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AN EXPLORATORY STUDY ON DETERMINANTS OF GOVERNMENT INVESTMENT IN PAKISTAN

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Abstract

The study attempts to explore the determinants of government investment (public investment, including general government investment) in Pakistan using the autoregressive distributed lags (ARDL) estimation technique over the period 1964 to 2015. Both theoretical and empirical content available in the literature is employed to develop an econometric model to analyse the government investment behaviour in the case of a developing country like Pakistan. The findings of empirical estimation indicate that budget deficit, output growth and foreign capital inflow boost government investment while domestic borrowing, military regimes and inflation discourage government/public sector's investment activity.

Keywords: Government Investment, Public Investment, General Government Investment, Investment Behavior, ARDL, Pakistan.
JEL Classification: C220, E220, E620, O2.

I. Introduction

Investment, an essential component of deriving growth in aggregate economic activity/gross domestic product (GDP) in an economy, can be classified into two broad categories, namely public and private investment, with the latter, also including foreign investment. This classification is important to understand the evolutionary structure of an economy because the motives and the nature of investment are quite different between the private and public sectors. While the profit motive almost always drives private investment, public investment is undertaken to counter market failure and is often driven by socioeconomic and political considerations.

A major component of public investment is directed towards developing infrastructure that falls in the category of public goods and capital, such as roads, airports, rail tracks, public utilities and power distribution networks. Another component is the

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investment in public services and facilities like education, health, parks and libraries, etc. These investments are meant to enhance the pace of such economic activities from where the private sector either shies away or its profit-maximisation motive conflicts with public welfare considerations. The third component in the list is the investment in business ventures where the public sector enters as a natural monopoly or to make earnings to be used for supplementing government revenues. Many developing countries, including Pakistan, undertook huge investments in public sector enterprises (autonomous publicly owned business entities) in the 1960s and 1970s in the hope of propelling to launch their economies on a higher growth trajectory.

The above description shows that economic and non-economic variables expected to determine the level of investments can vary considerably between public and private investment categories. In a recent article, Maluleke (2017) reviews the factors determining government expenditure and identifies government revenue, public debt, population, trade openness and economic growth as the key determinants of government expenditure. It is pertinent to note that public investment in most studies is described to be directly financed through federal/provincial or local government budgets but not by investment expenditure of state-owned enterprises on infrastructure [Perée (2007)].

The present study attempts to explore the government/public investment behaviour in Pakistan. Notably, in the case of the developing world, especially Pakistan, few studies have endeavoured to explore the determinants of government investment. However, no study has holistically probed to determine the overall government investment behaviour in the case of Pakistan's economy. For example, a study by Saghir and Azra (2012) has analysed the relationship between public and private investment in Pakistan. That study has narrowly focused on public or government investment behaviour by employing a limited set of explanatory variables.[1] The present study attempts to fill this gap and comprehensively explore the determinants of government investment (public sector investment plus general government investment expenditure) in Pakistan. The study differs from previous studies in terms of data coverage, estimation technique and selection of determinants based on theoretical and empirical literature.

The available literature suggests that government or public investment is mainly determined by output growth, budgetary position, inflation, foreign economic assistance, domestic borrowing, infrastructural development, law and order situation, demographic conditions, governance and economic and political stability [Boix (1999), Sturm (2001), Ajaz and Nazima (2012) and Foye (2014)].

Pertinently Pakistan's government has played a vital role in overall economic activities, including investment throughout the country's economic history. The historical trends of real government and private investments and real government investment growth and GDP growth are shown in Figure A-1 and Figure A-2 (Appendix-A), re-

[1] The definition of government/public investment is also unclear in their study. Public and government investment variable is interchangeably used.

spectively.[2] It is seen that both types of investment are moving almost in the same direction and are strongly related to each other. However, government investment is relatively stable than private investment, which cushions private investment fluctuations. This mutual interdependence between these two types of investments is reflected in overall investment activity in the economy. Similarly, government investment growth and GDP tend to move in the same direction, indicating a positive relationship between government investment and economic growth.

Therefore, it is essential to explore the determinants of government investment in Pakistan which then determines the overall investment activity in the economy. The present study aims to explore the determinants of public investment, including general government investment/expenditures for the Pakistan economy.

The econometric model of government investment has been devised by considering both theoretical and empirical issues. The autoregressive distributed lags (ARDL) model is used to empirically analyse government investment behaviour in Pakistan during 1964-2015. This empirical study will be useful in understanding what hinders investment in the public sector and what policy measures can be instituted to boost the pace of investment.

The next section covers a brief theoretical and empirical review of the literature, followed by Section III on building the econometric model for aggregate government investment. Section IV describes the data and estimation techniques employed by the study. Discussion on the results is given in Section V. The conclusion and policy implications based on the analysis are highlighted in Section VI.

II. Review of Literature

The literature suggests that the government/public investment behaviour should be explored by taking into consideration the country and region-specific conditions. Accordingly, different sets of variables in both country-specific and panels of countries are analysed [Foye (2014)]. In earlier studies that determine the government investment activity in an economy, various social, economic, political and institutional factors have been employed [De Haan, et al., (1996)]. Notably, the literature identifies lagged public investment expenditure, private investment, foreign direct investment (FDI), real gross domestic product (GDP), government revenue, fiscal deficits, public debt, external loans, foreign aid, external debt service, openness, and exchange rate depreciation as key determinants of government/public investment [Fan, et al., (2008)].

In a pioneering study on determining factors of public capital spending in developing economies, Sturm (2001) demonstrates that instead of politico-institutional factors (like political stability and ideology etc.), foreign/external aid, public deficits and

[2] The 'double axis graphs' are constructed where one line follows left axis scaling while another one follows right axis scaling.

private investment are the most important determinants of public capital formation. The study used panel data of 123 non-OECD/less developed countries to explore the government capital spending behaviour from 1970 to 1988.

Exploring the macroeconomic determinants of public investment Välilä and Mehrotra (2005) reveal that budgetary policy stance, considerations of fiscal sustainability and national income rather than fiscal rules and financing cost determine the level of public investment in Europe. According to Galí and Perotti (2003), public debt and the expected output gap significantly determine public investment in European Monetary Union.

In a time-series analysis from 1970 to 2010, Saghir and Azra (2012) find that public/government investment is positively and significantly determined by private investment in Pakistan. Moreover, the impact of change in lagged government investment is found to be positive and significant. The aid is found to be positively but insignificantly affecting government investment in the short-run. On the contrary, in the case of Argentina, Acosta and Loza (2005) show the non-existence of a long-run equilibrium/stable relationship between public and private investments during 1970-2005.

In a recent study, Foye (2014) employs the Error Correction Mechanism (ECM) to explore the macroeconomic determinants of public capital expenditure in Nigeria during 1970-2006. The study finds that lagged public expenditure, budget deficit, real GDP, public debt, debt servicing, FDI, private investment and trade openness are important determinants of government/public investment spending.

The overview of the literature indicates that many studies have been undertaken to explain investment expenditure in the public sector. However, the scope of these studies has been confined to a small set of potential variables mainly due to limited data availability. The present study attempts to fill in these gaps in two main ways in the context of the developing economy. Firstly, it employs a larger data set spanning over 52 years to accommodate a moderate set of explanatory variables in the analysis, which is expected to explain changing trends in public investment over the years. Secondly, the analysis period includes a few episodes of economic growth, inflation, the government's budget position, public debt and military versus democratic regimes related to the long-run path of public sector investment in Pakistan.

III. The Model of Government/Public Investment Behavior

It is useful to distinctly analyse the government/public investment behaviour because of differing investment decisions between private and public sectors for targeted policymaking process based on corresponding investment activity in a country.

The government/public investment decisions are mostly based on state-keeping (targeted GDP growth), political priorities (developmental versus non-developmental expenditures and defence expenditures) and budgetary position (domestic and foreign resources). Projections of government investment should be in line with budget plans; consequently, the investment behaviour of public enterprises is not principally deter-

mined by market forces. Instead, financial constraints and economic, social and political priorities matter more. In this regard, government revenue, the targets of the government, previous public investment level, net resource transfer to the public sector from the private sector and net external resource transfer.[3] The main factors to explain the public investment behaviour.

Turrini (2004), based on a theoretical model, proposes a list of fiscal and economic variables that determine public investment. In this model, the level of public investment is determined by the government's objective to reach the possibly mutually inconsistent targets for output, public debt and the budgetary balance. Mogues (2013) identifies some crucial factors: structure of political and economic governance climate; characteristics of public goods and services provisioning; various perks and traits of players (bureaucrats, politicians, donors and interest groups) and budget process that influences public investment arrangements. In this regard, political considerations, property rights, the rule of law and governance play a very important role in affecting and shaping the public investment decision-making process and the nature of government investment activity. Moreover, donor-driven public investment is also undertaken when it is financed through foreign/external aid [Pack and Pack (1993) and Fan, et al., (2008)].

The rationale and a brief description of the selected determining variables/factors of public or government investment included in the model and their possible effect are given below. Balassone and Franco (2000) used the term "golden rule", which states a positive relationship between public debt and public investment. It is assumed that debt is prudently used only to finance socially profitable investment spending that "brings its source of payment in the form of direct generation of resources... the rule implies that current spending should be financed only out of current income, never with debt ..." [Hurtado and Zamarripa (2013)]. It is consistent with Kellerman (2007), who shows that in the long term, the opportunity cost of social public investment financed with debt is superior to the public investment financed with taxes.

Jarosiński (2019) highlights the negative aspect of the budget deficit and excessive public debt. The budget deficits can pose new hazards to the public finances, which from a strategic viewpoint, could threaten investment projects in progress and the projects planned. It can happen because budget deficits narrow the range of spending options for the government. Continuing budget deficits result in debt accumulation and an increase in the cost of borrowing.

Moss and Chiang (2003) identified two channels underpinning the link between debt servicing and investment. Firstly, when the cost of servicing debt is high, it dampens private and public investment incentive because of high expected future taxes. Secondly, high debt servicing imposes liquidity constraints. The large payments for debt servicing may induce currency depreciation and raise the need for foreign exchange to import capital goods.

[3] There is taken net resource amount because there is gross borrowing minus principal paid, interest rate etc.

The inclusion of interest rate is straightforward, as the real long-term interest rate can be expected to influence investment decisions as an opportunity cost variable. Higher interest rates increase the cost of debt service [Välilä and Mehrotra (2005)]. The direction of the relationship of public investment with economic growth (i.e. accelerator principle or, more reasonably, Wagner's Law) is ambiguous in empirical research. A positive sign results if public investment moves in unison with GDP - either because infrastructure demand rises with the level of income or because public investment behaves pro-cyclically - otherwise, the coefficient assumes a negative sign [Välilä and Mehrotra (2005)].

Accordingly, the range of variables is used in the literature on public investment [Aubin, et al., (1988)]. The present study considers it recognises government revenue, government expenditure, budget surplus/deficit, domestic borrowing, foreign capital inflows (aid, loans and grants), GDP growth, development expenditure, interest rate, inflation rate, debt servicing, and military regime dummy, public investment lag, inflation and (nominal/real) interest rate as the key determining variables of public investment. The military regime dummy is used as a proxy for a security threat. In each of the three phases of military regimes (1958 to 1971, 1977 to 1988, 1999 to 2008), Pakistan either directly entered into major wars or was indirectly involved in major armed conflicts, especially the Afghan war with the Soviet Union, Afghan war with the USA and War Against Terrorism. During these episodes, national security was under threat, which is expected to have had adverse effects on investment activities.

Considering the issues mentioned above and data considerations, this study's government/public investment function is proposed in Equation (1).

$$I^{govt} = f\,(BD, DB, FCI, G, DE, INT, INF, DS, GD) \qquad (1)$$

where,

I^{govt} is public investment, including the investment expenditure undertaken at all levels of government and public sector enterprises,
BD is a budget/fiscal deficit,
DB is domestic borrowings,
FCI is the foreign capital inflow,
G is (real) GDP growth,
DE is development expenditures,
INT is the interest rate proxied by weighted rate of return on advances,
INF is the inflation rate based on GDP deflator,
DS is debt servicing,
GD is a military regime dummy, equal to one if the military regime.

Table 1 summarises the information and source of each variable included in the model.

TABLE 1

Variables used in the Model

Characteristics	Source
Dependent Variables	
Government/Public Investment (general government fixed capital formation)	Economic Survey of Pakistan
Independent Variables	
Budget/fiscal deficit	Hand Book of Statistics
Domestic debt	Hand Book of Statistics
Foreign capital inflow	Hand Book of Statistics
Real GDP growth	Hand Book of Statistics
Developmental expenditure	Economic Survey of Pakistan
Interest rate, (weighted rate of return on advances)	State Bank of Pakistan-Annual Reports
Inflation based on GDP deflator	Economic Survey of Pakistan
Debt servicing	Economic Survey of Pakistan
Military regime dummy	

Source: Authors' estimation.

IV. Data and Estimation Technique

The annual data on the selected variables are extracted from Pakistan Economic Survey and Hand Book of Statistics (2015) for the period 1964 to 2015. It gives a sample of 52 annual observations, which seems sufficient to accommodate a variety of potential explanatory variables in the analysis. All the variables used in the study are constant 1999-2000 Pakistan Rupee value. A brief description of key variables used in the study is given below.

At this stage, it will be instructive to define the exact meaning and measurement of the various categories of expenditure that fall in the category of public investment. The following Table provides a summary of how investment expenditure is accounted for in national income accounts in Pakistan compiled by the Pakistan Bureau of Statistics. Table 2 shows that public investment has two components of investment. The first one is public sector investment which includes investment undertaken by all public sector enterprises in non-defence sectors like air, rail and shipping transportation; exploration, production and distribution of fuels, water and several other activities. The second category is general government investment expenditure on the construction of rail/roads infrastructure, health and education facilities and other such structures that are meant for the use of the public in general.

TABLE 2

Sectoral Classification of Expenditure on Gross Domestic Product

Expenditure Category	Private Sector	Government/Public Sector		Mixed Private and Public Expenditure
		Public Sector	General Government Sector	
Consumption expenditure	Households final consumption expenditure		General government final consumption expenditure	
Investment expenditure	Gross fixed capital formation in the private sector	*Gross fixed capital formation in the public sector*	*General government investment expenditure*	Changes in inventories
Expenditure on net exports				Net exports

Source: Authors' estimation based on national income accounts given in Pakistan Economic Survey.

It may be noted that investment in the form of changes in inventories which is not the crucial component of investment, is not explicitly classified between private and public sectors. Also, note that most public sector enterprises are owned by the federal government. In contrast, general government investment expenditure is undertaken by federal and provincial governments, with a small portion undertaken by district governments.

Government/public investment (I^{govt}) analysed in this paper includes expenditures in general and public-sector enterprises, irrespective of whether these expenditures are undertaken at federal or provincial levels. This is converted to real terms using the government/public investment price deflator. The interest rate (INT) variable is constructed as the weighted average of three interest rates in real terms, i.e., call money rate, discount rate and government bond yield rate. The variable is converted into real terms by subtracting the inflation rate based on the GDP deflator index. Military regime dummy (GD) takes the value one for the period of the military regime in the economy and zero otherwise (democratic regime). The definition of other determinants in the list is straightforward as described by conventional economics and calculation/estimation procedure by the Pakistan Bureau of Statistics provided in Pakistan's National Income Accounts.

In time-series analysis, certain inevitable issues like spurious relationships due to non-stationarity of variables, serial correlation when present/current time errors/ran-

dom shocks carry over into coming/future time periods, and endogeneity which may exist in many economic relationships because of interdependence and inertia are important to address.

This study employs the Auto-Regressive Distributed Lag (ARDL) approach proposed by Pesaranet et al., (2001) to address the aforementioned issues. The ARDL approach tests cointegration among the variables and estimates long-run and short-run relationships. It does not require the same order of integration, i.e., mix of I(1) and I(0). It takes into account the serial correlation and endogeneity issues [Alam and Quazi, (2003), Rehman, et al., (2009)]. However, appropriate lag choice in the model crucially matters for both endogeneity and residual correlation. It is maintained that appropriate lag selection eliminates possible serial correlation in the error term/residuals [Pesaran and Shin, (1999)]. Similarly, endogeneity is no more an issue when residuals are white noise [Alam and Quazi, (2003)].

The corresponding ARDL model of public or government investment behaviour is given below in Equation (2).

$$\begin{aligned}\Delta I^{govt}_{t} = \alpha &+ \sum_{i=1}^{p1} a_i \Delta I^{govt}_{t-i} + \sum_{i=0}^{p2} b_i \Delta G_{t-i} + \sum_{i=0}^{p3} c_i \Delta BD_{t-i} + \sum_{i=0}^{p4} d_i \Delta DB_{t-i} \\ &+ \sum_{i=0}^{p5} e_i \Delta FCI_{t-i} + \sum_{i=0}^{p6} f_i \Delta DE_{t-i} + \sum_{i=0}^{p7} g_i \Delta INT_{t-i} + \sum_{i=0}^{p8} h_i \Delta INF_{t-i} \\ &+ \sum_{i=0}^{p9} h_i \Delta DS_{t-i} + \beta_1 I^{govt}_{t-1} + \beta_2 G_{t-1} + \beta_3 BD_{t-1} + \beta_4 DB_{t-1} + \beta_5 FCI_{t-1} \\ &+ \beta_6 DE_{t-1} + \beta_7 INT_{t-1} + \beta_8 INF_{t-1} + \beta_9 DS_{t-1} + \mu_t \end{aligned} \quad (2)$$

Expected signs of the parameters are as follows:

$\beta_2 > 0$, $\beta_3 > 0$ or < 0, $\beta_4 > 0$ or < 0, $\beta_5 > 0$ or < 0, $\beta_6 > 0$, $\beta_7 \leq 0$, $\beta_8 < 0$, $\beta_9 < 0$, $\gamma > 0$ or < 0.

Although there is no compulsion of having all the variables be integrated of the same order, we still have to employ unit root tests to ensure that the correct critical value of the F-statistic is used in the case F-statistic for the Bounds test lies between the lower and upper bounds. To this end, standard ADF tests on levels and first differences of the variables are applied.

To ensure the validity of t-statistics and efficiency of parameter estimates, the appropriate test of stability, normality, autocorrelation and heteroscedasticity in regression residuals are applied along with tests for unit root. Lag lengths of various variables in ARDL specification are selected using performance criteria like AIC, SBC and HQ statistics.

V. Estimation and Results

As mentioned above, government/public investment behaviour is distinct from private investment behaviour. Contrary to private investment decisions, the government investment decisions are based on government budgetary positions, political environment, foreign capital inflows and some other (social and institutional) factors.

It is pertinent to point out that the share of public investment in total/aggregate gross fixed capital formation in Pakistan has been shrinking over the years. However, the share of general government investment (mainly on infrastructure, i.e. health, education, dams, roads, bridges, etc.) compared to sector-specific public investment like agriculture and industry has been rising over time. Thus, the behaviour of total public-sector/government investment rather than its specific categories, individually constituting a very small portion of total investment outlay, is analysed for the Pakistan economy. For this purpose, the determinants of total public investment (including general government investment and sector-specific investments) are explored using the proposed model specified by Equation (2).

The results of the unit root test are presented in Table B-1 (Appendix-B). The results reveal that there is no variable that has second order of integration. On the basis of SBC, ARDL (4, 3, 1, 2, 1, 0, 0, 0, 0) model for public investment is selected. The selected model explains 96.4 per cent of the variation in the public or government investment (dependent variable). Diagnostics test of ARDL are presented in Table B-2 (Appendix B).

The bounds test confirms the existence of a long-run relationship among the variables at a 1 per cent level of significance. ECM value is negative and significant, which reconfirms the existence of a long-run relationship among the variables. ECM value is -0.706, which shows that 70.6 per cent of error is resolved in a single period, i.e., a year. Other diagnostic tests, i.e. LM test, Jarque-Bera (JB) test and ARCH test, confirm that residuals are serially uncorrelated, normally distributed and homoscedastic, respectively. Finally, CUSUM and CUSUMSQ show that the coefficients of the models are stable.

The findings of the model, given in the following table, reveal that public investment is significantly and positively influenced by a budget deficit (BD), foreign capital inflows (FCI) and economic growth (G). On the other hand, domestic borrowings (DB), inflation (INF) and military regime (GD) negatively and significantly affect public investment.

It is evident from the results presented in Table 3 that public sector development projects are mainly financed by foreign funds (loans or grants) [Blejer and Khan (1984) and Rahman (2008)]. The stimulating effect of government expenditure over and above government revenues may justify the observation that foreign funds are being spent for investment and development purposes. The results align with the government's claim to raise the share of public sector development projects. The

positive impact of economic growth confirms the accelerator principle. However, more plausibly, it can be understood as Wagner's Law indicating the rise in demand for infrastructure with the income level [Sturm (2001)]. Moreover, the positive association between GDP increase and a corresponding rise in public investment may be due to the pro-cyclical behaviour of public investment as well [Välilä and Mehrotra (2005)].

Foreign borrowings are mainly used for development purposes, whereas non-development and current expenditures are financed by domestic borrowings. Furthermore, the plausible reasons for the suppressing (crowding-out) effect of domestic borrowing on public investment may be that it is used for financing budget deficits and debt servicing [Sturm (2001)].

Importantly public investment decisions are not necessarily taken on the basis of profitability analysis, so the interest rate (cost of capital) does not seem to matter. The negative relationship between the inflation rate and public investment indicates that the rising cost of machinery, equipment and raw materials discourages public sector investment [Ajaz and Nazima (2012)]. Moreover, in the context of counter-cyclical policy, accelerating inflation may restrain public investment [Aubin, et al., (1988)]. Finally, the discouraging effect of the military regime on public investment signifies the role of the political process in the development of the country as the

TABLE 3

Long-Run Parameter Estimates

Independent Variables	Dependent Variables: Government Investment (I^{govt}) SBC Selected Model (4, 3, 1, 2, 1, 0, 0, 0, 0)	
	Coefficient	t-statistics
Budget deficit (BD)	0.044*	4.078
Domestic borrowing (DB)	-0.403**	-2.319
Foreign capital inflow (FCI)	0.740*	3.139
GDP growth (G)	0.087*	4.399
Developmental expenditures (DE)	-0.105	-1.26
Interest rate (INT)	0.008	0.544
Inflation rate (INF)	-0.014**	-2.572
Debt servicing (DS)	0.048	0.513
Government dummy (GD)	-0.111**	-2.487
CONS	9.198*	19.93

Source: Estimation results of ARDL model based on Equation (2).
The coefficients significant at 1% and 5% are indicated by * and ** respectively.

positive competition among the political parties to maximise the vote bank accelerates public investment activities.

The short-run dynamics of government investment are provided in Table 4. These exhibit similar relationships in the long-run except for domestic borrowings, showing a positive but insignificant effect in the short-run.

VI. Conclusion and Policy Implications

This study has analysed government/public investment behaviour in Pakistan, employing a reasonably rich data set spanning over 52 years and applying the appropriate ARDL approach to cointegration. The results of the econometric analysis reveal that budget deficit, accelerator and foreign capital inflow tend to boost the government/public investment. However, domestic borrowing, inflation and military regimes appear as discouraging factors for government/public investment activity.

The availability of domestic and international economic resources plays an important role in determining investment decisions and correspondingly designing the investment policy. Since foreign capital inflows are mostly in the form of loans from international agencies like the IMF and the World Bank, their absorption is monitored in loan agreements and, therefore, less influenced by domestic institutions. On the other hand, domestic borrowing has no such solid checks and is mostly used for less productive (non-investment) activities. A weak institutional framework is a bottleneck and infrastructural projects could better be implemented through requisite institutional reforms.

TABLE 4

Short-run Parameter Estimates

Independent Variables	Short-run Dynamics	
	Coefficient	t-statistics
$I^{govt}(-1)$	0.229	1.74
ΔBD	0.015**	2.31
ΔDB	0.218	1.03
ΔFCI	0.157***	2.19
ΔG	0.026**	2.59
ΔDE	-0.074	1.23
ΔINT	0.006	0.57
ΔINF	-0.010**	-2.59
ΔDS	0.034	0.57
ΔGD	-0.079**	-2.16

Source: Estimation results of ARDL model based on Equation (2).
The coefficients significant at 5% and 10% are indicated by ** and ***, respectively.

Political stability and a democratic environment appear as necessary conditions for enhancing the government investment activity in the country. In the absence of political will and a proper democratic process, the investment activity would remain uncertain and dampen the overall investment level. In this regard, effective and efficient execution of public projects could be a driver of investment and economic growth. Finally, consistency in public policy, fiscal prudence, fiscal discipline, a stable economy, and political conditions are essential to accelerate the investment activity in the economy.

Internal and external conflicts have seriously hindered investment activity in Pakistan though in most cases, Pakistan has been a victim of its geographic location that pushed the country into unintentional wars. With American forces leaving Afghanistan, democracy taking stronger roots than ever before and the CPEC agreement being implemented on a fast track basis could improve the investment climate in Pakistan in a substantial way. Pakistan has also successfully curbed terrorism with a prolonged war; the frequency and severity of terrorist attacks have significantly reduced, which is further expected to pave the way for investment ventures in future.

However, institutional weaknesses have not yet shown any sign of improvement. Although the current government had promised large scale reforms, the process of reforms is extremely slow and is marred by political compromises. This area needs persistent efforts over a long period of time spanning several political regimes. It can be possible if political parties agree on a roadmap to be followed successively.

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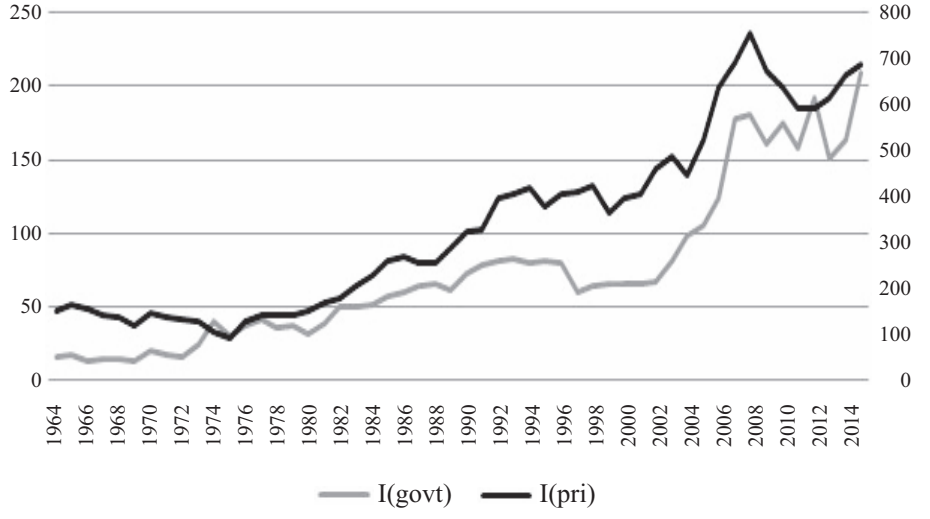
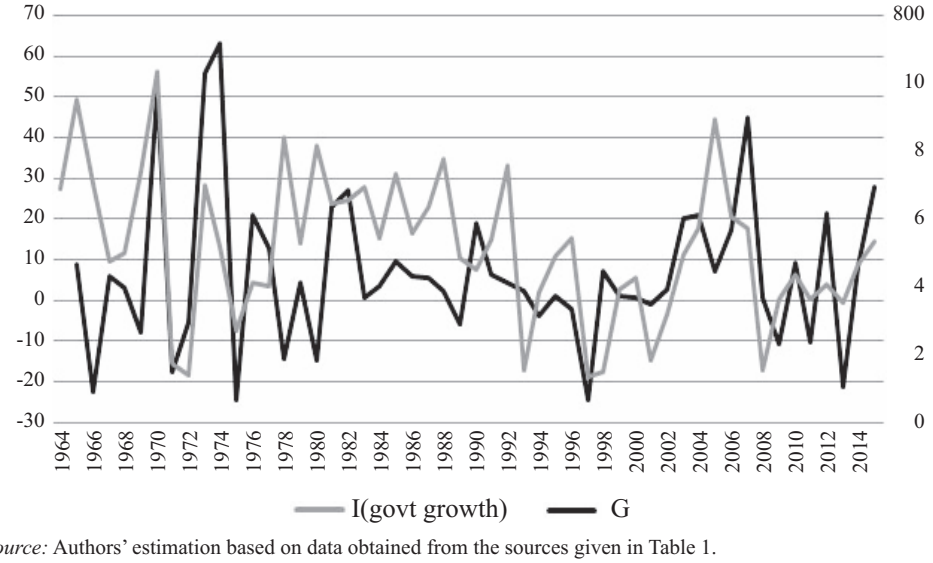
APPENDIX-A



Source: Authors' estimation based on data obtained from the sources given in Table 1.

FIGURE A-1

Real Government Investment and Private Investment (Rupees Billion)



Source: Authors' estimation based on data obtained from the sources given in Table 1.

FIGURE A-2

Real Government Investment Growth and GDP Growth (%)

APPENDIX-B

TABLE B-1

Unit Root for Government Investment

Variables	Augmented Dickey Fuller Test		Phillips Perron Test	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend
I^{govt}	-1.59	-1.97	-1.56	-2.03
	(0.47)	(0.60)	(0.49)	(0.56)
ΔI^{govt}	-6.95*	-6.83*	-6.95*	-6.82*
	(0.00)	(0.00)	(0.00)	(0.00)
DF	-7.55*	-2.50	-2.51	-2.98
	(0.00)	(0.32)	(0.11)	(0.14)
ΔDF		-4.13*	-10.14*	-10.75*
		(0.01)	(0.00)	(0.00)
DB	0.2	-1.45	0.13	-1.73
	(0.97)	(0.83)	(0.96)	(0.72)
ΔDB	-5.54*	-5.46*	-5.54*	-5.46*
	(0.00)	(0.00)	(0.00)	(0.00)
FCI	-0.29	-3.55**	0.12	-3.55**
	(0.91)	(0.04)	(0.96)	(0.04)
ΔFCI	-7.73*	-7.64*	-9.28*	-9.04*
	(0.00)	(0.00)	(0.00)	(0.00)
DE	-1.48	-2.4	-1.55	-2.41
	(0.53)	(0.37)	(0.50)	(0.36)
ΔDE	-7.24*	-7.23*	-7.25*	-7.25*
	(0.00)	(0.00)	(0.00)	(0.00)
INT	-2.85**	-2.79	-2.57***	-2.08
	(0.05)	(0.20)	(0.10)	(0.54)
ΔINT	-4.46*	-4.60*	-4.55*	-4.69*
	(0.00)	(0.00)	(0.00)	(0.00)
INF	-3.96*	-3.389*	-4.04*	-3.98*
	(0.00)	(0.01)	0.00	(0.01)
G	-5.219	-5.606	-5.145	-5.519
	(0.00)	(0.00)	(0.00)	(0.00)
DS	-1.99	-1.56	-2.58***	-2.52
	(0.28)	(0.79)	(0.10)	(0.31)
ΔDS	-7.67*	-8.02*	-11.38*	-21.80*
	(0.00)	(0.00)	(0.00)	(0.00)

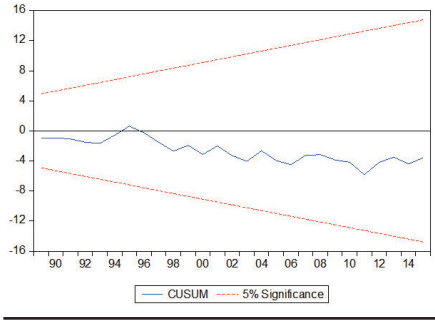
Source: Authors' estimation based on data obtained from the sources given in Table 1.
P-values are provided in the brackets.
The statistics significant at 1%, 5% and 10% are indicated by *, ** and *** respectively.

TABLE B-2

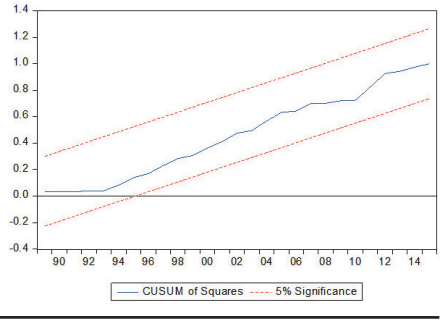
Diagnostic Tests of ARDL Model

	Test statistics		P-value		
				I(0)	I(1)
			10%	1.95	3.06
Bounds test	F-statistic	= 6.107	5%	2.22	3.39
			2.5%	2.48	3.7
			1%	**2.79**	**4.1**
Serial Correlation LM Test (3)	Obs*R-squared	= 6.44*	0.092		
Normality teat	Jarque-Bera	= 0.09	0.955		
Heteroscedasticity Test: ARCH (2)	Obs*R-squared	= 4.01	0.134		
Coint Eq(-1)	-0.706*		0.000		
Number of observations					R^2 =0.979
1964-2015 (52obs)					Adj R^2 =0.964

CUSUM



CUSUM Square



Source: Authors' estimation based on data obtained from the sources given in Table 1.
The coefficients significant at 1% are indicated by *.