Public Policy and Private Investment in Pakistan

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Abstract

This paper analyzes the importance of government policy in determining private investment in Pakistan. The empirical results show that public sector investment, changes in bank credit to the private sector and degree of capacity in the economy are playing an important role in determination of private investment. The level of expected GDP also positively affected the private investment, which is consistent with flexible accelerator model. The results are also consistent with the maintained hypothesis that public infrastructure investment is complimentary to private investment; whereas other kinds of public investment tend to be substitutes for private investment.

I.   Introduction

The accumulation of real physical capital stock has long been regarded as one of the major factors in economic development. Fluctuations in investment lead to significant changes on the functioning of an economy. More importantly, in developing countries, private investment plays a greater role than public investment in determining economic growth (Oshikoya, 1994; Naqvi, 2002). As a result, a number of studies have been made to investigate the determinants of private investment in developing countries (Abbas, 2003; Atukeren, 2005). The changes in macroeconomic variables due to financial liberalization are likely to modify the parameters of estimated investment functions, because relaxation of credit constraints and increased influence of borrowing costs both affect the investment decisions (McKinnon and Shaw, 1973; Akkina and Celebi, 2002).

This study investigates the role and scope of public policy for private investment in Pakistan. The study establishes a direct relation between government policy and private investment. The empirical results provide

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evidence that private investment in Pakistan is constrained due to variations in the flow of credit to the private sector. In contrast to previous studies, we are able to establish a quantitatively important role of public sector investment in the process of private investment. This role depends on the way in which public sector investment is introduced. It becomes fruitful only, when a clear distinction is made between long-term/infrastructural and short-term/non-infrastructural public investment. In either case the Pakistan government does appear to be in a position to alter the pattern of private investment by changing its own investment policy.

The rest of the discussion is organized as follows: section II provides survey of some selected studies: section III explains the model and framework of analysis; section IV introduces the dataset and the construction of variables, Section V puts forward the main findings from empirical analysis. Section VI consists of conclusion and policy implications of the study.

II.   Literature Review and Theoretical Framework

There is an abundant body of literature available on the empirical and theoretical study of the investment process. In existing literature, some have focused the investment problem by dividing it into two parts; public investment and private investment (Khan and Kumar, 1997; Khan and Rheinhardt, 1990). There are some recent studies that addressed only the issue of private investment (Khan, 1988; Sakr, 1993; Looney, 1997).

The debate whether private investment and public investment are complements or substitutes, has drawn the attention of researchers towards infrastructure investment that has positive/negative impact on private investment. The studies that mentioned a positive impact of public investment on private investment and, a positive/negative relationship between infrastructure/non-infrastructure and private investment include Oshikoya (1994), Blejer and Khan (1984), Cardoso (1993), Sakr (1993), Sasaki and Khan (2001), Erden and Hocolcombe (2005), where as the positive case is observed by Looney (1997), Akkina and Celebi (1992), and Everhart and Sumlinski (2001). The basic result of these studies is that government investment plays a very important role in determining the private investment; either it will crowd-in or crowd-out the private investment.

Besides this, Everhart and Sumlinski (2001) concluded that private investment will be reduced when higher debt service payments are involved. The studies that investigated and confirmed a positive relation between private investment and real GDP are Oshikoya, 1994; Looney, 1997; Sakr, 1993; Greene

and Villanueva, 1991; Veemon and Charles, 1996; Akkina and Celebi, 1992; Guimaraes and Unteroberdoerster, 2006; Cardoso, 1993; Maxfield and Pastor, 1999; Ramirez, 1994.

The availability of bank credit in developing economies is considered as a major constraint in the way of private investment. Some important studies that analyzed this relationship include Wai and Wong, 1982; Agosin, 1995; Sakr, 1993; Blejer and Khan, 1984; and Akkina and Celebi, 1992. These studies concluded that a positive relation holds between change in bank credit and private sector investment.

The cost of capital is another determinant of private investment which is measured by real interest rate. Some studies like; Greene and Villanueva (1991) and Mataya and Veemon (1996) support the hypothesis that private investment is negatively related to real interest rate where as the empirical results of Guimaraes and Unteroberdoerster (2006) do not support the above hypothesis but concluded that capital cost has a negative short-run impact on the growth of private investment.

III.   Model Specification, Variables and Data Sources

Blejer and Khan (1984) bring modification in flexible accelerator model to incorporate institutional and structural characteristics of a developing economy. By this modification, it becomes possible to assume that desired stock of capital is proportional to expected output in the long run. This is a quite standard formulation and can be rationalized by assuming that the underlying production function has fixed proportion among factor inputs because factor prices are not considered.

In this study we followed the approach suggested by Coen (1971). The methodology follows the track suggested Blejer and Khan (1984). This approach makes possible for private investment to vary with underlying economic conditions and it is consistent with the flexible accelerator framework. The response of private investment to the gap between desired and actual investment is measured by the coefficient B. It is also assumed that the coefficient B will vary systematically with economic factors that influence the ability of private investors to achieve the desired level of investment. The study hypothesizes that the response of private investors depends on; the stage of the business cycle, the availability of financing and the level of public sector investment.

During the expansionary phase of the cycle, demand conditions are buoyant. The private investors are expected to respond more rapidly to changes in desired investment. When trend or potential level of output is taken as an

indicator of full capacity, then the reaction of investors to the discrepancy between the desired and actual rates of investment would tend to be smaller if actual output is above the full capacity. This will lead to more strain on available resources and an increase in input prices. Alternatively, investment could respond more rapidly in situations of excess capacity. It is, therefore, not entirely clear what effect, on average, cyclical factors can be expected to have on the change in private investment.

The effect of the availability of financing on the coefficient of adjustment is less ambiguous. A clear consensus has emerged in recent years that, in contrast to developed countries, one of the principal constraints on investment in developing countries are quantity, rather than the cost of financial resources. The rates of return on investment in these countries typically tend to be quite high, whereas real interest rates on loan-able funds are kept low by government for a variety of reasons. In such circumstances the investor cannot be expected to equate the current marginal product of capital to its services cost. Indeed, these countries are facing the problem of limited financing resources and price mechanism that can't operate smoothly, so it is legitimate to hypothesize that the private investor is restricted by the level of available bank financing. Any effect exerted by the rate of interest on private investment is not direct within this rationing framework but, rather, occurs via the channel of financial savings.

An increase in real credit to the private sector will in general encourage real private investment, and rolling over bank loans can sufficiently lengthen the maturity of the debt. The role of foreign capital flows in the domestic investment process, whether they are in the form of direct or portfolio investment has also been documented by Wai and Wong (1982). The effects of foreign financing are broadly similar to the effects of variations in bank credit; both tend to increase investment because they expand the pool of financial savings. Since control on volume and composition of bank credit usually is the principal instrument of monetary policy in developing countries. Therefore, monetary policy has direct and strong impact on the rate of private investment. In a similar vein, private investment can be influenced by interest rate and exchange rate policies that cause changes in the private capital flows, which augment or reduce financial resources available to the private sector.

Finally, it is a well accepted proposition that in developing countries, private and public investments are related. The public investment can cause crowding out if it utilizes scarce physical and financial resources that would otherwise be available to the private sector or it produces marketable output that competes with private output. Furthermore, the financing of public sector investment—whether through taxes, issuance of debt, or inflation--- will lower

the resources available to the private sector and thus depress private investment activity. But the public investment which is related to infrastructure and provisions of public goods becomes complement to private investment. Public investment of this type can enhance the possibilities for private investment and raise the productivity of capital, increase the demand for private output through increased demand for inputs and ancillary services, and augment overall resource availability by expanding aggregate output and savings.

The overall effect of public investment on private investment, therefore, depends on the relative strength of these various effects, and there is no a priori reason to believe that they are necessarily substitutes or complements. Assuming that the possibility of financial crowding out is taken into account by the composite variable incorporating both the change in bank credit to the private sector and private capital flows, our specific concern here is with real aspects of public sector investment. If, on average, public and private investments are substitutes, we would expect that the coefficient of adjustment of private investment would become smaller as the rate of public investment increases; conversely, complementarity would imply a faster response of private investment. Again, this allows us to relate private investment behavior to government policy, in this case given by changes in government capital expenditures.

3.1.   The Model

On the basis of arguments mentioned above, we can express the coefficients of adjustment as a function of cyclical factors and monetary and fiscal policy variables. A linear representation of this relationship can be as follow:

$$B_t = b_0 + 1/(I^*_t - I_{t-1})\,(b_1\,GAP_t + b_2\,dDCR_t + b_3\,GIR_t + b_4\,RIR_t) \qquad (1)$$

Where:

B_t = Coefficient of adjustment.

I^*_t = realized investment in time period t

I_{t-1} = lagged investment

GAP_t = cyclical factors, given by the difference between actual and trend output.

$dDCR_t$ = change in real bank credit to the private sector plus real net private capital flows.

GIR_t = real public sector investment.

RIR_t = real interest rate.

The coefficient of adjustment (B_t) depends on both the level (GIR) and the change in public sector investment (dGIR), with the effect of the change in public investment considered to be ambiguous. The strict accelerator (b_0) expected to be positive and closer to unity in the long run. This result would ensure that in the steady state the capital output ratio would be constant. The effects of government policy on private investment can be directly obtained from the estimates of b_2, b_3 and b_4. The coefficient b_4 expected to be positive and b_3 can be negative or positive; negative in the case of real crowding out and positive in the case of crowding in.

An alternative approach is used to make the distinction between kinds of public investment whether it is expected or not. When expected public investment is closer to the long-term component then it exerts a positive influence on private investment, where as the effect of the unexpected or surprise component is uncertain. To calculate expected real public investment we used an empirical method by fitting a first-order autoregressive process as below:

$$EGIR_t = p_o + p_1 \, GIR_{t-1} \qquad (2)$$

Where $EGIR_t$ is the expected real gross public sector investment, p_0 is the average level of real public sector investment and p_1 is the auto regressive parameter.

The list of variables used in the model includes; government investment (IG), private investment (IP), change in domestic credit of the banking system to the private sector (ΔDCP), real interest rate (RINT), real gross domestic product (YR), trend value of real GDP (TYR), deviation of real GDP from its trend value (GAP), trend value of real gross public sector investment (TGIR), expected real gross public sector investment (EGIR) and δ is the rate of depreciation.

$$IP_t[1-(1-\lambda)(1+g)L] = \lambda b_0 a[YR_{t-1}-(1-\delta)YR_{t-2}]+[1-(1-\lambda)(1+g)L]$$
$$.[b_1GAP_t + b_2\Delta DCR_t + b_3GIR_t + (1-b_0)\,IPt_{t-1}] \qquad (3)$$

$$IP_t[1-(1-\lambda)(1+g)L] = \lambda b_0 a[YR_{t-1}-(1-\delta)YR_{t-2}]+[1-(1-\lambda)(1+g)L]$$
$$.[b_1GAP_t + b_2\Delta DCR_t + b_3GIR_t + b_4\Delta GIR_t + (1-b_0)\,IPt_{t-1}] \qquad (4)$$

$$IP_t[1-(1-\lambda)(1+g)L] = \lambda b_0 a[YR_{t-1}-(1-\delta)YR_{t-2}]+[1-(1-\lambda)(1+g)L]$$
$$.[b_1GAP_t + b_2\Delta DCR_t + b_3TGIR_t + b_4(GIR_t - TGIR_t) + (1-b_0)\,IPt_{t-1}] \qquad (5)$$

$$IP_t[1-(1-\lambda)(1+g)L] = \lambda b_0 a[YR_{t-1}-(1-\delta)YR_{t-2}]+[1-(1-\lambda)(1+g)L]$$
$$.[b_1GAP_t + b_2\Delta DCR_t + b_3EGIR_t + b_4(GIR_t - EGIR_t) + (1-b_0)\,IPt_{t-1}] \qquad (6)$$

This study used annual data series for the period 1970 to 2004 for Pakistan. The data series are collected from Handbook of Statistics on Pakistan's Economy, World Development Indicators (WDI), Economic Survey of Pakistan (various issues) and International Financial Statistics (IFS). All nominal data series are converted into real by deflating them with GDP deflator.

IV. Estimation and Empirical Results

The study used annual data series for the period of 1970-04 for the estimation equations (3) to (6) for Pakistan's economy. Ordinary Least Square (OLS) technique is used for estimation and results are presented in the following table 1.

Table: 1. Determinants of Real Private Investment

Parameters	Equation (3)	Equation (4)	Equation (5)	Equation (6)
Constant	131.66*	-205.0	-103*	-205
dYR_{t-1}	0.12*	0.19*	0.13**	0.19*
ΔDCR_t	0.33*	0.12*	0.07*	0.12*
IP_{t-1}	0.17*	0.35	0.30	0.35
GIR_t	-0.74*	0.29	-	-
$RINT_t$	-6.66	-	-	-
GAP_t	-	-0.0136*	-0.08*	-0.01*
ΔGIR_t	-	-0.69*		-
$TGIR_t$	-	-	0.12	-
$GIR_t - TGIR_t$	-	-	-0.13*	-
$EGIR_t$	-	-	-	0.43*
$GIR_t - EGIR_t$	-	-	-	-0.40*
R^2	0.96	0.99	0.98	0.99
Adj R^2	0.95	0.99	0.98	0.99
D W	2.31	1.87	1.65	1.86
F Stat	149	679	379	679

*, ** *shows 1% and 5% level of significance respectively.*

The real private investment is dependent variable of all four equations. The results of equation (3) show that all variables are having expected sign and significant except real interest rate, that is used as proxy for the cost of financing investment. The increase in real GDP and lag value of private investment will bring an increase in private investment. The results also predict that increase in gross public investment will reduce the level of private investment. This implies that private investment and public investments are substitute as predicted by Akkina and Celebi (1992), Sasaki and Khan (2001), Everhalt and Sumlinski (2001) and, Erden and Hocolcombe (2005).

The empirical results also revealed that change in domestic credit of banking sector to private sector will positively affect the level of private investment. If the over all 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 private sector would lead to crowding out and decline in the level of private investment. A decline would most likely lead to a fall in total investment. As the control over domestic credit is the major tool of monetary policy, this would be important for the real sector's response to changes in monetary policy. These results are consistent with the findings of Wai and Wong (1982), Blegir and Khan (1984), Agosin (1995) and Sakr (1993). The coefficient of trend in real interest rate variable is in-significant but has expected negative sign. These findings are corroborated with finding of Guimares and Unteroberdoerster (2006).

The equation (4) results are almost the same except that the coefficient of lagged value of private investment becomes insignificant and two more variables are introduced in this equation which are having negative signs and also significant. The coefficient of deviation of real GDP from its trend value indicates that one unit deviation of GDP from its trend value will inversely affect the level of private investment. This also supports the hypotheses that private investment is positively related to the degree of capacity in the economy. It shows the constraint of resource availability when output is above its natural level. The coefficient of second variable, change in gross real public investment shows that change in it will inversely affect the private investment. These results imply that the level of public sector investment has a positive effect on private investment, where as the change in government investment has a negative effect. On the basis of these results, it could be argued that it is not the level of public investment that crowds out the private sector investment rather; it is the change in public investment that appears to have strong crowding out effect.

In equation (5), we introduced two more variables; trend value of real gross public investment and the gap between gross real public investment and its trend. The coefficient of first newly introduced variable is in-significant but second has significant t-value. The behavior of all other variables remained almost same as in previous equations (3) and (4). In equation (6), we introduced two more variables; expected gross real public investment and the gap between gross real public investment and expected gross real public investment. Both variables are significant but expected gross real public investment has positive impact and the variable named, gap between gross real public investment and expected gross real public investment has negative impact.

These last two equations' results are the most interesting from the point of view of the empirical relationship between public and private investment in Pakistan. The estimates of equation (5) indicate that the trend component of real public investment exerts a positive influence on the level of real private investment; where as deviations from the trend have the opposite effect. The results are consistent with the maintained hypothesis that public infrastructure investment is complementary to private investment; where as other kinds of public investment tend to be substitutes for private investment. The same pattern is apparent in the estimates for equation (6), where the distinction is made between the expected and unexpected component of pubic sector investment. Here an expected increase in public sector investment would raise the rate of private investment, but an unexpected increase would have adverse effect on private capital formulation.

All other parameters for all four models like; R^2, Adjusted R^2 and DW Stat. indicate that all these performed well and relevant results are reliable for policy implications.

V.   Conclusion and Policy Implications

This study shows that tight monetary policy has negative effect on the level of private investment and economic growth as it reduces the availability of real credit to the private sector. Moreover, attempts made by the public sector to increase its share of domestic financial resources should be discouraged as it would crowd out the private investment. The same is the case with the foreign financing and public borrowing. It is suggested that government should increase the infrastructure investment and reduce non-development expenditure, since infrastructure provides sound foundations for new investment.

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