GROWTH AND FORECASTS OF FDI INFLOWS TO NORTH AND WEST AFRICA - AN EMPIRICAL ANALYSIS

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ABSTRACT: *The developing countries of Africa are in severe hunger of FDI inflows as these are receiving a meager 2.8 percent share of global FDI inflows and just 10 percent of aggregate FDI inflows to the developing world. The present study is an effort to examine the growth of FDI inflows to the two largest recipient regions of Africa, through the computation of compound annual growth rates by fitting an exponential function estimated by ordinary least square method. The study detected that during the last three decades, the growth of FDI inflows remained highest for Algeria and Cape Verde, in Northern Africa and West Africa respectively. Both these countries also remained ahead of the others, in their respective regions in growth of FDI as percentage of gross fixed capital formation. The forecasts of FDI inflows to the representative countries of North and West Africa have been generated by using Double Exponential Smoothing model for the period 2009 to 2020. The adequacy of the model is tested by computing autocorrelation coefficients and Ljung-Box Q statistics. The study revealed that in the ensuing decade, Egypt is expected to grow at the fastest pace as far as FDI inflows are concerned.*

KEY WORDS: *double exponential smoothing, compound growth rates, forecasts, auto correlation coefficients, Ljung-Box Q-Statistics*
JEL Classification: F21, F47

1. INTRODUCTION

African countries, eager to achieve high rate of economic growth, are trying their level best to accelerate the rate of capital formation. An increase in investment is no doubt, crucial for the attainment of sustained growth and development in the region. But the levels of income in these countries are so low that additional saving and investment are hard to be generated domestically and this requires mobilization of international financial resources. Given the unpredictability of aid inflows, low share

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of Africa in world trade (2.34 percent of world exports and 2.22 percent of world imports in the year 2003), high volatility of short-term capital flows, and the low savings rate of African countries (less than 20 percent), the desired increase in investment has to be achieved through an increase in FDI inflows (Dupasquier and Osakwe, 2005). FDI is viewed as a major stimulus to economic growth in developing countries because of its perceived ability to deal with major obstacles such as shortages of financial resources, technology and skills (Mwilima, 2003). FDI is welcomed and indeed actively sought by virtually all the African countries. For this reason they have made considerable efforts over the past decades to improve their investment climate. They have liberalized their investment regulations and have offered incentives to foreign investors. However, the expected surge of FDI into Africa as a whole has not occurred (Odenthal and Zimny, 1999). Africa received FDI inflows to the tune of US$ 1953 million in the year 1981 which was just 2.88 percent of global inflows and 8.12 percent of the aggregate inflows of developing countries. In the year 2008, with an amount of the order of US$ 52982 million, although Africa's share in the FDI inflows of developing countries rose marginally to 10 percent but the share in the global inflows remained restricted to 2.88 percent only (World Investment Report 2008). Present study is an effort to access the trends in growth and ascertain the prospects of FDI in the North Africa and West Africa, the regions which have garnered the maximum share of FDI inflows to Africa during the last few decades.

2. OBJECTIVES

The study has been conducted keeping in mind the following objectives:

1. To examine the trends in growth of FDI inflows to North Africa and West Africa.
2. To detect the share of FDI inflows in the gross fixed capital formation in North and West Africa.
3. To generate the forecasts of FDI inflows to the major recipient countries of North Africa and West Africa.

3. DATABASE AND METHODOLOGY

The present study is based on secondary data and is confined to the period of twenty seven years i.e. 1981-1982 to 2007-2008. The required data have been extracted from World Investment Report UNCTAD (2008). For the purpose of analysis, whole developing Africa has been divided into five regions viz. North Africa, West Africa, Central Africa, East Africa and Southern Africa. Out of these five regions, two major recipient regions have been selected by adopting percentage share approach. To calculate the compound annual growth rates (CAGRs), first of all, an exponential function has been fitted as shown below:

$$Y_t = \beta_0 \beta_1^{\,t} e^{ut} \qquad (1)$$

Here Y_t is dependent variable, β_0 and β_1 are the unknown parameters and U_t is the disturbance term. If we present equation (1) in the logarithmic manner it assumes the following form:

$$\log Y_t = \log\beta_0 + \log\beta_1 + U_t \tag{2}$$

Equation (2) makes use of Ordinary Least Square Method of regression. The compound rate of growth (gr_c) has been computed by taking antilog of estimated regression coefficient, subtracting 1 from it and multiplying by 100, as shown below:

$$gr_c = (A.L.\hat{\beta}_1 - 1) \times 100 \tag{3}$$

Where $\hat{\beta}_1$ is a regression estimate for β_1. To check whether the growth rates are significant or not Student's t-test has been applied which is as follows:

$$t = \frac{\hat{\beta}_1}{s(\hat{\beta}_1)} \sim t(n-2)\ d.f \tag{4}$$

Where $\hat{\beta}_1$ is the regression estimate, $s(\hat{\beta}_1)$ the respective standard error (Gupta and Kumar, 2006, p.297; Sidhu and Kumar, 2006, p.124). The forecasts have been generated by applying Double Exponential Smoothing - also known as Holt Exponential Smoothing model. Since Double Exponential Smoothing model is best suited to address the type of data which exhibits either an increasing or decreasing trend over time. Moreover, in Double Exponential Smoothing model past observations are given exponentially smaller weights as the observations get older. In other words, recent observations are given relatively more weight in forecasting than the older observations. Exponential smoothing is frequently the only reasonable time series methodology in large forecasting systems (Gardner, 1985, p.23). Two equations associated with Double Exponential Smoothing are as follows (http://www.itl.nist.gov/div898/handbook/pmc/section4/pmc434.htm).

$$f_t = \alpha . Y_t + (1-\alpha)(f_{t-1} + b_{t-1}) \tag{5}$$

$$b_t = \gamma . (f_t - f_{t-1}) + (1-\gamma) . b_{t-1} \tag{6}$$

where: Yt is the observed value at time t, ft is the forecast at time t, bt is the estimated slope at time t, α (Alpha) is the first smoothing constant, used to smooth the observations, γ (Gamma) is the second smoothing constant, used to smooth the trend.

To adjust level at time t, the trend of the previous period b_{t-1}, is added to the last smoothed value of level component as shown by equation (5). Then equation (6) is used to update the trend component, which is expressed as the difference between the

last two smoothed values. Since there might be some randomness remaining, the trend is modified by multiplying the trend in the past period (f_t-f_{t-1}) with γ and adding that to the previous estimate of the trend multiplied by $(1\text{-}\gamma)$ (Gupta and Kumar, 2008, p.30; http://www.itl.nist.gov/div898/handbook/pmc/section4/pmc434.htm).
The one-period-ahead forecast is given by:

$$F_{t+1} = f_t + b_t \tag{7}$$

The m-periods-ahead forecast is given by:

$$F_{t+m} = f_t + mb_t \tag{8}$$

Equation (7) is used to forecast the value for one period ahead and finally equation (8) was used to forecast ahead. For initialization process, grid search procedure was used on the software SPSS (version 7.5) and the values of two smoothing parameters α and γ were obtained. Only those values of α and γ were selected which corresponded to the lowest figure of accuracy measure used. The best value for the smoothing constant is the one that results in the smallest sum of the squared errors given by the following equation:

$$\text{Sum of Square of Errors (SSE)} = \Sigma\, e_t^2 = \Sigma \left(Y_t - \hat{Y}_t\right)^2 \tag{9}$$

4. ADEQUACY OF THE DOUBLE EXPONENTIAL SMOOTHING

Before generating forecasts it is imperative to check the adequacy of the forecasting technique used. Present study confirms the appropriateness of DES model to generate forecasts by making use of two identification techniques namely autocorrelation function and Ljung-Box Test. Exponential smoothing when allied to appropriate identification technique constitute an even stronger competitor method to alternative univariate forecasting procedures (Chatfield, Koehler, Ord, Synder, 2001). To test the hypothesis of randomness as a measure to confirm the adequacy of the model used, autocorrelation coefficients and Ljung-Box Q statistic of residuals have been calculated.

5. AUTOCORRELATION COEFFICIENT

The autocorrelation (Box and Jenkins, 1976) function has been used for the purpose of detecting non-randomness in data. Autocorrelations of residuals were worked out as under:

$$r_k(e) = \frac{\sum_{t=1}^{n-k} e_t \cdot e_{t+k}}{\sum_{t=1}^{n} e_t^2}; k=1,2.....l \qquad (10)$$

Computed values of auto correlation coefficient, rk(e) and the lag k were displayed graphically to depict autocorrelation function (ACF) also known as correlogram. The 95% confidence interval for residual ACF was obtained by using Bartlett's approximation while calculating standard errors (Bartlett, 1946; Gupta, Kumar, 2008, p.31; and http://www.itl.nist.gov/div898/handbook/pmc/section4/pmc434.htm). Residual ACF, which lies within the 95% interval taken as insignificant and insignificance of ACF, implies adequacy of DES to generated forecasts.

6. LJUNG-BOX TEST

Out of a large number of tests of randomness we have selected Ljung-Box test which can be used to test multiple autocorrelation coefficients and instead of testing randomness at each distinct lag, tests the overall randomness based on a number of lags. For this reason, it is often referred as portmanteau (French word which refers to a coat rack that can hold many items of clothing on its hook) test. In this test we have considered the whole set of the values all at a time to see whether they are significantly different from zero. Ljung-Box Q statistics was computed from the model's residuals by using the following equation:

$$Q = n(n+2)\sum_{k=1}^{k} r_k \frac{(e)^2}{n-i} \qquad \text{For } i = 1 \text{ to } k \qquad (11)$$

Where Q is Portmanteau test statistic, n is the sample size, L is the number of lags being tested. Non-significance of Q test is taken to imply that the generated residuals could be considered as white noise, thereby indicating the adequacy of estimated model (Gupta and Kumar, 2008, p.31; http://www.itl.nist.gov/div898/handbook/pmc/section4/pmc434.htm).

7. LIMITATIONS OF THE STUDY

Present study is limited to FDI inflows to two major recipient regions of Africa. However, the outflows from these regions are not the part or parcel of this study. While assessing the growth and generating the forecasts, the negative inflows where ever detected, were taken as zero. Moreover, the study compares the position of only two largest recipient regions.

8. DISCUSSION AND RESULTS

The discussion has been divided in to three sections. Section I examines the growth of FDI inflows to the largest recipient regions in Africa and detects the relative position of their respective countries. Section II traces the share of FDI inflows in the gross fixed capital formation in the countries of largest recipient regions. Section III is devoted to the generation of forecasts of FDI inflows to the major recipient countries of North Africa and West Africa.

The tides of FDI fluctuated up and down through the African countries over the last three decades with no distinct tendency to rise or fall. Another interesting fact is that the FDI inflows received by the continent have not been spread evenly among all the regions. In the year 2007-08, Africa received FDI to the tune of US $ 52982 million and out of this, the largest chunk of 42.30 percent has been garnered by North Africa only and second largest share of the order of 29.35 percent has been attracted by West Africa. (Refer Table 1). The aforementioned trend can be observed even when the average for the last twenty seven years is taken. The perusal of Table 1 clearly indicates that on the average, North Africa shared 36 percent of aggregate inflows received by Africa and West Africa was successful in attracting 30.27 percent. Southern Africa garnered a share of the order of 21.64 percent whereas Central Africa and East Africa have attracted meager share to the tune of 7.51 percent and 4.82 percent respectively. This shows that the major recipients of FDI in the continent in the last three decades have been two regions- North Africa and West Africa. A detailed comparative study of FDI growth in the respective countries of these two regions has been exercised in the subsequent analysis.

North African countries which are more or less taken as Arab countries have witnessed enormous rise in the FDI inflows although there has been severe fluctuations in FDI inflows received by some of them. On conspicuous observation of Table 2, we find that in North African region, during the period 1981-82 to 2007-08 the highest growth in FDI inflows has been experienced by Algeria, to the tune of 31.89 percent. It is followed by Sudan which has experienced FDI growth of 29.19 percent. The FDI growth in case of Morocco has also been quite significant i.e. 20.45 percent. Libya and Tunisia had moderate growth rates of 12.29 percent and 9.47 percent respectively. It is interesting to note that Egypt, which is otherwise garnering the lion's share in this region, in absolute sense has least compound annual growth rate to the tune of 6.03 percent only.

In West African region the picture is quite different from that in North African region as here some countries have experienced nil or even negative growth. It is obvious from Table 3 that in West Africa, Cape Verde witnessed the highest compound annual growth in FDI inflows during the period 1981-82 to 2007-08, to the tune of 26.23 percent followed by Ghana and Mauritania with 20.46 and 20.02 percent respectively. Nigeria, the largest recipient of this region had a compound annual growth in FDI inflows of the order of 11.67 percent. Mali experienced a significant growth in FDI inflows to the tune of 19.52 percent during the period of last twenty seven years.

Table 1. FDI inflows to Different Regions of Africa

Year	North Africa		West Africa		Central Africa		East Africa		Southern Africa		Africa aggregate	
	Inflows in million US $	Percent Share in Aggregate	Inflows in million US $	Percent Share in Aggregate	Inflows in million US $	Percent Share in Aggregate	Inflows in million US $	Percent Share in Aggregate	Inflows in million US $	Percent Share in Aggregate	Inflows in million US $	Percent Share in Aggregate
1981-82	427	21.85	947	48.48	325	16.64	43	2.21	211	10.81	1 953	100
1982-83	315	15.20	903	43.52	307	14.81	45	2.19	504	24.29	2 074	100
1983-84	425	32.16	430	32.47	208	15.72	29	2.18	231	17.47	1 323	100
1984-85	911	48.31	297	15.76	61	3.24	16	0.85	600	31.84	1 885	100
1985-86	1 453	59.47	472	19.30	488	19.99	58	2.39	- 28	-1.15	2 443	100
1986-87	1 124	63.49	139	7.85	109	6.14	65	3.65	334	18.87	1 770	100
1987-88	1 028	42.07	815	33.35	235	9.62	149	6.09	217	8.87	2 443	100
1988-89	1 464	48.28	754	24.88	250	8.26	21	0.71	542	17.88	3 032	100
1989-90	1 650	35.15	2 730	58.16	- 93	-1.98	99	2.11	307	6.55	4 693	100
1990-91	1 116	39.77	1 553	55.37	-1	0.00	133	4.74	4	0.15	2 805	100
1991-92	914	25.81	1 367	38.60	22	0.62	90	2.55	1 148	32.42	3 542	100
1992-93	1 596	41.56	1 401	36.50	161	4.20	99	2.57	582	15.17	3 840	100
1993-94	2 412	44.31	2 122	38.98	218	4.00	133	2.44	560	10.28	5 443	100
1994-95	2 277	37.30	2 787	45.66	- 59	-0.96	219	3.58	881	14.43	6 105	100
1995-96	1 228	21.72	1 861	32.90	- 104	-1.84	401	7.09	2 269	40.13	5 655	100
1996-97	1 468	24.65	2 615	43.90	1	0.01	338	5.68	1 535	25.76	5 957	100
1997-98	2 749	24.92	2 718	24.64	- 103	-0.93	808	7.32	4 861	44.06	11 033	100
1998-99	2 973	30.94	2 127	22.13	742	7.72	811	8.44	2 957	30.77	9 611	100
1999-00	3 332	27.62	2 427	20.12	585	4.85	972	8.06	4 749	39.36	12 064	100
2000-01	3 408	35.24	2 182	22.56	552	5.71	1 058	10.94	2 471	25.55	9 671	100
2001-02	5 461	27.44	2 075	10.42	1 565	7.86	1 044	5.24	9 760	49.03	19 905	100
2002-03	3 873	26.54	2 913	19.96	2 143	14.69	1 020	6.99	4 643	31.82	14 592	100
2003-04	5 262	28.11	3 364	17.97	3 244	17.33	1 309	6.99	5 541	29.60	18 719	100
2004-05	6 441	35.74	3 790	21.03	2 685	14.90	1 388	7.70	3 715	20.62	18 020	100
2005-06	12 235	41.53	5 652	19.19	3 466	11.77	1 535	5.21	6 571	22.31	29 459	100
2006-07	23 155	50.61	15 766	34.46	3 232	7.06	2 324	5.08	1 278	2.79	45 754	100
2007-08	22 415	42.31	15 553	29.35	4 084	7.71	3 867	7.30	7 063	13.33	52 982	100
Average		36.00		30.28		7.51		4.83		21.64		

Source: 1. World Investment Report, (UNCTAD) 2008. 2. Author's own calculations on the basis of World Investment Report (UNCTAD) data

Table 2. FDI inflows to North Africa

Year	Algeria	Egypt	Libya	Morocco	Sudan	Tunisia
1981-82	13	753	0	59	19	327
1982-83	0	294	0	80	17	371
1983-84	0	490	0	46	6	209
1984-85	1	729	0	47	9	141
1985-86	0	1 178	119	20	0	139
1986-87	5	1 217	0	1	0	86
1987-88	4	948	0	60	12	103
1988-89	13	1 190	98	85	2	76
1989-90	12	1 250	125	167	3	92
1990-91	0	734	159	165	0	89
1991-92	80	253	92	317	0	173
1992-93	30	459	99	424	0	584
1993-94	0	1 207	58	491	0	656
1994-95	0	1 133	0	551	99	566
1995-96	0	595	0	332	12	378
1996-97	270	636	0	322	0	351
1997-98	260	887	0	1 207	98	365
1998-99	607	1 076	0	400	371	668
1999-00	292	1 065	0	1 364	371	368
2000-01	438	1 235	141	422	392	779
2001-02	1196	510	0	2 808	574	486
2002-03	1065	647	145	481	713	821
2003-04	634	237	143	2 314	1 349	584
2004-05	882	2 157	357	895	1 511	639
2005-06	1081	5 376	1 038	1 653	2 305	782
2006-07	1795	10 043	2 013	2 450	3 541	3 312
2007-08	1665	11 578	2 541	2 577	2 436	1 618
CAGR (1981-2008)	31.89*	6.03*	12.29*	20.45*	29.19*	9.47*
Rank of CAGR	(1)	(6)	(4)	(3)	(2)	(5)

Source: 1. World Investment Report UNCTAD (2008), 2. Author's own calculations on the basis of World Investment Report (UNCTAD) data

*Note: 1. Figures in parentheses show the ranks. 2. Highest numeric figure has been assigned rank 1 and relatively lower figures are given ascending ranks. * Significant at 5 percent level of significance.*

Burkina Faso, Gambia and Guinea witnessed the CAGR of the order of 15.22, 15.21 and 14.49 percent respectively. Togo, Senegal, Sierra Leon and Cote d'Ivoire also saw moderate growth. But a striking feature is that, in case of Liberia there are wild fluctuations in FDI inflows during this period and the growth rate was negative of the order of -4.46 percent. Another astonishing feature is that, in West Africa, Saint Helena is the country which is totally untouched by FDI till now.

The study indicates that the FDI inflows growth in both North and West regions have not been satisfactory. African countries have still a long way to as far as FDI inflows are concerned. Even when we look at the potential and performance indices of inward FDI prepared by UNCTAD, these countries do not show positive picture. A two by two matrix formed to compare FDI potential and performance scores depict four quadrants. The position of various countries of North Africa and West Africa has been shown in Table 4.

Table 3. FDI inflows to West Africa

Amount in US $ million

Year	Benin	Burkina Faso	Cape Verde	Côte d' Ivoire	Gambia	Ghana	Guinea	Guinea-Bissau	Liberia	Mali	Mauri-tania	Niger	Nigeria	Saint Helena	Senegal	Sierra Leone	Togo
1981-82	2	2	0	33	2	16	0	0	288	4	12	0	542	0	34	8	10
1982-83	0	2	0	47	0	16	0	0	313	2	15	28	431	0	28	5	16
1983-84	0	2	0	38	0	2	0	0	49	3	1	1	364	0	0	2	1
1984-85	0	2	0	22	0	2	1	2	36	10	9	1	189	0	29	6	0
1985-86	0	0	0	29	0	6	1	1	0	3	7	0	486	0	0	0	16
1986-87	1	3	0	71	0	4	8	1	0	0	4	18	193	0	0	0	6
1987-88	0	1	3	88	1	5	13	0	39	0	2	15	611	0	0	39	7
1988-89	0	4	1	52	1	5	16	1	290	7	2	7	379	0	1	0	13
1989-90	62	6	0	18	15	15	12	0	656	6	3	1	1 884	0	18	22	9
1990-91	62	0	0	48	14	15	18	2	225	6	7	41	1 003	0	57	32	23
1991-92	121	1	2	19	8	20	39	2	8	1	2	15	1 124	0	0	8	6
1992-93	78	3	0	69	13	23	20	6	0	0	7	56	1 157	0	22	0	0
1993-94	1	3	4	175	11	125	3	3	0	4	17	0	1 878	0	0	0	0
1994-95	14	18	2	118	9	233	0	0	17	17	3	0	2 287	0	67	0	16
1995-96	8	10	26	212	15	107	1	0	5	111	7	14	1 271	0	35	7	32
1996-97	13	16	29	269	18	120	24	1	0	43	0	2	2 191	0	5	1	14
1997-98	14	10	12	415	21	82	17	11	214	70	0	17	1 642	0	177	2	19
1998-99	33	4	9	380	24	167	18	4	190	9	0	0	1 210	0	60	0	19
1999-00	39	8	62	324	49	244	63	1	256	2	15	0	1 178	0	153	1	32
2000-01	60	23	43	235	44	166	10	1	21	82	40	8	1 310	0	63	39	41
2001-02	44	6	13	273	35	89	2	0	8	122	77	23	1 277	0	32	10	64
2002-03	14	15	39	213	43	59	30	4	3	244	67	2	2 040	0	78	10	53
2003-04	45	29	34	165	15	105	83	4	372	132	102	11	2 171	0	52	9	34
2004-05	64	14	68	283	49	139	98	2	237	101	392	20	2 127	0	77	61	59
2005-06	53	34	82	312	45	145	105	9	0	224	814	30	4 978	0	45	83	77
2006-07	53	34	131	319	71	636	108	18	0	83	155	51	13 956	0	220	59	77
2007-08	48	600	177	427	64	855	111	7	42	360	153	27	12 454	0	78	81	69
CAGR (1981-2008)	10.52*	15.22*	26.33*	11.70*	15.21*	20.46*	14.49*	7.32*	-4.46*	19.52*	20.02*	5.67*	11.67*	0	7.47*	6.55*	10.91*
Rank of CAGR	(11)	(5)	(1)	(8)	(6)	(2)	(7)	(13)	(16)	(4)	(3)	(15)	(9)		(12)	(14)	(10)

Source: 1. World Investment Report UNCTAD (2008). 2. Author's own calculations on the basis of World Investment Report (UNCTAD) data

*Note: 1. Figures in parentheses show the ranks. 2. Highest numeric figure has been assigned rank 1 and relatively lower figures are given ascending ranks. * Significant at 5 percent level of significance*

Table 4. Position of North African and West African Countries in Inward FDI Potential and Performance Matrix

Country	1988-90	1999-01	2000-02	2001-03	2002-04	2003-05	2004-06
Algeria	3rd	4th	4th	4th	3rd	3rd	3rd
Egypt	2nd	3rd	3rd	4th	4th	2nd	2nd
Libya	3rd	3rd	3rd	3rd	3rd	3rd	3rd
Morocco	4th	2nd	2nd	2nd	2nd	2nd	4th
Sudan	4th	2nd	2nd	2nd	2nd	2nd	2nd
Tunisia	3rd	4th	2nd	1st	3rd	3rd	1st
Benin	2nd	4th	4th	4th	4th	4th	4th
Burkina Faso	4th	4th	4th	4th	4th	4th	4th
Cape Verde	-	-	-	-	-	-	-
Côte d' Ivoire	4th	4th	4th	4th	4th	4th	4th
Gambia	4th	2nd	2nd	2nd	2nd	2nd	2nd
Ghana	4th	4th	4th	4th	4th	4th	4th
Guinea	4th	-	4th	4th	4th	4th	2nd
Guinea-Bissau	-	-	-	-	-	-	-
Liberia	-	-	-	-	-	-	-
Mali	4th	2nd	2nd	2nd	2nd	2nd	4th
Mauritania	-	-	-	-	-	-	-
Niger	3rd	4th	4th	4th	4th	4th	4th
Nigeria	3rd	4th	4th	2nd	2nd	4th	2nd
Saint Helena	-	-	-	-	-	-	-
Senegal	4th	4th	4th	4th	4th	4th	4th
Sierra Leone	2nd	4th	4th	4th	4th	2nd	2nd
Togo	3rd	2nd	2nd	2nd	4th	4th	2nd

Source: FDI Indices, World Investment report, (UNCTAD)
Note: 1st Quadrant: Front runners (country with high FDI Potential and High Performance), 2nd Quadrant: Above Potential (country with Low FDI Potential and high Performance), 3rd Quadrant: Below Potential (country with High FDI Potential and low Performance), 4th Quadrant: Under Performance (country with Low FDI Potential and low Performance), (-) Not Available

The table elucidates that almost all the countries of North Africa and West Africa fall in 4th quadrant indicating poor potential as well as poor performance in attracting FDI. Some countries like Morocco, Sudan, Gambia, Mali, Sierra Leone and Togo have found place in 2nd quadrant showing high performance despite their low potential. Tunisia is the only country which has twice figured amongst the front runners indicating high potential as well as high performance. Even the largest recipients in absolute sense like Egypt and Nigeria have not fared satisfactorily as regards as potential and performance of FDI inflows.

Various reasons have been accounted for poor performance and potential of FDI inflows in Africa. A major reason which deters foreign investors to invest in Africa is the high degree of uncertainty which is manifested in terms of political instability and lack of policy transparency. Macro economic instability like incidence

of currency crashes, double digit inflation and excessive budgetary deficit discourage FDI to a great extent (Onyeiwu, Shrestha, 2004). Inhospitable regulatory environment has led to high cost of entry. Low GDP growth rate and the resultant small markets make it difficult for foreign investors to exploit economies of scale. The absence of adequate supporting infrastructure such as power supply, transport, telecommunication also has discouraging impact. High degree of protectionism, ineffective marketing strategy combined with weak governance and high level of corruption put strong constraints in the way of global investors (Dupasquier, Osakwe 2005).

Gross fixed capital formation (GFCF) is like life blood for the growth and development of an economy. Higher percentage of FDI in GFCF is a signal of its importance as a potent stimulator of capital formation. The growing importance of FDI inflows in African economy can be judged from rising ratios of FDI inflows as a proportion of GFCF from 1.7 percent in the year 1981-82 to as high as 21.3 percent in the year 2007-08, showing a CAGR to the tune of 10.46 percent (Refer Table 5). North Africa is not behind aggregate Africa as here also, FDI as percentage of gross fixed capital formation escalated from 1 percent in 1981-82 to 20.4 percent in 2007-08, showing a CAGR equal to 10.33 percent. A glance at Table 5 conveys that in Algeria, FDI has assumed importance in gross fixed capital formation (GFCF) in recent years as the percentage of FDI to GFCF has soared from .1 percent in 1981-82 to 5.1 percent in 2007-08, showing a CAGR of 22.44 percent, the highest in the region. In case of Sudan, FDI is playing a great role in formation of capital as its percentage has risen from 1.0 percent in 1981-82 to 22.9 percent in 2007-08, registering a CAGR of 22.29 percent. It is interesting to note that Egypt has the highest percentage of FDI in GFCF in absolute sense, it was 15.8 percent in 1981-82 and became 42.7 in 2007-08. However, this percentage has been wildly fluctuating during the whole period and as such the growth has taken place by .92 percent only.

As far as the importance of FDI inflows in GFCF of West Africa is concerned with the perusal of Table 6, it can be observed that in 1981-82 at aggregate level in West Africa, FDI inflows contributed just 2.5 percent to GFCF, but with passage of time this share grew to a considerable figure of 45.2 percent in 2007-08. The CAGR for the study period found to be 10.59 percent which is almost equal to the CAGR registered by North Africa and even whole Africa. The highest CAGR, 25.90 percent was found in the case of Cape Verde in which the share of FDI in GFCF escalated from nil in 1981-82 to 33.8 percent in 2007-08, showing a CAGR of 25.90 percent. Nigeria and Gambia had considerable high percentage of FDI to GFCF in the year 2007-08 and the CAGR in case of both the countries in the last twenty seven years was 12.73 percent and 10.93 percent respectively. Mali and Mauritania also had significant FDI as percentage of GFCF and experienced CAGR of 13.31 percent and 13.25 percent respectively. Sierra Leone and Liberia proved inconsistent as far as the ratio of FDI as proportion of GFCF is concerned. With wild fluctuations in the ratio of FDI as a proportion of GFCF, the CAGR in these countries has been 9.44 percent and1.86 percent respectively. The whole analysis reveals that the importance of FDI as a contributor to Gross fixed capital formation has certainly increased in case of aggregate Africa, North Africa and West Africa.

Table 5. Inwards FDI inflows as percentage of Gross Fixed Capital Formation in North Africa

Year	Algeria	Egypt	Libya	Morocco	Sudan	Tunisia	North Africa Aggregate	Africa Aggregate
1981-82	0.1	15.8	0.0	1.2	1.0	12.5	1	1.7
1982-83	0.0	5.1	0.0	1.6	1.1	13.4	0.8	2
1983-84	0.0	8.1	0.0	1.1	0.5	8.1	1.1	1.4
1984-85	0.0	11.0	0.0	1.3	0.7	5.7	2.4	2.4
1985-86	0.0	16.2	2.2	0.6	0.0	5.9	3.8	3.3
1986-87	0.0	15.7	0.0	0.0	0.0	3.8	2.7	2.3
1987-88	0.0	9.4	0.0	1.3	0.7	4.9	2.5	3.1
1988-89	0.1	12.6	3.1	1.6	0.1	3.7	3.9	3.8
1989-90	0.1	13.3	3.6	2.7	0.3	4.0	4.4	5.8
1990-91	0.0	8.2	4.0	2.2	0.0	3.0	2.8	3.1
1991-92	0.7	3.2	2.5	4.3	0.0	5.5	2.7	4.1
1992-93	0.2	5.9	2.8	5.6	0.0	13.8	4.3	4.2
1993-94	0.0	13.7	1.2	6.8	0.0	16.0	6	6.1
1994-95	0.0	11.4	0.0	7.4	7.0	13.4	5.8	7.1
1995-96	0.0	5.4	0.0	4.0	0.9	8.7	3.1	6.2
1996-97	2.3	4.5	0.0	3.8	0.0	7.7	3.4	6.1
1997-98	2.4	5.9	0.0	14.7	7.5	7.8	6.3	10.9
1998-99	4.9	6.4	0.0	4.3	21.1	13.6	6.2	9.2
1999-00	2.5	6.2	0.0	13.7	22.7	7.0	6.8	11.8
2000-01	3.9	7.3	3.3	4.4	18.6	15.4	6.9	9.6
2001-02	9.6	3.4	0.0	30.0	25.1	9.3	11.4	20.3
2002-03	7.6	4.4	5.5	4.7	25.0	15.3	7.8	14.5
2003-04	3.9	1.8	6.2	18.4	42.2	10.0	9.8	15.2
2004-05	4.3	16.9	7.1	5.9	35.4	9.9	10.1	11.8
2005-06	4.7	32.2	14.4	9.8	41.3	12.1	16.2	16.3
2006-07	6.3	49.8	23.0	13.0	42.2	45.5	25.1	21.4
2007-08	5.1	42.7	25.3	12.2	22.9	19.6	20.4	21.3
CAGR-(1981-2008)	22.44*	.92**	9.76*	11.22*	22.29*	4.21*	10.33*	10.46*
Rank of CAGR	(1)	(6)	(4)	(3)	(2)	(5)		

Source: 1. World Investment Report UNCTAD (2008). 2. Author's own calculations on the basis of World Investment Report (UNCTAD) data.

*Note: 1. Figures in parentheses show the ranks. 2. Highest numeric figure has been assigned rank 1 and relatively lower figures are given ascending ranks. * Significant at 5 percent level of significance. ** Insignificant at 5 percent level of significance.*

Table 6. Inwards FDI inflows as percentage of Gross Fixed Capital Formation in West Africa

Year	Benin	Burkina Faso	Cape Verde	Côte d' Ivoire	Gambia	Ghana	Guinea	Guinea-Bissau	Liberia	Mali	Mauri-tania	Niger	Nigeria	Senegal	Sierra Leone	Togo	West Africa Aggregate	Africa Aggregate
1981-82	0.8	0.9	0	1.6	7	10	0	0	160.3	1.1	6.3	0	1.6	8.4	4.7	4.1	2.5	1.7
1982-83	0	0.8	0	2.9	1.9	13.6	0	0	162	0.7	7.3	6	1.7	6.8	2.8	8.3	3	2
1983-84	0	0.8	0	3.1	0	1.9	0.2	0	26.8	1.6	0.7	0.4	2.4	0	1.1	1	2.2	1.4
1984-85	0	0.8	0	2.5	0	0.8	0.3	3.8	21.4	5.2	3.7	1.2	2.2	7.7	3.9	0	2.6	2.4
1985-86	0	0	0	3.5	0	1.4	0.5	2.8	0	1.3	3.6	0	6.4	0	0	9.6	4.3	3.3
1986-87	0.6	0.7	0	6.5	0	1	2.8	2.7	0	0	2.5	7.2	3.6	0	0	2.4	1.4	2.3
1987-88	0	0.3	2.9	7.4	8.3	1	3.6	0.3	32	0	0.9	4.7	19	0	65.8	3.1	10	3.1
1988-89	0	0.7	0.6	4.4	2.3	0.9	3.8	1.5	251.6	1.8	1.2	2.5	11.3	0.1	0	5.3	8.8	3.8
1989-90	33.2	1.1	0.2	1.8	23.9	2.1	3	1.3	677.7	1.6	1.9	0.3	68.6	2.3	13.3	2.6	33.9	5.8
1990-91	25.2	0.1	0.2	5.3	23.7	1.9	4	6.3	558.8	1.1	4.9	13.9	21.5	5.9	36.1	5.5	15.2	3.1
1991-92	46.9	0.1	1.4	2.1	13.3	2.3	6	8.6	27.1	0.2	1.3	6	25.2	0	7.8	2.2	13.3	4.1
1992-93	25.7	0.5	0.3	7.3	16.7	2.5	3.6	10	0	0	2.2	23.7	28.2	1.9	0	0	13.7	4.2
1993-94	0.4	0.5	2.5	20	11.6	8.8	0.5	4.5	0	0.8	6.5	0	41.5	0	0	0	19.6	6.1
1994-95	5.3	3.8	1.2	13.8	13.4	19	0	0.8	125.9	3.3	1.3	0	80.1	9.5	0	17.4	33.5	7.1
1995-96	2.1	1.8	13.8	15.6	14.9	7.8	0.2	0.1	32.7	14.7	3.2	7.3	50	3.9	10.3	18.5	20	6.2
1996-97	3.5	2.8	15	16.3	17.8	8.4	4.6	1.7	0	7	0	1	77.2	0.5	0.5	8.5	25.8	6.1
1997-98	3.5	1.6	6.1	25.5	25.2	5	3.5	19.7	707.8	11.7	0	7.5	39.7	19.4	2.9	14.7	23.9	10.9
1998-99	7.7	0.7	5.3	21	30	10	3.7	34.7	506.6	1.7	0	0	35.7	5.2	0.2	8.1	19.1	9.2
1999-00	8.8	1.3	30	17.7	62.6	15.3	8.7	3	673.4	0.4	7.9	0.1	32.4	13.3	1.2	14.5	21	11.8
2000-01	14	3.5	26.5	17.9	58.9	13.8	1.6	2.2	54.7	16.5	16.7	3.8	27.7	6	384.9	19	19	9.6
2001-02	9.6	0.9	7.1	26.3	35.1	6.3	0.3	1.2	30.9	21.2	31.3	8.8	38.2	2.9	17.8	29.5	20.1	20.3
2002-03	2.5	2.1	17.3	18.3	55.2	4.8	6	7.7	10.6	38.7	26.6	0.8	49.2	5.9	13.2	19.6	25.3	14.5
2003-04	6.4	3.1	13.2	12.8	21.1	6	19.3	8.7	967.9	17.4	28.8	3	32.3	3.6	10.5	10.7	21.6	15.2
2004-05	8.1	1.2	20	19.1	44.6	5.6	18.5	4.7	390.2	11.9	56.2	4.3	20.3	4.2	74.7	15.7	17.5	11.8
2005-06	6.3	2.7	21.9	18.3	37.3	4.6	23.4	19.8	0	26.4	97.8	5.6	36.7	2	104.8	18.8	21.3	16.3
2006-07	5.8	2.4	30.3	17.9	57.8	19.4	20	35.1	0	7.6	19.5	7.7	88.5	9.1	69.2	16.7	52.7	21.4
2007-08	4.6	37	33.8	21.2	40.2	22.3	13.7	12.4	41.6	30.1	19	3.5	69.6	2.7	81.7	13.3	45.2	21.3
CAGR - (1981 - 2008)	3.0*	9.13*	25.90*	10.15*	10.93*	7.60*	12.81*	9.0*	1.86*	13.31*	13.25*	1.0*	12.73*	.90*	9.44*	8.19*	10.59*	10.46*
Rank of CAGR	(13)	(9)	(1)	(7)	(6)	(12)	(4)	(10)	(14)	(2)	(3)	(15)	(5)	(16)	(8)	(11)		

Source: 1. World Investment Report UNCTAD (2008). 2. Author's own calculations on the basis of WIR (UNCTAD) data.

*Note: 1. Figures in parentheses show the ranks. 2. Highest numeric figure has been assigned rank 1 and relatively lower figures are given ascending ranks. * Significant at 5 percent level of significance*

Uncertainty and ambiguity are the parents of failure. Any economic policy which is not based on predicted or forecasted estimates may prove catastrophic because of its non-compliance to the situation in hand. Forecasting is a necessary input to planning. It can empower the planners because its use implies that they can modify the variable, now, to alter or to be prepared for future. This enables them to formulate the economic policy which can affect the future value of variable the way, they wish it to be. A prediction is an invitation to introduce the best desirable changes in the existing system (Walonick, 1993). Present study endeavors to generate the forecasts of FDI inflows to the major recipient countries of North Africa and West Africa for the period 2009-2020 and in order to detect the major recipient countries, percentage share of different countries in their respective region has been used.

Table 7. Percentage Share of Different Countries in Aggregate FDI Inflows to North Africa

Year	Algeria	Egypt	Libya	Morocco	Sudan	Tunisia	North Africa Aggregate
1981-82	1.13	64.27	0.00	5.00	1.65	27.95	100
1982-83	0.00	38.60	0.00	10.46	2.21	48.74	100
1983-84	0.06	65.15	0.00	6.13	0.84	27.82	100
1984-85	0.09	78.61	0.00	5.07	0.98	15.25	100
1985-86	0.03	80.87	8.19	1.37	0.00	9.54	100
1986-87	0.41	92.99	0.00	0.04	0.00	6.56	100
1987-88	0.33	84.21	0.00	5.29	1.04	9.13	100
1988-89	0.89	81.30	6.69	5.78	0.14	5.20	100
1989-90	0.73	75.78	7.59	10.13	0.21	5.57	100
1990-91	0.03	64.00	13.86	14.39	0.00	7.73	100
1991-92	8.75	27.66	10.05	34.66	0.00	18.89	100
1992-93	1.88	28.76	6.21	26.57	0.01	36.57	100
1993-94	0.00	50.02	2.41	20.36	0.00	27.21	100
1994-95	0.00	48.23	0.00	23.45	4.22	24.10	100
1995-96	0.00	45.20	0.00	25.21	0.91	28.67	100
1996-97	17.09	40.28	0.00	20.38	0.03	22.22	100
1997-98	9.23	31.48	0.00	42.85	3.47	12.97	100
1998-99	19.43	34.46	0.00	12.82	11.88	21.41	100
1999-00	8.43	30.79	0.00	39.42	10.72	10.63	100
2000-01	12.85	36.25	4.14	12.39	11.51	22.85	100
2001-02	21.46	9.15	0.00	50.37	10.30	8.73	100
2002-03	27.50	16.70	3.74	12.43	18.42	21.21	100
2003-04	12.05	4.51	2.72	43.99	25.64	11.10	100
2004-05	13.69	33.49	5.54	13.89	23.46	9.92	100
2005-06	8.84	43.94	8.48	13.51	18.84	6.39	100
2006-07	7.75	43.37	8.69	10.58	15.29	14.30	100
2007-08	7.43	51.65	11.34	11.50	10.87	7.22	100
Average	6.66	48.21	3.69	17.70	6.39	17.39	
Rank	(5)	(1)	(6)	(2)	(4)	(3)	

Source: Author's own calculations on the basis of World Investment Report (UNCTAD) data.
Note: 1. Figures in parentheses show the ranks. 2. Highest numeric figure has been assigned rank 1 and relatively lower figures are given ascending ranks.

Table 8. Percent Share of Different Countries in Aggregate FDI Inflows to West Africa

Year	Benin	Burkina Faso	Cape Verde	Côte d' Ivoire	Gambia	Ghana	Guinea	Guinea-Bissau	Liberia	Mali	Mauri-tania	Niger	Nigeria	Saint Helena	Senegal	Sierra Leone	Togo	West Africa Aggre-gate
1981-82	0.22	0.25	0.00	3.43	0.24	1.70	0.00	0.00	30.18	0.39	1.30	0.00	56.84	0.00	3.60	0.79	1.05	100
1982-83	0.00	0.22	0.00	5.26	0.03	1.81	0.00	0.00	34.66	0.17	1.66	3.13	47.71	0.00	3.11	0.52	1.79	100
1983-84	0.00	0.43	0.00	8.08	0.00	0.52	0.08	0.00	10.57	0.68	0.30	0.26	78.49	0.00	0.00	0.37	0.31	100
1984-85	0.00	0.54	0.00	7.04	0.00	0.65	0.23	0.74	11.72	3.26	2.76	0.47	61.26	0.00	9.42	1.90	0.00	100
1985-86	0.00	0.00	0.00	5.31	0.00	1.02	0.20	0.26	0.00	0.53	1.27	0.00	88.46	0.00	0.00	0.00	2.97	100
1986-87	0.35	1.01	0.00	22.83	0.00	1.39	2.71	0.26	0.00	0.00	1.45	5.68	62.34	0.00	0.00	0.00	1.97	100
1987-88	0.01	0.16	0.34	10.63	0.18	0.57	1.56	0.01	4.68	0.00	0.20	1.80	74.19	0.00	0.00	4.79	0.87	100
1988-89	0.00	0.48	0.08	6.65	0.15	0.64	2.02	0.09	37.32	0.91	0.25	0.89	48.71	0.00	0.15	0.00	1.67	100
1989-90	2.27	0.21	0.01	0.68	0.54	0.55	0.45	0.02	24.03	0.23	0.13	0.03	69.02	0.00	0.67	0.82	0.34	100
1990-91	4.02	0.03	0.02	3.12	0.91	0.95	1.15	0.13	14.50	0.37	0.43	2.63	64.53	0.00	3.66	2.09	1.46	100
1991-92	8.79	0.04	0.13	1.35	0.58	1.45	2.82	0.15	0.61	0.09	0.17	1.10	81.76	0.00	0.00	0.55	0.41	100
1992-93	5.34	0.21	0.03	4.75	0.89	1.55	1.36	0.40	0.00	0.00	0.48	3.88	79.62	0.00	1.48	0.00	0.00	100
1993-94	0.06	0.14	0.16	7.87	0.50	5.62	0.12	0.15	0.00	0.19	0.76	0.00	84.42	0.00	0.00	0.00	0.00	100
1994-95	0.49	0.66	0.08	4.20	0.31	8.32	0.01	0.02	0.62	0.62	0.10	0.00	81.65	0.00	2.39	0.00	0.55	100
1995-96	0.43	0.53	1.41	11.38	0.81	5.72	0.04	0.00	0.25	5.99	0.37	0.78	68.31	0.00	1.88	0.39	1.72	100
1996-97	0.49	0.59	1.04	9.80	0.67	4.37	0.87	0.04	0.00	1.58	0.00	0.09	79.74	0.00	0.20	0.02	0.53	100
1997-98	0.50	0.36	0.43	15.27	0.76	3.01	0.64	0.42	7.86	2.56	0.00	0.61	60.35	0.00	6.50	0.07	0.68	100
1998-99	1.54	0.21	0.41	17.86	1.11	7.87	0.84	0.21	8.94	0.42	0.00	0.00	56.86	0.00	2.84	0.00	0.92	100
1999-00	1.62	0.33	2.54	13.34	2.04	10.04	2.61	0.03	10.56	0.09	0.62	0.01	48.53	0.00	6.31	0.02	1.31	100
2000-01	2.73	1.06	1.99	10.74	1.99	7.59	0.45	0.03	0.95	3.77	1.83	0.39	59.92	0.00	2.88	1.78	1.90	100
2001-02	2.11	0.30	0.61	13.14	1.71	4.30	0.08	0.02	0.40	5.87	3.70	1.10	61.56	0.00	1.54	0.47	3.06	100
2002-03	0.46	0.52	1.32	7.30	1.47	2.02	1.03	0.12	0.10	8.37	2.31	0.08	70.03	0.00	2.68	0.36	1.83	100
2003-04	1.33	0.87	1.00	4.92	0.44	3.13	2.46	0.12	11.07	3.93	3.03	0.34	64.55	0.00	1.56	0.26	1.00	100
2004-05	1.68	0.38	1.79	7.46	1.30	3.67	2.58	0.04	6.25	2.66	10.33	0.52	56.11	0.00	2.03	1.61	1.57	100
2005-06	0.75	0.49	1.16	4.43	0.64	2.06	1.49	0.12	0.00	3.18	11.57	0.43	70.76	0.00	0.63	1.18	1.09	100
2006-07	0.33	0.21	0.82	2.00	0.45	3.98	0.68	0.11	0.00	0.52	0.97	0.32	87.39	0.00	1.38	0.37	0.48	100
2007-08	0.31	3.86	1.14	2.74	0.41	5.50	0.71	0.05	0.27	2.31	0.98	0.17	80.07	0.00	0.50	0.52	0.44	100
Average	2.56	0.52	0.61	7.80	0.67	3.33	1.01	0.13	7.98	1.80	1.73	0.91	68.26	0.00	2.05	0.70	1.11	
Rank	(5)	(15)	(14)	(3)	(12)	(4)	(10)	(16)	(2)	(7)	(8)	(11)	(1)		(6)	(13)	(9)	

Source: Author's own calculations on the basis of World Investment Report (UNCTAD) data.

Note: 1. Figures in parentheses show the ranks. 2. Highest numeric figure has been assigned rank 1 and relatively lower figures are given ascending ranks.

The FDI inflows to North Africa have escalated manifolds since 1981-82. (Refer Table 1) However the increased FDI has not flown in equal magnitudes to various countries of the region. A glance at Table No.7 illustrates that in North Africa, during the last twenty seven years, Egypt has been successful in garnering 48.21 percent (on the average) of aggregate inflows received by North Africa. On the second place both Morocco and Tunisia emerge with 17.70 percent and 17.39 percent share in the aggregate inflows to North Africa. Algeria, Sudan and Libya account for meager share of 6.66 percent, 6.39 percent and 3.69 percent respectively. It is quite clear that Egypt, Morocco and Tunisia can represent the whole North Africa as far as FDI inflows are concerned because these together account for more than two third shares (83.30 percent) of its FDI inflows.

Regional disparities of FDI inflows are all the more acute in case of West African countries. The perusal of Table 8 confirms Nigeria's strongest position as the major recipient among the West African countries. It alone attracted 68.26 percent (on the average) of aggregate FDI inflows received by West Africa during the period 1981-82 to 2007-08. Liberia and Cote d' Ivoire which received 7.98 percent and 7.8 percent of the aggregate inflows of West Africa are no where near to Nigeria in receiving the FDI inflows. Hence, only Nigeria represents the West Africa as far as FDI inflows are concerned because it accounts for more than two third shares.

Present study generates the forecasts of FDI inflows to the leading four countries namely Egypt, Morocco, Tunisia and Nigeria on the assumption that forecasting for these countries implies forecasting for whole North and West Africa.

Before applying Double Exponential Smoothing (DES) model to generate the forecasts of the four major recipient countries, its adequacy has been tested and the results have been highlighted in Table 9.

Table 9. Initial Values and Optimum Smoothing Parameters for Level and Growth Components

Country	f_0	b_0	α	γ	SSE
Egypt	544.82692	416.34615	1.000000	0.800000	24246986.8
Morocco	10.57692	96.84615	1.000000	1.000000	8081173.914
Tunisia	302.17308	49.65385	0.300000	0.000000	7131433.9
Nigeria	312.92308	458.15385	1.000000	0.000000	92765199.62

Source: Author's calculations on the basis of UNCTAD data using the software SPSS version 7.5
Note: f_0- Initial value for level component, b_0 - Initial value for growth component, α - Optimum value for smoothing parameter for trend, g - Optimum value of smoothing parameter for growth, SSE – Sum of square of errors

9. SMOOTHING PARAMETERS

Initial values and optimum smoothing parameters for level and growth components in case of all the four countries under study have been computed. Only those values of α and γ are considered optimal which ensure the lowest error. The optimum values of smoothing parameters α (alpha), is equal to 1.0 in case of Egypt, Morocco and Nigeria and it is less than 1 in case of Tunisia i.e. 0.3. The value of γ

(gamma), is .8 in case of Egypt, 1.0 in case of morocco. For Nigeria and Tunisia it has come out to be zero.

10. ADEQUACY OF THE MODEL

The adequacy of DES model is ensured by computing auto correlation functions (ACF) of residuals and by applying Ljung-Box Q statistics. Figure -1 depicts ACF among all the residuals and the values of Q-statistics for all the representative countries.

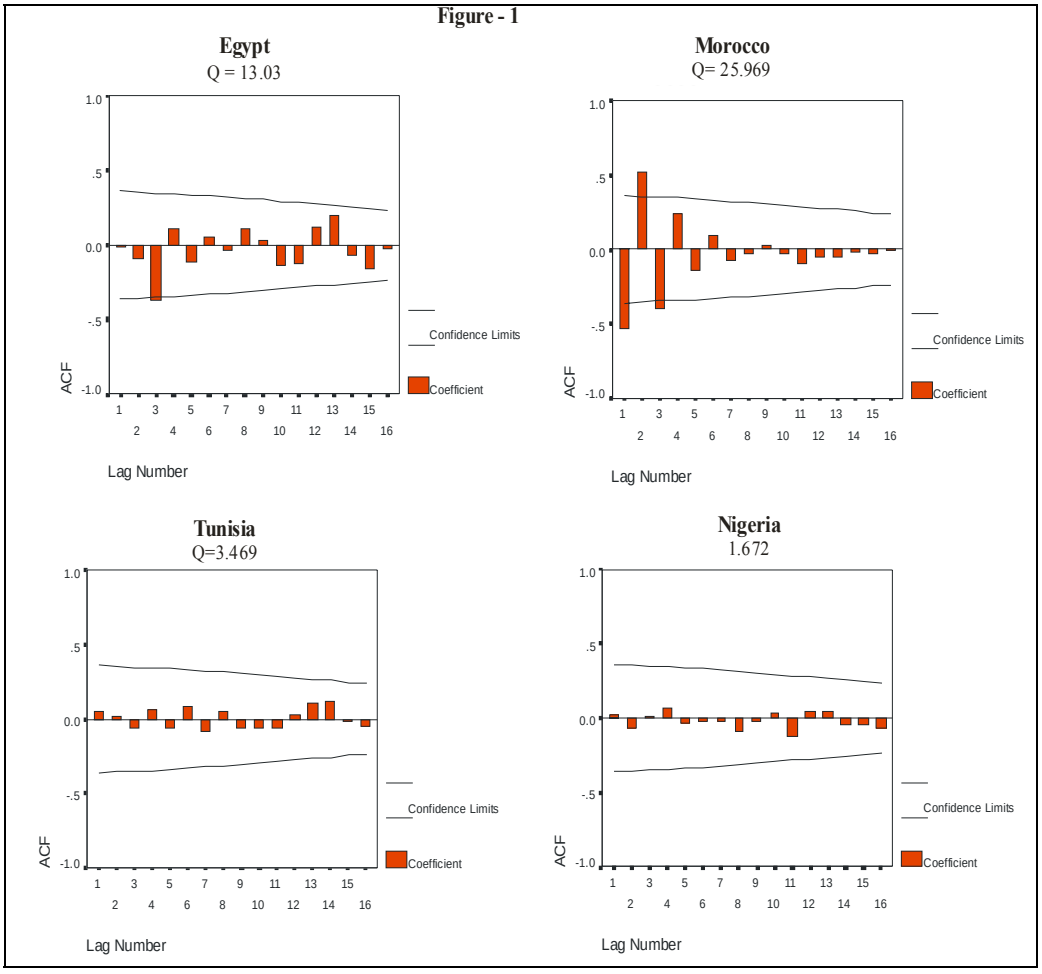


Figure 1.

The values of Q- statistics in case of all the countries are found to be insignificant at 5 percent level of significance. The non-significant of Q- statistics ensures the adequacy of DES model used to generate the forecasts. A careful glance of Figure 1. reveals that in case of all the countries, these were all (as a group) with in

specified limits. This confirms the adequacy of DES model to make prediction regarding future prospects of FDI inflows to the representative countries of North Africa and West Africa.

Table 10. Forecasts of Foreign Direct Investment in Representative Countries of North and West Africa

in US $ million

Year	Egypt	Morocco	Tunisia	Nigeria
2008-2009	13667.49	2456.11	1672.43	12912.15
2009-10	15756.98	2641.45	1722.08	13370.31
2010-11	17846.47	2826.79	1771.74	13828.46
2011-12	19935.96	3012.13	1821.39	14286.62
2012-13	22025.45	3197.47	1871.04	14744.77
2013-14	24114.95	3382.81	1920.70	15202.92
2014-15	26204.44	3568.15	1970.35	15661.08
2015-16	28293.93	3753.49	2020.01	16119.23
2016-17	30383.42	3938.83	2069.66	16577.38
2017-18	32472.91	4124.17	2119.31	17035.54
2018-19	34562.40	4309.51	2168.97	17493.69
2019-2020	36651.89	4494.85	2218.62	17951.85
CAGR (2008-2020)	**9.15***	**5.60***	**2.60***	**3.03***

Source: Author's calculations on the basis of UNCTAD data using the software SPSS version 7.5
*Note: * Significant at 5 percent level of significance.*

The forecasts of FDI inflows to the representative countries for the period 2009-10 to 2019-20 are depicted in Table No. 10. Perusal of this table, confirms that by the year 2020, Egypt may maintain its top position in North Africa as it expected to receive FDI inflows to the tune of US $ 36651.89 million, anticipated to rise from the expected amount of US $ 13667.49 million in the year 2009, showing a CAGR of 9.15 percent, significant at five percent level of significance. In Morocco, the amount of FDI anticipated in the year 2009 is US $ 2456.11 million and is expected to touch the amount of US $ 4494.85 million in 2020 with a CAGR of 5.60 percent, significant at five percent level of significance. FDI inflows to Tunisia are expected to grow at the rate of 2.60 percent during the period 2009-2020, reaching the amount US $ 2218.62 million in the year 2020. Nigeria stands good chance of receiving an amount of FDI inflows of the order of US $ 17951.85 million in 2020, with the CAGR equal to 3.03 percent for the ensuing decade.

The analysis suggests that prospects for FDI in North Africa and West Africa appear to be positive as the projections indicate. Improvements in the regulatory framework for FDI can certainly brighten the prospects of FDI inflows in the countries of Africa. Most African countries have concluded bilateral investment treaties (BITs) and double taxation treaties (DTTs) with other countries. For instance Egypt has signed as many as 50 BITs and Tunisia has concluded maximum number of DTTs (Odenthal, Zimny, 1999). However, because of the negative image of Africa as a whole, it may not be sufficient to make bilateral and multilateral agreements only.

The African countries seriously require improvements in governance, development of infrastructure, rationalization of macro economic management to

enhance their positive image. At the same time they must strongly combat negative forces like political unrests, uncertainty of policies, currency volatility, debt overhang and capricious regulatory environment so that the competitiveness and FDI potential are not undermined.

11. CONCLUSION

African countries have before them an important task of reversing the dismal FDI trend which they are facing currently. Africa is receiving a meager 2.8 percent of global FDI inflows and just 10 percent of aggregate FDI inflows to the developing countries. Present study concludes that out of five regions of Africa, only North Africa and West Africa have better standing in receiving FDI and these two account for one third share each, of the aggregate inflows attracted by aggregate Africa. During the last three decades, in North Africa highest growth in FDI inflows was experienced by Algeria followed by Sudan and Morocco. In West Africa, Cape Verde witnessed highest growth followed by Ghana and Mauritania. It is interesting to note that in case of growth of FDI as percentage of gross fixed capital formation; again Algeria and Cape Verde have attained first rank in their respective regions. The leaders in quantum of FDI inflows in Northern and Western regions during the last three decades have been Egypt, Morocco, Tunisia and Nigeria. Out of these Egypt is expected to grow in FDI inflows at the fastest pace during the ensuing decade.

REFERENCES:

[1]. Bagchi, A.K. - *The Other Side of Foreign Investments by Imperial Powers - Transfer of Surplus from Colonies*, Economic and Political Weekly, vol.37, no.23, 2002, pp.2229-2235,

[2]. Bartlett, M.S. - *On the Theoretical Specification of Sampling properties of Auto correlated Time Series*, Journal of Royal Statistical Society, vol.8, no.27, 1946

[3]. Box, G.E.P.; Jenkins, G.M. - *Time Series Analysis, Forecasting and Control*, 2nd ed. Holden-Day, San Francisco, 1976

[4]. Chantal, D.; Osakwe, P.N. - *Foreign Direct Investment in Africa: Performance, Challenges and Responsibilities*, Work in Progress no.21, African Trade Policy Centre, 2005

[5]. Chatfield, C.; Koehler, A.B.; Ord, J.K.; Synder, R.D. - *A New Look at Model for Exponential Smoothing*, Journal of the Royal Statistical Society, Series D (The Statistician), vol.50, no.2, 2001, pp.147-159

[6]. Clairmonte, F. - *Foreign Investment and Economic Growth*, Indian Journal of Economics, vol.40, no.156, 1959, pp.1-14

[7]. DeLurgio - *Forecasting Principles and Applications*, McGraw-Hill International Edition, 1998

[8]. Gardner, E.S. Jr. - *Exponential Smoothing: The State of the Art- Part II*, International Journal of Forecasting, vol.22, 2006, pp.637-666

[9]. Gardner, E.S. Jr. - *Exponential Smoothing: The State of the Art*, Journal of Forecasting, vol.4, 1985, pp.1-28

[10]. Goldar, B.; Ishigami, E. - *Foreign Direct Investment in Asia*, Economic and Political Weekly, vol.34, no.22, 1999, pp. M 50-M 59

[11]. Gupta, S.; Kumar, G. - *Growth Performance and Forecasts of exports of Leather Industry in Punjab*, Foreign Trade Review, vol.43, no.1, 2008, pp.27-41
[12]. Gupta, S.; Kumar, G. - *Growth Performance and Productivity of Leather Industry in Punjab*, Productivity, vol.47, no.3, 2006, pp.295-303
[13]. Humphrey, D. - *Direct Foreign Investment and Economic Growth*, The Economic Weekly, vol.12, no.23-25, 1960, pp.925-930
[14]. Koehler, A.B.; Synder, R.D.; Ord, K.J. - *Forecasting Models and Predication Intervals for the multiplicative Holt-Winters Method*, International Journal of Forecasting, vol.17, 2001, pp.269-286
[15]. Kumar, G.; Singh, A. - *Growth and Forecasts of Foreign Direct Investment Inflows to South and East Asia - An Empirical Analysis*, Asian Economic Review, vol.50, no.1, 2008, pp.17-31
[16]. Ludger, O.; Zimny, Z. - *Foreign Direct Investment in Africa: Performance and Potential*, http://www.unctad.org, 1999
[17]. Mwilima, N. - *Foreign Direct Investment in Africa, Final Draft Report*, Africa Labour Research Network, 2003
[18]. Onyeiwu, S.; Shrestha, H. - Determinants of Foreign Direct Investment in Africa, Journal of Developing Societies, vol.20, 2004, pp.89-106
[19]. Pankratz, A. - *Forecasting with univariate Box-Jenkins Models: Concepts and Cases*, John Wiley & Sons, New York, 1983
[20]. Sidhu, H.S.; Kumar, G. - *Growth, Performance and Prospects of Sports Goods Industry in Punjab*, Indian Journal of Applied Economics, vol.3, no.1, 2006, pp.122-135
[21]. Walonick, D.S. - *An Overview of Forecasting Methodology*, 1993, www.statpac. Com. assessed on 30-3-2009
[22]. *** - FDI Confidence Index, The Global Business Policy, 2004, www.atkearney.com accessed on 11-3-2008
[23]. *** - World Investment Report, UNCTAD, 2008
[24]. www.itl.nist.gov/div898/handbook/pmc/section4/pmc434.htm