Developing Country Studies
ISSN 2224-607X (Paper) ISSN 2225-0565 (Online)
Vol.4, No.25, 2014

Determining Factors of Private Investment: Empirical Study of Pakistan

Atif Salman[1] Nawaz Ahmad[2*]

[1]PhD scholar at SZABIST, Karachi, Pakistan. < salmanatif@hotmail.com>

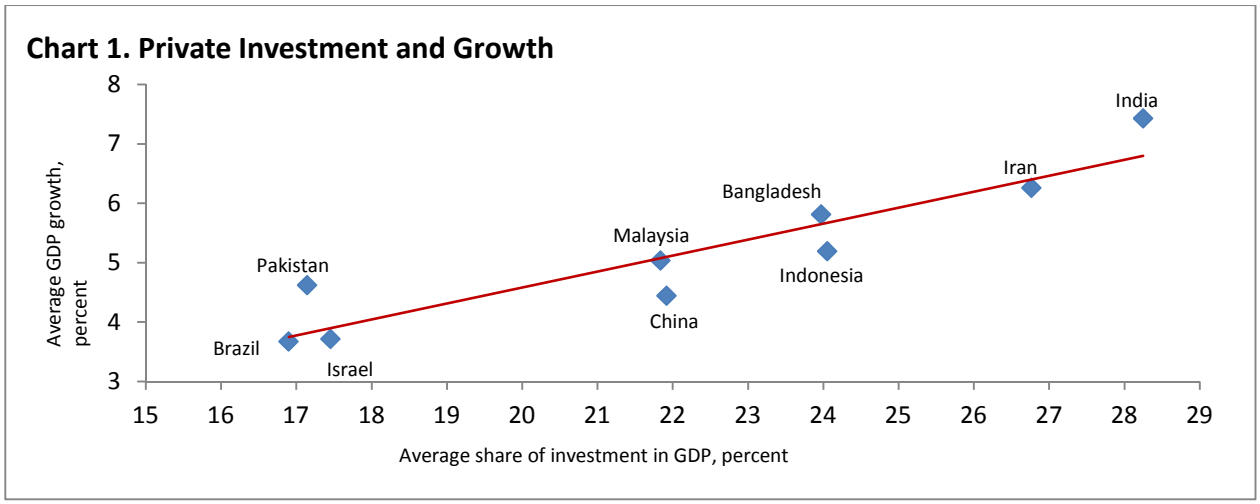
[2*]Assistant Professor at Indus University, Karachi, Pakistan. <nawazahmad_pk@hotmail.com>

1. Introduction

There is an ample amount of work on private investment for the cases of both developed and developing economies. Blejer and Khan (1984) study the investment function for developing countries using pooled data of 24 countries for the period 1971-1979. They find credit availability and infrastructural public investments are positively related to private investment. They observe that crowding-out phenomena works in case of non-infrastructural investment. As quoted by Saker (1993), behavior of private investment is quite different in developed and developing economies. Credit availability and government investment appear to be strong boosters of private investment in case of developing economies. Utilizing the Pakistani data set from FY 1974 to FY 1992, Saker (1993) concludes that private investment is positively correlated with output growth, private sector credit availability and government infrastructural investment. Oshikoya (1994) models private investment function for various middle-income and low-income African countries for the period 1971-1988. He finds that real output growth, real exchange rate, credit availability and government infrastructural investment are positively related to domestic private investment in studied African countries. Inflation and external debt servicing add to macroeconomic uncertainty and are, therefore negatively related to private investment.

1.1 Research Background

Private investment is one of the most important macroeconomic variables. Importance of private investment stems from the fact that it has both short term and long term implications for any economy. In short term, private investment drives the direction of business cycle whereas in long term it defines the path of economy by setting steady state growth rate. In short run, private investment is important because it is the most sensitive and volatile component of aggregate demand; which is chiefly responsible for business fluctuations. Long term significance of private investment comes from its role in physical and human capital formation which is the ultimate source of growth and productivity. Countries with high and stable investment paths are in general more prosperous than those countries that have low and volatile investment paths. Chart 1 shows this correlation.



Source: IMF, IPS

Horizontal axis in Chart 1 shows average share of investment in GDP for 9 emerging market economies for the period year 2000 to 2010. Vertical axis shows average growth rate of GDP for the same period. A strong positive relationship is reflected in positively sloped trend line. This clearly shows the importance of private investment

in determination of long run growth rate.

In context of Pakistan, if we analyze the annual data of GDP growth rates and private investment growth rate, we find clear evidence that private investment affects output growth via productivity channel with a lag of two periods. Chart 2 shows this relationship. In chart 2, we plot GDP growth rate side by side two periods lagged private investment growth rate. A strong positive correlation is clearly visible. This shows that private investment accumulates physical capital which gives maximum contribution to output after two periods.

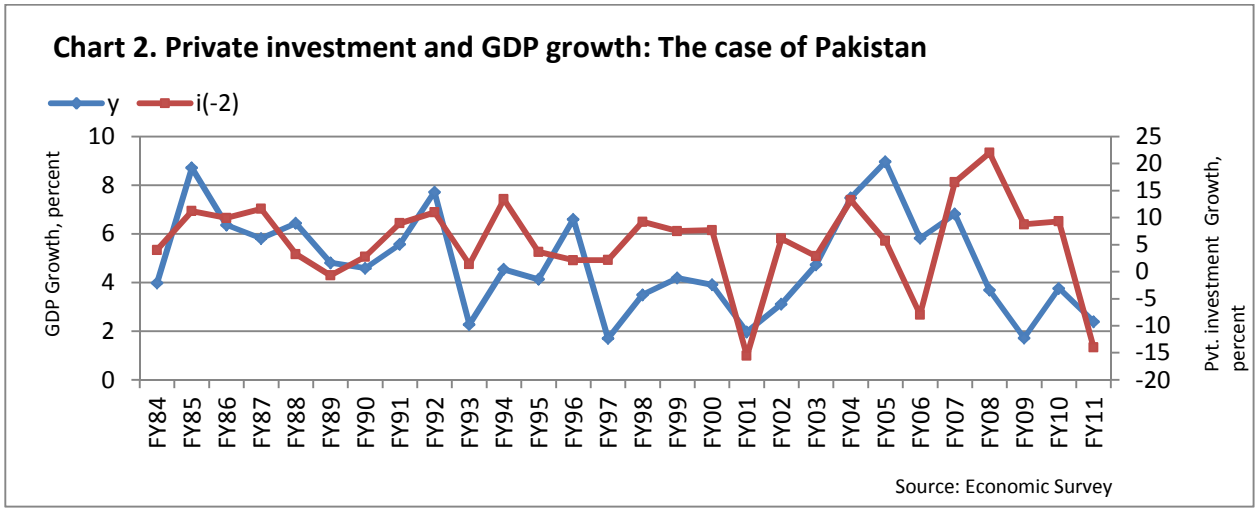


Chart 1 shows the importance of private investment in general and Chart 2 manifests the value of private investment in context of Pakistan economy. We present this information to justify our motivation for studying determinants of private investment for the case of Pakistan in this research project.

1.2 An Overview of Public & Private Investments

Investment is a central issue in any economy. Every government ensures that its policies promote investments & growth. Investment raises the productive capacity of the economy & promotes technological progress through use of new techniques. It is also responsible for the fluctuation of GDP over the business cycle. Government Investment in infrastructure and basic industry has traditionally been viewed as necessary by economists. Keynes (1936) was the first one to call attention to the existence of an independent investment function in the economy. However according to Classicals (Smith, Ricardo, Say, Marshall and others), cited in a study by Imtiaz Ahmad (2008), free markets are the best route to national prosperity and economic growth. They also discourage government interventions.

A study of literature shows that there are mixed views on public and private investments and the matter is not yet settled. Some takes a positive view of public investment & states that public investment stimulates private sector activity through the provision of education, infrastructure, health etc & in this way crowds in private investments. Others however argues that public investments actually crowd out private investment and & hampers economic growth. Especially the crash of markets and recession of 2008, the issue has resurfaced & several question marks have been raised on the efficiency of private markets (Akkina & Celebi, 2002).

Few studies links budgetary deficit to the displacement of private investments. Few studies concludes that there is a link between budget deficit and interest rate and high budget deficit leads to higher interest rate that in turn crowds out private investment. A study by Burney & Yasmeen (1989) found no significant relationship between budget deficit & interest rate. They also cite Dewald (1983), Dwayer (1982), Evans (1987) whose research also found that budget deficits do not have a significant impact on interest rate. Public investment in developing countries is nearly half of total investments, whereas the same is around one fifth for industrial countries. Essentially, the needs of developing countries for infrastructure and related capital are greater than developed countries. A substantial part of public investment is also spent on state-owned enterprises. An expansion of the capacity of public sector is essential before private sector can undertake investments in sectors that are dependent on these basis inputs. However, in many developing countries public sector directly competes with private sector for the provision of goods and services. Furthermore, bureaucratic motivation & corruption led to

sub optimal & inefficient expenditures on public sector. Non productive expenditures by governments in the shape of subsidization of inefficient state owned enterprises are severely criticized. Salaries expenditure on extra public servants & the pressure it exerts on raising wages for private sector (Khan 1996).

Source of financing of public sector expenditure is another factor that crowds out private investments. If it is financed by increase in taxes that may hamper investment by private sector & if financed from market borrowing, it leads to increase in interest rates cost & less credit availability for private investors.

1.3 Traditional Theories of Investments

Investment is expenditures on new plants, capital equipment, machinery, inventory etc.

According to a study by Saker (1993), there have been four basic models of investments;

- The Fixed Accelerator Model. In this model, once an increase in output is expected, the capital stock has to be proportionately increased. Investment is the sum of the difference between the existing & anticipated capital stock & the replacement needed to substitute the depreciation of the existing stock. So this is demand focused & investment is more as a result of demand. As output rises, businesses earn more profit & have better cash flows. As their confidence improves, they invest more in construction of factories, buildings & buy more machinery. This fixed investment would lead to more growth.
- The Profit Approach. According to this model profit is the only motivation behind investment. Businesses invest if profit incentive is there.
- The Neoclassical Approach. Saker cites Jorgenson (1963) whose study concluded that investor takes into account both expected earnings & funds cost.
- The Tobin's q Model. Saker cites Hayashi (1982) whose study concluded that firms invest as long as the increase in the value of their shares is higher than the increase in the replacement cost of their physical assets.

1.4 Relationship between Public & Private Investments

To date, the extent to which public investment especially on infrastructure crowds in or crowds out private investment remain largely unknown. The fact that public sector investment is largely non-excludable and non-rival in consumption, suggest positive spillover effect for the economy. Ghani and Din (2006) cites Ebert (1986), Costa, *et al.* (1987) and Deno (1988) to find public investment to be a major input in the production process and private and public investments to be complementary rather than substitutes. A better road network may help make the supply chain of private sector become efficient and reduce cost of products. So by lowering production costs and raising the profits for private investors, public investment helps in capital formation. Public investment on education and health enhances the productivity of the labor force of private sector. A study by Abdul Rasheed (2005) also concluded that both investment are complementary & move together in the long run. Another study by Saeed, Hyder & Ali (2006) concluded that crowding-in exists in the agricultural sector & public & private investment is complementary. Their study, however, found crowding out phenomena & a negative relationship for the manufacturing sector.

Crowding out occurs when budget deficit is financed by selling bonds or borrowing from market. This results in an increase demand for money and an increase in interest rates. The higher interest rate causes private investment to decline. Budget Deficit can also be financed by monetizing, that is creating excess supply of money. This results in inflation, capital outflow or increase in import bill Looney (1997), budget deficit is also financed by additional taxes that increases cost input for private investor discourages private investment. Keynesian Crowding-out assumes that any increase in deficit is paid through private savings & crowding out of private consumption. Government expenditures also preempt scarce physical resources that could have been more efficiently utilized by the private sector. Looney (1995) concluded that public investment on infrastructure has not played an important role in stimulating private investment. It is the private investment that has stimulated a follow on expansion in infrastructure.

1.5 Benefits of Private Investment

Imtiaz Ahmad & Abdul Qayyum (2008) cites the Classicals (Smith, Ricardo, Say, Marshal and others), who concluded that free markets are the best route to economic prosperity and growth & Government interventions

only create distortion and inefficiency in the system. These days, World Bank & IMF also emphasizes reduced role of Government in the economy & promote deregulation and privatization in member countries. This would reduce barriers to private initiatives & would stimulate investment quality activities. When private investor makes profit efficiently, they reinvest in the economy & contribute to GDP growth. In the last century, most of the countries that excelled economically are those that promoted private investments. Public Investment is marred with corruption, nepotism and is inefficient.

An environment of reregulation and liberalization attracts foreign investment that in turn is a source of capital, & introduces new technological & managerial skills. Many loss making state owned enterprises were purchased by foreign investors & turned around successfully. Liberalization of foreign exchange movement helps increase foreign exchange reserves of a country (Khan, A. 1997).

Rise in private investment leads to creation of more capital, job opportunities & higher tax revenue for government. Rise in Private Investment put pressure on public sector to expand road networks & & other infrastructure that leads to enhanced investment & growth (Saeed, Hyder & Ali). Increasing private investment help reduce poverty (Simon White). Private Investment promotes competition & discipline in the market place & consumers benefit by getting best products at competitive prices. It promotes innovation and research.

State owned enterprises all over have been incurring heavy losses and have been contributing to large budget deficits. Government owned utilities & organizations were privatized throughout the world during 1980s and 1990s & most of the organized once under private ownership became efficient and were turned around. Many enterprises were privatized to foreigners.

1.6 Criticism of Private Investment

Two different economic thoughts have dominated in the previous century. Keynes economy talked about government active interventions to correct macroeconomic imbalances. Second is Milton Friedman, popularly known as Chicago school of thoughts that supports unfettered capitalism & is the man credited with hyper mobile global economy.

Naomi Klein in her famous international best seller 'The Shock Doctrine' describes Friedman's methods of exploiting a large scale political & economic crisis in a country & imposing a shock therapy to rapidly transform the economy into a liberal & deregulated economy. Whenever a crisis struck a country, conditions like privatization, government deregulation & deep cut in social spending are attached with the loan by IMF. She says the world has become a lab for these Chicago boys and they exploited disasters to impose these free market theories as shock therapies on those countries. She also compare the before & after situation in Chile, Brazil, Argentina, Bolivia & concludes that the reforms introduced in these countries have further deteriorated the economic & social situation in these countries. She blames US government of toppling democratic regimes world over and then backing military regimes and send a Chicago boy to implement free market agenda. She further states that World Bank & IMF are colonized by the Chicago School. She concluded that in the end the only people who were benefitted were foreign companies or a small group of financiers. Enron-style financial houses purchased country's assets on borrowed money milked the assets to the full and eventually fled. In many instances these denationalized assets were again nationalized. In almost all cases, that adopted Chicago boys shock therapy to the economy, economies crashed. The end result was unemployment hitting at 30%, debts exploded & hyperinflation.

Proponents of public investment also criticize vagaries of market forces when they blame crash of 2008 on greed of financiers & private investors. A 'Global Inverted Pyramid' of household and bank debt was built on a narrow range of underlying assets-American Houses Prices. Most of the loans were subprime mortgage borrowers. These are the borrowers with poor prospects of paying back the loans. When prices fell, first slowly then rapidly the borrowers could not repay their loans. The banks stopped lending to each other & to their customers, who were borrowing to repay previous loan installment-called refinancing. This resulted in 'credit crunch'. Commodity prices started to fall from July 2008. Bankruptcy of Lehman Brothers in September 2008 shattered investor's confidence & stock market crashed. All these subprime loans were sold to other banks in Europe. Banks started failing all over the World. Suddenly, economists realized that market forces are not the ultimate solution to every economy. Unfettered capitalism can collapse & it did collapsed. The first depression in the last 100 years came in 1930's because of unfettered market forces & the second came in 2008. However, both the times economy was rescued by Keynes economy. Excessive government intervention in the shape of public spending, bailout or reflationary packages by several governments saved the economies from deep depressions of 1930's. It was Keynes who turned around the economies from depression in 1936 & again it is Keynes,

economists just rediscovered after 60 years, whose economics saved the world from complete crash.

1.7 The Research Problem

Private investment is one of the most; or perhaps the most important macro variable owing to its direct linkages with productivity, price stability, financial stability and employment. In fact, none of the short term or long term economic management policies can be designed without caring about its potential impact on private investment. Owing to this reason, understanding the determinants of private investments is critical for successful designing and implementation of macroeconomic policies.

"This study aims to find the determinants of private investment in Pakistan and to develop a relationship among those factors"

1.8 Objective of Research

- Objective of this study is identification and quantitative measurement of important determinants of private investment in Pakistan.
- To identify factors effecting Private Investment in Pakistan.
- To examine the relationship among those factors and their contribution towards Private Investment.
- To develop the plausible model to explain Private Investment in Pakistan.

1.9. Benefit of the Study.

This study would provide the different levels of importance of the determinants of private investment in Pakistan which can be very useful information for a policy maker.

1.10 Scope and Limitations of the Study

The study is limited by the availability of data as we would only include those independent variables whose data is easily available. This results in under specification of the model but this is the issue with most of the regression analysis we see around us. The policy implications of the study are based on the group of variables common in the literature so we are hopeful that the scope of these implications is generally good.

2. Literature Review

2.1 Private Investment in Pakistan

2.1.1 Historic overview

History of economic performance in Pakistan is broadly divided in 6 time periods: early difficult years of 1947-1958, Ayub Khan's 'decade of development' 1958-1968, Bhutto's nationalization era of 1968-1977, Martial Law of Zia 1977-1988, politically unstable years of 1988-1999, and Musharraf's mixed democracy and Gilani's government (Hasan (1998) and Zaidi (2005)). Owing to irreversibility of fixed capital installations, private investment has been highly sensitive to economic and non-economic factors in the country.

Before independence, the areas included in Pakistan used to supply agricultural products to rest of sub-continent and lacked productive capacity in manufacturing goods. This fact is reflected in Statement of Industrial Policy 19481 where it was observed that despite bulk production of raw jute, cotton, hides and skins, wool, sugarcane and tobacco, there were very few industrial units that could process this output. To create an environment conducive to private investment, overhead public investment in infrastructure was inevitable. As result, government was the major player in arena of investment. Lack of funds in private sector and availability of foreign aid only with government were other factors which made share of public investment in GDP 3.8 percent in comparison to 3.2 percent share of private sector investment in 1954-55 (Hasan 1998). However, greater share of public investment did not mean that private sector was unresponsive. Annual returns on investment were in the range of 50 percent to even 100 percent and private investment was strongly encouraged by government in early fifties.

[1] Cited by Zaidi (2005)

It would be necessary to shed some light on import substitution industrialization policy adopted in early years and 60's that had long impacts on private investment. In order to get rid of dependence on imported manufactured goods and to fully utilize domestically available raw materials, policy makers went for an import substitution industrialization policy. In this policy, imports of non-essential goods are restricted for two purposes: first, to encourage domestic industry during her teething troubles and second to conserve foreign exchange so that it could be used to import capital for investment purpose. This policy has strong implications for private investment behaviour. Lewis1 states that long run implications of import substitution industrialization policy are lack of global competitiveness in domestic industry, production of only consumer goods and heavy dependence on imported capital that makes private investment hostage to exchange rate movements. During early years of Pakistan history, industry and economy benefitted from this policy but long term consequences did prove to be dire. Private investment in Pakistan became heavily dependent on imported capital and data shows negative relationship between private investment and exchange rate2.

Ayub Khan's reign is regarded as one of the most stable spans in history of Pakistan. During this period, private investment demonstrated very stable and growing trend. Private investment exceeded target values by 50 percent margin in Second Five Year Plan (1960-65). Important factors behind this impressive performance were supportive government policies that include better availability of foreign exchange, continuation of strong incentives and increase in long-term industrial credit (Hasan (1998)).

Bhutto's period (1971-77) is regarded as one the worst periods with respect to private investment. All important industries such as iron and steel, basic metals, heavy engineering, automobile assembling and manufacture, tractor assembling and manufacturing, chemicals, cement, educational institutes, vegetable oil, petroleum marketing, shipping, cotton ginning, rice husking, flour milling and private banks were acquired under direct state control through nationalization in different phases (Zaidi, 2005). Such a large scale nationalization was a big blow to private investment and by the end of 1977, private investment was less than half of its maximum value observed in 1965 (Hasan 1998).

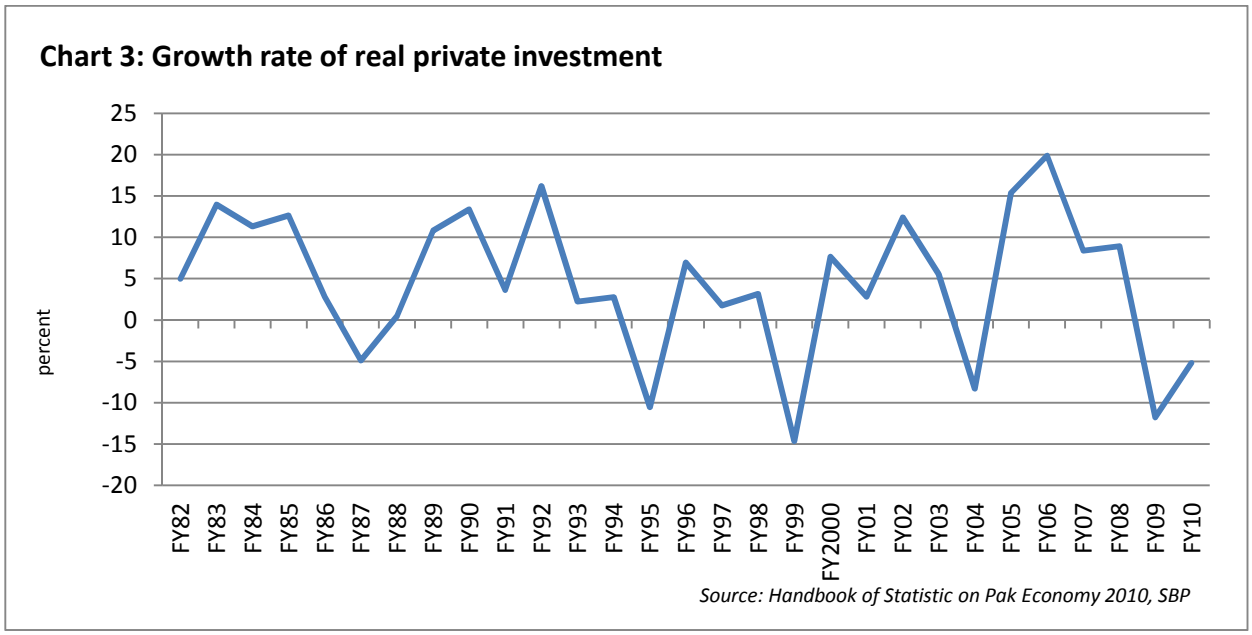
After taking over in 1977, General Zia-ul-Haq ruled the country till his unexpected demise in 1988. In the early years of this period, nationalization process was reversed; yet only partially and gradually. Small scale agro-based industries such as rice husking, flour milling and cotton ginning were denationalized immediately in 1977. In order to restore investors' confidence and create an environment congenial to private investment, various steps were taken. These include guarantees against future nationalization, clear demarcation of public and private investment activities, additional tax concessions, ease in investment controls and, restriction of public investment to only balancing, modernization and replacement of existing projects. Through such measures, Zia government was successful in signaling that private sector had to play the pivotal role in the days to come. This is reflected by the fact that private sector share in total industrial investment rose to 84 percent in 1988 from 27 percent in 1979 (Zaidi 2005). However, the main criticism on Zia's period is that the neglect from structural issues of economy during this period culminated into poor environment for investment and growth in future. No attention was paid towards development of resources of water and energy. The issue of Kalabagh Dam is the greatest example in this regard. Seeds of extremism sown in that era are bearing fruit now. Nowadays, energy crisis and terrorism are greatest hurdles for private investment and it would not be unfair to state that these troubles have roots in Zia's regime.

Followed by politically stable Zia's regime was the highly unstable era of Benazir and Nawaz Sharif's governments during 1988-1999. From 1988 to 1997, 3 general elections took place and people of Pakistan flavored the taste of 10 governments in this 9 years time period. These politically unstable conditions were exacerbated by long-term structural problems of economy such as low tax to GDP ratio, balance of payment problems and shortages in energy sector. These factors combined together to make 90's called 'the lost decade'. Average growth rate of private investment was only 2.9 percent in first half of 90's and it decelerated further to a negligible amount of 1 percent in second half due to nuclear tests and economic repercussions of these tests (see Table 1). The impact of economic sanctions on private investment is clearly visible in Chart 3.

General Pervez Musharraf took over in 1999 by overthrowing the government of Nawaz Sharif. Over Musharraf regime during 1999-2008, the economy and private investment showed reasonable growth. But this was mainly consumption driven growth and little was done to enhance the productive capacity of economy. Few steps were taken to resolve structural issues of economy such as low tax to GDP ratio, balance of payment problem and energy sector problems. These issues remain hidden under the cover of heavy inflow of foreign aid in the

[1] Cited by Zaidi (2005)
[2] See estimation section

aftermath of 9/11 attacks and earth quake in 2005 and globally stable economic environment. But at the end of Musharraf regime, sever energy shortages, soaring commodity prices due to financial crisis, foreign exchange crisis and terrorism gravely deteriorated economy in general and private investment in particular. Private investment growth rate fell to -12 percent in 2009 from a peak of 20 percent in 2006. The government of Gilani shares most of the criticism on Musharraf regime plus the charges of corruption. After Musharraf, little has been done to resolve energy crisis and other structural issues. Resultantly, private investment is still falling as shown by negative growth rate in Chart 3.



2.2 *Review of Determinants of Private Investment in Pakistan*

Interest Rate is the most important factor affecting economic activity & investments in an economy. Increase/decrease in Interest rate affects not only investments but exports in a very dramatic manner. Interest rate also influences inflation affecting the cost of input for exports and investments. Increase/decrease in Interest rate strongly impacts exchange rate that in turn effect exports positively or negatively. Devaluation and Revaluation has a very strong impact on exports, imports, foreign remittances & balance of trade of an economy.

Theoretically, an increase in money supply leads to lowering of interest rates. This leads to a downward pressure on the exchange rate of an economy & results in devaluation. However, on the other hand prices began an upward movement because of earlier developments & results in inflation. The central bank as a result of inflation increases interest rates that results in an upward movement of exchange rate for the country. A re-valuation, may be conducive for import because imports become cheaper but may hamper exports (Gulzar, Feng, 2005).

Interest Rate helps promote research & development R&D in business. Lower interest rate encourages R&D that has other positive spillover effects for the overall economy. Hence, Interest rate operates through its influence on the cost of Capital to the investor as well as on returns to various groups of savers. Change in interest rate affects the overall cost of capital, debt-equity choices of companies and individuals. Arshad & Qayyum (2007) concludes that there exists a long term relationship between real GDP, trade liberalization, financial development, real interest rate & investments. Their study concludes that financial reforms & competition between banks can lower interest rate & the cost of borrowing for investors, which in turn would have a favorable impact on investments.

A study by Mario I. Blejer and Mohsin S. Khan (1984) found that private investment in developing countries is constrained by the availability of financing & flow of credit to the private sector. If government tightens its monetary policy, & in the process it is not ensuring that the net flow to private is not impacted or curtailed, overall private investment would be adversely effected. If the total amount of foreign financing to a developing country is limited, then the credit available for private sector would be curtailed if the public sector borrowing increases.

A study by Temitope W. Oshikoya (1994) found that GDP impact on private investment is mixed. There appears to be a positive relationship between GDP and private investment in African countries, as private investment was discouraged by slower economic growth. However, when the economic growth improved and real GDP increased that was not matched by the increase in private investments in African Countries. Serven and Solimano (1992) cites Blejer and Khan (1984) whose study concluded that GDP is the most important determinant of Private Investment. According to Serven & Solimano, a slow economy also influences investment through expectations. A recession may induce investors to postpone their investments & they may delay & wait for the economy to recover.

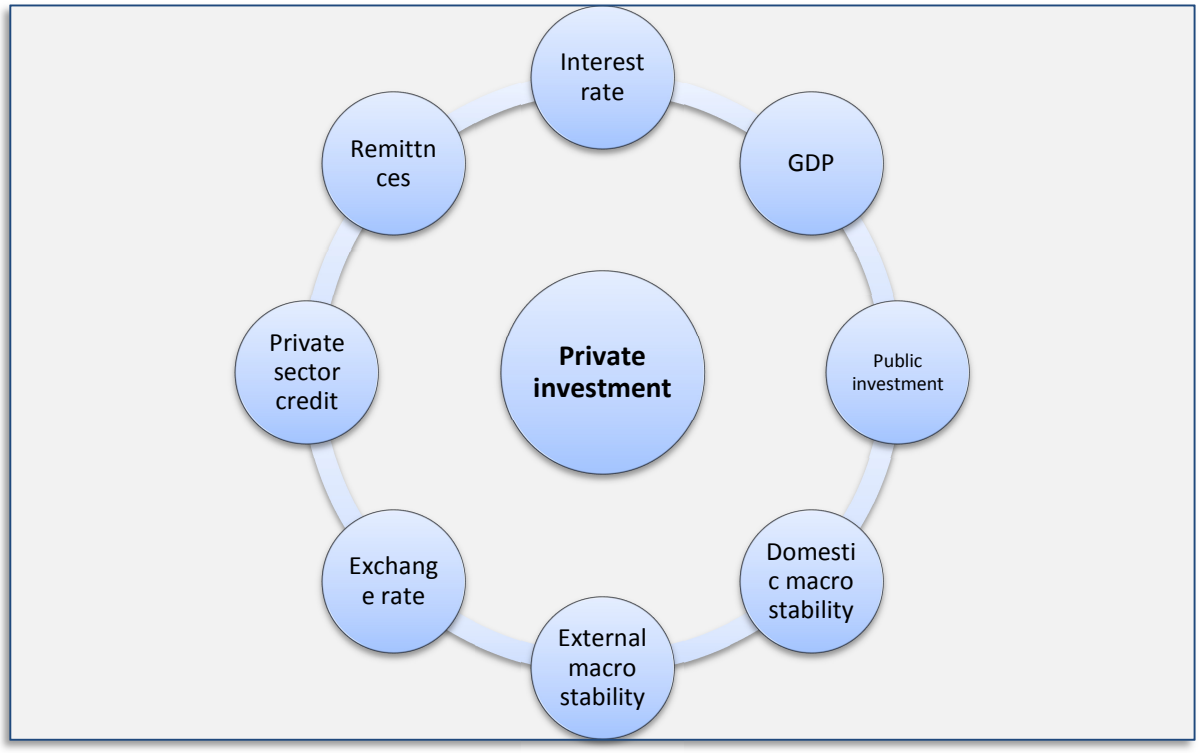
According to Temitope W. Oshikoya (1994), Inflation Rate adversely impact private investment. Unpredictable and abnormality in inflation and prices of investment goods distort the information content of relative prices & increase riskiness and uncertainty of long term investment. Temitope W. Oshikoya (1994) cites Greene and Villanueva research that found that high inflation negatively impacted private investment in 23 developing countries.

A study by Yaw Asante (2000) concluded that the effect of real exchange rate on private investment is ambiguous. He cites Chibber and Mansoor (1990) who found that a real depreciation of a currency negatively impact production of investment goods. A de-valuation may impact the economy through influencing aggregate demand. If its impact is contractionary, then investment would be reduced & if its impact is expansionary then it increases investments. In short run, the real devaluation would have a negative impact on private investment. It results in a reduction in wealth of private individuals due to its inflationary impact. Hence, it reduces domestic demand and that may induce firms to reduce investment spending (Oshikoya 1994). On supply side, the impact of devaluation is uncertain. It will have a positive impact and stimulate investment in tradable goods & discourage investment in non tradable good. However, in an economy that is highly dependent on imported capital goods, a real devaluation may negatively impact private investments (Oshkoya 1994). According to Khawaja Amjad Saeed (1995), devaluation in Pakistan has been ineffective in Pakistan in improving Balance of Payment. The economy quickly incorporates the changes in costs arising from exchange rate movements & results in inflation and upward price movement for exporter's input. In his book "Economy of Pakistan" , he concludes that devaluation increases inflation in Pakistan and stimulates speculation and distortion in income. It adversely impacts private investment.

The Term of Trade is one of the most important external shocks to the economy. As is the case of Petroleum prices increase. An increase in the cost of imports reduces the purchasing capacity of our exports & adversely impacts private investments. According to Temitope W. Oshikoya (1994), foreign price shocks have been responsible for major fluctuation in the exchange rate of a country & results in devaluation of currencies, as petroleum price shock would put a downward pressure on an oil importing country and an upward pressure on an oil exporting country.

2.3 Conceptual Framework

Conceptual framework used in the study consists of explained variable and set of explanatory variables.



3. Data and Research Methodology

3.1. Data

3.1.1. Data Sources

Conceptual framework broadly defines dependent and independent variables. Details of variables are given in the following table.

S #	Factors	Variable
1	Private investment	Private gross fixed capital formation at current prices
2	Interest rate	Average of weighted average rate of return on advances
3	Private sector credit	Annual flow of credit to private sector credit
4	Output	Gross domestic product (factor cost) at current factor cost
5	Domestic macroeconomic stability	Annual inflation measured by GDP deflator
6	External macro stability	Ratio of foreign debt servicing to exports
7	Exchange rate	Annual average exchange rate between PKR and USD
8	Public investment	Sum of public fixed capital formation and General government fixed capital formation
9	Workers' remittances	Annual flow of workers' remittances

We take annual nominal data of all variables from 1980 to 2009 from Handbook of Statistics on Pakistan

Economy 2010 available on website of State Bank of Pakistan (SBP)[1]. Although Federal Bureau of Statistics (FBS) is original sources of GDP, private investment, public investment, exports and inflation yet it is hard to obtain historic data series from there. Data of external debt servicing is compiled by Economic Affairs Division. SBP is primary data source for interest rate, exchange rate and remittances.

3.1.2. Data Treatment

Nominal data series of aggregate variables are made real using GDP deflator as a measure of inflation. Using index of GDP deflator, we calculate relative change as P_t/P_{t-1} and deflate all nominal variables by this series. Variables denominated in foreign currency (exports, remittances and external debt servicing) i.e. US dollars are converted into Pakistani currency to make them comparable with other variables. For this purpose, we multiply them with annual average exchange rate.

3.2. Research Design and Procedure

I would carry out the analysis where private investment would be the dependent variable and the rest of the variables in the table above would serve as independent variables. The resulting model and its estimation would check various hypotheses. The overall hypothesis of the equation would be the Goodness of Fit which is evaluated by the F-stat. Its significance shows if the dependent variable is depending upon the group of independent variables significantly or not. On the other hand the importance of individual independent variables is checked by t-stat and p-values (exact probability of committing type I error). t-stat shows the hypothesis whether a single independent variable is significant determinant of the dependent variable. Rule of thumb regarding t-stat is that for data set containing 30 or more observations, an independent variable is considered statistically significant if absolute value of t-stat is equal to or greater than 2. If the t-stat for a certain variable is very insignificant then for model improvement that variable can be dropped from the regression equation.

The regression results for both F-stat and t-stat are provided simultaneously by any statistical program that can handle regression analysis e.g. Eviews. Results obtained from EViews output are given in appendix.

3.2.1. Hypotheses

H1: Private Investment is explained by the group of 8 independent variables mentioned above.

H2: Private Investment is negatively related to Interest rate.

H3: Private Investment is positively related to Private Sector Credit.

H4: Private Investment is positively related to Output.

H5: Private Investment is negatively related to Exchange Rate.

H6: Private investment is negatively related to domestic inflation

H7: Private investment is negative related to ratio of foreign debt servicing to exports

H8: Private Investment is positively related to Public Investment.

H9: Workers' Remittances are related positively to private investment

4. Analysis of Data

Data related to investment and its determinants under study have been analyzed using descriptive and time series techniques.

4.1 Descriptive Data Analysis

Investment data has following important dimensions:

1. Performance of private investment over time

[1] Statistics Handbook of Pakistan is available at SBP website http://www.sbp.org.pk/departments/stats/PakEconomy_HandBook/index.htm

2. Mix of public and private investment in total investment
3. Composition of private investment

We use a combination of tabular and graphical approach to explore these dimensions.

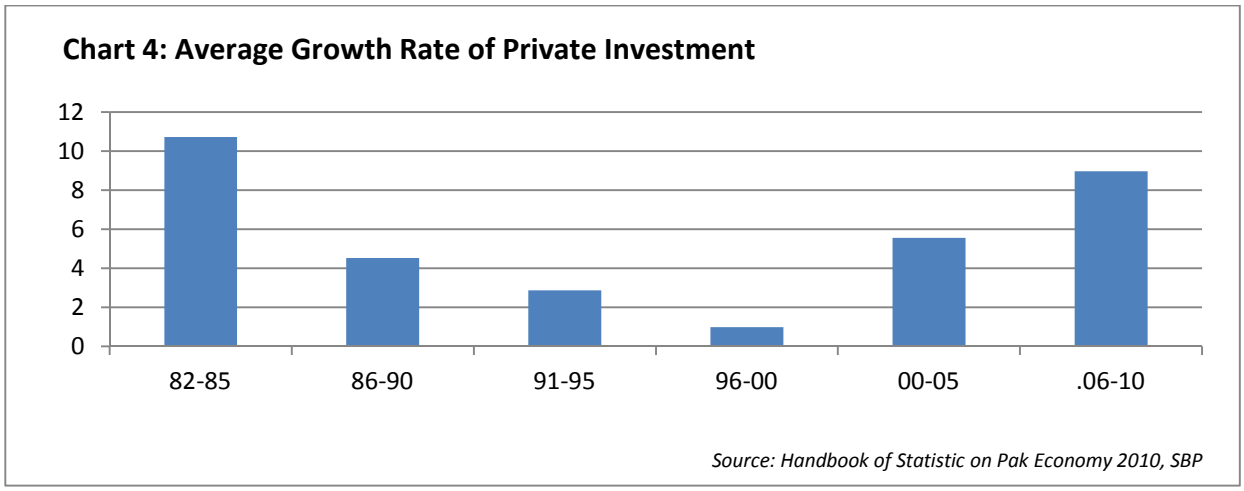
4.1.1. Performance of private investment over time

To judge performance of different types of investment over time, use average growth rates. We take averages of annual growth rates over 5-year periods.

Table 1: Average Growth Rate of Private and Public Investment (%)

	82-85	86-90	91-95	96-00	00-05	06-10
Real Fixed Investment	7.9	2.8	3.1	-1.0	2.9	5.6
Private Fixed Investment	10.7	4.5	2.9	1.0	5.6	9.0
Public Fixed Investment	3.4	-1.4	4.2	-4.1	-13.4	-13.8
General Government Fixed Investment	9.2	5.2	2.1	-4.2	9.3	12.7

Table 1 shows average growth rate of private investment over time. Table 1 reveals why economist regard 90's as the "lost decade". Average growth rates of overall investment and all its components have been at their historic ebb during this decade. Average growth rate of private has been graphed in Chart 4.



4.1.2. Public and private mix in total investment

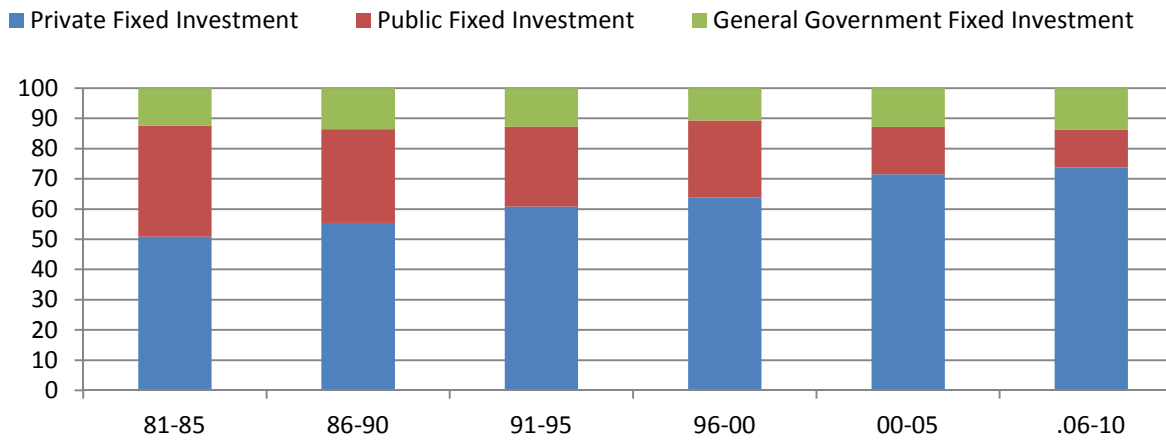
In order to analyze mix of public and private investment in total investment, we take averages of shares of private, public and general government investments in total investment over 5-year periods. Sum of shares of three components of investment adds up to 100 percent or 1.

Table 2: Average Shares of Private and Public Investment in Total Investment (%)

	81-85	86-90	91-95	96-00	00-05	06-10
Private Fixed Investment	50.8	55.4	60.8	63.7	71.5	73.8
Public Fixed Investment	36.8	31.0	26.5	25.6	15.8	12.6
General Government Fixed Investment	12.3	13.5	12.8	10.7	12.8	13.7

Table 2 shows shares of private, public and general government investment in total investment. It is clear from the table that share of private investment in total investment is increasing over time. Share of public fixed investment (Public Sector Development Program (PSDP)) is declining and share of general government investment that includes public sector corporations such as WAPDA is fairly stable. Chart 5 provides graphical presentation of information contained in Table 2.

Chart 5: Mix of Public, General Government and Private Investment

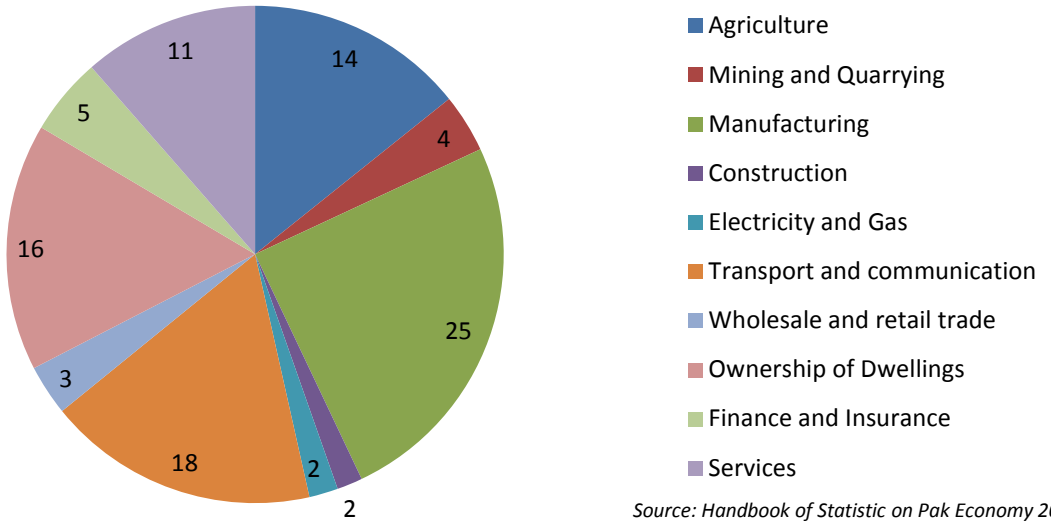


Source: Handbook of Statistic on Pak Economy 2010, SBP

4.1.3. Composition of private investment

We use sectoral shares of private investment to analyze composition of private investment. After calculating these shares using annual data, we take average over the period FY03 to FY10.

Chart 6: Average Composition of Private Investment during FY03-FY10



Source: Handbook of Statistic on Pak Economy 2010, SBP

Manufacturing appear to be the most important component of private investment by accounting for 25 percent of total private investment on average during FY03-FY10. Transport and communication sector constitutes the second biggest part of private investment. The relatively big share of this sector in private investment has connections with surge of mobile industry in the economy during the averaging time period. The Ownership of dwellings, which includes investments on residential structures, is third big component of private investment. The two sectors which receive less attention

by private sector are agriculture and mining quarrying. These are core sectors if viewed from raw material supplies to industries. Policy makers should facilitate private investment in these areas. Chart 6 reveals that during this time period, only 2 percent of total private investment has been devoted to electricity and gas sector. A careful and well thought analysis of energy supply and demand could have indicated the incapacity of government to provide energy supply and private sector could have been mobilized to bridge the gap between supply and demand.

4.2 Temporal (time-series) Data Analysis

We use ordinary least square (OLS) regression method using econometric software E-views to investigate determinants of private investment. We suppose that

$$IP_t = f(R_{t-1}, GDP_{t-1}, ER_t, IG_{t-1}, PSCt, INF_t, \frac{DS_t}{X_t}, RMT_t)$$

and estimate following linear regression model using OLS:

$$IP_t = c + \beta_1 R_{t-1} + \beta_2 GDP_{t-1} + \beta_3 ER_t + \beta_4 IG_{t-1} + \beta_5 PSCt + \beta_6 INF_t + \beta_7 \frac{DS_t}{X_t} + \beta_8 RMT_t + \mu_t$$

Where,

IP_t Real private investment

c Regression constant

R_{t-1} Lag of interest rate

GDP_{t-1} Lag of real GDP

ER_t Exchange rate

IG_{t-1} Sum of real public and general government investment

PSC_t Real flow of private sector credit

INF_t GDP deflator

$\frac{DS_t}{X_t}$ Ratio of external debt servicing to exports

RMT_t Real workers' remittances

μ_t Error term of regression

We expect $\beta_1 < 0, \beta_2 > 0$ and >1 , $\beta_3 < 0, \beta_4 > 0,, \beta_5 > 0, \beta_6 < 0, \beta_7 < 0$ and $\beta_8 > 0.$

Following 'General to Specific' approach of econometric model selection, we estimate several specifications of linear investment function and gradually drop statistically insignificant variables. Remittances and ratio of debt servicing to exports variables have theoretically correct signs but small t-stat values indicating their insignificance. So we drop these variables. Private sector credit variable has theoretically wrong sign and appears statistically insignificant as well. So we exclude this variable from our model. Finally specified model is given as:

$$\log(IP_t) = c + \beta_1 R_{t-1} + \beta_2 \log(GDP_{t-1}) + \beta_3 \log(ER_t) + \beta_4 \log(IG_{t-1}) + \beta_6 INF_t + \mu_t$$

$Betas:$	−3.17	−2.59	1.12	−0.52	0.44	−0.98
$t-statitstics:$	−1.24	−1.71	4.99	−1.80	2.20	−1.51
$p-values:$	0.23	0.10	0.00	0.10	0.04	0.14

$R^2 = 0.995$ $\quad$ $Durbin\ Watson\ Statistic\ (DW) = 1.98$

$Adjusted\ R^2 = 0.994$ $\quad$ $F-statistic = 1000.32$

$.P-value(F-statistic) = 0.00$

Results of estimation show that signs of all parameters are according to our hypotheses. p-value for lagged interest rate and exchange rate is 0.10 indicating that these variables are significant at 10% level of significance (LOS), p-value for inflation is 0.14 implying that the variable is statistically significant at 15% LOS. Lags of GDP and public investment are significant at 5% LOS. F-statistic is 1000.32 with a p-value of 0.00. This shows that our model significantly explains variations in private investment. Durbin Watson (DW) statistic is 1.98 which is fairly close to 2. Therefore we can safely assume that there is no autocorrelation problem with our estimation. Adjusted R-squared is 0.994 showing that about 99% of deviations in private investment from its mean value are explained by our model.

5. Summary of Findings and Policy Recommendation

5.1 Major Findings

Since we have used logarithms of private investment, GDP, exchange rate and public investment, the estimated parameters show elasticities of private investment with respect to these independent variables. According to results obtained from estimation, we see that hypotheses H3, H7 and H9 (that are related to relationship of private sector credit, debt servicing to exports ratio and workers' remittances respectively) are rejected as these variables appear to be statistically insignificant. Hypotheses H2 (interest rate), H4 (GDP), H5 (exchange rate), H6 (inflation) and H8 (public investment) are not rejected as these variables are significant according to 15% LOS criteria. In the following lines, we discuss quantitative impact of these variables on private investment.

5.1.1. Impact of interest rate on private investment

Coefficient of interest rate is -2.59 which shows that holding all other explanatory variables constant, 1 percent increase causes 2.59 percent decrease in private investment.

5.1.2. Impact of GDP on private investment

Coefficient of lagged GDP is 1.12. This shows that holding other explanatory variables constant, one percent increase in GDP causes 1.12 percent increase in private investment in next period. Hence our study confirms presence of investment accelerator process.

5.1.3. Impact of exchange rate on private investment

Coefficient of exchange rate is -0.52. This shows that one percent increase in exchange rate will reduce private investment by 0.52 percent; holding other independent variables constant. This shows that private investment in Pakistan is vulnerable to exchange rate movements. This may be due to import substitution industrialization policy adopted during most of the time in economic history of Pakistan.

5.1.4. Impact of public investment on private investment

Coefficient of public investment is 0.44. This shows that private investment is expected to grow by 0.44 percent corresponding to 1 percent increase in public investment.

5.1.4. Impact of domestic macro stability on private investment

We have used domestic inflation as a proxy variable for domestic macroeconomic stability. Coefficient of inflation is -0.98 showing that 1 percent increase in inflation is expected to reduce private investment by 0.98 percent if all other explanatory variables are held constant.

5.2 Recommendations for improvement in policy

Our study has important policy implications regarding monetary, fiscal and exchange rate policies. First of all, we discuss about monetary policy. In Pakistan, tight monetary policy stance is typically characterized by very high interest rates. Our study documents that such a high interest rate has negative consequences for private investment. Whenever Pakistan enters some structural adjustment program or avails some IMF facility to avoid balance of payment crisis, fiscal policy is made tight under IMF directives. Governments remained always failed in controlling their unnecessary expenditures and as a result, development expenditure or public investment is curtailed. Our study shows that this curtailment of public investment has negative implications for private investment. Therefore, while tightening fiscal policy, policy makers should ensure that only non-development expenditures are cut and flow of public investment should remain intact. Keeping in view negative impact of exchange rate movement, policy makers should provide incentives for establishing industries of capital goods in the country so that the economy could get rid of dependence on imported capital.

References

Ahmed, I., (Winter 2008), “Dynamic Modeling of Private Investment in Agricultural Sector of Pakistan”, *The Pakistan Development Review*, Part II, pp. 47:4, 517-530,

Agenor, P., R., (2005), "Public Infrastucture and Private Investment in the Middle East and North Africa", *World Bank Research Working Paper*, No 3661.

Ahmed, I., (2008), "Effect of Government Spending and Macro-Economic Uncertainity on Private Investment in Services Sector", *European Journal of Economics, Finance and Administrative Sciences*, Vol. 11.

Akkina, K., R., (Autumn 2002), "The Determinants of Private Fixed Investment and the Relationship between Public and Private Capital Accumulation in Turkey", *The Pakistan Development Review,* Part II, pp 41:3, 243-254.

Blejer, M., I., (1984), "Government Policy and Private Investment in Developing Countries", *International Monetary Fund,* Vol 31, No 2, pp. 379-403.

Ghani, E., (2006), "The Impact of Public Investment on Economic Growth in Pakistan", The Pakistan *Development Review,* Part II, pp. 45:1, 87-98.

Handbook of Statistics on Pakistan Economy 2010, URL: http://www.sbp.org.pk/departments/stats/PakEconomy_HandBook/index.htm

Hasan, Parvez (1998), “Pakistan’s Economy at Crossroads: Past Policies and Present Imperatives”, Oxford University Press, Karachi.

Hermes, N., (2001), "Fiscal Policy and Private Investment in Less Developed Countries", *United Nations University*, No 32.

Hyder, K., (2003), "Why Private Investment in Pakistan Has Collapsed and How it can be Restored", *The Lahore Journal of Economics*, Vol. 9, No 1, pp. 107-128.

Khan, M., S., (Winter 1996), "Government Investment and Economic Growth in the Developing World", *The Pakistan Development Review*, Part II, pp. 35:4. 419-439.

Looney, R., E., (1997), "Government Investment and Follow-on Private Sector Investment in Pakistan, 1972-1995", *Journal of Economic Development,* Vol. 22, No 1, pp. 91-100.

Looney, R., E., (1995), "Public Sector Deficits and Private Investment: A Test of the Crowding-out Hypothesis in Pakistans Manufacturing Industry", *The Pakistan Development Review*, Part II, pp. 34:3. 277-297.

Oshikoya, T., W., (1994), "Macroeconomic Determinants of Domestic Private Investment in Africa: An Empirical Analysis", *Chicago Journals,* Vol 42, No 3, pp. 573-596.

Ramirez, M., D., (1994), "Public and Private Investment in Mexico", *Southern Economic Journal,* Vol. 61, No 1, pp. 1-17.

Rashid, A., (Winter 2005), "Public / Private Investment Linkages: A Multivariate Cointegration Analysis", *The Pakistan Development Review,* Part II, pp. 44:4. 805-817.

Saeed, N., (Winter 2006), "The Impact of Public Investment on Private Investment: A Disaggregated Analysis", *The Pakistan Development Review*, Part II, pp. 45:4, 639-663.

Saker, K., (1993), "Determinants of Private Investment in Pakistan", *International Monetary Fund*, Vol. E22, No 16.

Serven, L., (1992), "Private Investment and Macroeconomic Adjustment", *Oxford Journals,* Vol 7, No 1, pp. 95-114.

Shahbaz, M., (Winter 2008), "Economic Growth and its Determinants in Pakistan", *The Pakistan Development Review*, Part II, pp. 47:4, 471-486.

Ahmad, M., (Autumn 1999), "Private Sector Investment in Agricultural Research in Pakistan", *The Pakistan Development Review*, Part II, pp. 38:3, 269-292.

Khan, Z., M., (Winter 1996),"Prospects for Private Capital Flows and Financial Sector Development", *The Pakistan Development Review*, Part II, pp. 35:4, 853-883.

Aqeel, A., (Winter 2004), "The Determinants of Foreign Direct Investment in Pakistan", *The Pakistan Development Review*, Part II, pp. 43:4, 651-664.

Kemal, R., A., (Winter 2000), "Financing Economic Development", *The Pakistan Development Review*, Part II, pp. 39:4, 293-311.

Hussain, M., A., (Winter 1995), "Long-Run Determinants of Private Saving Behaviour in Pakistan", *The Pakistan Development Review*, Part II, pp. 34:4, 1057-1066

Khan, S., M., (Winter 1998), "Capital Flows to Developing Countries: Blessing or Curse", *The Pakistan Development Review,* Part II, pp. 37:4, 125-151.

Tariq, A., (Winter 1995), "Export Earnings Instability in Pakistan", *The Pakistan Development Review*, Part II, pp 34:4, 1181-1189.

Feng, Y., (2001), "Politcal Freedom, Political Instability, and Policy Uncertainity: A Study of Political Institution and Private Investment in Developing Countries", *International Studies Quaterly*, Vol. 45, No 2, pp. 271-294.

Greene, J., (1991), "Private Investment in Developing Countries", *International Monetary Fund*, Vol. 38, No 1, pp. 33-58.

Serven, L., (2003), "Real-Exchange-Rate Uncertainity and Private Investment in LDCS", *The Review of Economics and Statistics*, Vol. 85, No 1, pp. 212-218.

Alesina, A., (1993), "Income Distribution, Political, Instability and Investment, *National Bureau of Economic Research",* Working Paper, No 4486.

Amjad, R., (Spring 1997), "Macroeconomic Policies and their Impact on Poverty Alleviation in Pakistan", *The Pakistan Development Review,* Part II, pp. 36:1, 39-68.

Khan, A., (Winter 1997), "Foreign Direct Investment in Pakistan Policies and Trends", *The Pakistan Development Review*, Part II, pp. 36:4, 959-985.

Chishti, S., (Winter 1992), "Foreign Aid, Defence Expenditure and Public Investment in Pakistan", *The Pakistan Development Review*, Part II, pp. 31:4, 895-908.

Gersovitz, M., 1984, 'The Effects of Domestics Taxes on Foreign Private Investment', *Woodrow Wilson School*, Discussion Paper, No 114.

Khan, H, A, (1999), "Foreign Direct Investment in Pakistan: Policy Issues and Operational Implications", *Asian Development Bank*, No 66.

Estache, A., (2005), "How Widespread were Private Investment and Regulatory Reform in Infrastructure Utilities During the 1990s", *World Bank Policy Research*, No 3595.

Klein, N., (2007), "*The Shock Doctrine",* Penguin Group, London.

Saeed, A., K., (1995), "*Economy of Pakistan",* Salam Publications, Lahore.

Skidelsky, R., (2009), "*Keynes The Return of The Master"*, Public Affairs, New York.

Zaidi, S. Akbar, (2005), "Issues in Pakistan's Economy", Oxford University Press, Karachi.

Appendix

We estimate following final investment equation

Estimation Command:
==========
LS LOG (IP) C R(-1) LOG(GDP(-1)) LOG(IG(-1)) INF LOG(ER)

Estimation Equation:
==========
LOG(IP) = C(1) + C(2)*R(-1) + C(3)*LOG(GDP(-1)) + C(4)*LOG(IG(-1)) + C(5)*INF + C(6)*LOG(ER)

Substituted Coefficients:
==========
LOG(IP) = -3.170204988 - 2.590639414*R(-1) + 1.121536865*LOG(GDP(-1)) + 0.4418204816*LOG(IG(-1)) - 0.9844289801*INF - 0.52013659*LOG(ER)

Dependent Variable: LOG(IP)
Method: Least Squares
Date: 10/28/11 Time: 01:38
Sample (adjusted): 1981 2009
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.170205	2.562622	-1.237094	0.2285
R(-1)	-2.590639	1.513264	-1.711954	0.1004
LOG(GDP(-1))	1.121537	0.224643	4.992539	0.0000
LOG(IG(-1))	0.441820	0.201010	2.197998	0.0383
INF	-0.984429	0.650319	-1.513763	0.1437
LOG(ER)	-0.520137	0.293981	-1.769286	0.0901

R-squared	0.995423	Mean dependent var	11.97105
Adjusted R-squared	0.994427	S.D. dependent var	1.344732
S.E. of regression	0.100384	Akaike info criterion	-1.577637
Sum squared resid	0.231770	Schwarz criterion	-1.294748
Log likelihood	28.87574	F-statistic	1000.319
Durbin-Watson stat	1.980008	Prob(F-statistic)	0.000000

Correlation between private investment and explanatory variables

	IP	R	ER	GDP	IG	INF
IP	1	-0.05149	0.855009	0.987346	0.975972	0.364911

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
http://www.iiste.org

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: http://www.iiste.org/journals/ All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: http://www.iiste.org/book/

Academic conference: http://www.iiste.org/conference/upcoming-conferences-call-for-paper/

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar