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Article

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Impact of Democratic/Non-Democratic Regimes on Foreign Direct Investment in Pakistan: Pre and Post September 11, 2001 Scenarios

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Abstract

In this study the impact of democratic and non-democratic regime (pre and post September 11, 2001seenarios) on foreign direct investment in Pakistan have been investigated using quarterly data over the period of 1976Q1 to 2006Q4. Stepwise regression, Box-Jenkins methodologies have been applied initially then GARCH-type models are used to counter the problems of auto-correlation and ARCH effect and to model the conditional variance of FDI. It is found that foreign direct investment in Pakistan mainly depends upon on the past trends, as higher order auto-regressive terms are statistically significant. It has also been observed that the volatility shocks are quite persistent and take a long time to die out. September 11, 2001incident and thereafter war on terror has increased the conditional volatility of foreign direct investment and has statistically significant impact while FDI was not volatile before the September, 11, 2001. CPI plays a significant role to decrease conditional volatility. One interesting finding of this study is that the impact of Non-Democratic regime before September, 11 scenario is statistically significant and severely bad on foreign direct investment but with the inclusion of observations of post September, 11 the variable becomes insignificant.

Keywords: Box and Jenkins Methodology, GARCH Model, Auto-correlation, ARCH Effect, Volatility.

1. Introduction

Foreign direct investment is a form of international capital flows (Assaf and Efrain, 2007). Pakistan being a developing country requires FDI to develop its different sectors like Industrial Sector, Agricultural Sector, Science and Technology, and to reduce unemployment in order to emerge as a developed country. The importance of FDI can be judged from the rapid growth of the neighboring countries of Pakistan like China and India which are the economic hub of Asia and are receiving the bulk of foreign investment. There are many factors in economic theory which can affect FDI like Foreign Exchange Rate (EXR), Foreign Exchange Reserves, Inflation Rate (CPI), Trade Balance, Privatization Policies, Local Investments, Natural Resources, Political stability, Competitiveness, infrastructure and etc. Pakistan has the history of politically unstable country as frequent Non-Democratic takeover and an ordinary law and order situation abandoned the FDI inflows in Pakistan. Moreover, the tense situation on borders especially on Eastern borders after September 11, 2001 incident and more recently the war against terror also played its part. It is reported in the Pakistan Economic Survey 2001-2003 that FDI decreased by 66.5 % in 2001. Only in period of three months (October – December 2001), Pakistan has lost billions in exports and imports orders that resulted in the increase in unemployment and deterioration in capital and current account deficit (Khan, 2001).

Bulk of literature is available on the impact of FDI in a country's economic growth. Dondeti and Mohany (2007) report that foreign direct investment promotes economic growth, and further provided an estimate that one dollar of FDI adds about 3.27 dollars in GDP of each of the four countries China, India, Malaysia and Singapore. (Minjung (2004) reported that inconsistent causal relationship exists between FDI inflow and GDP growth. It is found that FDI cannot be considered as an independent variable for GDP growth ignoring other important factors that contributes to economic growth in the long run and shocks in GDP are tend to be explained by its own shocks, which mean that FDI has a little effect on variance of GDP. Impulse response function depicts that response of FDI to a shock in GDP is not significant. As far as the case of Pakistan is concerned Khan (2007); Falki (2009) and Mahmud (2009) investigated the impact of FDI on GDP and found it a significant factor along with other factors. Ghumro and Hakro (2007) reported that the stability of macroeconomic indicators, country's risk profile, improved environment for investment and cost related factors are the real determinants for attraction of FDI.

Non-Democratic regimes are likely to reduce the capital formation and domestic saving ratios, foreign direct investment and the pace of economic growth. Moreover, the share of Government Expenditures in the GDP, monetary growth and the inflation rate tend to rise. Non-Democratic regimes generally worsen the balance of payments and the current account deficit (Odedokun, 1995).

Foreign exchange rate uncertainty and its volatility can also play a significant role in determination of FDI inflows. Although it is a controversial subject in literature but it can have a negative impact on FDI inflows. Nominal exchange rate uncertainty mainly obstructs FDI inflows in accession countries (Brzozowski, 2003). Similarly Hara and Razafimaheefa (2005); Aqeel and Nishat (2004) and Kyereboah-Coleman and Agyire-Tettey (2008) have also reported that exchange rate has a significant impact in determination of FDI inflows.

Price moments (CPI), wage rate, skilled and educated labor can also be a significant factor for attracting FDI inflows in developing countries like Pakistan. Usually CPI is very high in developing countries and it attracts the foreign investors to invest (Hara and Razafimaheefa, 2005 and Jaumotte, 2004).

2. Methodological Framework and Data

The variables; foreign direct investment (FDI), foreign exchange rate (EXR), consumer price index number (CPI) and two dummy variables, one for the incidence of September 11, 2001 incident and there after war on terror (D_1) and other for Democratic or Non-

Democratic rule (D_2) are used in this study. Quarterly based data over the period of

1976Q1 to 2006Q4 for the variable FDI, EXR and CPI is obtained from International Financial Statistics (IFS) CD-ROM 2008. This study is divided into two parts to investigate the pattern of FDI, one is scenario of pre-September 11, 2001 and the other is post September 11, 2001 scenario (including pre-September 11, 2001 observations). At first, a well known econometric technique, Step wise regression is employed to get an idea about the relationship between the variables. Then more advanced techniques, like ARIMA models and GARCH models are employed to estimate the mean as well as variation in FDI.

2.1 Pre September 11, 2001 Scenario

Along with Step-wise regression we have employed Box and Jenkins (1970) methodology for pre September 11, 2001 scenario by including explanatory variables along with the conventional AR and MA terms.

$$\Delta^{2} FDI = \varphi_{0} + \varphi_{1} \Delta^{2} FDI_{t-2} + \varphi_{2} \varepsilon_{t-1} + \varphi_{3} \Delta CPI + \varphi_{4} \Delta EXR + \varphi_{5} D_{2} + \varepsilon_{t}$$
Where $\varepsilon_{t} / I_{t-1} \sim N(0, h_{t})$
(1)

 $\Delta^2 FDI$ is 2nd order stationary series of FDI; D_2 is the dummy variable for Democratic / Non-Democratic rule. ΔEXR represents the 1st difference series of foreign exchange rate (EXR) where as ΔCPI represents the 1st difference series of CPI. $\Delta^2 FDI_{t-2}$ is the

AR(2) term whereas \mathcal{E}_{t-1} is the MA(1) term included in the model.

2.2 Post September 11, 2001 Scenario

Along with Step-wise regression we have used GARCH model introduced by Bollerslev (1986) for post September 11 scenario. Taking into consideration the high volatility after the September 11, incident and to see whether Democratic/Non-Democratic regimes have any influence on FDI dummy variables D_1 and D_2 have been introduced in the variance equation along with ΔCPI and ΔEXR on the pattern of Muhammad Kashif (Shah et al., 2009). Thus the specification of GARCH-X model is as under:-

$$\Delta^{2} FDI = \varphi_{0} + \varphi_{1} \Delta^{2} FDI_{t-2} + \varphi_{2} \varepsilon_{t-1} + \varphi_{3} \Delta EXR + \varphi_{4} D_{1} + \varphi_{5} D_{2} + \varepsilon_{t}$$

$$\varepsilon_{t} / I_{t-1} \sim N(0, h_{t})$$

$$h_{t} = \delta_{0} + \delta_{1} \Delta EXR + \delta_{2} \Delta CPI + \delta_{3} D_{1} + \delta_{4} D_{2} + \alpha \varepsilon_{t-1}^{2} + \beta h_{t-1}$$
(2)

Where $\Delta^2 FDI$ is 2nd order stationary series of FDI. D_1 , D_2 are the dummy variables for September 11, 2001 incident and thereafter war against terror and Democratic / Non-Democratic rule respectively. ΔEXR represent the 1st difference series of foreign exchange rate (EXR) where as ΔCPI represents the 1st difference series of CPI. $\Delta^2 FDI_{t-2}$ is the AR(2) term whereas \mathcal{E}_{t-1} is the MA(1) term included in the model. I_t is representing the information set through time t-1; \mathcal{E}_t is the error term. Model-2 consists of 3 equations, equation (1) of the model (the "mean" equation) analyzes $\Delta^2 FDI$ as a function of exchange rate effect (EXR), dummy variables D_1 , D_2 effect and also the effect of MA(1) and AR(2); equation (2) explains that the residuals of the fitted regression will be modeled as a GARCH process; and equation (3) models the conditional FDI volatility, h_t , as a function of ARCH and GARCH effects, dummy variables, exchange rate and CPI. The parameters of the fitted model will be estimated by using the Quasi-Maximum Likelihood (QML) approach developed by Bollerslev and Wooldridge (1992), which provides standard errors which are robust to non-normality in the density function that underlying the residuals.

3. Empirical Results

In this section we will discuss in detail the results obtained after the analysis of the data by employing the methodological framework explained in Section-2.

3.1 Pre September 11, 2001 Scenario

Table-1 presents the ANOVA results of stepwise regression, while the estimated parameters (coefficients) of the model are presented in Table-2. The overall model is significant (Table-1). Table-2 shows that the variables like EXR, CPI have significant and positive impact on FDI while the non-democratic takeovers (D_2) have significant but negative effect on FDI. (D₂=1 represents presence of non-democratic Government).

	Model	Sum of Squares	df	Mean Square	F-value	Sig.
	Regression	78004.349	1	78004.349	3370.035	.000
1	Residual	2337.792	101	23.146		
	Total	80342.141	102			
	Regression	79037.479	2	39518.740	3029.041	.000
2	Residual	1304.662	100	13.047		
	Total	80342.141	102			
	Regression	79092.305	3	26364.102	2088.311	.000
3	Residual	1249.836	99	12.625		
	Total	80342.141	102			

Table 1: ANOVA Table by Step-wise Regression Analysis (Pre September 11 Scenario)

 Table 2: Coefficients of model selection by Step-wise Regression (Pre September 11 Scenario)

Model		Un standar Coeffic	- dized ients	Standardized Coefficients		
		В	Std. Error	Beta	t-value	Sig.
1	(Constant)	1.547***	.919		1.684	.095
Ŧ	exchange rate	1.898*	.033	.985	58.052	.000
	(Constant)	1.940*	.691		2.807	.006
2	exchange rate	1.714*	.032	.890	53.482	.000
	consumer price index	.061*	.007	.148	8.899	.000
	(Constant)	3.321*	.949		3.498	.001
	exchange rate	1.716*	.032	.891	54.401	.000
3	consumer price index	.054*	.008	.130	7.016	.000
	dummy Democratic/Non- Democratic	-1.762**	.846	032	-2.084	.040
N	ote: *, ** and *** shows the signification res	ance at 1% pectively.	, 5% an	d 10% level of S	Significan	ce

The diagnostic checks which are not reported here but can be made available on demand, shows the existence of the problem of auto correlation and hetroskedasticity. Moreover, the value of R^2 is also found to be greater than the value of Durbin Watson d-statistic which is an indication of spurious regression. Therefore, there is strong evidence for inclusion of some autoregressive terms in the model, which leads us to use well known Box and Jenkins (1970) methodology. The pre-requisite of Box-Jenkins methodology is the stationarity of the variables. The series FDI is stationary at second difference while EXR and CPI are stationary at first difference. We tried various models but only two models are being reported.

Variables	Ν	Iodel -I		Model-II			
v ar tables	Coefficients	t-stat	P-value	Coefficients	t-stat	P-value	
Constant	0.0836*	5.9402	0.0000	0.0812*	5.6579	0.0000	
D_2	-0.0587*	-4.9845	0.0000	-0.0577*	-4.7479	0.0000	
D(EXR)	-0.0976*	-5.7573	0.0000	-0.0936*	-5.4774	0.0000	
D(CPI)	0.0023**	2.0053	0.0479	0.0021***	1.8744	0.0640	
AR(1)	0.0874	0.3566	0.7221				
MA(4)	0.2994*	3.566	0.0006	0.2655*	3.1319	0.0023	
MA(2)	-0.4957**	-2.0770	0.0406	-0.7135*	-7.3823	0.0000	
MA(1)	-0.7892*	-3.4644	0.0008	-0.5366*	-4.1595	0.0001	
		Diag	nostic Cheo	eks			
S.E. of re	egression		00.501	00.498			
Log Like	elihood -68.686			-	69.296		
Durban-V	Watson Stat		01.978	01.956			
Akaike info Criterion			01.534	01.511			
Schwarz Criterion			01.742	01.692			
F-Statistic		10.546		12.343			
Probabili	ty		00.000	00.000			

Table 3: Results of ARIMA Models for FDI (Pre September 11 Scenario)

Impa	ct of Demo	ocratic/Non-	Democratic	Regimes	on Foreign	Direct	Investment

	Ling Por O stat	1	
	Ljulig-Box Q-stat	•	
Q(5)		03.298	
	(0.069)		
O (10)		10 184	
Q (10)	(0.117)	10.101	03.521 (0.172)
0(15)		15 026	10.396 (0.167)
Q(13)	(0, 181)	15.050	15 457 (0 217)
2	(0.181)		13.437 (0.217)
$Q^{2}(5)$		03.836	03.485 (0.175)
	(0.050)		14.339 (0.054)
$Q^{2}(10)$		13.331	16 671 (0 162)
	(0.038)		10.071 (0.102)
$O^{2}(15)$		15 349	
Q (15)	(0.167)	15.547	
	(0.107)		
Skewness		0.236	0.250
Kurtosis		2.759	2.810
Jarque-Ber	a test Prob.	0.558	0.558
	Notes: (a). Figur	es in parentheses a	are numbers of lags.
()). *. ** and *** sh	nows the significar	nce at 1%, 5% and 10% level of
	Sic	mificance respecti	velv
	512	,eunee respecti	

From the results reported in Table-3 shows that in Model-I except the term AR(1), rest of the coefficients are statistically significant. The negative sign of D_2 shows the impact of

non-democratic takeovers is severely bad on the FDI in Pakistan. Similarly the depreciation of the local currency also has a negative impact on FDI in pre September 11, 2001 scenario. However, the impact of CPI is positive which means that higher CPI will have a positive impact on FDI. The Ljung-Box (1978) Q-stats and the Breusch Godfrey Serial Correlation LM-Test, presented in Table-A1 in Appendix-A, shows the problem of autocorrelation which stimulates that we should improve our model

In Model-II, we have eliminated AR (1) term as it is insignificant in Model-I. All the variables in Model-II are also significant and the nature of impact of these variables on FDI is same as in Model-I. The S.E of regression, AIC and SBC have been improved as compared to Model-I. The problem of auto correlation has also been removed as indicated by the Ljung-Box Q-stats and Breusch Godfrey Serial Correlation LM-Test (Table A3). Moreover, the ARCH effect has also been removed as indicated by the ARCH-LM Test (Table-A4) and Q^2 -Stats.

3.2 Post September 11, 2001 Scenario

In this part, the observations of after September 11, 2001 incident and subsequent war on terror period along with the pre-September 11, 2001 scenario are included to build a model for FDI. The same procedure has been adopted as of Pre-September 11, 2001 scenario. The results are reported in Table-4 and Table-5.

	Model	Sum of Squares	Df	Mean Square	F	Sig.
	Regression	169117.014	1	169117.014	3725.180	.000
1	Residual	5538.599	122	45.398		
	Total	174655.613	123			
	Regression	172121.109	2	86060.554	4108.625	.000
2	Residual	2534.504	121	20.946		
	Total	174655.613	123			
	Regression	172365.166	3	57455.055	3010.157	.000
3	Residual	2290.447	120	19.087		
	Total	174655.613	123			

 Table 4: ANOVA Table by Step-wise Regression Analysis (Post September 11 Scenario)

 Table 5: Coefficients of model selection by Step-wise Regression (Post September 11 Scenario)

Model		Un-stan Coeff	dardized ficients	Standardized Coefficients		
		В	Std. Error	Beta	t	Sig.
1	(Constant)	.092	1.145		.080	.936
1	exchange rate	1.977*	.032	.984	61.034	.000
	(Constant)	2.289*	.799		2.863	.005
2	exchange rate	1.781*	.027	.886	64.864	.000
	consumer price index	.029*	.002	.164	11.976	.000
	(Constant)	4.017*	.903		4.447	.000
	exchange rate	1.778*	.026	.885	67.829	.000
3	consumer price index	.030*	.002	.168	12.803	.000
	dummy Democratic/Non- Democratic	-2.881*	.806	038	-3.576	.001
	Note: * shows the	significan	ce at 1% lev	el of Significance.	- !	•

The results show that the dummy variable for September 11, 2001 has been eliminated and the significance and nature of EXR and CPI is same as in the case in pre-September 11 scenario. However, there is also a problem of autocorrelation and presence of ARCH effect in this model and the value of R^2 is also found to be greater than the value of Durbin Watson d-statistic which is an indication of spurious regression We then tried ARIMA models (which are not reported in this paper) but the problem of ARCH effect could not be sorted out and finally the GARCH type models are employed to effectively overcome this problem. Various GARCH models were tried out but only two are reported here.

The results are reported in Table-6, the mean equation of Model-I show that all the parameters estimated are statistically significant at 5% level of significance. The variable D_2 has negative significant impact which means that the transition from Democratic to Non-Democratic government causes decrease in FDI. Same is the case with exchange rate. By increasing the EXR, depreciating local currency, the FDI is decreased. However, D_1 has a positive significant impact, which indicates that inflows of FDI in Pakistan have been increased due to the September 11, 2001 incident and on-going war against terrorism.

The variance equation of this model has some problems. The negative insignificant ARCH term indicates improper specification of the model and needs improvement. The low value of Durbin-Watson statistic (1.5362) and Ljung Box Q-statistic shows the presence of autocorrelation. Moreover, Table B-1 in Appendix-B shows significant ARCH effect at lag 2.

Variables Model -I		Model-II				
	Coefficients	Z-stat	P-value	Coefficients	Z-stat	P-value
		Mean	Equation			
Constant	0.0562*	3.1741	0.0015	0.0264	1.5861	0.1127
D_1	0.0594**	2.1018	0.0356			
D_2	-0.0369**	-2.1412	0.0323			
D(EXR)	-0.0621*	-5.1402	0.0000	-0.0476***	-1.6199	0.1053
AR(2)	-0.3785*	-4.1020	0.0000	-0.4125*	-4.5828	0.0000
AR(8)				0.3203*	4.3577	0.0000
MA(1)	-0.8849*	-16.775	0.0000	-0.5164*	-5.6143	0.0000
MA(3)				-0.2511*	-3.5361	0.0004
		Varianc	e Equation	n		
Constant	0.0533**	2.2308	0.0257	0.0357	1.3577	0.1746
$\alpha(ARCH)$	-0.0294	-0.6332	0.5266	0.1974**	1.9704	0.0488
$\beta(GARCH)$	0.9985*	12.3582	0.0000	0.6611*	3.8443	0.0001
D_1	0.1495*	2.6205	0.0088	0.2396**	1.9395	0.0524

Table 6: Results of GARCH Models for FDI (Post September 11 Scenario)

D_2	-0.0389**	-2.3297	0.0198							
D(EXR)	-0.0418*	-2.6331	0.0085							
D(CPI)	-0.0023*	-2.9843	0.0028	-0.0016*	-4.8965	0.0000				
	Diagnostic Checks									
S.E. of regre	ession	0.0	6454	(0.6104					
Log Likelihood		-90.2642		-84.3670						

Tabl	Table 6: Continued						
Durban-Watson Stat	1.5362	2.0578					
Akaike info Criterion	1.7211	1.7183					
Schwarz Criterion	2.0230	1.9868					
F-Statistic	4.6055	6.0043					
Probability	0.0000	0.0000					
Ljung–Box Q-	stat ^a .						
Q(5)	8.8203 (0.032)	2.9096 (0.088)					
Q(10)	18.629 (0.017)	6.2737 (0.393)					
Q(15)	26.559 (0.014)	14.371 (0.213)					
Q ² (5)	07.957 (0.047)	0.7788 (0.378)					
Q ² (10)	12.814 (0.118)	6.4423 (0.332)					
Q ² (15)	16.203 (0.238)	9.3774 (0.587)					
Skewness	0.292	0.268					
Kurtosis	2.745	3.091					
Jarque–Bera test Prob.	0.361	0.502					
Notes: (a). Figures in	n parentheses are numbers of	of lags.					
(b)*, ** and *** shows the sig	gnificance at 1%, 5% and 10 respectively.	0%level of Significance					

All the above illustrations show that the model is to be re-specified. So, after some experimentation which is not reported here due to the length of the study, Model-II (Table. 6) has been fitted. The results show that the AR(2), AR(8), MA(1) and MA(3) are highly significant at 1% level while the D(EXR) is significant at 10% level of significance in mean equation. Negative sign of D (EXR) presents the inverse relationship of it with FDI. It means that if the Pak Rupee is depreciated by one unit there will be 0.047 million US \$ less foreign investment in Pakistan. The model satisfies the diagnostic checks as shown in Table-6 and Table B-2 in Appendix-B.

In variance equation we see that all the variables are significant at 5% level of significance except the constant term. The variable D_1 indicates that due to September, 11

incident and on-going war on terror, the volatility in foreign direct investment is increased by 0.239. Moreover, negative sign of D (CPI) indicates that the volatility in foreign direct investment is decreases by 0.001 due to CPI.

The S.E of regression and the sum of squared residuals of this model is less than that of previous model-I. Moreover, AIC and SBC and Log Likelihood have also been improved. The ARCH and GARCH effects, both are positive and significant, indicating the satisfaction of standard test of robustness of the Model-II. The GARCH effect ($\beta = 0.661$) is comparatively a bit higher than the ARCH effect ($\alpha = 0.197$) which describes that the shocks to the conditional variances are quite persistent. Furthermore, the model is showing stability as the sum of ARCH and GARCH terms is less than one, that is ($\alpha + \beta \leq 1$).

4. Conclusion and Recommendations

The step-wise regression is used to get an idea about the relationship between the variables and for the justification of using auto-regression models. We tried to overcome the problem of auto-correlation and hetroskedastic residuals that we face during fitting step-wise regression but the problem could not be fully resolved which stimulates us to use GARCH models.

The GARCH models resolve the problem and the findings suggest us that: (i) Foreign Exchange Rate have a negative impact on the foreign direct investment as reflected by the mean equation of the GARCH model. The impact of exchange rate on foreign direct investment is a controversial subject in literature but in our case the results support the theory that it has a negative impact. The reason of its negative impact could be the fact that in Pakistan the investment is not export oriented and if the local currency depreciates, the cost of production escalates which minimizes the profitability of the foreign investors. Moreover, the depreciation of currency gives rise to inflation and purchasing power of the buyers decreases that effects the selling and thereby the profits of the investors and they feel reluctant to further investment; (ii) Most of the investment is related to the past trends as indicated by the mean equation which includes a relatively higher order of autoregressive terms. So, the past investments trends does effect the future investments; (iii) The stability condition is also satisfied and the volatility shocks are quite constant; (iv) Higher value of GARCH coefficient as compared to ARCH coefficient term in variance equation indicates that the volatility shocks takes relatively a long time to die out; (v) September 11, 2001 and thereafter war on terror has increased the conditional volatility of foreign direct investment as indicated by the variance equation of the GARCH Model and it is also supported by the model fitted on the data before September 11, 2001 where we do not face the problem of auto-regressive conditional hetroskedasticity and ARIMA models are adequate; (vi) although CPI decreases the conditional volatility and has a highly significant impact but takes value close to zero.; (vii) one interesting finding of this study is the impact of Non-Democratic government before September, 11 scenario was severely bad on foreign direct investment but with the inclusion of data of post September, 11 the variable becomes insignificant and thus was eliminated from the mean and variance equation of the GARCH model. This might be due to the fact that in last Non-Democratic regime the foreign investors were attracted by the fast growth of some sectors like telecommunications, information technology etc. and the investment volume was increased substantially in these sectors.

There are some policy implications of this study which can be useful in attraction of foreign direct investment in Pakistan. The State bank of Pakistan should strictly monitor the foreign exchange rate and should take necessary steps to stop the depreciation and to stabilize the local currency against dollar in order to build the confidence of the foreign investors moreover, the continuous depreciation in local currency give rise to inflation. The non-democratic takeovers also increase the volatility in foreign direct investment therefore these should be avoided.

REFERENCES

Aggarwal, J.P.I. (1980). Determinants of Foreign Direct Investment, *welsirstchaftiches* Archiv, 116, 739-773.

Aqeel, A. and Nishat, M. (2004). The determinants of foreign direct investment in Pakistan. *The Pakistan Development Review*, 43, 651-664.

Assaf and Efrain (2007), *Foreign Direct Investment: An analysis of aggregate flows*. Princeton: Princeton University Press.

Bollerslev, T and Jeffery M.W. (1992), Quasi-Maximum Likelihood Estimation and Inference in Dynamic Models with Time Varying Co-variances. *Econometric Reviews*, 11, 143-172.

Bollerslev, T. (1986). Generalized Auto Regressive Conditional Hetroskedasticity. *Journal of Econometrics*, 31, 307-327.

Box, G.E.P and Pierce, D.A. (1970). Distribution of the residual autocorrelations in autoregressive-integrated moving-average time series models. *Journal of the American Statistical Association*, 65, 1509-1526.

Box, G.E.P. and Jenkins, G.M. (1970). *Time Series Analysis, Forecasting and Control.* San Francisco, CA: Holden-Day.

Brzozowski, M. (2003), Exchange Rate Variability and Foreign Direct Investment – Consequences of EMU Enlargement, © CASE – Centre for Social and Economic Research, Warsaw, ISSN 1506-1701, ISBN: 83-7178-313-2.

Dondeti, V.R. and Mohanty B.B. (2007). Impact of Foreign Direct Investment on the Gross Domestic Product, Exports and Imports of Four Asian Countries. *Delhi Business Review*, 8(1), 3-23.

Ghumro , A.A. and Hakro, A.N. (2007). Foreign Direct Investment, Determinants and Policy Analysis: Case Study of Pakistan. Paper provided by Department of Economics, University of Glasgow in its series [Working Papers] with number 2007_04.

Haider, M. (2009), Application of Endogenous Growth Model to the Economy of Pakistan: A Cointegration Approach. *Pakistan Journal of Commerce and Social Sciences*, 2, 16-24.

Hara, M. and Razafimaheefa, I.F. (2005). The Determinants of Foreign Direct Investments into Japan. *Kobe University Economic Review*, 51, 21-34.

Jaumotte, F. (2004), Foreign Direct Investment and Regional Trade Agreements: The Market Size Effect Revisited, IMF [working Paper] No.206.

Khan, A.H. (2001). Recent Economic Performance: Impact of September 11 and Shortterm Economic Outlook of Pakistan, Islamabad, Pakistan. Khan, M.A (2007). Foreign Direct Investment and Economic Growth: The Role of Domestic Financial Sector, PIDE [working Papers] 2007:18

Kyereboah-Coleman, A. and Agyire-Tettey, K.F. (2008). Effect of exchange-rate volatility on foreign direct investment in Sub-Saharan Africa: the case of Ghana. (Case study). *Journal of Risk Finance*, 9, 52-70.

Ljung G.M. and Box, G.E.P. (1978). On a Measure of a Lack of Fit in Time Series Models. *Biometrika*, 65, 297-303.

Minjung, K. (2004). Does a causal link exists between foreign direct investment and economic growth in asia nies, A thesis presented to the faculty of international studies of Ohio University.

Nawaz, T. (2009). Impact of Civil/Military Rule on FDI before and after September 11, 2001 and Forecast Model for FDI, [Unpublished M.Phil thesis], Govt. College University Lahore.

Nuzhat, F. (2009). *The Impact of Foreign Direct Investment on Economic Growth in Pakistan*. Presented in 10th International Business Research Conference, Dubai, 16-17 April, 2009.

Odedokun, M.O. (1995). Evaluation of the Impacts of Non-democratic Regimes on the Economy: Multi-Country Evidence from the Sub-Sahara Africa. African Study Monographs: The Centre for African Area Studies, Kyoto University, 16 (3), 119-148

Shah, M.K.A., Hyder, Z. and Pervaiz, M.K. (2009). Central bank intervention and exchange rate volatility in Pakistan: an analysis using GARCH-X model. *Applied Financial Economics*, 19(18), 1497-1508.

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Appendix-A

Lags 1								
F-Statistics	0.377	Probability	0.540					
Obs* R-squared	0.399	Probability	0.527					
Lag	s 2							
F-Statistics	0.365	Probability	0.695					
Obs* R-squared	0.790	Probability	0.673					
Lag	s 3							
F-Statistics	0.281	Probability	0.838					
Obs* R-squared	0.927	Probability	0.818					
Lag	s 4							
F-Statistics	2.293	Probability	0.065					
Obs* R-squared	9.427	Probability	0.051					
Lag 5								
F-Statistics	2.172	Probability	0.064					
Obs* R-squared	11.082	Probability	0.049					

Table A1: Breusch Godfrey Serial Correlation LM-Test (Model-I) for pre-September, 11 Scenario

Table A2: ARCH Test (Model-I) for Pre-September, 11 Scenario

Lags 1							
F-Statistics	1.457	Probability	0.230				
Obs* R-squared	1.465	Probability	0.225				
	Lags 2						
F-Statistics	1.433	Probability	0.243				
Obs* R-squared	2.870	Probability	0.238				
Lags 3							
F-Statistics	1.113	Probability	0.347				
Obs* R-squared	3.364	Probability	0.338				
	Lags 4						
F-Statistics	0.895	Probability	0.469				
Obs* R-squared	3.636	Probability	0.457				
Lags 5							
F-Statistics	0.730	Probability	0.602				
Obs* R-squared	3.747	Probability	0.586				

Impact of Democratic/Non-Democratic Regimes on Foreign Direct Investment

Lags 1						
F-Statistics	0.066	Probability	0.797			
Obs* R-squared	0.049	Probability	0.823			
Lags 2						
F-Statistics	0.161	Probability	0.851			
Obs* R-squared	0.329	Probability	0.848			
Lags 3						
F-Statistics	0.126	Probability	0.944			
Obs* R-squared	0.395	Probability	0.941			
Lags 4						
F-Statistics	2.235	Probability	0.071			
Obs* R-squared	9.108	Probability	0.058			
Lags 5						
F-Statistics	1.932	Probability	0.096			
Obs* R-squared	9.872	Probability	0.078			

Table A3: Breusch Godfrey Serial Correlation LM-Test (Model-2) for pre-September, 11 Scenario

Table A4: ARCH Test (Model-II) for Pre- September, 11

Lags 1						
F-Statistics	1.490	Probability	0.225			
Obs* R-squared	1.498	Probability	0.220			
Lags 2						
F-Statistics	1.296	Probability	0.278			
Obs* R-squared	2.603	Probability	0.272			
Lags 3						
F-Statistics	0.997	Probability	0.397			
Obs* R-squared	3.024	Probability	0.387			
Lags 4						
F-Statistics	0.815	Probability	0.518			
Obs* R-squared	3.322	Probability	0.505			
Lags 5						
F-Statistics	0.644	Probability	0.666			
Obs* R-squared	3.318	Probability	0.6510			

Lags 1						
F-Statistics	1.732	Probability	0.196			
Obs* R-squared	1.736	Probability	0.187			
Lags 2						
F-Statistics	2.713	Probability	0.070			
Obs* R-squared	5.317	Probability	0.070			
Lags 3						
F-Statistics	1.913	Probability	0.128			
Obs* R-squared	5.707	Probability	0.126			
Lags 4						
F-Statistics	1.423	Probability	0.231			
Obs* R-squared	5.658	Probability	0.226			
Lags 5						
F-Statistics	1.555	Probability	0.178			
Obs* R-squared	7.656	Probability	0.176			

Appendix-B Table B1: ARCH Test (Model-I) for Post-September 11, 2001 Scenario

Table B2: ARCH Test (Model-II) for Post-September 11, 2001 Scenario

Lags 1							
F-Statistics	0.0085	Probability	0.926				
Obs* R-squared	0.0086	Probability	0.925				
Lags 2							
F-Statistics	0.0397	Probability	0.961				
Obs* R-squared	0.0817	Probability	0.959				
	Lags 3						
F-Statistics	0.0976	Probability	0.9611				
Obs* R-squared	0.303	Probability	0.959				
Lags 4							
F-Statistics	0.1067	Probability	0.979				
Obs* R-squared	0.4459	Probability	0.978				
Lags 5							
F-Statistics	0.1971	Probability	0.962				
Obs* R-squared	1.0344	Probability	0.959				