Modeling and Forecasting Foreign Direct Investment (FDI) into SAARC for the Period of 2013-2037 with ARIMA

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Abstract

This paper forecasts the value of FDI for SAARC for the period of 2013-2037. This study applies times series data from 1970 to 2012. The analysis indicates that both mean and the variance change with an increasing trend for the forecasting period. FDI data is stationary according to the Augmented Dickey-Fuller Test. The paper identifies minimum AIC value and presents ARIMA (1, 1, 5) and ARIMA (1, 0, 5) models as optimal models to forecast FDI in the region. Box-Ljung test is employed to illustrate the randomization of residuals. The total value of FDI expected for the next twenty five years (2013-2037) is US $ 1672895.18 million and average FDI expected for the next twenty five years is US $ 66915.81 million for SAARC. The total value of FDI for the period of 2013-2023 is $671839.07 million and for the balance fifteen years (2024-2037), it is $ 1001056.11 million. The average FDI for the period 2013-2023 is $ 67183.91 million and for 2024-2037, it is $ 71504.01 million. There is a significant potential for enhancing regional co-operation in the area of direct investment, both for expanding intra-SAARC FDI, and for attracting FDI from outside the South Asian region. However, the role of FDI in economic integration is an issue that has received little attention in South Asia.

Keywords: Foreign Direct Investment, forecasting, Box-Jenkins models, ARIMA, SAARC

1. Introduction

Foreign Direct investment (FDI) is defined as an investment that involves a long-term relationship, interest, and management influence by a resident of one economy (foreign direct investor / parent enterprise) in an enterprise residing in an economy other than that of the foreign direct investor. Compared to other South Asian countries, Sri Lanka formed a FDI friendly macroeconomic environment a long time back. In the recent past, Sri Lanka received less inward FDI compared to other South Asian countries like India, Bangladesh and Pakistan. During the period of 2000-2013, Sri Lanka's average inward FDI is less than 3 percent compared to 15 percent in the 1990s. Bulk of the inward FDI in the South Asia goes to India, accounting for 85 percent of regional inward FDI. Bangladesh receives 5 percent of inward FDI in the region, while Pakistan receives 4 percent. Therefore, more than 90 percent of regional inward FDI is shared by India, Bangladesh and Pakistan. The main objective of this study is to forecast the value of FDI of SAARC for the next 25 years from 2013-2037. This study also estimates the total and average FDI for the period 2013-2037 with a breakdown in the analysis presented for the periods 2013-2023 and 2023-2037.

This study is useful for policy makers of individual SAARC countries and SAARC secretariat in drafting and attracting FDI to the region and individual countries. Forecasting of FDI into the SAARC region is relevant to address the balance of payments problems in the region, to deal with international business and financial market in general.

2. Literature Review

There are quite a few but significant empirical attempts made by researchers to examine the growth of FDI inflows and forecast using the ARIMA models. Batchelor (2000) compares the accuracy and information content of macroeconomic economic forecasts for G7 countries made in the 1990s by the OECD and IMF. This study finds with few exceptions, that private sector forecasts are less biased and more accurate in terms of mean absolute error and root mean square error compared to OECD and IMF.

Al-Abdulrazag and Bataineh (2007) forecast FDI inflows into Jordan for the period 2004-2025 using Box-Jenkins methodology. This study used ARIMA model based on time series data for the period 1976-2003. The study found that ARIMA (0, 1, 1) is the optimal model for forecasting FDI in Jordan for the period of 2004-2025. Rajan, Rongala and Ghosh (2008) presented forecasts of inward direct investment of India for the years 2008 to 2012 and the projected figure of FDI inflows is $ 60 billion for the year 2012.

Tsai (2010) forecasts FDI for Taiwan applying Modified Diffusion Model. This study aimed at the profitability impact on FDI in Taiwan and on integrated circuit (IC) manufacturing industry based on genetic algorithms (GA) methods in numerical simulations. This study predicts FDI using alternative models.

T. Al-Rawashdeh, Jaafar H. Nsour and Rafat S. Salameh (2011) forecast FDI for Jordan for the period 2011 - 2030 using ARIMA models based on time series data covering the period 1981-2010. This study only focuses on fitting ARIMA model for 20 years. This study identified that the variable FDI was not stationary in its levels and to make FDI data stationary, ARIMA models are applied after identifying first order of difference. This study was based on the computer program (Minitab, 14 and Eviews, 3.1) for data analysis and forecasting of FDI. The study recommends that there is a need to provide appropriate investment environment through providing necessary incentives and facilities to investors away from bureaucracy, the need to work on a comprehensive economic plan, especially in the aftermath of the global financial crisis that affected the world including Jordan and to make a comprehensive review of all legislations governing FDI. This study provides some useful insights to the current study on the application of ARIMA model for Sri Lanka.

Kumar and Dhingra (2012) forecast growth of FDI inflows to Sri Lanka and generated the short term forecasts of FDI inflows to Sri Lanka for the period of 2011-2020 using SPSS (7.5). This study uses the ARIMA model to evaluate the performance of FDI and compares Sri Lanka with other South Asian countries. It applies Double Exponential Smoothing using Holt's approach. However, Double Exponential Smoothing model is best suited to address the type of data which exhibits either an increasing or decreasing trend over time or when the data is non-stationary in nature. The forecasting is based on the sample data from 1990 to 2010.

Trading Economics (2014) forecasts FDI flows to countries like America, Europe, Asia and Africa using an ARIMA model. After modelling the past behaviour of a time series, they forecast for those regions and selected countries.

3. Methodology

This paper models the SAARC inward FDI series in US dollars using a univariate model, the Auto-Regressive Integrated Moving Average (ARIMA) model proposed by Box, Jenkins and Reinsel (1994). The behavior of the variable FDI at a given observation *t* is explained by its own past values (auto-regressive, AR terms) in the univariate model, and by its own past and present errors (moving average, MA terms).

The data employed in the study are extracted from the Central Bank of Sri Lanka, the World Development Indicators of the World Bank, International Financial Statistics Year Books of the International Monetary Fund and the Department of Census and Statistics of Sri Lanka. According to inward FDI data set, time series analysis forecasts the value of FDI in SAARC using R software version 3.0.3 tseries package for time series forecasting.
The ARIMA modeling procedure initiates with model identification, where the original series has to be filtered so as to identify its generating process and make it stationary. The correlograms of the Auto Correlation Function (ACF) and the Partial Autocorrelation Function (PACF) were used to determine whether the data generating process is Auto-Regressive (AR) or Moving-Average (MA), and to ascertain the order of integration (I), and their respective orders.

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \delta_1 \Delta y_{t-1} + \cdots + \delta_{p-1} \Delta y_{t-p+1} + \varepsilon_t,$$

Stationary nature of FDI series is identified using Augmented Dickey-Fuller Test. The testing procedure for the ADF test is similar to the Dickey–Fuller test but it is applied to the model where α is a constant, β the coefficient on a time trend and p the lag order of the AR process. The unit root test is then carried out under the null hypothesis $\gamma = 0$.

After examining the stationary nature of data, the study plotted the Auto Correlation Function (ACF) and Partial Auto Correlation Function (PACF).

$$DF_\tau = \frac{\hat{\gamma}}{SE(\hat{\gamma})}$$

Following this, the Box-Jenkins models were used to select the best suited model for the current study. Selected Box-Jenkins models are estimated and the best optimal model using minimum Akaike Information Criterion(AIC) value, is identified. ARIMA (1,1,5) model is identified as the best suited model to investigate the adequacy and residual randomizations. The Ljung–Box test is used where *n* is the sample size,ρ_k is the sample autocorrelation at lag *k*, and *h* is the number of lags being tested. According to the FDI data set, forecasting the volume of FDI for SAARC using time series analysis, ARIMA (p,d,q).

The same ARIMA (1,1,5) model is applied to forecast the inward FDI to SAARC countries for the period 2013-2037.

4. FDI in SAARC Countries

Nearly all of the South Asian countries follow outward-looking economic growth and development policies today. The region has recorded the lowest rate of savings and investments, compared to other regional blocs. Foreign Direct Investment as a percentage of GDP is summarised in Table 1. FDI openness is measured by the inward FDI stock of a country expressed as a percentage of nominal GDP in dollars. A higher value indicates more inward FDI as well as the degree of openness in the economy. Maldives receives the highest FDI inflows as a percentage of GDP and Nepal is the receiver of lowest FDI among SAARC countries.

India consistently receives the bulk of SAARC FDI flows, while Pakistan and Bangladesh show a considerable amount of FDI inflows in the recent past. India is an attractive destination for FDI due to its potential market, cheap labour, natural resources, skilled computer literate labour force and the political and policy stability. India was placed the 5th position in the year 2013 by the Foreign Direct Investment Confidence Index. Pakistan and Bangladesh have moderately increased their regional share of FDI recently, but Afghanistan, Bhutan, Maldives and Nepal record less than 1 percent of FDI inflows of SAARC countries.

The sluggish progress in the FDI inflow is attributed to policy restrictions for foreign investors, weak regional investment environment, lack of good governance, inefficient bureaucracy, political instability, poor infrastructure facilities, political influence on private sector activities, labour market imperfections (strikes / *hartal* etc.), as well as the negative image regarding the region. Depression in the world economy, poor profitability due to low rate of return, weak financial markets, instability in the region are the other factors contributing to limited FDI in South Asia.

Afghanistan recently introduced a new investment policy to support FDI in different sectors, especially in industry, construction, agriculture and mining. Afghanistan aims at attracting FDI to the country and to prevent investments from leaving the country. The new incentives include providing land at almost no cost to industrialists, seven-year tax exemptions for factory owners and one-year multiple entry visas to foreign investors. However, there are fears that once NATO troops withdraw, aid money will decline and investors will leave due to security concerns. The government of Afghanistan reiterated its commitment to promote a business friendly environment at the Tokyo Conference in July 2012.

Bangladesh offers promising prospects for foreign investors and is likely to become one of Asia's preferred low-cost manufacturing centres given its fast-growing economy, abundant labour force and strategic geographic location. Bangladesh no longer applies discriminatory policies against foreign investment. Bangladesh's investment policy includes, 100 percent ownership coverage, tax holidays, reduction in import duties on capital and machinery and spare parts, 100 percent duty free facilities for exporters, interest on foreign loans and capital gains for portfolio investment, Bilateral Investment Guarantee Agreements, commitment to the MIGA, full convertibility of the taka on the current account and facilities offered under BOI. However, the country has attracted relatively little FDI, thus lies far and underperforms in comparison to other SAARC countries. Poor infrastructure and safety issues of workers are often cited as major obstacles to FDI in Bangladesh. Saudi Arabia, South Korea, China, Hong Kong, Norway, USA, Singapore, and Malaysia are the biggest investors in Bangladesh. The government of Bangladesh has adopted an 'Open Door Policy' to FDI. However, Bangladesh needs further efforts to attract more FDI such as addressing infrastructure and labour standards issues, addressing legal issues and improving the country's performance in the Doing Business Index.

Bhutan recently introduced a FDI policy, allowing foreign investors to own up to 70 percent of joint venture companies and which specifies a minimum amount of investment. Various incentives were offered every year through budgets for foreign investors. India dominates FDI in Bhutan.

India introduced a new industrial policy in 1991 which increased the attraction of foreign investment to the country. The policy introduced 100 percent export oriented projects and an export-processing zone, targeting more foreign investment and the Indian rupee is fully convertible on the current account. Due to its liberalization policy, India today is one of the most attractive destinations for foreign investment (both FDI and portfolio) in the world. It has recently relaxed its restricted FDI policies on the energy sector as well. Most of the foreign investment is directed to power generation, telecommunications, ports, roads, petroleum exploration and processing and mining. The Indian software industry has been identified as the most attractive sector for FDI during the next 10 years. In 2013, India amended its investment policy to increase foreign investment while eliminating barriers faced by foreign investors, addressing legal regulations for foreign institutional investors and firms. India is ranked the 6th place among 112 countries in the world for both 2013 and 2014 according to Baseline Profitability Index for 2014.

Maldives continues to attract more foreign investment and encourages capital intensive foreign investments to the country. Foreign investors, irrespective of their size, are encouraged to enter and operate in Maldives; small investors are encouraged to form joint ventures with Maldivian nationals or companies registered in the Maldives. Maldives offers a wide range of incentives to foreign investors that include full foreign ownership, legally backed investment guarantee, provision for overseas arbitration of disputes, long term contractual agreements and long term lease of land, freedom to use foreign managerial, technical and unskilled workers, no restrictions on foreign exchange and no restrictions on the repatriations of earnings or profits.

Amendments to the foreign investment and technology act of 1980 and national investment plan in 1992 clearly mark the commitment of Nepal to attract more foreign investment to the country. This includes 100 percent equity participation by foreigners, non-discriminatory treatment on foreign investment and guarantee against nationalisation. Tax holidays, no tax on dividends and export earnings are other incentives. Prior to the establishment of the Investment Board in 2011, one window servicing agency for all foreign investment to facilitate corporate registration, land transfers, utility connections, administrative services agreements and coordination among various agencies were offered by the Department of Industry. On January 1, 2010, as part of Nepal's accession commitments to the WTO, Nepal opened the domestic banking sector to foreign banks. In August 2011, a high-level Investment Board was created to serve as one window facility for domestic and foreign investors pursuing large projects greater than USD 115 million. Hospital and medical services, hydropower and construction sectors are the attractive sectors in Nepal. India, China, South Korea and the USA are the top investors in Nepal.

Pakistan's investment policy has been formulated to create an investor-friendly environment with a focus on further opening up of the economy and marketing the potential for direct foreign investment. Pakistan introduced a foreign private investment act in 1976 to legally protect FDI, through tax free facilities and provisions to safeguard foreign investments. Protection of economic reforms Act, 1992 also safeguards foreign investors and it welcomed joint ventures in Pakistan. Except for a few sensitive areas, most of the country and sectors are open to foreign investments. Pakistan relaxed foreign exchange control and has to only meet the minimum legal requirements. UK, USA, UAE, Saudi Arabia and Japan are the top 5 foreign investors in Pakistan. Other countries are Netherlands, Hong Kong, Korea, Germany, New Zealand and Singapore. FDI inflow is concentrated on transport storage, financial sector, oil and gas sector, food, beverages and tobacco, power, chemicals, pharmaceutical, fertilisers and cement industries. Pakistan introduced various incentives to attract more foreign investment including full repatriation of capital, capital gains, dividends and profits in recent years. According to the Baseline Profitability Index (BPI) report, Pakistan is ranked 97th as compared to 106th in 2013 in the list of FDI friendly countries.

Sri Lanka was the pioneer in welcoming FDI to the region. It set up a separate body, Greater Colombo Economic Commission to manage the Export Processing Zones (EPZs) and to attract more foreign investment. The country established a separate body called BOI, under No. 4 BOI Act of 1978, to facilitate the foreign investment and related activities. BOI (2014) in Sri Lanka classified foreign investment projects into small scale (Rs. 25-50 million), medium scale (Rs 50 -300 million) and large scale (not less than Rs. 300 million).

Foreign investors are entitled to have 100 percent foreign ownership and no restrictions on foreign earnings and exchange transactions. Current investment policy offers corporate tax incentives for new enterprises, project expansions for existing enterprises, strategic development projects, import duty exceptions, customs duty, VAT and PAL exceptions, tax on dividends exceptions and exception on exchange controls. Sri Lanka receives the highest amount of foreign investment from China followed by Hong Kong, Singapore, Netherlands, Malaysia and the UK and India.

5. Results and Discussion

The main features of mean, median, range, quartile in the SAARC FDI data during the period of 1970 to 2012 is qualitatively described in Table 3.

5.1 Visual inspection of Data

In the visual inspection of Figure1, it seems that mean and variance have changed over time. With the applications of non-stationary data, the changes from time *t-i* to time, finite variance process of which the mean and the variance are constant in time, it identifies patterns in correlated data trends and seasonal variations.

5.2 Shapiro-Wilk Normality Test

The null hypothesis for Shapiro-Wilk normality test is that the data are normally distributed. The Prob < W value listed in the output is the *p*-value. If the chosen alpha level is 0.05 and the *p*-value is less than 0.05, then the null hypothesis that the data are normally distributed is rejected. If the *p*-value is greater than 0.05, then the null hypothesis is not rejected. The result of the Shapiro-Wilk normality test is summarized in Table 4.

According to Table 4, at *P*-value < 0.05, H_0 is rejected at 5 percent significance level, and then FDI data is not normally distributed for SAARC countries.

5.3 Dickey-Fuller test

Unit root tests can be used to determine if trending data should be first differenced or regressed on deterministic functions of time to render the data stationary. The ADF regression test is for the existence of unit root of X_t, namely in the logarithm of all variables at time *t*. The ADF test is based on the following regression model and the basic equation is

$$\Delta X_t = \delta_0 + \delta_1 t + \delta_2 X_{t-1} + \sum_{i=1}^{k} \alpha_i \Delta X_{t-i} + u_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Here, ΔX_{t-i} shows the first differences with i lags. On the other hand, u_t adjusts the error of auto correlation. It is required to estimate α_i and coefficients δ_0, $\delta_1$and δ_2. The null and alternative hypotheses for the existence of unit root in variable X_t are as follows: $H_0 : \delta_2 = 0$; $H_A : \delta_2 < 0$.

In this study, Augmented Dickey Fuller (ADF) unit root test is employed to check the stationary nature of data. If there is a unit root, then that particular series is considered to be non-stationary. Among three different specifications of ADF test, we use the specification method that includes both the trend term and the constant term. The Akaike Information criterion was used to decide the optimal lag length. Table 5 presents the results of Augmented Dickey-Fuller Test employed in this study. According to the Table 5, FDI data series of SAARC countries is stationary.

5.4 Selection of an ARIMA Model

The most commonly used techniques of model identification were propounded originally by Box and Jenkins (1972). Their basic tools of Auto Correlation Function (ACF) and the Partial Auto Correlation Function (PACF) were applied to identify tentative ARIMA models. Figure 2 presents the behavior of autocorrelation for the SAARC FDI data.

According to Figure 2, Auto Correlation Function is computed applying MA (5), could consider as it is cut off after lag 5 and dies down moderately.

The partial autocorrelation measures the dependence between current and future values after the effect of the intervening values has been removed. Figure 3 gives details of the behavior of partial autocorrelation for SAARC FDI data.

According to Figure 3, Partial Auto Correlation Function is computed AR (1) could be considered as it dies down quickly and cut off after lag 1. When observing Figure 1, two tentative models can be identified for the forecasting of FDI to SAARC countries.

• ARIMA (1, 0, 5)
• ARIMA (1, 1, 5)

Table 6 summarizes both results of model estimating.

According to Table 6, using minimum AIC value, it is possible to select ARIMA (1, 1, 5) model as the best model for the forecasting of FDI for SAARC countries.

Two Box-Jenkins models are applied and ARIMA (1,1,5) based on MA (5) could be considered as it dies down moderately in Auto correlation function. AR (1) could be considered as it dies down quickly and is cut off after lag 1 in partial auto correlation function.

Table 7 provides the Randomization of residuals up to 20 lags for the SAARC countries.

3.5 Forecasting of FDI to SAARC countries

Table 8 presents the forecasting of FDI for SAARC for the period of 2013-2037.

6. Conclusion

The total value of FDI expected for the next twenty five years (2013-2037) is US $ 1672895.18 million and average FDI expected for the next twenty five years is US $ 66915.81 million for SAARC. The total value of FDI for the period of 2013-2023 is $671839.07 million and for the balance fifteen years (2024-2037), it is $ 1001056.11 million. The average FDI for the period 2013-2023 is $ 67183.91million and for 2024-2037, it is $ 71504.01 million. Future prospects of most SAARC countries are determined by the inflow of FDI into the region. There is a significant potential for enhancing regional co-operation in the area of direct investment, both for expanding intra-SAARC FDI, and for attracting FDI from outside the South Asian region. However, the role of FDI in economic integration is an issue that has received little attention in South Asia.

7. References

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Table 1: FDI as a Percentage of GDP in SAARC Countries

Country	1990	2000	2010	2011	2012	2013
Afghanistan	0.33	0.49	8.88	7.98	7.7	7.9
Bangladesh	1.70	4.75	6.91	5.68	6.1	6.1
Bhutan	0.72	1.66	0.88	1.97	7.6	8.2
India	0.57	3.49	11.88	1.38	12.0	12.1
Maldives	12.62	2.46	73.70	57.6	63.5	87.0
Nepal	0.36	1.25	1.58	1.91	2.4	2.7
Pakistan	3.95	9.71	11.39	9.9	10.7	11.6
Sri Lanka	8.28	9.55	1.18	10.1	11.7	11.9

Source: calculated based on UNCTAD FDI data base, 2014

Table 2: Country Shares of FDI (As a Percentage of total FDI Inflows to SAARC)

Year	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka	Total(M.US $)
2000	0	12.39	0	76.82	0.48	-0.01	6.62	3.7	4670.5
2001	0.01	5.51	0	85.2	0.32	0.32	5.96	2.67	6428.9
2002	0.71	4.66	0.03	79.87	0.35	-0.08	11.68	2.79	7048.6
2003	1.04	6.32	0.06	77.97	0.57	0.27	9.64	4.13	5541.8
2004	2.38	5.87	0.11	73.72	0.68	-0.01	14.26	2.97	7837.5
2005	2.4	7.48	0.05	67.49	0.65	0.02	19.49	2.41	11292.9
2006	0.91	3.02	0.27	77.37	0.36	-0.03	16.26	1.83	26272.0
2007	0.58	2.05	0.01	77.9	0.41	0.02	17.18	1.85	32539.7
2008	0.17	1.99	0.04	86.16	0.33	0	9.94	1.37	54711.8
2009	0.19	1.78	0.18	90.4	0.4	0.1	5.93	1.02	39443.3
2010	0.67	2.91	0.1	87.39	0.69	0.28	6.44	1.52	31389.4
2011	0.21	2.83	0.06	90.26	0.64	0.24	3.31	2.45	40095.2
2012	0.34	4.65	0.08	87.1	1.02	0.33	3.09	3.39	27780.0
2013	0.21	4.92	0.07	86.74	1	0.23	4.02	2.82	32510.6
2000-2013 Avg.	0.7	4.74	0.08	81.74	0.56	0.12	9.56	2.49	23397.3

Source: Calculated based on UNCTAD, FDI/TNC database

Table 3: Descriptive Statistics of SAARC FDI Data

Minimum	1st Qu.	Median	Mean	3rd Qu.	Maximum
-13.9	130.8	574.8	7349.7	5985.3	54699.1

Figure 1: Visual Inspection of Data

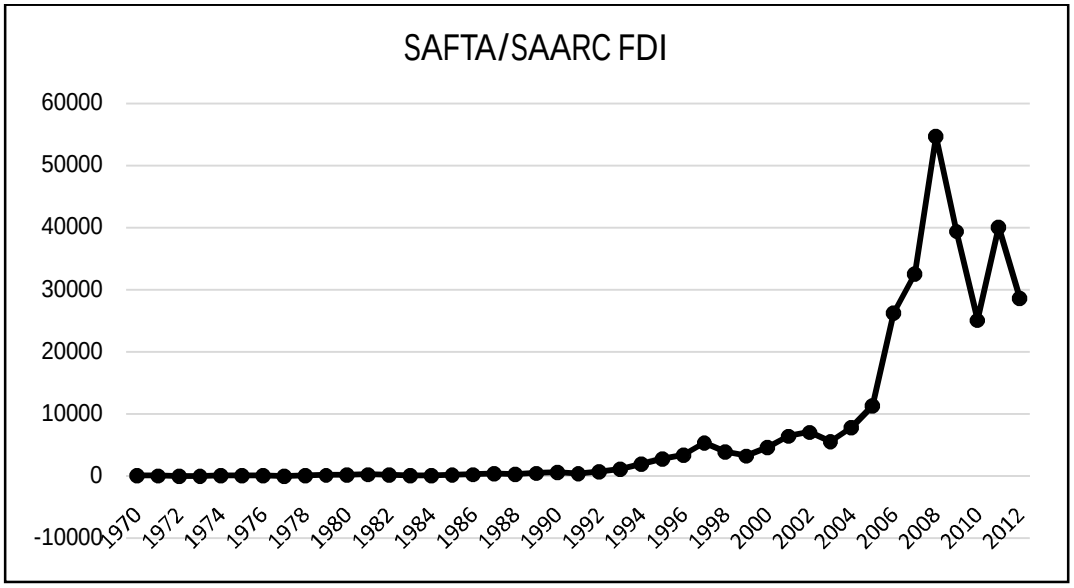

Table 4: Shapiro-Wilk Normality Test for SAARC Countries

W = 0.612, p-value = 1.943e-09

Table 5: Augmented Dickey-Fuller Test

Augmented Dickey-Fuller Test
Dickey-Fuller = -2.4088, Lag order = 3, p-value = 0.4122
Alternative hypothesis: stationary

Figure 2: Behavior of Autocorrelation

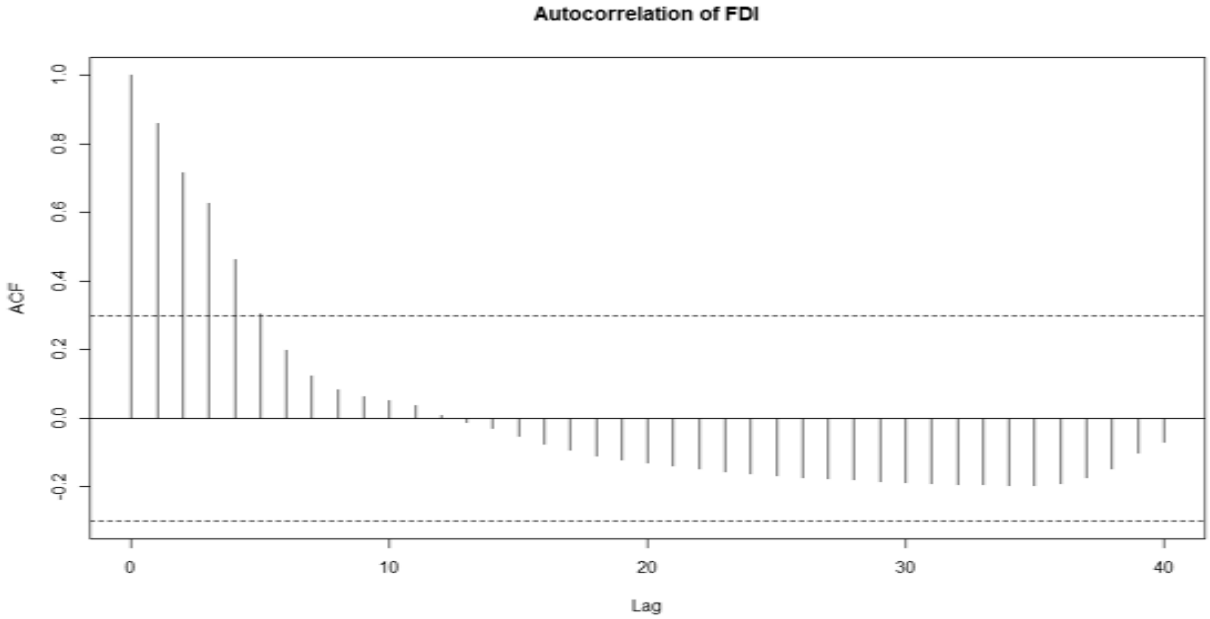

Figure 3: Partial Autocorrelation of SAARC FDI Data

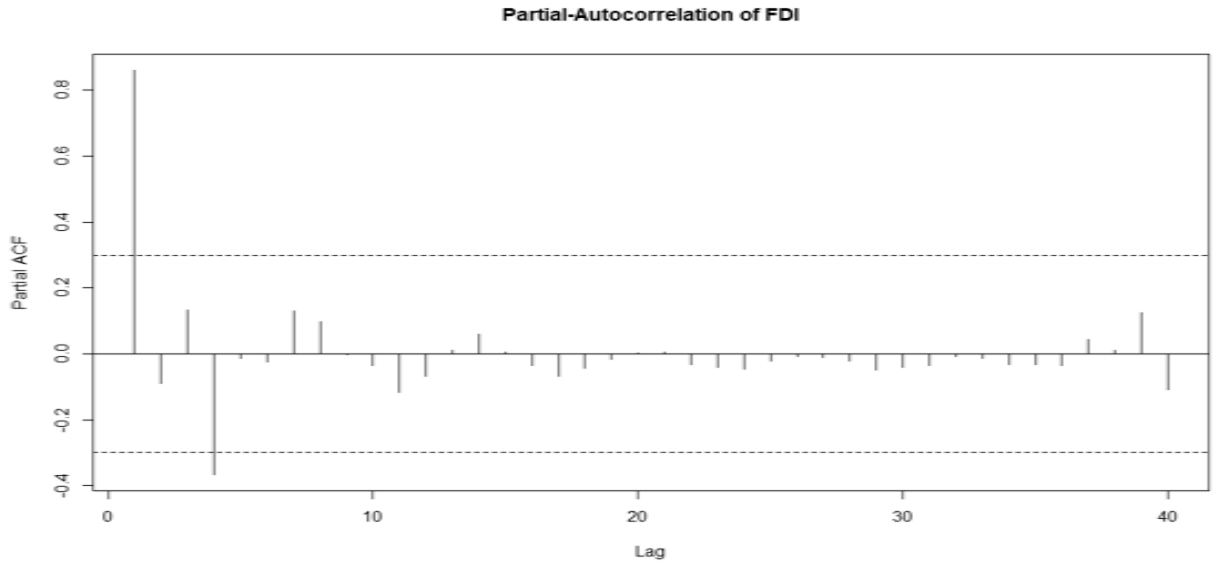

Table 6: Model Estimating with ARIMA (1, 0, 5) and ARIMA (1, 1, 5)

ARIMA(1,0,5)							
Coefficients:	ar1	ma1	ma2	ma3	ma4	ma5	intercept
Estimator	0.9313	0.0034	-0.0526	0.2338	-0.3755	0.2216	11579.7
Standard Error	0.0942	0.1985	0.1916	0.1671	0.2568	0.2504	10511.5
Sigma squared estimated as 29428856: log likelihood = -432.64, AIC = 881.28							
ARIMA(1,1,5)							
Coefficients:	ar1	ma1	ma2	ma3	ma4	ma5	
Estimator	0.8066	-0.9221	0.1773	0.1896	-0.9396	0.8568	
Standard Error	0.201	0.3079	0.5634	0.4837	0.6049	0.52	
Sigma squared estimated as 25061966: log likelihood = -420.76, AIC = 855.52							

Table 7: Box-Ljung Test

Box-Ljung test
X-squared = 3.0205, df = 13, p-value = 0.9979

Table 8: Forecasting of FDI for SAARC for the Period of 2013-2037

Year	Predicted FDI (US $M.)	Standard Error	95% Confidence Interval	
			Lower Limit	Upper Limit
2013	45332.46	5076.107	35383.2903	55281.6297
2014	58989.78	6751.188	45757.4515	72222.1085
2015	55693.04	8312.988	39399.5835	71986.4965
2016	56421.4	10309.866	36214.0626	76628.7374
2017	59534.43	10610.902	38737.0621	80331.7979
2018	62045.35	11283.467	39929.7547	84160.9453
2019	64070.61	12304.698	39953.4019	88187.8181
2020	65704.15	13591.045	39065.7018	92342.5982
2021	67021.73	15051.639	37520.5176	96522.9424
2022	68084.47	16612.326	35524.311	100644.629
2023	68941.65	18219.832	33230.7793	104652.5207
2024	69633.04	19838.292	30749.9877	108516.0923
2025	70190.71	21444.508	28159.4743	112221.9457
2026	70640.51	23023.998	25513.4739	115767.5461
2027	71003.31	24568.129	22849.7772	119156.8428
2028	71295.94	26072.154	20194.5182	122397.3618
2029	71531.96	27533.88	17565.5552	125498.3648
2030	71722.34	28952.779	14974.8932	128469.7868
2031	71875.9	30329.393	12430.2897	131321.5103
2032	71999.75	31664.93	9936.4872	134063.0128
2033	72099.65	32960.994	7496.1018	136703.1982
2034	72180.22	34219.408	5110.1803	139250.2597
2035	72245.22	35442.086	2778.7314	141711.7086
2036	72297.64	36630.961	500.9564	144094.3236
2037	72339.92	37787.925	-1724.413	146404.253