

IMPACT OF SELECTIVE MACRO-ECONOMIC VARIABLES ON FOREIGN DIRECT INVESTMENT: PAKISTAN PERSPECTIVE

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ABSTRACT:

The aim of this study is to measure the long-term relationship of FDI along with interest rates, inflation, market size, trade openness, terrorism, and the governance structure in Pakistan. This study uses the ARDL approach, to explore the long-run relation of FDI inflow along with selective macro-economic variables. Secondary data is collected from the World Bank database for the Pakistan economy, International Financial Statistics, IMF and the global terrorism database for the period 1980-2018 via the ARDL approach. The major findings show that the inflation rate, interest rate, market size, democracy, and trade openness have a positive and significant relationship with the dependent variable (FDI). Similarly, terrorism has a negative significant impact on FDI, while interest rate shows negative but insignificant behavior with FDI. On the basis of the bounds test, it is concluded that long-term equilibrating relationship exists between FDI and selected variables. The practical implication of the study is the use of finding in policymakers to make the policies that urge the FDI inflow, as well as foreign investors, to make the decision to invest in Pakistan. This study has an originality value/ similarity index of 30%.

Keywords: *Interest rate, Foreign Direct Investment, Terrorism*

Introduction:

The world now becomes a global village and more integrated over the last few decades, as globalization opened the trade and capital flow between the countries, which creates more investment opportunities for investors at local as well as abroad level (Hanusch, Nguyen, & Algu, 2018, p. 1). Investment is a driving tool for job creation, which results in poverty reduction, as well as the causes of many social outcomes (Elly & Ojung, 2013, p. 1). Two historical views about investment, Hayekian (perceives investment as the fine-tuning to equilibrium), while Keynesian (less emphasis on the adjustment), Instead, they take investment as behavioral decision (Faroh & Shen, 2015, p. 3). Investment in a county depends on different factors and any change in these factors results in a significant change in investment (Shi, 2019, p. 3). This study will discuss the flow of investment across the border named FDI plays a significant role in the economic development of the host country (Mohammad & Gharaibeh, 2015, p. 1).

Onuorah and Okoli, 2013, p. 162 defined FDI as foreign ownership of factories, land, mine and productive assets. Rauf et al., 2016, p. 7 conclude that FDI inflow is crucial for Pakistan to establish a bridge between the saving-investment gap, to enhance managerial skills, raise employment rate and foreign exchange reserves, financing development projects, ornament productivity, and output, attaining the latest technology, improving infrastructure, strengthening industrial sectors, and ultimately achieving the economic growth.

Democracy is a driving force for economic development. But in the case of Pakistan, there is a total of six military coups spanning from almost 35 years, out of which three were successful (Alesina & Perotti, 1995; Hayat, Fatima, Mukhtar, & Bano, 2016). Hence, it is expected that the Governance variable gives awareness to the impact of institutional quality on FDI. Government structure (as dummy 1 for democracy o otherwise) and suggest negative correlation (Uddin, Chowdhury, Zafar, Shafique, & Liu, 2018, p. 6).

An investor always prefers to invest in a healthy and safe environment. Any unfavorable move in this regard makes the investor too much conscious. Investments become risky and investors lose confidence in investing in a politically unstable economy (Tan & Tang, 2016, p. 214). Political stability and a consistent exchange rate attract foreign investors (Froot & Stein, 1991, p. 1195).

Other important factors for FDI inflow are the stable institutional and political structure, but as a case of Pakistan, these factors do not show more consistency, which raises the level of corruption, weak law and order situation, and unproductive governance. All these factors are direct effects on inward FDI (S. H. Shah, Ahmad, & Ahmed, 2015, p. 4). Pakistan is the 7th largest country with the high potential to grow, and thus considered to be the good destination for FDI inflow, but lags behind because of political instability in the late 1990s and then Pakistan's role in the ongoing war on terrorism in 2001 (S. H. Shah et al., 2015, pp. 2–3). In the occurrence of terrorist attacks, investors lose sureness and slowdown the FDI inflows in the host country (Uddin et al., 2018, p. 2).

Shah and Faiz, 2015, p. 4 showed that individuals or groups achieve their social and political targets by threatening the general public through direct victims, terrorism, aggression by individuals, use or threat of violence through terrorists. A peaceful environment attracts foreign investors, they invest in secure countries where they will generate more returns than other locations. Rauf et al., 2016, p. 3 explain that investors lost their confidence in Pakistan's current economic and political setting, the reason behind is Pakistan is bearing the huge cost of war contrary to political instability and terrorism.

FDI inflow is considered as engines that ignite the economic growth of developing countries, it can impact the host economy in different ways like the transfer of technology, innovative capacity, skills, administrative and managerial practices (Faroh & Shen, 2015, p. 1). Ahlquist, 2006 inspects the effect of the economic policy outcome on the cross-country capital flows and finds out that that portfolio investor shows a sensitive response to fiscal policy outcome and with the past government behavior.

Zaman et al., 2012, pp. 72–79 shows that Pakistan's economy has suffered from the problems like the growing population, political disputes, poor saving rate, lower exports, weak governance structure, the high level of corruption, lack of transparency, internal conflicts, inflation rate, and conflict with the neighboring India not only for foreign investor but also for private sector investment. Political instability, the low level of GDP and other socio-economic factors also cause the capital outflow and decrease the overall productivity level in the economy.

FDI inflow into the recipient country speeds up its development process. These macroeconomic indicators such as interest rate, money supply, human capital, exchange rate,

inflation rate, terrorism, stock prices, political and economic instability, etc. have a significant impact on FDI inflows (Tan & Tang, 2016, p. 2). The mutual relationship between FDI and other macroeconomic variables has fascinated the dedication of the researchers in recent decades.

In the current scenario, there is a need to analyze the factor that causes the inward FDI nexus. In this study we will test the co-integral relationship between FDI and selected macroeconomic variables, such as terrorist attacks, interest rates, inflation, market size, the openness of trade and governance, these variables are selected because of its crucial role for an emerging economy.

Research Questions

Why do development and investments vary in different countries of the world? Is this due to political or social instability or the insufficient supply of wealth that reduces investment in these countries? (Alesina & Perotti, 1995, p. 2). These are the questions that are to be discussed in this research.

- 1) Is there any relation between FDI inflow and terrorist attacks in Pakistan?
- 2) To determine the relationship between selected variables (Market size, Interest rate, Inflation rate, Trade openness, and Governance) and FDI inflow?

The objective of the study

On the basis of research problem following are the objectives of this study:

- 1) To find the relation between selected variables (Market size, Interest rate, Inflation rate, Trade openness, Terrorism incidents, and Governance) and FDI inflows in Pakistan through the ARDL approach.
- 2) To aid the foreign investor to classify the factors that influence the flow of FDI in Pakistan.
- 3) To enable policymakers to formulate macroeconomic policies.

The Rationale of the Study

Political uncertainty and rise in terrorism are a serious threat to the Pakistani economy, which slows down the economic growth and FDI because investments are risky and investors lose confidence in investing. Pakistan is one of the countries with veterinary political uncertainty, deep-rooted corruption, poor public order and a lack of strong governance (S. H. Shah et al., 2015, p. 5). That is why there must be a permanent policy and consistent exchange rate to attract foreign investors (Urata & Kiyota, 2003).

LITERATURE REVIEW

Literature shows that different researches have been conducted to explore the determinants of FDI. Onuorah and Okoli, 2013 measures the long-term relationship between GDP, inflation, money supply and foreign direct investment in Nigeria, applied techniques were impulse function, co-integration, and VAR model. The result stated that GDP correlates negatively with FDI, while other variables put a positive effect on FDI in Nigeria.

Uddin et al., 2018, p. 2 examine the structural break to see the effect of the early 1990's institutional reforms in Pakistan, to enhance FDI inflow. They also determined that Pakistan has been distressed by an unstable political situation between democratic and military governments. Çevis and Çamurdan, 2007, p. 289 developed an experimental framework to explain the economic factors of FDI inflows by using panel data for 17 changing developing economies for the period of 1989-2006, by using variables Lag of FDI, Wage rate, Market size, Trade Openness, the Real Interest Rate, Inflation Rate, and Domestic Investment. The results show that FDI is positively related to FDI lag, trade openness, and growth rates, but negative with the interest rate. The part of FDI in an economy is fundamental because it improves economic growth and is also the source of the latest technology, skills and foreign capital for the host country (Nasir & Hassan, 2011).

Shah et al., 2015, p. 5 explore the role of institutional factors that are expected to attract inward FDI in Pakistan, by incorporating the Legal system, Property rights, the Size of Government, Freedom of international trade, Access to sound money, Political stability, Protection of civil rights, Democracy and the nature of the government regime. Anwar & Afza, 2014 measure the impact of political instability and terrorism incidents on inward FDI along with trade openness, infrastructure, exchange and inflation rate, investors incentives and market size. The results showed FDI shows negative implications with political stability and terrorism. The inflation rate and Exchange rate have a negative influence on FDI. Terrorist attacks include suicide attacks, bombings, kidnapping, threats, hijacking, assassinations and all other aggressive activities (Sandler & Enders, 2008).

Ang, 2008, pp. 2–5 examined the FDI by using time series data for the period 1960–2005. Consistent with the expected results real GDP has a significant positive impact on FDI inflows. From the policy point of view, it was concluded that trade openness, the level of

financial and infrastructure development, appreciation of exchange rate and higher statutory corporate seem to depress FDI inflows.

Hooda, 2011, conducted research in India for the period of 1991-2008, by measuring the FDI inflow through regression techniques, found the inflation rate, infrastructural facilities, exchange rates, and political instability are important determinants of FDI inflow in developing countries. Rauf et al., 2016 mentioned that in Pakistan FDI, political uncertainty and terrorism are interweaved with each other from the last decade. This study empirically enlightens the determinants of FDI for Pakistan with time series annual data over the period 1970 to 2013, adopting the optimistic approach, a set of variables like terrorism, trade openness, political stability, and GDP had been analyzed by applying the Ordinary Least Square method. As expected, the estimated results confirm that political stability, trade openness and GDP have a positive and significant impact, while terrorism has a negative and significant influence on FDI inflows in Pakistan.

Mohammad & Gharaibeh, 2015, p. 1 used country-specific variables and include market size, the balance of payments, economic growth, inflation rates, political stability, tax, and state policies for foreign investments. M. H. Shah & Faiz, 2015, pp. 9–14 in their research find the causal relationship between FDI and terrorist attacks have in SAARC nations and to lean-to light on other variables like growth rate, trade openness, economic instability, and exchange rate. Secondary data for the period between 1980 to 2012 were collected from the World Bank data source by using the panel data estimation technique along with its assumptions Housman test, Multi-collinearity (Variance Inflation Factor VIF), and heteroscedasticity. The study uses five major countries of SAARC (Bangladesh, India, Nepal, Pakistan, and Sri Lanka) results showed a significant positive impact of trade openness, market size, economic growth, and infrastructure availability FDI inflow in these SAARC countries. The results further revealed that terrorism has a statistically significant and negative effect on inward FD, so it empirically establishes, that terrorism is a serious threat for FDI inflow.

Demirhan and Masca, 2008 show that FDI inflow has a positive relation with infrastructure, trade openness and market size. This research uses transversal data from developing countries for the period 2000-2004. Asiedu & Lien, 2011 studied the relationship between natural resources, democracy, and FDI, through the linear dynamic techniques using panel data for 112 emerging countries over the period of 1982–2007. They identify that

expansion of democracy in 22 countries may reduce FDI and increasing democracy in 90 countries may promote FDI. Faroh and Shen, 2015, p. 5 observe the effect of interest rate along with other variables (Market Size, Inflation, Exchange rate, and openness) in Sierra Leone from 1985 to 2012, by using OLS along with its diagnostic test of multi-collinearity and stationarity. The results show the constructive relationship of FDI with GDP, Trade Openness, Exchange rate, while negative with interest rate and inflation rate.

Nwaogu and Ryan, 2015, p. 5 examine how FDI, foreign aid and remittances influence the economic growth of 53 African and 34 Latin American and Caribbean countries. The empirical analysis of this study uses a panel data set consisting of eight separate 5-year periods (1970–1974, 1975–1979, 1980–1984, 1985–1989, 1990–1994, 1995–1999, 2000–2004 and 2005–2009, through fixed and random-effects, and GMM and OLS.

Mohammad & Gharaibeh, 2015, p. 10 used the OLS technique to measure FDI inflows in a host country with the variables Market size, Trade Openness, Exchange rate, Inflation, Economic stability, Labor force. Infrastructure development, Public education, Export potential, Population, and Welfare. The empirical findings show FDI has an insignificant but positive relationship with economic stability, country welfare, inflation rate, trade openness, labor force, population, and public education, while Country welfare found to be statistically insignificant, though negatively related, to FDI inflows.

Ahmad & Ahmed, 2014, pp. 10–12 investigate the long-run and short-run dynamic relationship between institutional quality and FDI by using the ARDL technique after a diagnostic test of stationarity assumption. The analysis comprises 30 years of data from 1980 to 2010 for the Pakistan economy. Overall, the results strongly support that the institutional quality and trade openness positively impacts on FDI inflows.

The effect of foreign direct investment (FDI) is well recognized in the literature for developing and developed countries. FDI has grown-up at least twice as fast as trade over the past decade. As there is a shortage of capital in emerging countries who want capital for their growth process, the marginal productivity of capital is higher in these countries. (Aqeel & Nishat, 2014).

Zaman et al., 2012 Identify key macroeconomic factors that improve foreign direct investment for Pakistan through the co-integration and error correction model in data from 28 years 1980 and 2008. The result shows that FDI has a significant positive impact on Pakistan's

economic growth in the long run, while trade liberalization has a positive effect in the short run, while a negative effect is observed in the long run upon the economic growth of Pakistan.

Simionescu 2016, pp. 7–12 applied Bayesian random-effects, OLS, and Panel vector-autoregressive models to test the relationship between economic growth and FDI, using the data of 28 EU countries from 2008 to 2014. Panel data analysis was performed along with the unit root, stationarity, and Granger causality test, results showed the bi-directional underlying relationship among GDP and FDI at a significance level of 5%.

The linkage between the quality of institutions and FDI by collecting data from the International Country Risk Guide (ICRG 1980-2012). The dependent variable FDI is measured as a proportion of GDP. The collected data was explored through bi-directional causal long and short-run dynamic relationship between FDI and institutional quality through ARDL technique of co-integration along with its assumption of stationarity at level $I(0)$, and first difference $I(1)$ or mix of both (S. H. Shah et al., 2015, pp. 2–6).

Hanusch et al., 2018, p. 6 examine the relationship between exchange rate instability and FDI inflow and tests the impact of any change in exchange rate volatility on FDI inflow. Annual data was collected for 80 countries from the World Bank's database between 1990 to 2015, it was suggested that reducing exchange rate volatility by 10% can increase FDI inflows by 0.48 percentage points of GDP.

Tan & Tang, 2016, p. 6 estimates the impact of domestic investment, FDI, trade and the real interest rate on economic growth by taking data from 1970 to 2012 from World bank data source for in the ASEAN-5 developing countries, Johansen-Julius's cointegration technique applied and concluded the selected variables have a long-term relationship. Simionescu 2016, p. 3 showed that FDI inflows positively influence economic growth, but the impact varies from country to country.

Faroh and Shen, 2015 mention FDI as a driving force that ignites economic growth in developing countries, influence of interest rate on FDI in Sierra Leone are measured after the civil war ended in 2001 to attract more FDI inflow by favorable foreign investment policies. Time series data for the period of 1985 to 2012 were analyzed through OLS and recommended that government should support the private investment, mobilize domestic resources, and increase opportunities for foreign trade, reduce corruption, improve infrastructure to attract

foreign investment, promote production, maintain the single-digit inflation rate, boost employment to build up GDP and finally to limit exchange rate fluctuation.

Ahlquist, 2006 by reviewing ninety emerging countries, finds that with the democratic political institution and more stable government regime, it can attract more FDI, especially from direct investors more sensitive to political considerations. Mahmood & Chaudhry, 2012 describe official freedom as economic freedom and democracy, both put a positive effect on economic development, national savings, and investments. Nasir and Hassan, 2011 explore the effect of the exchange rate, economic freedom, and market size on FDI in South Asia and have faith in that there is a constructive relationship among selected variables. Khan & Khan, 2011 measure long-run relation of FDI on GDP in Pakistan through cointegration and the Granger causality test consisting of data from 1981 to 2008. Aqeel & Nishat, 2014 show that investors work in industries characterized by relatively large economies, growth, and the rank of market size is magnified because they can exploit the large-scale economies only after attaining threshold market size.

Xaypanya, Rangkakulnuwat, & Paweenawat, 2015 predict the dependent variable FDI inflow into Pakistan from 1991 to 2010 along with GDP, Inflation rate, Interest rate, Tax rate, and Domestic Investment. The empirical result shows that the entire independent variable has a positive association, but GDP, inflation and interest rates are insignificant, while the national investment and the tax rate are significant for foreign direct investment.

Mahmood & Chaudhry, 2012 investigate the Economic growth in Pakistan while considering the role of self-governing and non-democratic Governments in comparison. Yearly data of 30 years is used from 1980 to 2010 for the variables of economic performance which include GDP, Direct and Indirect Tax, GDP per capita, Exchange rate, Inflation Rate, Unemployment rate, Net Export, FDI, Real wages and Expenditure on Health. It was concluded that there is a positive relationship between Growth and Political competitiveness.

Asiamah and Barnor, 2011 investigated the causal relationship between exchange rate and FDI inflows over a period of 39 years (1970-2008). OLS technique was applied along with Co-integration and stationarity, after which ECM Error-Correction Model was estimated. Awan, Khan, & Zaman, 2010 checked the factors that influence FDI flow in Pakistan and analyzed time-series data for 1971-2008, ECM and the regression analysis were applied to verify the impact of independent variables such as debt service, commercial opening, account balance,

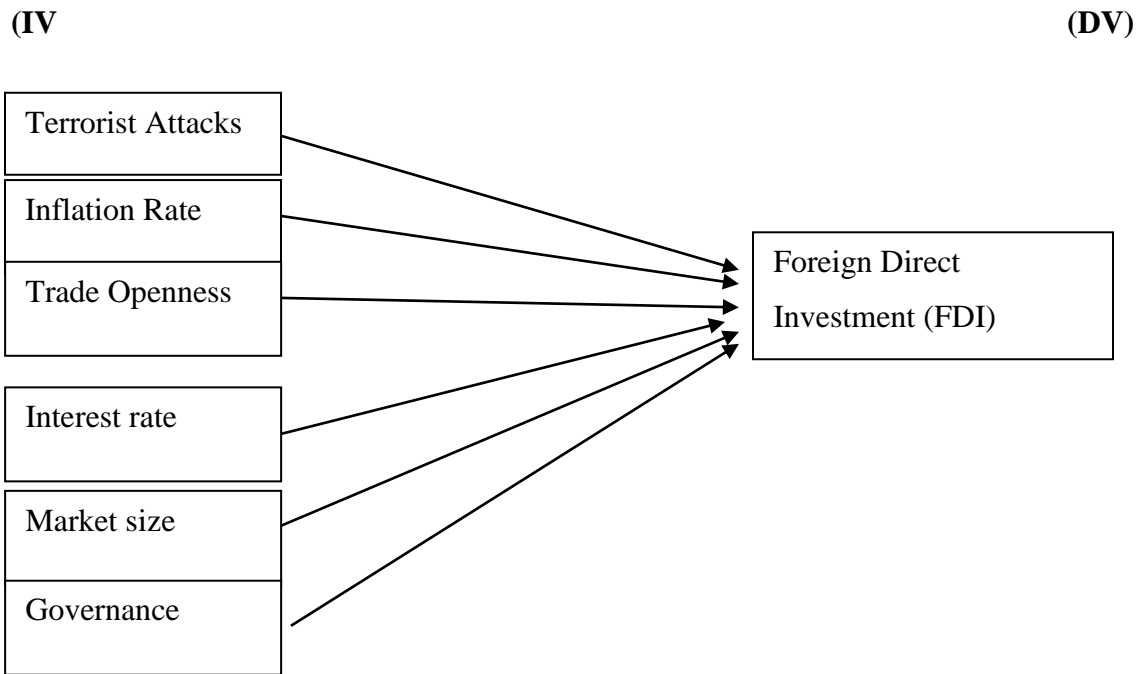
inflation rate, capital formation and GDP from DBI in Pakistan. The results show that the opening of trade, inflation rate, capital formation, and debt service have a positive effect, while the account balance shows a negative impact on FDI.

Limitation of the previous research

Related studies show that considerable research has been done to verify the impact of different variables on FDI in Pakistan, but this study includes a unique set of variables for the period 1980-2012. In addition, this study uses for the first time all types of terrorist attacks to verify its impact on FDI flow in Pakistan. Because terrorism incidents are important determining factors for the influx of FDI into the receiving country and foreign investors hesitate to invest in such countries.

Proposed Model

Figure: 1 Factor affecting the FDI in Pakistan from 1980 to 2018.



Study Hypothesis.

The test hypotheses of this study are the following:

H₀: There is no long-run relationship between FDI inflow and terrorist attacks in the economy of Pakistan from 1980-2018.

H1: There is a long-run relationship between FDI inflow and terrorist attacks in the economy of Pakistan from 1980-2018.

H0: There is no significant relationship between FDI and other variables (Inflation rate, Interest rate, Trade openness, Market size, and Governance) in Pakistan from 1980-2018.

H1: There is a significant relationship between FDI and other variables (Inflation rate, Interest rate, Trade openness, Market size, and Governance) in Pakistan from 1980-2018.

RESEARCH METHODOLOGY

The present study will assess the relation in bidirectional form, long and short-run by using the ARDL technique of co-integration developed by Pesaran and Shin (1999) and Pesaran, Shin, and Smith (2001). The validity of this technique either the selected variables are stationary at the level I (0), the first difference I (1) or a mix of both. Moreover, the additional advantages of the ARDL approach are (a) useful with time-series studies even with small sample size and (b) this approach is more effective as compared to Johansen and Julius co-integration for small samples and (c) also provides the adjustment in the short run without losing the long-run information (S. H. Shah et al., 2015, p. 6). Only a few researchers analyzed the causality relationship between FDI and economic growth, most of these studies employed co-integration techniques by using the Engle-Granger co-integration test or maximum likelihood test (Simionescu, 2016, p. 5)

Model Specification and justification of variables

To explore the dependency of FDI in Pakistan, a model has been developed based on hypothetical and empirical literature by the following equation:

$$FDI_C = \beta_0 + \beta_1(MS)_t + \beta_2(IR)_t + \beta_3(CPI)_t + \beta_4(OP)_t + \beta_5(TE)_t + \beta_6(GOV)_t + \mu_t$$

Where, β_1 , β_2 , β_3 , β_4 , β_5 , and β_6 are coefficients and μ_t is the disturbance term. The variables FDI, MS, OP, CPI, IR, are transformed percentage, variable TE shows the total number of terrorist attacks while GOV is Dummy variables 1 for democracy 0 otherwise.

- FDI = Growth in Foreign Direct Investment
- MS= Gross Domestic Product per Capita in \$.
- OP= (Exports + Imports) percentage of GDP

- CPI= Consumer Price Index
- IR = Interest Rate
- TE= Terrorist Attacks (All incidents)
- GOV= 1 for Democratic regimes and 0 otherwise

Endogenous Variables (FDI)

The dependent variable used in this study is the import of FDI into Pakistan. In the previous study, FDI was used as a growth rate of FDI, real annual FDI inflows, growth in annual FDI inflows, FDI per capita. This study will consider FDI as a foreign (direct) private investment due to its availability (Aqeel & Nishat, 2014; Nasir & Hassan, 2011; S. H. Shah et al., 2015; Uddin et al., 2018)

Expected signs of Variables

In the light of related studies, the following table shows the exogenous variables and their expected sign with the dependent variable (foreign direct investment, FDI) from Pakistan.

Table 1: the *Expected direction of variables from the period 1980-2018*.

Variables	Description	Expected direction
Market size (MS)	Gross Domestic Product in Pak Rupees	+
Openness (OP)	Openness (Exports, BOP + Imports, BOP)	+
Inflation (CPI)	Consumer prices index, all items	+ or -
Interest rate (IR)	Money market interest rate	+ or -
Terrorism (TE)	All incidents(terrorism)	-
Democracy (DU)	Introduce Dummy 1 for Democracy 0 otherwise	+

Table 2: *Data sources of variables from the period 1980-2018*

Variables	Description	Sources
FDI	Foreign private investment(direct)	World Bank Data Sources
Market size	Percentage Change on GDP per Capita	World Bank Data Sources
Openness	Openness (exports + imports)	World Bank Data Sources
Inflation	Consumer prices index	World Bank Data Sources
Interest rate	Money market interest rate	World Bank Data Sources
Terrorism	All incidents(terrorism)	Global terrorism data base

Governance Dummy variable 1 for democracy 0 otherwise

Econometric Models and Estimation Techniques

The E-views 10 software package was used for the root of the unit, the ARDL approach, and other diagnostic tests.

Descriptive Statistics

Table:4 Descriptive Results for All Variables

	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
FDI	8.709656	0.583939	-0.1399	2.275836	0.929147
GDP	656.8354	362.9724	0.973438	2.456247	6.299243
INF	8.274341	3.878001	0.675401	3.658370	3.481266
IR	8.567558	2.464125	-0.4953	3.234939	1.597702
OPP	10.43182	0.321230	0.227267	1.698417	2.930275
LTD	2.485582	0.824752	-0.1728	2.303946	0.931036
DU	0.405405	0.497743	0.385337	1.148485	6.200657

Descriptive analysis is performed to check the normality of the variables. It can be observed from table 3.1 variables GDP, INF, Trade openness and interest rate and terrorism are negatively skewed. Kurtosis values of FDI, GDP, Trade openness terrorism, and the dummy is < 3 representing leptokurtic distribution, while inflation rate and the interest rate it is > 3 which means Meso-kurtic distribution. The normality of data is assessed that through Jarque-Bera and the calculated P-value of the Jarque-Bera test is > 0.01 which shows that data is normally distributed.

Correlation Analysis

To verify the relationship between the variables, a correlation analysis is performed. The results of the correlation analysis are shown in Table 4.

Table 5: Correlation Results between all Variables

	FDI	GDP	INF	IR	OPP	LTD	DU
FDI	1						
GDP	0.7612	1					
INF	0.2572	0.0954	1				
IR	0.2089	0.1962	0.6120	1			
OPP	0.9121	0.9374	0.1978	0.2029	1		
LTD	0.8044	0.8215	0.2573	0.2330	0.8844	1	

DU	0.1897	-0.1561	0.5899	0.3848	0.0055	0.1939	1
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Table 5 shows that the selected variables are positively correlated with the dependent variable (foreign direct investment, FDI), but the FDI coefficient is weak with inflation and interest rates. The correlation coefficient among the independent variables is of mixed nature, as there is a strong positive correlation between the interest rate and inflation rate, trade openness and GDP, terrorism with GDP and trade openness, inflation and democracy. There seems no correlation between inflation rate and GDP and between Democracy and trade openness,

Unit Root Test

The N-j Peron test is used in this study to check the stationery of the variable’s series. The reason to use this test is that the ADF test is not appropriate if a number of observations are less. If a number of observations are less than the N-j Peron test is used. The results of Unit Root test are described below:

Hypothesis:

Ho: The series is not stationary.

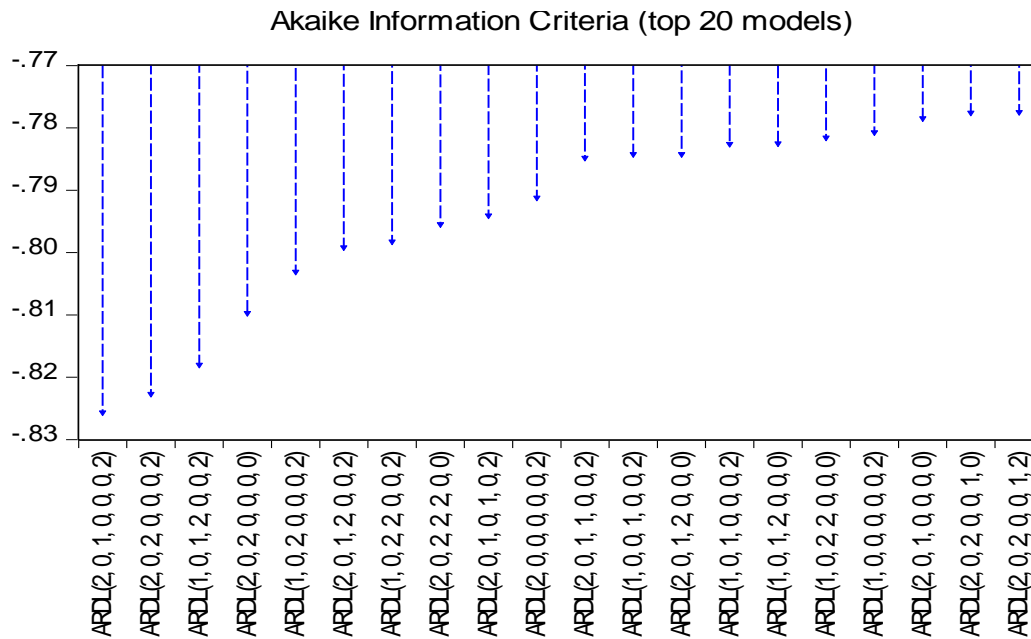
Ha: The series is stationary.

Table 6 *Results for Unit Root Test*

	Level of Significance	Critical Value	Computed Value	Significant or Not	Results	At level or first difference
FDI	1%	-13.8	-16.9892	Significant	Stationary	1st difference
GDP	1%	-13.8	-17.0917	Significant	Stationary	1st difference
INF	1%	-13.8	-39.3135	Significant	Stationary	Level
IR	1%	-13.8	-17.848	Significant	Stationary	1st difference
LOPP	1%	-13.8	-17.4024	Significant	Stationary	1st difference
LTD	1%	-13.8	-17.3824	Significant	Stationary	1st difference
DU	1%	-13.8	-18	Significant	Stationary	1st difference

The above table shows that the selected variables are stationary, but the stationarity level is different for different variables, similar findings were observed by (Aqeel & Nishat, 2014). Stationarity at different level establishes the order of integration among variables during the study period.

Figure: 2 Criteria Graph



The optimal lag selection of variables is conducted through Akaike information criteria. Figure 2 provides the top twenty models with different lag numbers. Acceptance criteria for Akaike Information are to select the model having minimum Akaike Value. In this study series of lag (2,0,1,0,0,0,2) will be used due to the minimum Akaike value of -0.82 Approximately. In this study, the maximum number of lags is two, the data set used in this study is annual so the selected number of maximum lags is two.

Serial Correlation

Table 7 Serial Correlation Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.185484	Prob. F (2,21)	0.1373
Obs*R-squared	6.029880	Prob. Chi-Square (2)	0.0490

It is necessary for the co-integration model the residuals should be uncorrelated means, LM test for serial correlation is applied, the null hypothesis was that the residuals serially uncorrelated. P-value obtained from the Breusch-Godfrey Serial Correlation LM Test is 0.1373, which is greater than 0.05, so H0 will be accepted. It is concluded from the LM test that residuals are serially uncorrelated.

HeteroscedasticityTable 8 *Heteroscedasticity Test: Breusch-Pagan-Godfrey*

F-statistic	0.727201	Prob. F (11,23)	0.7024
Obs*R-squared	9.031595	Prob. Chi-Square (11)	0.6190
Scaled explained SS	4.441832	Prob. Chi-Square (11)	0.9552

Another assumption for time series data is that residuals are homoscedastic. To test the homoscedasticity Breusch-Pagan-Godfrey test is applied, the null hypothesis was that the residuals are homoscedastic. P-value obtained from Breusch-Pagan-Godfrey is 0.7024, which is greater than 0.05, so H₀ will be accepted. It is concluded from the Breusch-Pagan-Godfrey test that residuals are homoscedastic.

Table 9 *ARDL Approach*

Dependent Variable: LFDI2
 Method: ARDL
 Date: 06/27/19 Time: 12:02
 Sample (adjusted): 1982 2016
 Included observations: 35 after adjustments
 Maximum dependent lags: 2 (Automatic selection)
 Model selection method: Akaike info criterion (AIC)
 Dynamic regressors (2 lags, automatic): GDP4 INF1 IR LOPP1 LTD DU
 Fixed regresses: C
 Number of models evaluated: 1458
 Selected Model: ARDL (2, 0, 1, 0, 0, 0, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LFDI2(-1)	0.524003	0.167885	3.121197	0.0048
LFDI2(-2)	-0.246840	0.158542	-1.556938	0.1331
GDP4	-0.001063	0.000293	-3.629168	0.0014
INF1	-0.019033	0.012535	-1.518445	0.1425
INF1(-1)	-0.016147	0.010872	-1.485184	0.1511
IR	0.031265	0.017274	1.809930	0.0834
LOPP1	2.464326	0.488065	5.049178	0.0000
LTD	-0.006068	0.080829	-0.075070	0.9408
DU	0.155838	0.089900	1.733464	0.0964
DU(-1)	0.093686	0.106067	0.883269	0.3862
DU(-2)	-0.185066	0.092401	-2.002852	0.0571
C	-18.71362	3.957081	-4.729147	0.0001
R-squared	0.958627	Mean dependent var		8.754852
Adjusted R-squared	0.938841	S.D. dependent var		0.566888
S.E. of regression	0.140194	Akaike info criterion		-0.825720
Sum squared resid	0.452050	Schwarz criterion		-0.292458
Log-likelihood	26.45010	Hannan-Quinn criteria.		-0.641638
F-statistic	48.44768	Durbin-Watson stat		2.319745
Prob (F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model selection.

On the basis of unit root results, the Autoregressive Dependent Variable Lag ARDL approach is applied because all of the variables are not significant at level. Table 4.6 shows the results of the ARDL approach on the model based on a series of selected lags by the Akaike information graph. The results of the ARDL model have analyzed through further analysis.

Table 10 Co-integration test

ARDL Long Run Form and Bounds Test
 Dependent Variable: D(LFDI2)
 Selected Model: ARDL (2, 0, 1, 0, 0, 0, 2)
 Case 3: Unrestricted Constant and No Trend
 Date: 06/27/19 Time: 06:18
 Sample: 1980 2017
 Included observations: 35

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signifi.	I (0)	I (1)
F-statistic	4.879862	10%	2.12	3.23
K	6	5%	2.45	3.61
		2.5%	2.75	3.99
		1%	3.15	4.43

To test for the presence of co-integration, the long run form and bounds test applied. The F-statistic value 4.607258 is evidently greater than the I(1) bound critical value even at 1% Pesaran, et al. (2001)(S. H. Shah et al., 2015, p. 6). The null hypothesis for the bound test that there is no equilibrium relationship is rejected, so the conclusion is that the presence of an equilibrating relationship.

Long Run Form and T Bounds test

Table 12 ARDL

Dependent Variable: D(LFDI2)
 Selected Model: ARDL (2, 0, 1, 0, 0, 0, 2)
 Case 3: Unrestricted Constant and No Trend
 Date: 06/27/19 Time: 06:18
 Sample: 1980 2017
 Included observations: 35

t-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Sign.	I (0)	I (1)
t-statistic	-4.865514	10%	-2.57	-4.04
		5%	-2.86	-4.38
		2.5%	-3.13	-4.66
		1%	-3.43	-4.99

When the null hypothesis in F-statistics is ejected, then this exposition directs toward the use of the T-Bounds Test to determine either the relationship is nonsensical or of the usual kind or valid but degenerate. In this case, the absolute value of the t-statistic is $|-4.865514|=4.865514$ is greater than the absolute value of either the I (0) or I (1) t-bound. Thus, the null hypothesis is rejected and concluded that the co-integrating relationship is in fact nonsensical.

Error Correction Model

Table 13

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LFDI2(-1))	0.246840	0.113283	2.178966	0.0398
D(INF1)	-0.019033	0.008511	-2.236405	0.0353
D(DU)	0.155838	0.066888	2.329829	0.0290
D(DU(-1))	0.185066	0.070254	2.634236	0.0148
CointEq(-1)*	-0.722837	0.104250	-6.933667	0.0000
R-squared	0.653450	Mean dependent var		0.038917

As it observed the EC term, here represented as CointEq(-1), is negative with an associated coefficient estimate of -0.722837 . This implies that about 72.28% of any movements into disequilibrium are corrected for within one period. Moreover, given a very large value of t-statistic namely -4.865514 , which mentioned that the coefficient is highly significant (Tan & Tang, 2016, p. 2).

CONCLUSION AND RECOMMENDATIONS

This study was conducted to verify the impact of interest rates, inflation, trade openness, market size, democracy and terrorism on foreign direct investment in Pakistan. The period used in this study is from 1980 to 2018. The method used is Descriptive, Correlation, Normality Test, Seasonality / Unit Root Test, ARDL, Serial Correlogram Correlation, Linked Tests, Cointegration, Heteroskedasticity and Error Correction Model. A diagnostic test used to evaluate the data fit for analysis, normality of data checked through Jarque-Bera at 1% significant level, N-j Peron test is validating the stationarity of the variable's series because if the number of observations is less than N-j Peron test is used. Stationarity at different level establishes the order of integration among variables (Aqeel & Nishat, 2014). AIC provides the optimal number of lags

for variables, the data set used in this study is annual so the selected number of maximum lags is two. For serial correlation, Breusch-Godfrey Test is applied, which shows that residuals are serially uncorrelated. To test the homoscedasticity Breusch-Pagan-Godfrey test is applied, and it is concluded that residuals are homoscedastic. To assess the long run and short-run relation between variables ARDL model is applied on the basis of unit root results because if the stationary level of variables is different than the ARDL approach is applicable. The bi-directional relationship observed among the variables, all variables are positively correlated with FDI, the correlation between FDI and terrorism incidents is negative as expected from the literature. The positive relationship between market size (EM) and commercial opening (OPP) with foreign direct investment shows that there should be an increase in capital formation, more commercial opening, and production in the country. Based on the F-statistic limit test, it is concluded that there is a long-term equilibrium relationship between FDI and the selected variables. When the null hypothesis in F-statistics is ejected, then this exposition directed toward the use of the T-Bounds Test to determine either the relationship is nonsensical or of the usual kind or valid but degenerate. In this case, it is concluded that the co-integrating relationship is in fact nonsensical. To assess the speed of long un relation Error Correction term is applied which shows that 72.28% of any movements into disequilibrium are corrected for within one period. Moreover, given a very large value of t-statistic namely -4.865514 , which mentioned that the coefficient is highly significant (Tan & Tang, 2016, p. 2).

Recommendations for future study

This research shows that there is a balanced long-term relationship between FDI and the selected variables. Therefore, for the future, a comparison can be made between democratic and non-democratic regimes in Pakistan. In addition, more studies will be conducted using some other important variables such as money supply and trade balance, labor costs, profitability, etc. In addition, it can be concluded in the future that there are reasons for the relationship between these variables.

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