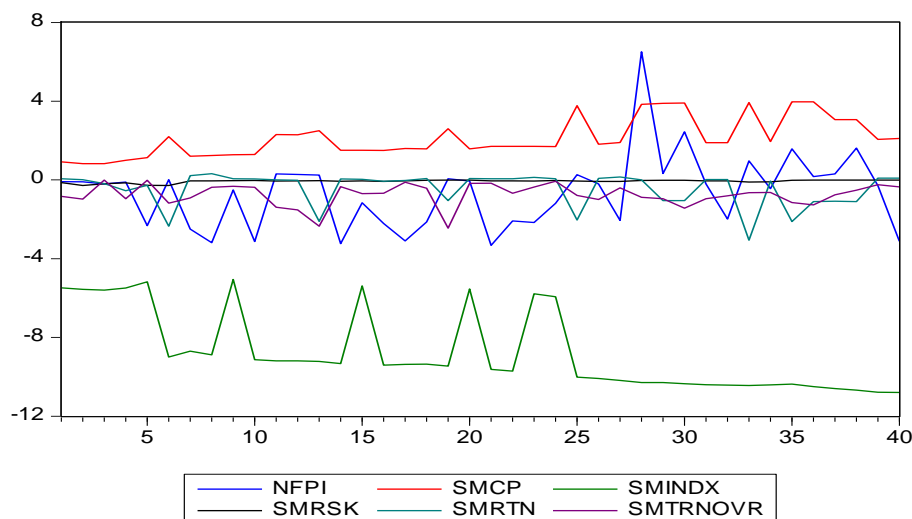
Figure 1: Differences and stationarity of data.

Therefore it is essential for the research to test first for the stationarity of variables before generalizing any decision, discussion and relationship. For this purpose, we are using unit-roots Augmented Dickey-Fuller tests Dickey (1976) and Fuller (1976). The test investigated that, at the null hypothesis each variable is not unit root or non- stationary versus alternative each variable is unit root or non-stationary.

Table 5: Unit Roots Test Results

Variable Name	Test statistic			
	ADF Test Statistics		ADF Test Statistics	
	Level	Critical values %5/10%	1st differences	Critical values %5/10%
NFPI	-6.082	-2.939/-2.608	-12.374	-2.941/-2.609
SMCP	-3.071	-2.946/-2.612	-5.386	-2.946/-2.612
SMINDX	0.716	-2.939/-2.608	-3.543	-2.941/-2.609
SMRSK	-2.635	-2.939/-2.608	-7.782	-2.941/-2.609
SMRTN	-3.201	-2.939/-2.608	-4.433	-2.943/-2.610
SMTRNOVR	-1.269	-2.943/-2.610	-6.490	-2.943/-2.610

* ADF Test showing Stationarity of time series data at first difference

The test results, presented in Table 5 indicate that all variables are non-stationary or not unit root at the level. Stationarity is achieved at first differences of each variable. The selected variables in this on-going research study are all stationary at same level i.e. at first differences, therefore, it's suitable for co-integration analysis. As the data set satisfies the basic assumption for co-integration analysis which is all the selected variables must be stationary at same level.

3.8 CO-INTEGRATION

The co-integration analysis is used to check whether the selected variables are co-integrated or not. If the selected variables are co-integrated, then there exists a linear, stable and long-run relationship among variables, as the error terms which in disequilibrium would like to be scattered around zero mean. The co-integration analysis was used by Engle and Granger (1987), Johansen (1988), Anayochukwu (2012), etc. to identify the existence of a long-run equilibrium linear relationship between two or more variables. The co-integration analysis used two test statistics, the trace, and eigenvalues. Large values of both statistics indicate co-integration equations between variables and vice versa. In this study, we used Johansen's technique to know the number of co-integration equations existing between the variables. The null hypothesis for this analysis is: There is no co-integration between variables. Table 6 shows the co-integration analysis results after achieving the stationarity of data at same level. From Table 6, the maximum eigenvalues and trace statistics for first three co-integrated equations suggested the presence of co-integration among the selected variables in the Pakistan economy at 5 percent level of significance. Therefore, finally co-integration analysis suggests that the selected set of co-integrated time series variables have an error-correction representation, which shows the long-run adjustment mechanism of variables.

Table 6: Johansen Co-integration Test Results

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	Critical Value	Prob.**
None *	0.800	150.112	95.754	0.000
At most 1 *	0.653	88.994	69.819	0.001
At most 2 *	0.498	48.822	47.856	0.040
At most 3	0.268	22.641	29.797	0.264
At most 4	0.235	10.790	15.495	0.225
At most 5	0.016	0.617	3.841	0.432

Trace test indicates 3 co-integrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level

3.9 VECTOR ERROR CORRECTION MODEL (VECM)

When a long-run relationship is established through co-integration, we checked the short-run relationship between dependent and independent variables by employing vector error correction model (VECM). VECM is a suitable estimation method that adjusts to both long-run as well as short-run changes in variables and deviations from equilibrium. As three co-integrating relations have been found in Johansen co-integration tests, short-run relationship is analysed through VECM. The main parameter in the estimation of the VECM model is the coefficient of the error correction term ECM (-1), which measures the adjustment speed to the level of equilibrium. That is the value of ECM (-1) captures the impact whether the past values of the selected variables affect the selected variables' current values and the differentiated terms of each individual coefficients show the short-run effects. Table 7   presents the results of VECM, results of the differentiated terms for D (SMCP (-1)) and D (SMRTN (-1)) were observed to be positive and significant while for D (SMTRNOVR (-1)) it is recorded positive but insignificant. However, for D (SMRSK (-1)) it is recorded negative and

significant while for D (SMINDX (-1)) it is negative but insignificant. The coefficient for ECM (-1) was recorded negative but highly significant which shows that the past value of the selected variables has high impact on current values. Thus rejecting the null hypothesis and concluding that there exists short term relationship between the selected variables.

Table 7: VECM results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.013	0.282	-0.045	0.964
D(SMCP(-1))	1.937	0.608	3.186	0.003
D(SMINDX(-1))	-0.073	0.158	-0.462	0.648
D(SMRSK(-1))	-11.804	5.208	-2.266	0.031
D(SMRTN(-1))	1.198	0.447	2.681	0.012
D(SMTRNOVR(-1))	0.379	0.434	0.874	0.389
ECM(-1)	-1.360	0.216	-6.307	<0.001
R-squared	0.620	Mean dependent var		-0.079
Adjusted R-squared	0.547	S.D. dependent var		2.559
S.E. of regression	1.723	Akaike info criterion		4.090
Sum squared resid	91.996	Schwarz criterion		4.392
Log-likelihood	-70.719	Hannan-Quinn criteria.		4.198
F-statistic	8.438	Durbin-Watson stat		1.850
Prob(F-statistic)	0.00002			

Table 8: Regression coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.900	1.236	-2.346	0.025
SMCP	2.294	0.402	5.702	<0.001
SMINDX	0.389	0.136	2.856	0.007
SMRSK	-7.638	3.670	-2.081	0.045
SMRTN	0.931	0.405	2.301	0.028
SMTRNOVR	0.941	0.411	-2.287	0.029
R-squared	0.622	Mean dependent var		-0.650
Adjusted R-squared	0.567	S.D. dependent var		1.898
S.E. of regression	1.249	Akaike info criterion		3.421
Sum squared resid	53.070	Schwarz criterion		3.674
Log-likelihood	-62.412	Hannan-Quinn criteria		3.512
F-statistic	11.211	Durbin-Watson stat		2.354
Prob(F-statistic)	0.000			

3.10 REGRESSION ANALYSIS

Following Sadorsky (2014), the ordinary least square model (OLS) is used to carry out multiple regression analyses to identify the impact of independent variables i.e. stock market indicators on the dependent variable NFPI. The impact of SMCP on NEPI is found to be positive and highly significant with p-value (<0.001, less than 0.05). It indicates if the SMCP increases the NEPI will also increase and vice versa. Similarly, the variable SMINDX, SMRTN, and SMTRNOVR show a positive impact on NFPI as increase in one will cause an increase in the other and vice versa. Table 8, the impacts are recorded to be statistically significant with p-value (0.007 and 0.027 both < 0.05). The negative and significant impact of SMRSK was recorded on NFPI. An increase in SMRSK will decrease NFPI and vice versa. The values of R-square and adjusted R-square show that most variation in dependent variables up to 62.24 and 56.69 percent was explained by independent variables and the remaining unexplained were on the basis of some others factors not included in the model. The observed value of F-statistic is quite high and the p-value is (<0.001, less than 0.05). It shows that the overall model is statistically significant. The values of Log-likelihood, Akaike information criterion, and Schwarz information criterion were recorded much low this indicates the model is best fit to data.

4. CONCLUSION

In the research study, long term relationship is analysed through the co-integration technique. After the establishment of long term relationship, short term relationship is checked through an error correction model (ECM). Three co-integrating vectors were found that are: Long term relationships are found between NFPI and stock market capitalization and stock market index. After establishing long term relationships, ECM is employed and it shows that market capitalization, market returns, and market risk have short term relationships with NFPI. It is also concluded that past values have negative but significant impact on the current values of the selected variables. Regression analysis is also undertaken to check the impact of the stock market indicators on NFPI. It is concluded that market capitalization, market index, and market returns have significant positive influence on NFPI. Stock market risk has a negative significant effect on NFPI. Stock market turnover has positive and significant impact on NFPI. The model is fit as the probability of F statistics is less than 0.05 and it explains that more than 62 percent of the variations in NFPI are due to the selected stock market indicators. The hypotheses developed for the study are proved by the study.

The conclusions of the study recommend investors to invest in stocks of foreign exposure as it will help in diversifying the risk. Second, it will improve market liquidity and will also improve the returns on investment. The study also recommends investors to invest in the market having larger market size that is market capitalization. It is also recommended for investors to take the historical values into account when investing in international stocks. As the model explains almost 62 percent variations in the dependent variable, so it is suggested that researchers should explore other possible variables to explain the rest of the variations in NFPI. Also the study has use quarterly data, therefore high-frequency data subject to the availability can also be tested.

5. AVAILABILITY OF DATA AND MATERIAL
Data can be made available by contacting the corresponding authors

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