An Econometric Analysis on Determinants of Foreign Portfolio Investment in India using the ARDL Approach

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ABSTRACT *: In 1991, the Indian economy began a financial liberalization initiative, which resulted in an increase of capital flows as well as a significant change in how these flows were financed. Foreign portfolio investment (FPI) is a critical component of capital inflows in every country, acting as a vital driver of global economic integration and growth. Foreign capital inflows can have both positive and negative consequences for a country's economic progress. Very few studies have looked at FPI as an important part of foreign investment in developing nations. The current study aims to investigate the factors influencing foreign portfolio investment in India. The findings of the ARDL Bound test reveal that the Bombay Stock Exchange, Index of Industrial Production, and Openness all have a considerable positive impact on foreign portfolio investment in India. In contrast, both exports and imports have a large negative influence on foreign portfolio investment in the country.*

KEYWORDS - *ARDL, Foreign Portfolio Investment, Unit Root Test, ECM, Sensex*

I. INTRODUCTION

Foreign portfolio investment consists of purchasing existing bonds and stocks only for the purpose of receiving dividends or capital gains, as well as investing in new international bond and debenture offerings by a financial institution or a foreign government (Chopra, 2003). Portfolio investments in India can be made through two methods: 1) through foreign institutional investors (FIIs) such as mutual funds, and 2) through Euro-issued securities such as Global Depository Receipts (GDRs), American Depository Receipts (ADRs), and Foreign Currency Convertible Bonds.

Foreign direct investment (FDI) and foreign portfolio investment (FPI) are important components of capital inflows in any country, acting as significant drivers of international economic integration and growth (Singhania et al., 2015). Foreign capital inflows can have both a positive and negative impact on a country's economic growth. While most studies have concentrated on the influence of FDI on economic growth, few have looked at FPI as a major component of foreign investment in developing nations. According to Saha (2000), capital inflows into India increased dramatically in the post-reform period following the 1990s compared to the pre-reform era. Financial crises in the foreign exchange market, as well as rising interest rates, have prompted foreign capital inflows. Furthermore, the major openness of the capital and current accounts has resulted in an increase in unofficial capital inflows, posing new obstacles to maintaining a fixed exchange rate regime (Shah and Patnaik, 2018). It is apparent that free capital movement and financial globalization are processes that differ throughout regions. Compared to the substantial literature on the determinants of FDI inflows, research on the determinants of portfolio inflows to emerging countries is limited.

The study contributes to the existing literature in several ways: (a) it highlights a gap in prior research, as no previous studies have specifically explored the determinants of foreign portfolio investment in India; (b) it investigates the impact of the 2008 global financial crisis on foreign portfolio investment in India; (c) it employs a large sample size, spanning the period from April 2000 to March 2022; and (d) it employs advanced time series techniques. Given these considerations, the study's goal is to provide insight into the long-term determinants of foreign portfolio investment in India.

The rest of the study is organized as follows. Section II presents an overview of studies on foreign portfolio investment. Section III highlights the manuscript's need and purpose. Section IV contains an extensive explanation of the research methodology. Section V expands on the theoretical foundation for determinants of foreign portfolios. Section VI includes the study's findings and discussion. The concluding section VI summarizes the manuscript's outcomes.

II.   REVIEW OF LITERATURE

The present section reviews the numerous research on foreign portfolio investments in India and abroad.

Rao et al. (1999) proposed that developing nations improve their stock markets to encourage private capital flows in the form of portfolio investments. These inflows can boost stock markets directly by increasing the investor base and indirectly by persuading local governments to upgrade trading systems, notwithstanding the well-known volatility associated with portfolio capital transfers. There is also concern that foreign institutional investors would distort host country markets in order to make capital gains. In this regard, the study measures the importance of foreign portfolio investments (FPI) in India in comparison to other major types, as well as the changes in FPI in the Indian stock market during the last four years.

Chopra (2003) investigated the factors influencing FPI in India, concluding that portfolio performance is determined by the interaction of ownership, locational, and externalization advantages. To put these claims to the test, he examined variables such as GDP, foreign exchange reserves, the debt-service ratio, the interest rate differential between India and the United States, openness, turnover ratio, market capitalization share at the Bombay Stock Exchange (BSE), and the real effective exchange rate. According to the literature, GDP, foreign exchange reserves, openness, turnover ratio, and the BSE's share of world market capitalization should all have positive coefficients, whereas the remaining factors should have negative coefficients. His regression research, which used annual data from 1980-1981 to 1999-2000, revealed that GDP, openness, REER, and the debt-service ratio all influenced FPI in India, with trade openness having the greatest impact.

Bhaskaran et al. (2005) examined patterns in portfolio equity capital flows to emerging market countries (EMCs) and considered the implications for policymakers. They noticed major shifts in the patterns of winners and losers, a significant increase in the amount of portfolio equity movements, high volatility in these flows, and an increase in Asian dominance. Furthermore, competition for portfolio equity capital has increased, making equity portfolio flows more essential than other types of capital.

Joseph and Atsuyuki (2007) investigated U.S. investors' buying behavior in response to massive portfolio equity flows into China and India and discovered that fundamental shocks have a considerable impact. Their empirical research revealed that U.S. institutional investors make judgments based on long-term value determinants rather than short-term price signals or return chasing. They believe that as information asymmetries narrow, US investors will develop more sophisticated methodologies for judging underlying value in China and India.

Roy (2007) added to the discussion on capital account convertibility by focusing on foreign portfolio flows, proposing that capital liberalization policies should take into consideration the unique characteristics of each capital flow component. His research sought to identify the true nature of FPI and assess India's existing openness to such flows. He also urged for understanding the motivations underlying financial flows before liberalizing them, claiming that FPIs entering India are mostly motivated by capital gains, with stock price fluctuations being the most important reason.

Onuorah and Akujuobi (2013) used empirical analyses such as the Phillips-Perron, cointegration, and Granger causality tests to examine the impact of macroeconomic variables on FPI in Nigeria between 1980 and 2010. They discovered that macroeconomic factors were cointegrated with FPI in Nigeria. While GDP and the money supply were inversely associated to FPI, other macroeconomic factors were positively related to it. However, macroeconomic variables were not statistically significant in determining FPI.

Gumus and Bener (2013) investigated the association between the FPI and macroeconomic parameters in Turkey from 2006 to 2012. Using studies like as VAR, Granger Causality studies, Impulse Responses, and Variance Decomposition, they discovered that FPI influences the Istanbul Stock Exchange Price Index and exchange rates, with industrial production having a significant effect on FPI.

Aziz et al. (2015) used the OLS regression model to examine the link between FPI and variables such as Pakistan's foreign exchange rate, trade openness, inflation rate, GDP growth rate, and market capitalization from 2005 to 2014. Their empirical analysis found that trade openness, GDP growth rate, and market capitalization were all favorably and strongly connected with FPI in Pakistan, whereas the inflation rate was negatively and significantly correlated with FPI.

Aziz and Mishra (2015) applied Arellano-Bover/Blundell-Bond linear dynamic panel data estimate to investigate the geographical determinants of foreign direct investment (FDI) to 16 Arab economies between 1984 and 2012. It was discovered that market size, trade openness, preferential trade agreements, and financial development all had a strong beneficial impact on FDI inflows into Arab economies. FDI in Arab economies appears to be resource-based, as the total oil supply variable is positive and considerable. According to the study, better institutions and a more educated workforce may play an important role in luring FDI inflows. The study proposed that Arab economies sequence their economic policy measures with their institutional ones, beginning with an emphasis on privatization and trade liberalization and then shifting to improved economic growth.

Al-Smadi (2018) looked into the determinants of FPI in Jordan and discovered that a stable macroeconomic environment is the primary draw for foreign investors, with risk diversification and liquidity also playing important roles.

Bhattacharjee and Das (2020) looked at the relationship between stock prices and domestic macroeconomic indicators in India, utilizing monthly data from April 2005 to December 2019. Their vector error correction model results indicated that stock prices and macroeconomic factors were cointegrated, confirming a long-term link. The Granger causality test indicated that short-term interest rates, money supply, and exchange rate Granger all influence stock prices. The VDC research also revealed that stock prices in India are relatively exogenous when compared to other macroeconomic indicators.

Nwadibe et al. (2023) divided FPI into four categories and discovered that trade openness, interest rates, and industrial production are important predictors of FPI in the equities sector, whereas interest rates, trade openness, and GDP growth rate are big determinants of FPI in the bonds sector. FPI in the money market instruments category is primarily determined by foreign debt, market capitalization, and inflation rate. Furthermore, the primary variables influencing net FPI are the inflation rate, industrial production, external debt, and trade openness.

According to the aforementioned research, foreign capital inflows have a significant impact on a country's economic behavior. However, few research has been undertaken on international portfolio investments. There has been no extensive study on the determinants of foreign portfolio investment in India.

III.   NEED AND OBJECTIVE OF THE STUDY

Many studies have looked at the influence of foreign direct investment on economic growth, but few have focused on foreign portfolio investment, which is a large component of foreign investment in developing nations. Capital inflows into India have surged since the 1990s, as compared to the pre-reform period. There has been no previous research into the impact of the global financial crisis of 2008 on foreign portfolio investment in India. The majority of the studies have employed annual time series data. However, few studies have used monthly time series data. As a result, it is critical to identify the factors influencing capital inflows into India and how they interact with the real economy. The study's goal is to present the theoretical framework for determinants of foreign portfolios as well as to empirically investigate the determinants of foreign portfolio investment in India.

IV.   DATABASE AND METHODOLGY

This analysis is based on secondary data obtained from a variety of sources, including the World Bank, IMF, Reserve Bank of India, Securities and Exchange Board of India, and Ministry of Finance. The goal is to investigate the relationship between foreign portfolio inflows and macroeconomic variables, as well as to determine the factors influencing foreign portfolio investment. The key variables examined are capital inflows (CI), FDI, FPI, exports, imports, foreign exchange reserves, the wholesale price index, the Index of Industrial Production (IIP) as a proxy for GDP, the Real Effective Exchange Rate (REER), the BSE Sensex, exchange rates, economic openness, and a dummy variable for the 2008 financial crisis.

The study relies on monthly data, but because monthly GDP data is unavailable, the IIP is employed as a proxy for economic growth. The IIP was chosen for two reasons: first, it is highly connected with GDP (correlation coefficient of 0.97 at a significance level of 0.01), as well as with real service production, making it a reliable predictor of economic growth. Second, the IIP is regarded as a credible leading indicator of business cycles in India (Mazumdar, 2005). The statistics for these variables were sourced from the Reserve Bank of India's Handbook of Statistics on the Indian Economy, which covered the period from April 2000 to March 2022.

Advanced econometric models, such as the Unit Root Test and the ARDL Bound Testing technique, were used to determine the drivers of FPI in India. It is critical to identify the factors that drive FPI in India, as well as their potential impact and policy implications. The study's capacity to assess these aspects in the Indian setting is contingent on the availability of data. For this study, specific location-based and external variables such as exports, imports, foreign exchange reserves, the IIP (as a GDP proxy), REER, the BSE Sensex, openness, the wholesale price index, and exchange rates were chosen to assess the impact of various macroeconomic variables on FPI using the ARDL Bound Testing approach. Table 8.1 displays a list of selected variables together with their sources.

Table 1
Description of Variables

Acronyms	Construction of variable	Data source
LNFPI	Natural Log of Foreign portfolio investment	www.rbi.org .in
LNBSE	Natural Log of BSE SENSEX	www.bse.nic .in
LNOP	Natural Log of Openness	www.rbi.org .in
LNIIP	Natural Log of Index of Industrial Production	www.rbi.org .in
LNER	Natural Log of Exchange Rate	www.rbi.org .in
LNWPI	Natural Log of Wholesale Price Index	www.rbi.org .in
LNREER	Natural Log of REER	www.rbi.org .in
LNIMP	Natural Log of Imports	www.rbi.org .in
LNFER	Natural Log of Foreign Exchange Reserves	www.rbi.org .in
LNEXP	Natural Log of Exports	www.rbi.org .in
D01	Dummy for 2008 global financial crisis	

Source : "Authors own findings"

V.   THEORTICAL FRAMEWORK

5.1 Theoretical Framework for Determinants of Foreign Portfolios

The United Nations Conference on Trade and Development (1999) categorizes the factors of foreign portfolio investment (FPI) into two groups :

5.1.1 Economic determinants

Economic determinants are not directly related to initiatives designed to attract foreign portfolio flows. Instead, they represent the economy's overall health, the profitability potential of enterprises functioning in such an environment, and the ability to provide sufficient returns on fixed income assets. Investors often focus on the factors listed below:

- High economic growth rate
- Exchange rate stability
- Macroeconomic stability
- Level of foreign exchange reserves
- Health of the domestic banking system
- Stock and bond market liquidity
- Real interest rates

A few factors are more important for equities investors, such as high economic growth rates and stock market liquidity, whilst others are more significant to fixed income investors. Although portfolio capital investment in emerging economies increased significantly in the 1990s, it remained concentrated in nations with stable macroeconomic policies and relatively strong growth rates. For example, Africa, with its dubious economic prospects, got less than 1% of total assets invested in emerging economies. Similarly, Asia contributed for more than half of total FPI between 1990 and 1997, with only a few nations receiving the great majority of these inflows.

5.1.2 Policy/Regulatory Determinants

The second type of determinant concerns policy and regulatory frameworks in individual emerging economies, which are directly affected by native governments. The key determinants in this group are:
Ease of repatriating dividends and capital

- Domestic capital gains tax
- Regulation of stock and bond markets
- Quality of domestic accounting and disclosure standards
- Speed and reliability of the settlement system
- Availability of domestic custodians and brokers
- Degree of investor rights protection

No single factor may be recognized as the most essential, but others are more significant, such as the level of investor rights protection and the ease with which dividends and capital can be repatriated. Portfolio stock flows are also influenced by conjunctural, cyclical, and structural variables, as well as the larger institutional environment.

a) Conjunctural Factors: These include predicted returns and the unpredictability of returns in the target country when compared to mature countries. These aspects are usually influenced by the relative economic growth and monetary development of emerging markets. Developments in returns and volatility in emerging

markets as a whole can have an impact on individual countries, as emerging market equities is frequently viewed as an asset class in foreign investors' portfolio allocation decisions.

b) Cyclical Factors: Portfolio capital is influenced by cyclical factors such as expected returns, exchange rate expectations, sovereign credit ratings, and real interest rate differentials. Economic development and monetary policy cycles in rich nations, particularly the United States, have a disproportionately large impact on net flows of portfolio equity capital to emerging market countries (EMCs). For example, loose monetary conditions in the United States and other OECD nations can result in excess liquidity, which is initially directed toward financial assets in developed countries. Prolonged soft monetary conditions in these economies can have an influence on portfolio stock flows to EMCs.

c) Structural Changes: Portfolio equity flows are also impacted by structural changes such as capital account opening, convertibility difficulties, market development, and market infrastructure enhancements. These reasons, together with the increasing availability of investment vehicles and liquid markets in many developing and emerging markets, have led to an increase in foreign capital flows (Bhaskaran et al., 2005).

VI.   RESULTS AND DISCUSSION

6.1 Stationarity of the variables under examination using Augmented–Dicky Fuller Technique
        Before performing the ARDL Bound test, the data must be checked for stationarity. Table 2 displays the results of the Augmented Dickey-Fuller (ADF) unit root test on the selected variables related to foreign portfolio investment in India. The table shows that the majority of variables—BSE Sensex, WPI, imports, exports, IIP, openness, exchange rate, REER, and foreign exchange reserves—are integrated at order I(1), whereas FPI is integrated at order I(0). None of the variables are integrated to order 2 or higher (I(2)). Because the variables are not integrated in the same order, the ADF test findings support the usage of the ARDL Bound test, which is appropriate when the variables are integrated at I(1) or I(0).

6.2 Results and Discussion of Autoregressive Distributed Lag (ARDL) or Bound Testing Approach
        Before using multivariate regression, it is critical to evaluate the long-term relationship between the selected variables. To accomplish this, the Autoregressive Distributed Lag (ARDL) or Bound testing cointegration approach established by Pesaran, Shin, and Smith (2001) was applied. This approach was chosen because ARDL estimation works regardless of whether the variables in the model are I(1) or I(0). The cointegration relationship between foreign portfolio investment (FPI) and its determinants—such as the BSE Sensex, WPI, imports, exports, IIP, openness, exchange rate, REER, foreign exchange reserves, and a dummy variable for the 2008 crisis—was evaluated using the ARDL Bound testing approach. To investigate the long-run relationship between FPI and the other variables, the first step is to estimate the ARDL model using ordinary least squares (OLS) regression, followed by an F-test to determine the joint significance of the coefficients of the lagged levels of the variables. The ARDL model is specified as (1,1,0,1,0,1,1,1,1,0,0).

Table 2
Result of Augmented-Dickey Fuller test at logarithmic level

Variable	At level		At first difference	
	Without trend and intercept	**With trend and intercept**	**Without trend And intercept**	**With trend and intercept**
LFPI	-6.273555*	-6.723155*	-18.67525*	-18.61346*
LEXP	-0.786195	-3.002035	-14.46094*	-14.43350*
LFER	-1.825254	-1.332109	-13.18967*	-13.29983*
LIMP	-0.873331	-2.249674	-20.72990*	-20.69045*
LREER	-1.993061	-0.667246	-15.40673*	-15.37125*
LWPI	-0.242855	-0.346699	-24.06708*	-24.00891*
LBSE	-0.490710	-2.476691	-11.37019*	-11.35261*
LOP	-0.984729	-2.884454	-16.36876*	-16.35261*
LIIP	-2.369819	-2.301302	-3.429493**	-3.474670*
LER	-0.660229	-1.527128	-9.861823*	-9.875043*

Note: a) denotes acceptance of the null hypothesis of trend stationary at the 1%*
*b) ** denotes acceptance of the null hypothesis of trend stationary at the 5%*
        Source : Computed from data.

        Figure 1 shows that the selected ARDL (1,1,0,1,0,1,1,1,1,0,0) model outperforms the ARDL (1,1,1,1,0,1,1,1,1,0,0) model somewhat. The cointegration between foreign portfolio investment and various macroeconomic variables has been estimated using the ARDL Bound testing approach, including the BSE Sensex, exchange rate, foreign exchange reserves, index of industrial production, exports, imports, openness,

REER, wholesale price index, and a dummy variable for the 2008 crisis. The ARDL model was estimated using E-Views 9 to investigate the long-run relationship between foreign portfolio investment and these macroeconomic variables, followed by an F-test for the joint significance of the coefficients of the variables' lagged levels.

Table 3 displays the computed F-statistic derived by standardizing all regressors for foreign portfolio investment. When foreign portfolio investment is normalized on all regressors, including the BSE Sensex, exchange rate, foreign exchange reserve, index of industrial production, export, import, openness, REER, and wholesale price index, as well as a dummy for the 2008 crisis, the calculated F-statistic is 11.08859, which is greater than the upper bound critical value of 3.61 at the 1% level of significance.
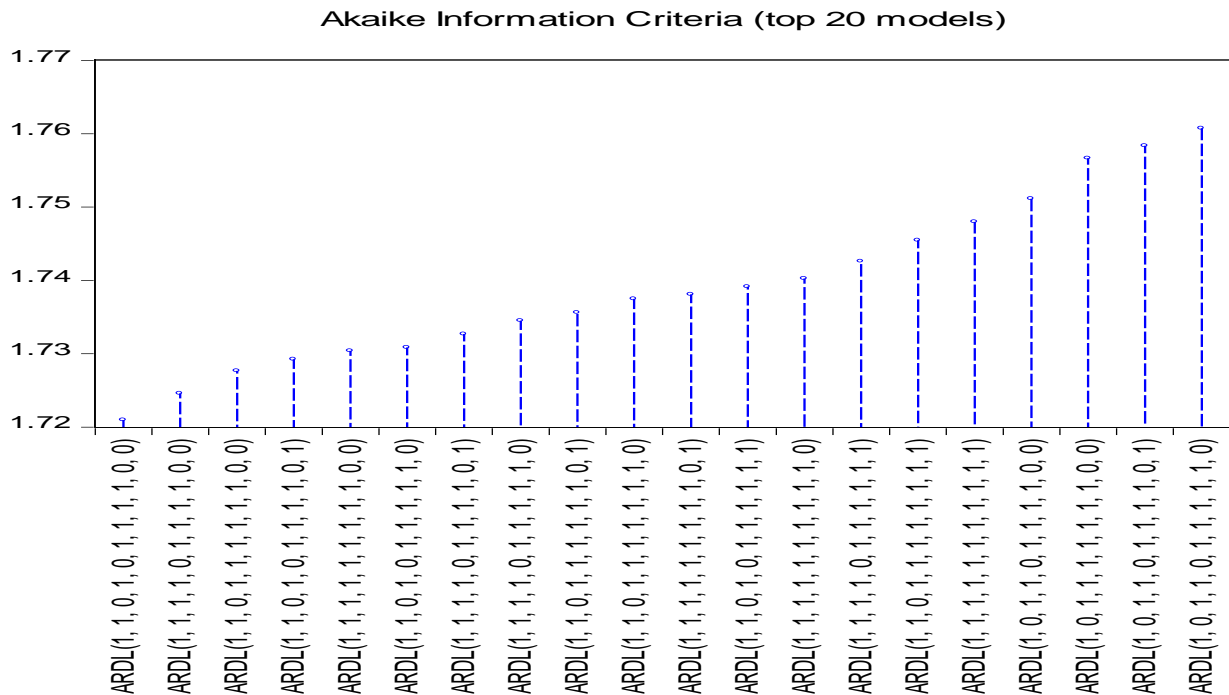
Figure 1

Akaike Information Criteria (top 20 models)

Table 3
Results of Bound Test

Dependent variable	F-statistic	Probability	Result
LNFPI(LNBSE,LNER,LNFE,LNIIP,LNEXP, LNIM,LNOP,LNREER,LNWPI,DO1)	11.08859	0.00	Co-integration
Critical value	**Lower bound**		**Upper bound**
10% level	1.76		2.77
5% level	1.98		3.04
2.5% level	2.18		3.28
1% level,	2.41		3.61

Source : Computed from data.

When the regressors are normalized to foreign portfolio investment (FPI), the long-run cointegration relationship between the variables is verified, and the null hypothesis of no cointegration is rejected. Table 4 shows that in the long run, the elasticity coefficients for foreign exchange reserves (LNFER), wholesale price index (LNWPI), exports (LNEXP), imports (LNIMP), and the 2008 crisis dummy (D01) are all negative. This suggests that both LNEXP and LNIMP have a negative and large influence on foreign portfolio investment, but LNFER, LNWPI, and D01 have no impact. In contrast, the Bombay Stock Exchange Sensex (LNBSE), Index of Industrial Production (LNIIP), exchange rate (LNER), and openness (LNOP) all have a favorable and considerable long-term impact on foreign portfolio investment. However, the real effective exchange rate

(LNREER) has a favorable but negligible influence on foreign portfolio investments. The LNFPI is expressed as follows:

LNFPI=0.9792*LNBSE +1.1455*LNER-0.0407LNFER + 48.0065*LNIIP-19.7661 *LNEXP-26.9898*LNIMP + 46.3238*LNOP + 0.5703LNREER-0.1844*LNWPI-0.0890*D01-48.2672……………………..(8.1)

Where,

FPI= Foreign portfolio investment
IIP = Index of Industrial production taken as a Proxy of GDP
FE = Foreign Exchange Reserve
REER = Real Effective Exchange Rate
BSE = Bombay Stock Exchange Sensex
OP = the degree of openness (Export + Imports / GDP)
ER = Exchange Rate
IMP=Import
EXP=Export
WPI= Wholesale Price Index
D01=Dummy for 2008 crisis

The BSE Sensex, Index of Industrial Production (IIP), openness, exports, and imports were all statistically significant variables that influenced portfolio investment over the study period, according to the ARDL bound test. The BSE Sensex, IIP, and openness all have a favorable and considerable influence on foreign portfolio investment, with significance at the 1% level. In contrast, exports and imports have a negative and considerable impact on foreign portfolio investment.

The IIP coefficient is assessed at 48.0065, which means that a 1% increase in IIP results in a 48.0065% rise in foreign portfolio investment, and vice versa. A greater market size, faster economic growth, and a higher level of economic development create more opportunity for foreign investors to capitalize on a country's resources and reap economic benefits.

These findings are consistent with those of Gumus et al. (2013), Baghebo and Apere (2014), and Duasa and Kasim (2009), which show that IIP has a considerable beneficial influence on foreign portfolio investment. They argue that a country's economic performance is an important factor in attracting international portfolio investment. As a result, maintaining a strong economic climate is critical to increasing investor trust in the Indian economy.

Table 4

Estimated long run coefficients using ARDL approach for FPI investment and its determinants
Dependent variable: FPI net investment

Regressors	Coefficient	t-value	p-values
Constant	-48.26725	-2.743124	(0.00)*
LNBSE	0.979239	2.902000	(0.00)*
LNER	1.145470	1.567076	(0.11)
LNFER	-0.040721	-0.162644	(0.87)
LNIIP	48.00651	2.246403	(0.02)*
LNEXP	-19.76613	-2.199382	(0.02)*
LNIM	-26.98979	-2.163217	(0.03)*
LNOP	46.32380	21.37039	(0.02)*
LNREER	0.570312	0.335751	(0.74)
LNWPI	-0.184390	0.335751	(0.58)
D01	-0.088984	-0.207802	(0.83)

*Note: a)*significant at 1% level*
Source : Computed from data.

The BSE Sensex is also noteworthy at 1% and has a beneficial effect on foreign portfolio investment (FPI). FPI and the BSE Sensex have a significant positive correlation, with a coefficient of 0.979239. This means that a 1% gain in the BSE Sensex corresponds to a 0.979239% increase in FPI, and vice versa. Foreign portfolio investment can also help to improve the equity market and boost shareholder involvement in company governance.

Bekaert and Harvey (1998) contend that stock market performance is a significant influence in recruiting FPI. Levine (1997) observes that stronger stock market returns attract more overseas portfolio investors and increase their confidence in future investments. Additionally, Bekaert and Harvey (1998), Froot and Mark (2001), and Gordon and Gupta (2003) discovered that results in emerging stock markets had a considerable impact on portfolio investment, with capital flows influenced by prior returns.

Open markets enable foreign investors to diversify their portfolios, improve risk management, and perhaps increase savings and investment (Evans, 2002). Openness, which measures a country's inclusion into the global economy, is important at the 1% level. The coefficient for this variable is 46.32380, which means that a 1% rise in openness corresponds to a 46.32380% increase in foreign portfolio investment (FPI), and vice versa. These findings are consistent with research by Aziz et al. (2015), Rashid and Husain (2013), and Talat and Zeshan (2013), which suggests that investors prefer to invest in more open countries with strong investor rights, higher accounting standards, and stronger legal frameworks.

Foreign portfolio investment is significantly and negatively impacted by exports and imports. For exports, a 1% rise results in a -19.76613% change in FPI, suggesting a negative impact. Similarly, imports have a significant negative association with FPI, with a coefficient of -26.32380, indicating that a 1% increase in imports reduces FPI by 26.32380%.

Other factors associated with the 2008 crisis, such as the Foreign Exchange Reserve, Exchange Rate, REER, Wholesale Price Index, and Dummy, are statistically inconsequential. The findings indicate that the widely held idea that FPI increases a country's stock market and general GDP does not entirely apply to India. While FPI has had an impact on the Indian stock market's secondary market, its impact on the real economy has been less than expected. The influx of FPI has produced uncertainty and mistrust in the stock market, as well as issues for macroeconomic management (Pal, 2006).

Table 5 shows the findings of the Error Correction Model. The Error Correction Model (ECM) variant of the ARDL model was used to estimate short-term coefficients and evaluate the rate of equilibrium adjustment. The ECM coefficient, which should be statistically significant and negative, was determined to be -33.32709. This negative and substantial figure implies a slow rate of adjustment, implying that around 33% of the disequilibrium from past shocks corrects itself in the current year.

Table 6 demonstrates that the estimated ARDL model does not exhibit serial correlation or heteroscedasticity, and the data is normally distributed. There are no problems with functional form misspecification, as evidenced by the negligible F-tests for each diagnostic test. Furthermore, the Cumulative Sum (CUSUM) plot in Figure 2, which is obtained from the model's recursive estimation, shows that the coefficients are stable during the sample duration. At the 5% significance level, the recursive estimates' trend lines are inside the standard error trend lines, indicating that the model's coefficients are stable.

Table 5

Estimated short-run co-efficient using ARDL approach

Dependent Variable: Foreign Portfolio Investment (LNFPI)

Regressors	Coefficient	t-value	p-values
D(LNBSE)	0.690470	2.83	(0.00)*
D(LNER)	0.790913	1.55	(0.12)
D(LNFER)	-0.028117	-0.16	(0.87)
D(LNIIP)	33.14706	2.30	(0.02)*
D(LNEXP)	-13.64792	-2.25	(0.02)*
D(LNIM)	-18.63564	-2.21	(0.02)*
D(LNOP)	31.98520	2.22	(0.02)*
D(LNREER)	0.393783	0.33	(0.74)*
D(LNWPI)	-0.127316	-0.54	(0.58)
D01	-0.061441	-0.20	(0.83)
ECM(-1)	-33.32709	-2.760493	(0.00)*

Note: a) significant at 1% level.*
Source : Computed from data.

Table 6

Autoregressive Distributive lag Distribution Diagonostic Test

Test statistics	Null hypothesis	F-statistic	Probability
Serial correlation (LM-Test)	No serial correlation	0.2482	0.6346
Heteroscedasticity test (Breusch-Pagan-Godfrey-Test)	No Heteroscedasticity	2.221	0.1234
Normality Test (Jarque-Bera Test)	There is normal distribution	0.443	0.7670

Note: a) Significant at 5% level*
Source : Computed from data.

Figure 2
Cumulative Sum (CUSUM) plots from recursive estimation of model
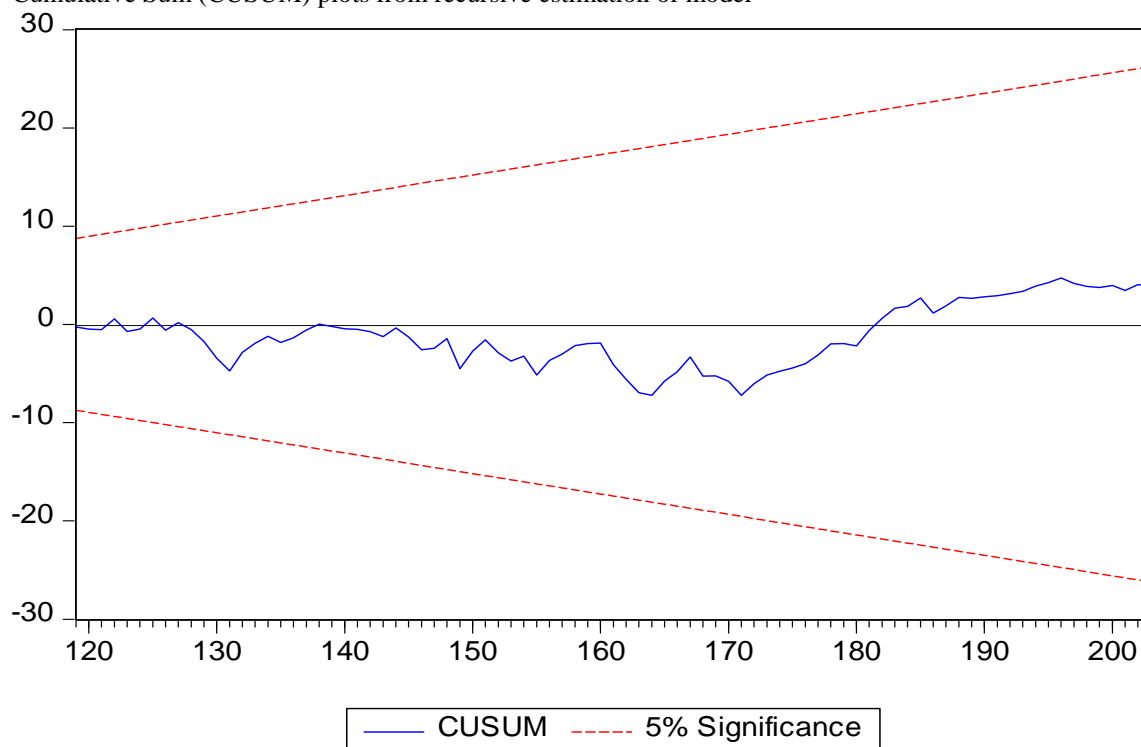
VII.   CONCLUSION

The study concludes that foreign portfolio investment has had a substantial impact in India. The ARDL Bound test results demonstrate that the Bombay Stock Exchange, Index of Industrial Production, and Openness all have a considerable positive impact on foreign portfolio investment in India. Conversely, exports and imports have a considerable negative impact on foreign portfolio investment in the country. To boost stock market returns, the government should focus on policies that encourage more portfolio investment in India.

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