

## **FACTORS AFFECTING PORTFOLIO INVESTMENT IN PAKISTAN: EVIDENCE FROM TIME SERIES ANALYSIS**

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**Abstract.** This study is an endeavour to establish the factors that affect the portfolio investment in Pakistan. Portfolio investment is one of the main components of private investment. Portfolio investment is helpful to fill the gap between savings and investment in Pakistan. Time-series annual data have been taken for the period 1981-2012. This study employs Autoregressive Model of partial adjustment with least-square method. Net Portfolio Investment (NPI) has been taken as dependent variable whereas market capitalization, weighted average rate of return on deposit, trade openness, broad money ( $M_2$ ), one period lagged dependent variable and Foreign Direct Investment (FDI) have been taken as independent variables. The study concludes that FDI has negative impact on NPI while all other variables are positively related to NPI. The Government of Pakistan should defend its financial sector from terrorism and its effects.

**Keywords:** Net portfolio investment, Foreign direct investment, Market capitalization, Trade openness,  $M_2$ , Weighted average rate of return on deposit, Pakistan

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### **I. INTRODUCTION**

Investment is the loyalty of money or capital to purchase financial instruments and other assets in order to receive profitable returns in the form

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of interest as well as the positive reception of the value of the instruments. Most of the studies emphasized on the positive aspects of foreign capital on economic growth. Foreign capital improves the process of economic growth by filling the gap between savings and investment. Foreign capital flows are divided into two types: foreign aid and foreign private investment. Foreign private investment is the most important source of foreign capital. Foreign private investment is further divided into Foreign Portfolio Investment and Foreign Direct Investment.

Portfolio investment is a cluster of financial investment instruments. These financial instruments are easy to trade and are less eternal. These instruments are not unavoidably a representation of long-run interest. It includes stocks, bonds, debt securities, dividends and mutual funds of different businesses from abroad and domestic. This type of investment gives the investors dividend payments, possible voting rights and ownership of a part of the company. This type of investment represents usually short-term interest as it is considered more volatile and uncertain.

These financial assets, Portfolio Investment, are highly liquid in nature and easy to convert into currency in any time. Asian Economic Crisis of 1997 occurred due to high volatility of Foreign Portfolio Investment. Large amount of assets have converted into cash at the time of financial crisis. Investors can sale their financial instruments from portfolios at any time, depends on investor's choice. In this thesis NPI has been taken as dependent variable. NPI is attained by subtracting debit from credit in portfolio investment flows.

Portfolio investment will lead to a capital structure of firms in Pakistan by improving the managerial incentives and firm's value. When portfolio investment will rise, it will lead improvement in Pakistan economy as it will improve opportunities of employment, business sector performance, per capita income, GDP growth, exchange rate stabilization, and balance of payment improvement etc. Portfolio investment flows will also increase foreign reserves in Pakistan with a positive impact on stabilization of exchange rate. This study on factors affecting the portfolio investment in Pakistan is very important especially because of a very high market risk and geopolitical situation of Pakistan. As Foreign Portfolio Investment (FPI) is a main source that can attract foreign investment towards Pakistan in the situation of high market risk.

Foreign portfolio investment has proved to be more volatile and sensitive to the changes in its determinants, in the Asian Financial Crisis. This study discusses factors that affect portfolio investment in Pakistan with

evidences from time series analysis. Study tries to find out the relationship between Net Portfolio Investment, market capitalization,  $M_2$ , Foreign Direct Investment and trade degree of openness. This study assists in finding out the policies to attract Portfolio Investment flows into Pakistan. Like Pakistan, this study would also be of interest to policy makers in many developing economies.

## II. REVIEW OF LITERATURE

Various studies have been offered on the factors of portfolio investment. Major portion of these studies has been conducted internationally. Keeping in view the importance of Portfolio Investment, we present the review of significant studies.

Statman (1987) examined that “how many stocks make a diversified portfolio.” Study showed that a well-diversified portfolio included at least 30 stocks and 40 stocks of randomly selected stocks, for a borrowing investor and lending investors, respectively. Study denied that benefits of diversification were attached with a portfolio of approximately 10 stocks.

Trennepohl *et al.* (1988) provided empirical evidences about performance of insured portfolios constructed from listed put and call options, their underlying stocks, and treasury bills. Study found that insured portfolios represented the majority of main assets.

Goldstein and Razin (2006) scrutinized an information-based trade off between foreign direct investment and Foreign Portfolio Investment. Results show that foreign direct investment ratio is larger than foreign portfolio investment in developing countries and same is lower in developed countries. Study used the probability criteria and risk measurements. Study has examined that investors with more liquidity shocks, prefer foreign portfolio investment and investors with less liquidity shocks, prefer foreign direct investment. Study has several results with empirical evidences. First, developed countries attracted a larger share of foreign portfolio investment than developing countries. Second, investors with high liquidity were attached with foreign portfolio investment and vice versa. Third, developed economies with high levels of transparency have smaller differences between the withdrawal ratios of foreign portfolio investment and foreign direct investment.

Lagoarde-Segot and Lucey (2007) analyzed portfolio diversification profits in seven MENA stock markets. Study used weekly data over the period 1998-2006. Data was obtained by the S&P/IFC. Conclusions highlighted the existence of diversification reimbursed in the considering

region. The study found that minimum variance portfolio showed best performance. Study suggested that physically powerful and translucent economic and financial institutions are necessary for maintaining long-term portfolio returns.

Goetzmann and Kumar (2008) examined the equity portfolio diversification. Study analyzed that US investors favoured less-diversified portfolios. Data has been taken from US discount brokerage house (DBH) from the time period 1991 to the end of 1996. Study focused on the improvement of diversification, correlation of diversification with individual characteristics and on the relationship of portfolio diversification and performance. Study has concluded that majority of individuals are less-diversified and less-diversification is superior in retirement accounts. Study indicates that with respect to time diversification is improving. They found that variations in the correlation structure of the US equity market induced the improvement in diversification characteristics. They found that investors were less-diversified because they had better information and investors improved portfolio presentation by merely investing the available passive funds.

Hasan and Nasir (2008) examined macroeconomic factors and equity prices with the help of ARDL approach. They analyzed the long-run causal association between Pakistani capital market and major economic variables. They used month wise data for the period 1998-2008. They used a set of macroeconomic variables such as Industrial Production Index (IPI), broad money ( $M_2$ ), Oil Prices (OP), foreign exchange rate (EXR), Inflation Rate (IR) and interest rate ( $r$ ). Results showed that in the long-run Industrial Production (IP), OP and inflation were statistically unimportant while interest rates ( $r$ ), EXR and money supply ( $M_2$ ) were statistically important for the determination of equity prices. They also exhibited that statistically effects of Industrial Production, OP and inflation had no implication while changes in interest rates ( $r$ ), exchange rate (EXR) and money supply ( $M_2$ ) were statistically important in the short-run. They analyzed that effects of FPI had been significant in short-run but not significant in long-run.

Horasanli (2008) worked on the factors of portfolio selection by applying a new study of fractional programming. He used a new programming for evaluating the best value for the constant risk aversion. Proposed algorithm is for the minimum risky portfolio as well. He selected weekly data stuck between January 2003 and December 2007 with 261 observations. Question of the study was why the hot capital flow preferred Turkish market. He concluded that Turkish stock market offered highest return for a unit of wealth, so it was the answer of the question.

Duasa and Kassim (2009) examined foreign portfolio investment and economic growth in Malaysia. They analyzed causation between FPI and real GDP by using Granger causality test and Toda and Yamamoto's non-causality test. They used the same test for the volatility of FPI and real GDP also. Quarterly data from 1991-2006 has been used. They found that economic growth of Malaysia caused the FPI inflow but its volatility remained constant. But the volatility did not cause economic growth. Results showed that FPI and its volatility was not a vital factor in the determination of economic presentation of Malaysia. Rather, they found that economic growth had highly significant impacts in determining the flows of FPI. They declared that the experience financial crisis during 1997 had clearly shown the lower FPI inflow and massive FPI outflow resulted from the anticipation of weaker economic performance due to the financial crisis.

Gozgor and Erzurumlu (2010) inspected the causal association among Foreign Direct Investment and volatility of Portfolio Investment. They analyzed the economies of Czech Republic, Poland, Russia and Turkey. They used monthly and quarterly data set of considering countries. GARCH model was used to show the volatility of Portfolio Investment. They used Granger, Sims and Toda and Yamamoto test methods. They used monthly data from 2000 to 2009 for Turkey and Poland while quarterly data in the case of Czech Republic and Russia from 1995-2009. Data has been obtained from central banks of related markets. They concluded that in case of Russia and Turkey, FDI had a significant cause on volatility of FPI while no such causation has been found in case of Czech Republic and Poland. They supported the arguments that FDI was helpful in reducing the informational inefficiencies and raising the foreign investment in emerging markets.

Kaur and Dhillon (2010) examined the determinants of foreign institutional investor's investment in India by considering both financial and economic factors. They considered domestic country financial factors, foreign country financial factors, domestic country economic factors, and foreign country economic factors. Data provided the information about variables for the period from April 1995 to December 2006. Sources of data were RBI bulletin various issues, RBI hand book of statistics various issues and World Bank global development finance. They used Autoregressive Distributed Lag (ARDL) model by OLS method. They found that returns of Indian stock market had optimistic crash but US stock market returns had no important impacts on "FIIs investment in India". They concluded that stock market risk had negative and unconstructive impacts on FIIs inflows, whereas market capitalization and stock turnover of India had positive influence only in short-run. They examined that economic growth of India

had positive impacts on FIIs investment in India both in long-run and in short-run, whereas all other macroeconomic determinants had important persuasion only in the long-run. US interest rate has unfavourable impacts while liberalization policies of India have important role in FIIs inflows to India. They found that inflation in US had optimistic impacts but inflation rate (IR) in India had unhelpful impacts on FIIs Inflows. They concluded that both stock market characteristics and macroeconomic factors were important for determining the FIIs inflows in India.

Zadeh and Madani (2012) examined the relationship between financial development, FDI and economic growth of Iran. The main purpose of the study was to travel around the role of financial developments in arbitrating the role and impacts of FDI on Iranian economic growth. They implemented the regression model. Average growth rate of real GDP was taken an independent variable, whereas FDI as a share in GDP, variables hypothesized (oil revenues growth, population growth rates, and investment-GDP ratio) and financial market indicators FIN were taken as dependent variables. They concluded that effect of FDI on growth rate was non-linear. FDI has negative impacts on economic growth when financial development is low level and positively influences when financial development exceeded a threshold level. They found negative impacts of share of oil revenues in GDP on economic growth after threshold regime but the variable was insignificant before the threshold regime.

Chukwuemeka *et al.* (2012) worked on the long-run influencing factors of foreign portfolio investment in Nigeria. They discovered the appropriate policies to attract foreign portfolio investment in the long-run. They used the quarterly time series data over the period of 1981-2010. Market capitalization, real exchange rate, real interest rate, real gross domestic product, and trade openness were considered variables. Net portfolio investment was considered as dependent variable. They applied finite distributed lag model of time series analysis. They concluded that foreign portfolio investment flow into Nigeria had a positive long-run relationship with market capitalization and degree of openness. They suggested that it was good to make Nigeria's trade policy as investment welcoming policy for attracting Portfolio Investment flows.

Nageswari *et al.* (2013) examined the optimal portfolio selection by using the Sharpe's single index model, through which a significant reduction in changeability of the return on securities could be estimated. Objective of their study was to provide direction for the investor's release. They composed and analyze BSE sensx index and its securities daily closing

prices. They used time period from April 2007 to March 2012. They determined percentage of investment to be invested in each selected stocks, on the basis of respective weights assigned to each stock. Weights were based on respective beta value as well as stock movement variance random risk, return on stock, and risk free return.

Hsu and Wang (2013) used the second order stochastic dominance to select the portfolio from the efficient frontier through expected return and variance. They used daily data of stock price on 30 leading market value stocks from 2004 to 2005 in United States market. Study selected 30 companies, based on ranking of company's market value. Study found most significant differences by  $p$ -values were in the middle of mean and variance range. Study declared that if investors were difficult to evaluate risk preference for investment strategy, they had alternative choice of portfolio by SSD.

Farzi *et al.* (2013) projected an approach based on portfolio selection problem. Main objective of their study was to estimate the best results for the portfolio selection. Data on monthly return for each company consisted last 72 months ending in March 2008. Stocks of Iran Khodro as well as Iran Khodro diesel, Behran oil, Pars oil .... etc., were considered in the study. They found that to minimize the fitness function, the investor invests 7.6% of capital in the Behran oil company. Study compared the return of selected portfolio with Markowitz model and Genetic Algorithm, for measuring the quality of selected portfolio by QPSO. Study concluded that QPSO model was considered as best model for the selection of best portfolio.

### III. OBJECTIVES OF THE STUDY

The present study aims:

1. To analyze factors which encourage or discourage portfolio investment in Pakistan.
2. To explore the long-run and short-run association between Net Portfolio Investment (NPI), Deposit rate, market capitalization, Broad Money ( $M_2$ ), foreign direct investment and trade degree of openness.
3. To offer policy implications to obtain better and sustainable growth of Portfolio Investment flows in Pakistan.

### IV. DATA AND METHODOLOGY

Data source should be trustworthy for constructing a trustworthy model. Variables and relationships among variables should also be reliable for

forecasting the behaviour of considering economy in a well-mannered ways. If the proper techniques are applied for analysis then we get accurate results from analysis. Unsuitable data and methodology lead to wrong prediction of variables and wrong results. Secondary data has been used in various studies with the application of different techniques and methodologies.

Present study considers, annual data covering the time period from 1981 to 2012. This time period has been chosen because of the accessibility of data on dependent and independent variables. Data have been obtained from State Bank of Pakistan (Handbook of Statistics on Pakistan's Economy) and *World Development Indicators*. Autoregressive model of partial adjustment with least square method has been applied. The selection of variables is justified by existing literature and their importance.

## V. ECONOMETRIC SPECIFICATIONS

For examining the relationship between dependent and independent variables, following econometric equation is developed. Autoregressive Model with least square methods is applied for getting econometric equation.

$$NPI = \beta_0 + \beta_1 Mcap + \beta_2 TO + \beta_3 WARRD + \beta_4 GM_2 + \beta_5 FDIGDP + \beta_6 NPI(-1) + \varepsilon \quad (1)$$

Where

*NPI* = Net Portfolio Investment

*Mcap* = Market Capitalization

*TO* = Trade Openness

*WARRD* = Weighted Average Rate of Return on Deposit

*GM<sub>2</sub>* = Growth Rate of M<sub>2</sub> (Broad Money)

*FDIGDP* = FDI (GDP %)

*NPI(-1)* = Lagged Dependent Variable as Explanatory Variable

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4,$  and  $\beta_6 > 0$  whereas  $\beta_5 < 0$ .

## VI. RESULTS AND DISCUSSIONS

### ELEMENTARY ANALYSIS

Elementary analysis provides some important implications for better understanding of the study. It provides basis for further analysis. It includes Descriptive Statistics and Correlation Matrix for the variables.



### Descriptive Statistics

Descriptive Statistics explains the variables with quantitative values. Descriptive analysis presents that what were the past trends of variables under consideration with the help of data. A researcher can analyze the average past trends of variables with the help of average values, given in the descriptive analysis. It also helps the researchers to predict the future trends of all considered variables. It gives maximum and minimum values as well as standard deviation, skewness, Kurtosis, Jarque-Bera statistics and probability of the variables. Descriptive analysis of Net Portfolio Investment, Market Capitalization, trade openness, Weighted Average Rate of Return on Deposit, growth rate of  $M_2$  and Foreign Direct Investment (GDP %) are given in Table 1. Descriptive analysis tells about the range of data by examining the maximum and minimum values of data.

TABLE 1

Descriptive Analysis of Net Portfolio Investment and its Factors

Variables	NPI	MCAP	TO	WARRD	GM <sub>2</sub>	FDIGDP
Mean	-11154.32	1249355.00	1.52	10.26	14.84	1.364215
Median	1467.00	293326.80	0.80	12.33	14.15	0.700000
Maximum	60800.00	66169225.00	10.05	18.89	37.71	4.628455
Minimum	-208600.00	6583.00	0.07	1.90	-4.48	0.100000
Std. Dev.	54201.20	1967564.00	2.63	4.65	7.35	1.393131
Skewness	-2.73	1.58	2.78	-0.25	0.64	1.243889
Kurtosis	10.34	4.06	8.90	2.00	5.59	2.974605
Jarque-Bera	115.11	15.25	90.16	1.71	11.50	8.510809
Probability	0.00	0.00	0.00	0.43	0.00	0.014187
Observations	32	32	32	32	32	32

Calculations are carried out with the help of E-Views 7 (Quantitative software).

Table 1 shows that the mean value of Net Portfolio Investment is -11154.32 which are smaller than the median value 1467. Its negative value shows that Net Portfolio Investment is discouraging in Pakistan. The Maximum value of Net Portfolio Investment has been observed 60800 while minimum value is remained at -208600. Difference between maximum and minimum values, tells about the range of data. Standard Deviation for Net

Portfolio Investment has been examined 54201.20 which shows higher deviation from average mean value.

Table 1 indicates that mean value of Market Capitalization is 1249355 which are greater than its median value 293326.8; its positive value shows that Market Capitalization is encouraging in Pakistan. Standard deviation for Market Capitalization is 1967564, which shows higher deviation or dispersion from average value. The maximum value of Market Capitalization is 66169125 while its minimum value is 6583.

Table 1 also indicates that average value of Trade Openness is 1.52 which is greater than its median value 0.80; its positive value of mean shows that trade openness is also encouraging in Pakistan. Standard deviation for trade openness is 2.63 while its maximum and minimum values are 10.05 and 0.07 respectively. Mean value for Weighted Average Rate of Return on Deposit is 10.26 which are smaller than its median value 12.33, while standard deviation from average value is 4.65 for Weighted Average Rate of Return on Deposit. Maximum value for Weighted Average Rate of Return on Deposit is 18.89 while minimum value remains at 1.09. Weighted Average Rate of Return on Deposit is also encouraging in Pakistan.

Table 1 shows that mean value for growth of broad money supply is indicated by the value of 14.8 and this mean value is somehow greater than median value of 14.15 with standard deviation of 7.35 from average value. This variable is encouraging in Pakistan. Maximum and minimum values for Weighted Average Rate of Return on Deposit are 37.71 and -4.48, respectively. Average value for Foreign Direct Investment has been examined at 1.364215 with smaller median value of 0.70000. FDI is also encouraging in Pakistan. Standard deviation for Foreign Direct Investment is 1.393131 which shows dispersion from the central value.

Skewness is a measure of “lack of symmetry” as shown in Table 1. All the variables Market Capitalization, trade openness, growth rate of broad money and Foreign Direct Investment as % of GDP are rightly and positively skewed but remaining variables, Net Portfolio Investment and Weighted Average Rate of Return on Deposit, are negatively skewed.

Kurtosis presents the shape of “Probability Distribution” in Table 1. Kurtosis tells that whether the data on variables are peaked or flat as compare to the “Normal Distribution”. So kurtosis values are considered as a measure of peakedness of probability distribution of actual valued random variable. Table 1 explains that Net Portfolio Investment, Market Capitalization, Trade Openness, Growth Rate of Broad Money ( $M_2$ ), and Foreign Direct

Investment (GDP %) are leptokurtic long-tailed or higher peak while Weighted Average Rate of Return on Deposit is platykurtic short-tailed or flat. Jarque-Bera statistics indicates that residuals of Net Portfolio Investment, Market Capitalization, Trade Openness, Growth Rate of Broad Money ( $M_2$ ), and Foreign Direct Investment (GDP %) are not normally distributed because their value of probability are 0.00 while Weighted Average Rate of Return on Deposit is normally distributed with probability value 0.43.

### Correlation Matrix

Correlation matrix depicts the linear association between two variables. These variables may be both dependent and a set of independent-dependent variables. Correlation matrix tells about the degree or direction of association among any two variables under consideration. So, correlation matrix explains that in which direction two variables are related to each other. Coefficients and signs of variables indicate degree of connection and direction, respectively. Correlation matrix also indicates multicollinearity. When correlation coefficient between two explanatory variables, takes the value greater than or equal to 0.90, there is an indication of strong multicollinearity.

Table 2 explains the correlation coefficients of variables under consideration. Diagonal values in Table 2 explain the self-correlation of variables. Self-correlation means relationship of a single variable with itself. These diagonal values have values equal to unity because a single variable is perfectly correlated with itself.

TABLE 2

Correlation Coefficients Matrix

Variables	NPI	MCAP	TO	WARRD	GM <sub>2</sub>	FDI (GDP %)
NPI	1.00					
MCAP	-0.20	1.00				
TO	-0.30	0.13	1.00			
WARRD	0.38	-0.61	-0.22	1.00		
GM <sub>2</sub>	-0.08	-0.08	-0.07	-0.19	1.00	
FDI (GDP %)	-0.31	0.97	0.21	-0.60	-0.10	1.00

Calculations are carried out with the help of E-Views 7 (Quantitative software).

Net Portfolio Investment has negative and weak relationship with Market Capitalization, Trade Openness, Growth rate of Broad Money ( $M_2$ ), and Foreign Direct Investment (GDP %) but it has positive and weak association with weighted average rate of return.

It is clear from Table 2 that Market Capitalization has a weak and negative relationship with Net Portfolio Investment. Market Capitalization has positive and weak correlation with trade openness but it has strong negative relationship with weighted average rate of return. Coefficient of correlation indicates that Market Capitalization has negative and weak relation with Growth rate of Broad Money ( $M_2$ ) and it is positively and strongly correlated with Foreign Direct Investment (GDP %).

### ECONOMETRIC ANALYSIS

Econometric analysis explains the estimated coefficients and relationship between dependent and independent variables.

TABLE 3

Estimation of Portfolio Investment Model

Dependent Variable: NPI			
Method: Least squares			
Sample: 1981-2012			
Variables	Coefficient	Stand. Error	T-Statistics
C	-31225.37	41398.57	-0.75
Mcap	0.044*	0.017429	2.53
TO	2581.463	3748.963	0.68
WARRD	4309.3***	2252.298	1.91
GM <sub>2</sub>	242.55	1158.429	0.20
FDI (GDP %)	-60120.96*	24818.16	-2.42
NPI (-1)	0.411**	0.187	2.19
R-Squared	0.48	Adjusted R-Squared	0.36
Durbin Watson Statistic	1.40	Durbin Watson h Statistic	1.51

\*, \*\* and \*\*\* represent significance of *t*-statistic at 1%, 5% and 10%, respectively.

Calculations are carried out with the help of E-Views 7 (Quantitative software).

Now, all of the regression coefficients, given in Table 3, are discussed one by one. Net Portfolio Investment is Dependent variable while Market Capitalization, trade openness, Weighted Average Rate of Return on Deposit, growth rate of  $M_2$ , Foreign Direct Investment and NPI(-1) are independent variables. All the results are according to the concepts and theories. Table 4 describes the test for autocorrelation.

TABLE 4  
Breusch-Godfrey LM Test

Breusch-Godfrey Serial Correlation LM Test			
F-Statistics	1.48	Probability	0.23
Obs*R-Squared	10.21	Probability	0.11

Calculations are carried out through the help of E-Views 7 (Quantitative software).

First of all, the coefficient of Market Capitalization that is 0.044 and it positively influences to the Net Portfolio Investment in Pakistan will be discussed. This coefficient is significant at 1% level of significance. A one unit increase in Market Capitalization will increase the Net Portfolio Investment about 0.044 units. Concepts also verify this positive relationship, as larger Market Capitalization indicates high returns.

Regression coefficient of Trade Openness is 2581.463 which indicates positive impact of trade openness on Net Portfolio Investment. A one unit increase in trade openness will increase the NPI to 2581.463 units. But this coefficient is statistically insignificant, may be because of financial uncertainty and terrorist attacks of suicide bombing in Pakistan.

Weighted Average Rate of Return on Deposit has regression coefficient 4309.282 that also indicates the positive impact of WARRD on Net Portfolio Investment. This coefficient is significant at 10% level of significance. A one unit increase in WARRD will bring a rise of 4309.282 units in NPI. Its sign is according to the concept, as deposit rate increases deposit amount on mutual funds also increases.

The value of the coefficient Growth Rate of  $M_2$  is 242.5497. It also indicates the positive impact of growth rate of  $M_2$  on NPI. One unit rise in this coefficient will raise the NPI to 242.5497 units. However, this coefficient is insignificant, may it be because of war against terrorism. Coefficient of FDI is negative and significant at 1% level of significance. Its value is -60120.96, which shows that a one unit rise in FDI will decline the

NPI to 60120.96 units. This result is also accurate to the concept that there is trade-off between NPI and FDI.

The value of “**speed of adjustment coefficient**” is 0.411. This is the coefficient of dependent lagged variable that is added as an independent variable. This coefficient is significant at 5% level of significance.

“**Coefficient of Determination**”  $R^2$  is 0.48 which explains that 48% variations in dependent variable are due to its linear relationship with dependent variables. This moderate value of  $R^2$  also shows that none of the independent variables is highly correlated. So, there are no chances of multicollinearity.

### Tests for the Presence of Autocorrelation

The following two tests have been used:

1. Breusch-Godfrey serial correlation LM test
2. Durbin’s h Statistics

According to Breusch-Godfrey serial correlation LM test, there is no autocorrelation. Durbin’s h statistic is 1.51, given in Table 4, obtained from the following formula:

$$h = \left(1 - \frac{d}{2}\right) \sqrt{\frac{n}{1 - n\sigma_r^2}}$$

Here,

$n$  = number of observations

$d$  = value of Durbin Watson statistics

$\sigma_r^2$  = estimated variance of the coefficient of lagged dependent variable

**Durbin’s h Statistics 1.51** indicates the acceptance of null hypothesis of no autocorrelation.

So, both Breusch-Godfrey serial correlation LM test and Durbin’s h statistic accept null hypothesis of no autocorrelation.

### Long-run Estimated Equation for Portfolio Investment Model

Long-run equation has been estimated by dividing each short-run coefficient to 0.59 (1 – speed of adjustment coefficient).

Estimated coefficient of Long-run equation for Portfolio Investment Model is as follow:

$$NPI = -53014.2 + 0.075 Mcap + 4382.79 TO + 7316.27 WARRD + 411.8 GM_2 - 102072.9 FDIGDP \quad (2)$$

Long-run coefficient of Market Capitalization indicates 0.075 units increase in Net Portfolio Investment for per unit change in Market Capitalization. 4382.79 units increase in Net Portfolio Investment for a one unit change in trade openness.

One unit rise or decline in WARRD will increase or decrease the Net Portfolio Investment to 7316.27 units, respectively. One unit increase in  $GM_2$  will increase the Net Portfolio Investment to 411.8 units. 102072.9 units decline in Net Portfolio Investment is indicating for a one unit increase in Foreign Direct Investment.

All the results are according to the conceptual and theoretical framework. Investors prefer high rate of return. Investors will invest more hard-earned income in financial assets at higher rate of return for earning positive profit. According to the conceptual and theoretical framework, Market Capitalization is the determination of market size and it is positively attached with Net Portfolio Investment (*see* Chukwuemeka *et al.*, 2012; Kaur and Dhillon, 2010).

Trade Openness is also positively related to NPI (*see* Chukwuemeka *et al.*, 2012). According to the conceptual framework Foreign Direct Investment have both negative and positive association with NPI (*see* Goldstein and Razin, 2006; Gozgor and Erzurumlu, 2010).

$M_2$  includes  $M_1$  and time deposits, mutual funds and highly liquid assets as near money. Economists consider it as money supply as it is much liquid in its nature. It can be converted into cash easily at the time of need. In time of inflation, real purchasing power of money decreases and people will convert their cash into highly liquid assets, which causes to increase Portfolio Investment. So, it is also positively related to portfolio investment.

## VII. CONCLUSION AND POLICY RECOMMENDATIONS

This study is an attempt to examine the association among dependent and independent variables. Study analyzes the factors that influence the Portfolio Investment in Pakistan. The time-series data has been used for this analysis. Annual data covering the time period of 32 years from 1981 to 2012 is considered. Net Portfolio Investment has been taken as dependent variable while Weighted Average Rate of Return on Deposit, Growth rate of Broad Money, Trade Openness, Foreign Direct Investment as percentage of GDP

and Market Capitalization have been taken as independent variables. Independent variables have been taken according to their relative importance in literature review. Study used Autoregressive model of Partial Adjustment with simple Least Squares methods. So, regression equation has a lagged dependent variable as an explanatory variable. Study focused on the influences of independent variables on Net Portfolio Investment.

Results of the study explain that Market Capitalization has positive significant impact on Net Portfolio Investment. This result is consistent to Chukwuemeka *et al.*, 2012; Kaur and Dhillon, 2010. Growth rate of  $M_2$  and Trade Openness both have positive impact on Net Portfolio Investment but these are found insignificant variables because in Pakistan there is lack of transparent and peaceful economic and financial atmosphere.

On the other hand, Weighted Average Rate of Return on Deposit and Foreign Direct investment (GDP %) have positive and negative influence on Net Portfolio Investment, respectively (*see* Kaur and Dhillon, 2010; Gozgor and Erzurumlu, 2010; Horasanli, 2008).

On the basis of results, we suggest that extra protection should be given to foreign investors by the government of Pakistan. Terrorism should be eradicated to flourish market capitalization as well as to improve financial institutions in Pakistan. Government of Pakistan should provide welcoming atmosphere to the foreign investors. Interest rate on deposit in Pakistan should increase for attracting FPI.



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