The Determinants of Private Investment and the Relationship between Public and Private Investment in Pakistan

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Abstract

This paper analyzes the factors that play an important role in determining private investment in Pakistan using annual data for the period 1970-2006. The econometric tests undertaken support the view that private sector output, net capital inflows to the private sector, total sources of funds and past capital stock have all been significant determinants of private investment rates, while changes in the volume of bank credit also has a positive effect. The empirical evidence suggests that if the sector is squeezed for credit then there will be a reduction in the level of private investment with adverse impacts on the long-term productive capacity of the private sector. The results suggest that overall relationship of public and private investment is one of substitutability. It means there is a "crowding out" effect indicating that most of the physical and financial resources are utilized by public sector, thereby exerts a negative influence on private investment.

JEL classification: E22; H54

Key Words: Private Investment; Public Investment; Crowding out

I. Introduction:

Investment plays a very important role in the economic growth of a country, as it raises the productive capacity of an economy, increases the level of employment and promotes technical progress through embodiment of new techniques. It also plays a crucial role in determining the long-run productive capacity of an economy, because investment creates new capital goods, so a higher rate of investment means that capital stock is growing rapidly.

Mainly, there are two types of investment i.e. public and private investment and these two components can have different impact on economic growth and social conditions of a country. The impact varies because both investments have different marginal productivities. If the marginal productivity of private investment is higher, an increase in the size of public sector at the expense of the private sector might hinder economic growth and well being, even when the share of total investments in GDP remains same.

Private investment is a powerful mean for innovation, economic growth and poverty reduction. Countries with wider and deeper private-sector investments demonstrate accelerated growth. As it creates more job opportunities, generate more revenues and increases income of the poor so it is very important for an economy to increases its investment in private sector. Broad consensus has emerged on the importance of increasing total investment and promoting private-sector development and increasing its share of total investment for long-term growth. But in many developing countries, investment rates are too low, incentives for innovation are insufficient and even returns on investment are not so predictable which is the major cause of slow growth of a developing economy.

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A large body of the theoretical and empirical literature exists, examining the connection between the accumulation of physical capital and economic growth. To be consistent with the theory we shall consider various popular models of investment behavior. In particular, the well renowned theories of investment behavior are the neo-classical theory and flexible accelerator theory of investment. According to Jorgensen (1971), there is a stable relationship between an economy's capital stock, the level of real output and the real user cost of capital. While, the accelerator approach [Chenery, (1952)] emphasizes the role of demand. It links investment to the changes in output due to changes in demand.

The literature on the impact of public investment in developing economies gives inconsistent results on whether it complements or substitutes private investment. Various studies have been done in order to investigate the relationship between public and private investment in developing countries. In general, some components of public investment maybe complementary to private investment and so would be beneficial for growth, while others maybe substitutes and have a less positive, or even negative, effect on growth.

This study aims to investigate the determinants of private investment and the relationship between private and public investment. The study is based on the modified version of the flexible accelerator theory of investment with particular reference to Pakistan. The model is then applied to time-series data over the period 1970 to 2006. The rest of the discussion is organized as follows: section II provides a review of relevant literature. Section III explains the model and framework of analysis. Chapter IV introduces the data set and the construction of variables. Chapter V puts forward the main findings from empirical analysis. Chapter VI presents summary results with some policy implications.

II. Review of Literature:

The theoretical literature on private investment is quite rich and diverse. For the last few decades, in both developed and developing countries, increasing attention has been given to the analysis of productivity of private capital stock and its relation to economic growth. A vast literature has focused on the empirical and theoretical study of the investment process. In addition, public and private investment has been differentiated by a number of studies, arguing that the two types of capital have different functions and productivity [e.g. Khan and Kumar (1997); Khan and Rheinhardt (1990) etc]. A lot of research has been done in order to determine what factors mainly influence investment in private sector. While several general studies of the Pakistan economy have recently been established, literature dealing specifically with private investment is scarce. The exceptions are papers by Khan (1988), Sakr (1993) and Looney (1997) etc

Naqvi (2002) examined the relationship between economic growth, public investment and private investment by using the Co-integrating VAR based method. This analysis is conducted using 37 years of the annual data for Pakistan. The results showed that past government investment does appear to have a positive effect on private investment because of `time to build` characteristics. The accelerator-based models also indicate that the growth in the economy generates investment of both types. However, investment by itself doesn't seem to be igniting source of economic growth. Finally, uncertainty is shown to have a negative impact on private investment because it has much larger impact on private investment than public investment.

In a study done by Sundararajan and Thakur (1980), the authors examined critically the relationships between public and private investment in a developing

country. For this purpose, a dynamic model of public investment, private investment, savings and growth is postulated and applied to India and Korea. The results of the study reveal that public investment exerts a short-term crowding-out effect on private investment.

The model of private investment is estimated by Blejer and Khan (1984) for 24 developing countries with pooled data over the period 1971-79. Their analysis concluded that the change in bank credit to the private sector and net private capital flows is positive and significant. With more credit availability, their productivity increases and so private investment. Finally, their results show that public sector infrastructure investment is complementary to private investment; where as other kinds of public investment would tend to be substitutes for private investment.

Atukeren (2005) analyzed the interaction between public and private investment by using long-term co-integration analysis and Granger causality tests on a sample of 25 developing countries. The findings indicate that both crowding-in and crowding-out effect of public investment occur in developing countries but there is no clear general verdict on whether public investment crowds out private investment or vice-versa. The effects vary from country to country. Moreover, the study also reveals that in some countries there may be crowding-out effect of public investment in the short-run but the overall effect on the private sector might be positive in the longer term.

Mataya and Veemon (1996) have analyzed the investment behavior of public and private sector in Malawi from over the period 1967 to 1988. A neo–classical flexible accelerator model is applied. The results indicate a two-way causal-relationship between public and private investment. The results also suggest that there in an inverse relationship between private investment and real interest rate, but it is positively related to expected level of output and public investment.

In a paper, written by Guimaraes and Unteroberdoerster (2006), the relationship between real output, growth and investment is analyzed particularly in Malaysia after an unprecedented decline in the wake of the Asian crises. The study found out that impact of real growth on investment is positive and highly significant in the long run indicating that 1% increase in real growth will bring 2 to 4 % higher investment. Apart from growth, a dummy variable has been used for an Asian crisis (as it measures uncertainty), which is found statistically significant ands its coefficient is negative in all specifications. The results do not clearly support that capital cost (here it is measured by average real bank lending rates) has a negative short-run impact on the growth of private investment.

Erden and Hocolcombe (2005) have examined the impact of public investment on private investment. For this, the authors have applied several pooled specifications of a standard investment model to a panel of developing economies from the period 1980 to 1997. Their study finds out that public investment crowds in private investment i.e. on average, a 10% increase in public investment is associated with 2 % increase in private investment. Moreover, the results also indicate that in developing economies availability of bank credit is the major constraint for private investment.

Everhart and Sumlinski (2001) analyzed the quality of public investment, its interaction with corruption and the resulting impact on private investment for 63 developing countries from 1970 to 2000. They found out that lagged private investment and the availability of credit to private sector are positive and significant. The external debt is also negative with expected negative sign implying that the presence of large external debt burden illustrates uncertainty. So, funds available for private investment will be reduced where a higher debt service payment is involved.

The results also confirm that higher public investment is associated with a lower private investment i.e. crowding out. Moreover, the coefficient of the corruption index is large and significant showing less corruption and it leads to higher quality public investment which further leads to an increase in private investment

Some studies have emphasized that the availability rather than the cost of finance represents a major constraint on private investment. Thus, the availability of financing seems to be an important factor explaining private investment. In this case, bank credit, foreign capital inflows; etc represents the major determinants of private investment. [Wai and Wong (1982), Agosin (1995) and Sakr (1993)]

Besides past changes in output, real investment also responds to the measure of cost of funds. i.e. interest rate. Lower will be the rate of interest, more investment would take place and vice-versa. [Keynes (1936)]. Inflation rates are an indicator of macro economic stability, which can have adverse impact on private investment. High and unpredictable inflation increases the risk of longer-term investment and thus it is associated with lower investment spending. [Greene and Villanueva (1991) and Oshikoya (1994)]

III. Methodology:

One can proceed to estimate the flexible accelerator investment model that captures some of the institutional and structural characteristics of developing nations such as Pakistan. The choice of the modified accelerator model over more conventional formulations of the neoclassical investment model resides in the fact that in countries such as Pakistan, there are no published capital stock series or reliable estimates for the rate of depreciation.

A mathematical formulation of private investment is represented as follows. Let the desired capital stock (the capital stock that the private sector desires to have in period t) and the actual capital stock of the private sector be denoted by KP^* and KP, respectively, and assume that replacement investment is proportional to the existing capital stock. Then, the gross private investment (IP) is defined as:

$$IP_t = \beta_t (KP^*_t - KP_{t-1}) + \delta KP_{t-1} + \mu_{1t} \qquad (1)$$

The letter u in this and the subsequent equations indicates the disturbance terms.

We assume that the reaction coefficient, β, depends positively on the change in bank credit to the private sector (ΔDCP) and net capital inflow to the private sector (CMP), both in relation to the discrepancy between the desired capital stock and the existing capital stock. Thus,

$$\beta_t = f [\Delta DCP_t / (KP^*_t - KP_{t-1}), CMP_t / (KP^*_t - KP_{t-1}), \mu_{2t}] \qquad (2)$$

A linear regression model for private investment can be constructed if we specify the desired capital stock as being proportional to the private sector output (QP) and assume that equation 2 is linear. Thus, from equation (1) and (2) and the assumption regarding capital stock we have

$$IP_t = a_0 + a_1 (QP_t) + a_2 (\Delta DCP_t) + a_3 (CMP_t) + a_4 (KP_{t-1}) + \mu_{3t} \qquad (3)$$

Assume that the private sector output is a linear function of the government investment (IG) and private investment. Then the investment function for the private sector can be written as

$$IP_t = a_0 + a_1 (B_0 + B_1 IG_t + B_2 IP_t) + a_2 (\Delta DCP_t) + a_3 (CMP_t) + a_4 (KP_t) + \mu_{3t}$$

$$IP_t = b_0 + b_1 (IG_t) + b_2 (\Delta DCP_t) + b_3 (CMP_t) + b_4 (KP_{t-1}) + \mu_{4t} \qquad (4)$$

It is argued that both the change in domestic credit to the private sector and the net capital inflow to the private sector are sources of funds for private investment. Within the context of flow of funds, the inflow of foreign capital to the private sector, be it trade credit or other forms of loans and equities constitutes a source of funds to

this sector. An important component in the inflow of foreign capital in private sector-oriented developing countries is foreign direct investment. But from the point of view of the domestic private investors, it would probably not make much difference whether foreign capital is in the form of direct investment or portfolio investment. For this reason, the inflow of foreign capital to the private sector as a whole is considered to be the determinant of private investment.

The relationship between changes in bank credit in real terms and private investment can be argued on several theoretical grounds. In broad terms, the behavior of each sector in the economy mainly depends on the amount of readily available funds, which may act as a short-run constraint. In the absence of developed capital markets, any short-term and medium-term loans for financing business operations would release the pressure on enterprise and enable them in total to finance a larger amount of capital formation. So, changes in the volume of bank credit are supposed to have a positive impact on private investment activity among developing countries. Moreover, in countries where a large proportion of machinery and equipment has to be imported, credit availability will facilitate imports and exercise a positive impact on private investment.

So, under these assumption, equation (4), maybe respecified as

$$IP_t = c_o + c_1 (IG_t) + c_2 (FP_t) + c_3 (KP_{t-1}) + \mu_{5t} \qquad (5)$$

Where FP is the sum of change in domestic credit to the private sector and the net capital inflow to the private sector.

Equation (5) is subject to further investigation. In the context of a single equation, the estimated coefficient to government investment in this equation, as well as in equation (4), may exaggerate the contributory effect of government investment on private investment as government investment may also exercise an adverse impact on private investment through the decrease in the availability of domestic and foreign credit or a net reduction in the resources available to private sector. This 'financial crowding-out effect' cannot be concerned from equation (5). So the following three-equation recursive model is constructed to shed some light on the issue. This model is based on the assumption of Sundararajan and Thakur that government and private investment compete one to one with each other for financing.

$$FG_t = g_o + g_1 (IG_t) + \mu_{6t} \qquad (6)$$

$$FP_t = F_t - FG_t \qquad (7)$$

$$IP_t = h_o + h_1 (IG_t) + h_2 (FP_t) + h_3 (KP_{t-1}) + \mu_{7t} \qquad (8)$$

Where FG t is the change in banking system's net claims on the government plus net foreign capital inflow to the government. And F is the sum of FG and FP. The predetermined variables in this model are IG_t, F_t and KP_{t-1}. A distinct feature of equation (6) in comparison with equation (8), which is in the same form as equation(5), is that the change in net domestic credit to the government plus net foreign capital inflow to the government is demand-determined. Given the change in total domestic credit of the banking system plus total net foreign capital inflow to the economy, the available domestic credit plus foreign capital for the private sector is then determined as a residual as stated in equation (7). The variable FP_t in equation (8) is thus constrained by equation (6) and (7).

Using the recursive model as specified, the combined direct and indirect impact of government investment on private investment can be observed from the estimated coefficient to government investment in the following reduced form equation.

$$IP_t = k_o + k_1 (IG_t) + k_2 (F_t) + k_3 (KP_{t-1}) + \nu_t \qquad (9)$$

Where $ko = h_o - h_2 g_o$, $k1 = h_1 - h_2 g_1$, $k2 = h_2$, $k3 = h_3$.

And ν_t is a composite disturbance term.

This methodology takes into account the various variables that effect private investment but it ignores real rate of interest. It has been suggested that private investment is likely to respond to some measure of cost of funds i.e. interest rate. As rate of interest increases, cost of borrowing increases and thus there is less incentives for private investors to invest, so private investment declines. So, real interest rate is included in the private investment equation to see the impact of these variables.

$$IP_t = j_0 + j_1 (IG_t) + j_2 (F_t) + j_3 (R\ INT_t) + j_5 (KP_{t-1}) + z_t. \qquad (10)$$

Equation (5) and (9) are the two important econometric equations of our model. As can be seen from the equations, equation (5) constitutes those variables that influence private investment where as equation (9) shows the recursive model that incorporates the financial crowding out effect. While in equation (10), interest rate is included to see its impact on private fixed capital formation. In the empirical part, we shall estimate all these equations. But the theoretical background will be useful to comment on the empirical results. This completes the theoretical part of the study. Equation (3), (4), (5), (9) and (10) will be estimated using time series data.

IV. Data and Estimation Procedure:

In this study, all the data are based on annual figures. The time-series data have been used for the period 1970 to 2006 for Pakistan. There is no direct source of complete data. Therefore, data are collected from different surveys and reports. Some variables are not found directly, so their computation is done. All the nominal variables used in the estimation are measured in million rupees and are converted into real, dividing by GDP deflator (1981=100).

The data for this study have been taken from Handbook of Statistics on Pakistan's Economy, World Development Indicator (WDI), Economic Survey Pakistan and International Financial Statistics (IFS), a publication of International Monetary Fund.

Testing for Unit Roots

We first examine time series properties of the data by using the Augemented Dickey Fuller (ADF) unit root test. The results of ADF test are reported in Table-1. Trend and additional lags were included when they were statistically significant. The ADFs show that all the variables considered are integrated of order. We cannot reject the hypotheses that all the variables are stationary in the first difference, and integrated of order I (1). So the series may be used to estimate OLS regressions.

Table-1: Augmented Dickey Fuller (ADF) Tests

Variable	Model & ADF Stat		Decision
	Levels		
	Constant	Cons. & Trend	I (1)
IG_t	-2.35	-3.16	I (1)
IP_t	-2.49	-2.43	I (1)
QP_t	-1.70	-2.10	I (1)
CMP_t	-2.27	-2.57	I (1)
DCP_t	-2.76	-2.95	I (1)
KP_t	-1.51	-1.76	I (1)
	First Difference		
IG_t	-5.56	-6.11	I (1)
IP_t	-7.32	-8.64	I (1)
QP_t	-4.31	-4.88	I (1)
CMP_t	-1.33	-2.26	I (1)
DCP_t	-3.29	-3.88	I (1)
KP_t	-3.26	-3.71	I (1)

The variables that theoretically as well as empirically affect private fixed capital formation significantly are included in the model.

IG $_t$ = Government investment during year t in real terms (million of rupees). Data are collected from Handbook of Statistics on Pakistan's Economy.

IP $_t$ = Private investment during year t in real terms (million of rupees). Data are collected from Handbook of Statistics on Pakistan's Economy.

QP $_t$ = Private sector output. (i.e. GDP minus domestic product of government services) in year t. Domestic product of government services is calculated by adding government investment and government final consumption. Data for fixed government consumption expenditure and fixed public investment are taken from Handbook of Statistics on Pakistan's Economy.

CMP $_t$ = Net capital inflow to the private sector during year t. Data is taken from WDI. As Data in WDI is in current US$. So, it is multiplied by exchange rate and then dividing by 1000000 to make it into million rupees.

ΔDCP $_t$ = Change in domestic credit of the banking system to the private sector at the end of the year t in real terms (million of rupees). Data is collected from WDI.

FP $_t$ = Sum of the change in the domestic credit of the banking system to the private sector and the net capital inflow to the private sector during year t (CMP $_t$ + ΔDCP $_t$).

FG $_t$ = Sum of the change in banking system's net claims on the government and net capital inflow to the government in year t. Net capital inflow to the government is calculated by adding net long-term capital official sector and net short-term capital official sector in the balance of payment's capital account while banking system's net claims on the government is calculated as net borrowing of government from the banking system. Data are collected from various issues of Pakistan Economic Survey.

KP $_t$ = Estimated capital stock for the private sector at the end of the year t. For Pakistan, there are no data on capital stock for the private sector. The series of KP $_t$ used in the regression equation is estimated by the following method.

$K_1 = I_1 / g + \delta$, $K2 = (1 - \delta) K_1 + I_1$, $K_3 = (1 - \delta) K_2 + I_2$

Where g = compound growth rate of GDP at constant price (1959-60=100) and δ is rate of depreciation per year. Here δ = 0.05. I_1 is gross fixed capital formation in the initial period.

R INT $_t$ = Real interest rate. It is considered as a proxy for the cost of financing investment. It is calculated by subtracting rate of inflation from the nominal interest rate.

Rate of inflation is calculated by the growth of CPI (consumer price index). Data for CPI (1981=100) is taken from WDI and nominal interest rate is taken from IFS.

V. Results: In this chapter, we report the empirical results based on the time-series data for Pakistan over the period 1970 to 2006. The time series model is estimated by OLS. The ordinary least squares method was applied to equations (3), (4), (5) and (9) individually. The main equations are equation (5) and (9). Equation (5) tells us the main factors that influence private investment such as government investment, total availability of funds to private sector and previous year capital stock. Where, equation (9) constitutes the recursive model that shows the combined direct and indirect impact of government investment on private investment. The regression results are shown in tables 1 and 2.

Table 2: Parameters Estimates of the Private Investment Model

Variables	Equation 3	Equation 4	Equation 5	Equation 9	Equation 10
Constant	-4.10 (-0.15)	74.3 (2.43)*	77.41 (2.19)*	101.14 (2.4)*	166.1762 (2.98)*
QP $_t$	0.072 (3.45)*	-	-	-	-
ΔDCP $_t$	0.044 (0.72)	0.035 (0.48)	-	-	-
CMP $_t$	0.150 (1.86)**	0.467 (4.21)*	-	-	-
KP $_{t-1}$	0.086 (7.36)*	-	0.130 (6.17)*	0.19 (9.5)*	0.178 (9.23)*
IG $_t$	-	-0.1180 (-0.44)	-0.34 (-1.27)	-0.79 (-2.8)*	-0.53 (-1.68)***
KP $_t$	-	0.092 (3.82)*	-	-	-
FP $_t$	-	-	0.275 (3.6)*	0.05 (0.67)	0.027 (0.35)
R Int $_t$	-	-	-	-	-11.437 (-1.71)***
R⁻2	0.97	0.96	0.96	0.94	0.95
DW	1.37	1.34	1.37	1.20	1.31
F Stat.	294	207	235	1.62	140

Note: the values with * and ** are significant at 1% and 5% significantly.

The results show that the overall performance of the estimated equations is satisfactory. The value of R^2 appears to be reasonably high for Pakistan for all these equations. Furthermore, all the F values are significant at 1% level of significance. As the F-test shows that the model can explain the variation in private investment at $\alpha = 0.01$ significance level, the Durbin Watson test shows that there is no auto-correlation in these equations.

The effect of private sector output is found to be positive and significant at the 1 % level on private investment. A 1% point increase in private sector output will increase private sector investment by 7% point because when private sector output increases, income and revenues increase and thus it induces private investors to invest more because of higher profits in future.

As far as the coefficient of government investment is concerned, it shows the negative sign but insignificant effect on private investment. It means that if there is an increase in the fixed government capital formation, it will reduce private investment, hence showing the substitute role between these two types of investment. But as the variable is insignificant, so our studies do not support significantly on empirical grounds.

The effect of change in domestic credit to private sector is found to be positive but insignificant. Therefore, it suggests that the change in bank credit does not have any significant favorable effect on the private investment. The reason for this can be that credit taken is basically misused. Bank credit is available for private investors. They take it for investment purposes but spend it on non-investment purposes. Moreover, the facility of credit does not only matter but the cost of financing is also very important. So the result implies a direct role of monetary policy in influencing

private investment behavior. Since, monetary policy in Pakistan has been implemented through the use of credit rationing. For such type of policies to work, financial markets must be kept segmented and restricted.

The estimated coefficient of the net capital inflow to the private sector is positive and significant. It supports the hypothesis of Blejer and Khan (1984) and Wai and Wong (1982). As one of the increasingly significant component in the inflow of foreign capital is foreign direct investment, So it can produce the positive effects on private investment through different mechanisms. Firstly, the foreign investment may have a direct linkage effect on investment in domestic industries. For example, the establishment of a foreign automobile plant may induce the investors to invest in domestic tire and petrochemical industries. Secondly, an increase in the foreign direct investment may increase imports of consumption goods through an increase in income. Thirdly, the increase in output or expenditure due to an increase in FDI could produce an accelerator effect on domestic investment. Thus, through all these channels there will be an increase in private investment due to a one-unit increase in the net capital inflow[1].

According to the results of equation 5, total capital flow to the private sector is positive and significant at 1% level. It is consistent with the empirical evidence that an increase in the net flow of credit to the private sector will benefit private investment. The estimation also includes previous period capital stock and it can be seen from the results that the coefficient for this variable is statistically significant at the 1% level and bears a positive sign, although it is a physical measure that varies by sector [see Pargal, (2003)]. This result implies that if there is some amount of capital stock left i.e. past capital stock in the form of existing plants, machinery, equipments, etc, it is associated with the current level of investment as it helps in increasing the net capital stock for the next year and also increases profits. So, there is a positive relationship between these two

Assuming that the specification of the model is a correct one, the net effect of government investment on private investment that is the contributory effect less the financial crowding-out effect is negative and significant. The parameter estimate for this variable is -0.79. It implies the substitute role between private and public investment for Pakistan. So, a 1% point increase in government investment crowds outs private investment by 79% point. This finding supports the argument of Sundararajan and Thakur (1980), Akkina and Celebi (2002) and Blejer and Khan (1984) while it differs from the argument of Srinivasan and Narayana (1977) and Greene and Villanueva (1991).

There are different channels through which public investment can crowd out private investment. Firstly, government investment can crowd out private investment through increased borrowing and higher tax burden in the future. For example, if public sector investments are financed by borrowing, this leads to an increase in the market interest rate and thus raises the cost of capital for the private sector; in other words, they are crowded out. In the case of tax financing of public sector investment, the taxes may distort the resource allocation decisions of private investors in the economy by changing relative prices. Secondly, it is also argued that public investment exerts a negative influence on private investment. This argument is based on the fact that both private and public sectors compete for a limited amount of physical and financial resources and because of government dominating role in the

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[1] For a useful discussion on FDI see, for example, Majeed and Ahmad (2007, 2008).

developing countries like Pakistan, it draws off most of the resources by itself which results in having an adverse effect on private investment.

According to the results, public investment crowds out private investment for the case of Pakistan, but every component of private investment cannot be crowded out completely as there are few components of private investment, which are complementary to public investment.

The parameter estimate of F_t is 0.053, which is positive but insignificant. It shows that private sector absorbs 5% of the total resources, which means that it is not fully utilizing all the resources and funds available in the economy. Thus, it indicates that funds and resources are being used more by the government sector than the private sector. If the overall quantity of financial resources is given, then any attempt by the government to increase its share of either domestic or foreign financing at the expense of the private sector would lead to crowding out and to a decline in the level of private investment. As the role of government investment in Pakistan is the substitute one, indicating that government absorb most of the resources by its dominant role, so it negatively effects private capital formation and most likely leads to a fall in total investment as well. The coefficient of the lagged value of capital stock is 0.19, which is positive and significant indicating that a 1% point increase in the past capital stock will increase private investment by 19% point.

We now discuss the estimated results of equation (10). This equation consists of a very important variable which influences private investment i.e. real interest rate. So, it is included in the equation of private investment i.e. equation (5). The regression result for this equation is shown in table (2). It is still consistent with the previous results that, government investment is substitutability to private investment in the case of Pakistan. Total amount of resources are being utilized more by the government sector leaving less resources for the private sector. It is obvious from the coefficient of IG_t, which is negative and significant at 10% level.

The results further show that the real interest rate has a significant negative impact on private investment in case of Pakistan. The real rate of interest is included to capture the impact of the cost of financing on investment decisions. At higher interest rates, fewer investment projects have a prospective return high enough to justify borrowing to finance them. This differs from the McKinnon-Shaw (1973) hypothesis while it favors the arguments given by Pargal (2003) and Keynes (1936). The coefficient of the previous year capital stock is positive and significant indicating that 1% point increase in past capital stock will increase investment by 17% point in next year.

VI. Conclusion:

This study has been an attempt to identify the factors, which affect private investment significantly and which can be used as policy variables to get the desired results for capital formation and determining the investment behaviors in Pakistan and to determine the relationship between public and private investment. For this purpose, a modified version of the flexible accelerator theory of investment is applied.

The empirical analysis is based on the time series data for Pakistan over the period 1970 to 2006. Most of the data have been derived from WDI, IFS and various issues of Economic Survey. All the regression equations are estimated by the OLS technique. The results for this study provide some support for the hypothesis that rates of private investment in Pakistan are affected by important macro-economic variables. The econometric tests undertaken support the view that private sector output, net capital inflows to the private sector, total sources of funds and past capital stock have

all been significant determinants of private investment rates, while changes in the volume of bank credit also has a positive effect. The empirical evidence suggests that if the sector is squeezed for credit then there will be a reduction in the level of private investment with adverse impacts on the long-term productive capacity of the private sector.

In order to see whether public investment 'crowds-in' or 'crowds-out' private investment for the case of Pakistan, the recursive model was introduced in the equations. The results suggest that overall relationship of public and private investment is one of substitutability. It means there is a "crowding out" effect indicating that most of the physical and financial resources are utilized by public sector, thereby exerts a negative influence on private investment.

There is an introduction of a very important variable that is real interest rate. The results suggest that interest rate is found to have a negative and significant effect on private investment. It is consistent with the empirical evidence that when interest rate rises, cost of borrowing increases so there will be reduction in the future profits. As a result, it hinders private investors to invest more. The results provide evidence that private investment in Pakistan is constrained by the availability of financing, and that monetary policy, by varying the flow of credit to the private sector, can thus directly and effectively change private investment decisions.

In order to attract the private investment, a country must adopt suitable policies. The proper use of bank credit as policy instrument can influence the level of private capital formation in Pakistan. With respect to fiscal policy, public sector investment is found to play an important role in boosting up the level of private investment. A reduction in investment on the infrastructure by this sector as policy would discourage private investment and may retard the growth. So, it means there should be provision of proper physical, technological and financial infra-structure by the government.

Moreover, cost of financing or funds i.e. interest rate is required to be low in developing countries. Only then, it will induce private investors to invest. High costs reduce profits and discourage investment. Moreover, they also create disincentives for firms to formalize, with a resultant loss of benefits to the economy. Therefore, government should reduce the borrowing and lending charges.

It is intended to assist governments to create an environment that attracts domestic and foreign investors. It would also be beneficial to increase the capacity of local firms to respond to new investment opportunities and to expand business relationships with foreign investors. Finally, public sector partners in developing countries can be encouraged to engage more with the private sector, such as through public-private partnership.

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