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Macroeconomic Policy and Private Investment in Pakistan

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This paper demonstrates that a theoretically consistent investment function for a developing country like Pakistan can be specified and estimated. A variant of the flexible accelerator model was modified to incorporate the special features of developing countries. Within the framework of the model thus derived, the impact of fiscal and monetary policies on private investment has been examined.

I. INTRODUCTION

Ever since the publication of Jorgenson's (1967, 1971) seminal contributions, the neoclassical model of investment has served as a theoretical foundation for estimating investment function in industrialized countries. In the case of developing countries, however, there exists a large gap between the modern theory of investment and the investment functions that have been estimated.[1]

The purpose of this paper is as follows: First, to specify and estimate a theoretically consistent private investment function for Pakistan. As the Jorgenson type neoclassical model of investment cannot be applied as such to Pakistan,[2] a variant of flexible accelerator model will serve as theoretical foundation for our empirical investment function. Second, we extend the work of earlier authors[3] by specifying

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[1] For example, Naqvi *et al.* (1983), Naqvi *et al.* (1984), Naqvi and Ahmed (1986), Khilji (1982), Krishnamurty and Pandit (1985), Mikhail (1985), Rashid (1984) and Bhattacharya (1984) have all estimated investment functions with no sound theoretical foundation.

[2] For more on this issue see Blejer and Khan (1984), Wai and Wong (1982) and Sundararajan and Thakur (1980).

[3] See for example Sundararajan and Thakur (1980), Wai and Wong (1982), Blejer and Khan (1984) and Khan (1987).

and estimating private investment in disaggregated form. Third, within the framework of the model derived, the impact of monetary and fiscal policies on private investment will be examined. Since monetary policy in Pakistan has been implemented through the use of credit rationing, bank credit to the private sector will serve as an instrument of monetary policy. Public sector investment, on the other hand, will serve as an instrument of fiscal policy. This will also enable us to shed light on the issue of substitution and complementary roles of public investment in Pakistan.[4, 5]

The plan of the paper is as follows: In Section II we discuss the theoretical foundation of the model relevant to developing countries. Data and its sources are also discussed briefly in the same section. The results corresponding to the derived model are presented in Section III. The last section deals with concluding remarks and the policy implications of the research.

II. MODEL SPECIFICATION

The standard neoclassical optimizing investment model cannot be applied as such to Pakistan because of the various institutional and structural difficulties listed above. The model of private capital formation which we intend to develop here is, therefore, a variant of the flexible accelerator type. The roles of fiscal and monetary authorities are explicitly introduced within the framework of the derived model.

The production technology for our model is assumed to have fixed proportions among factor inputs. The choice of technique is simply based on its relative simplicity because factor prices do not enter into the specification and is not subject to arguments against its use in an underutilization situation.[6] The long-run version of the accelerator principle can be derived from the underlying technology by assuming that desired capital stock (K_t^*) is proportional to expected output (y_t^e),

$$K_t^* = \alpha y_t^e \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

[4] We shall discuss this issue in detail in Section II.

[5] In the literature the substitution and complementary roles of public investment are represented by 'crowding out' and 'crowding in' respectively. Since interest rates in developing countries are not determined freely by market forces; rather, they are administered by the monetary authority the use of the word 'crowding out' and 'crowding in' seems to be inappropriate for a developing country like Pakistan

[6] Various authors have used different technology, for example, Khan (1987) has used 'nested' C.E.S. production technology; Blejer and Khan (1984) and Sundararajan and Thakur (1980) have used fixed coefficient and Cobb-Douglas technology respectively. No matter what production technology is ultimately used, it will be only an approximation. See Klein (1974).

The adjustment of capital stock to its desired level is assumed to occur with a lag. Thus, we specify an adjustment mechanism as

$$\Delta K_t = \beta(K_t^* - K_{t-1}) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

or

$$K_t = \beta K_t^* + (1-\beta) K_{t-1} \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

where K_t is the actual capital stock; therefore, ΔK_t is net private investment, and β is the adjustment parameter such that $0 \leqslant \beta \leqslant 1$. Gross private investment is defined as

$$I_t^p = \Delta K_t + \delta K_{t-1} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (4)$$

where δ is the rate of depreciation. Equation (4) can also be written as

$$I_t^p = [1-(1-\delta)L]K_t \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (5)$$

where L is a lag operator i.e. $LK_t = K_{t-1}$. Writing Equation (5) in terms of K_t we have

$$K_t = \frac{I_t^p}{[1-(1-\delta)L]} \text{ and } K_{t-1} = \frac{I_{t-1}^p}{[1-(1-\delta)L]} \quad \ldots \quad \ldots \quad (6)$$

Substituting Equation (6) into Equation (3) we have

$$\frac{I_t^p}{[1-(1-\delta)L]} = \beta K_t^* + (1-\beta)\frac{I_{t-1}^p}{[1-(1-\delta)L]} \quad \ldots \quad \ldots \quad (7)$$

Solving Equation (7) we get

$$I_t^p = \beta[1-(1-\delta)L]\, K_t^* + (1-\beta) I_{t-1}^p \quad \ldots \quad \ldots \quad (8)$$

An alternative way to derive Equation (8) is to specify a partial adjustment mechanism directly for private investment, i.e.,

$$\Delta I_t^p = \beta\,[I_t^{*p} - I_{t-1}^p] \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (9)$$

where I^{*p}_t is the desired level of private investment. In the steady state desired private investment is given as

$$I^{*p}_t = [1-(1-\delta)L]\ K^*_t \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (10)$$

If we combine Equations (9) and (10) and solve for I^p_t we get Equation (8).

We now depart from the traditional optimizing model of the neoclassical tradition and follow the approach suggested by Coen (1971), where it is argued that in order to achieve the desired level of investment, private investors react to the gap between desired and actual investment, as measured by the β coefficient. We agrue that the reaction of private investors depends upon three main factors: (1) general market conditions; (2) the availability of bank credit to the private sector; and (3) the level of public sector investment. Thus, the coefficient of adjustment, β, is specified as a function of these three factors in relation to the discrepancy between the desired and actual investment.

$$\beta = \Psi_0 + \frac{1}{I^{*p}_t - I^p_{t-1}} [\Psi_1 G_y + \Psi_2 \Delta C^p_r + \Psi_3 I_{go}] \quad \ldots \quad (11)$$

The choice of general market condition (G_y) as an argument in Equation (11) is made on the assumption that the private investor would respond quickly to changes in desired investment if market conditions are favourable. Assuming the trend level of gross domestic product (GDP) as an indicator of full capacity, if actual GDP exceeds capacity output the private investor's reaction to the gap between the desired and actual investment would be slower. On the other hand, if actual GDP falls short of the full capacity level, the private investor would react sharply to the discrepancy between the desired and actual investment. Hence, the effect of general market conditions on private investment is at best ambiguous.

The choice of bank credit to the private sector (ΔC^p_rt) as an argument in Equation (11) is made on the basis of a vast body of literature on "financial repression". McKinnon (1973); Shaw (1973); Fry (1980, 1982) and Galbis (1979) have argued that low nominal interest rates, interest rate ceilings combined with high and variable rates of inflation have retarded the process of financial deepening in many developing countries. In the case of Pakistan, financial repression has been prevalent since its inception. The government for a variety of reasons, always keeps the real interest rate low which impedes financial deepening, capital formation and growth. The money or capital market remains relatively less developed and the interest rate is not

determined by the free play of market forces rather it is administered by the monetary authorities, therefore, it does not reflect the true cost of financing investment.[7]

Second, in the traditional Keynesian model the link between the real and monetary sectors are provided by the rate of interest via its effect on investment. This has been the standard approach in the model for developed countries because of the very nature of the well-organized capital market. This link seems to be inapplicable in the model for developing economies. Thus, bank credit in the investment function actually provides a link between the real and monetary sectors. In doing so it is also clear that monetary policy can have a direct influence on the rate of private investment.

The choice of public investment (I_{go}) as an argument in Equation (11) is made on the following grounds. It is a well-accepted proposition that in developing countries both private and public sector investment play important roles in the country's economic development. Pakistan, being a mixed economy, is a typical example of the above proposition. However, there exists a disagreement as to whether on balance, public sector investment raises or discourages private investment. Ahluwalia (1982) and Srinivasan and Narayana (1977), on the one hand, argue that public investment not only provides supply of crucial inputs such as irrigation, power, transport and communication, thereby encouraging private investment, but also augments aggregate demand. Hence, their views project complementarity between public and private investment.

On the other hand, Sundararajan and Thakur (1980) argue that public investment exerts a negative influence on private investment. Their 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 its dominating role in developing countries, the public sector siphons resources for its use through licensing and other controls. Their views suggest a substitutability between the public and private sectors.

It is clear that the issue is an empirical one, and private investment must be studied at a disaggregated level. A distinction must be drawn between agriculture and manufacturing sectors to obtain a proper perspective of the dominance of complimentarity and substitutability. Therefore, the purpose of including public investment in the private investment function is to analyse the above issue for Pakistan.

On the basis of the above arguments, we now complete the specification of the private investment function. Substitute Equation (11) into Equation (9) to get

[7] For a more detailed discussion on the importance of interest rates in developing countries, see Lanyi and Saracoglu (1983). Furthermore in a recent paper Edwards and Khan (1985) analysed the positive association between the degree of development of financial sector (liberalization of domestic financial market) and the general economic performance.

$$\Delta I_t^p = \left\{\Psi_0 + \frac{1}{I_t^{*p} - I_{t-1}^p}\ (\Psi_1 G_y + \Psi_2 \Delta C_r^p + \Psi_3 I_{go})\right\}$$

$$(I_t^{*p} - I_{t-1}^p) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (12)$$

Simplifying Equation (12), we get

$$I_t^p = \Psi_0 I_t^{*p} + \Psi_1 G_y + \Psi_2 \Delta C_r^p + \Psi_3 I_{go} + (1 - \Psi_0) I_{t-1}^p \quad \ldots \quad (13)$$

Substitute Equation (10) into Equation (13) to get

$$I_t^p = \Psi_0 [1-(1-\delta)L] K_t^* + \Psi_1 G_y + \Psi_2 \Delta C_r^p + \Psi_3 I_{go} +$$

$$(1-\Psi_0) I_{t-1}^p \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (14)$$

If we substitute the desired demand for capital stock given in Equation (1) into Equation (14), we get a basic dynamic accelerator model for private investment fully consistent with theory.

$$I_t^p = \alpha\Psi_0 [1-(1-\delta)L]\ y_t^e + \Psi_1 G_y + \Psi_2 \Delta C_r^p + \Psi_3 I_{go} +$$

$$(1-\Psi_0) I_{t-1}^p \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (15)$$

Since the issue of complementary and substitution roles of public sector investment is central to our discussion, following Blejer and Khan (1984), we also use both the level (I_{go}) and changes in public investment (ΔI_{go}) to influence the coefficient of adjustment β in Equation (11). By doing so, our private investment function is extended to

$$I_t^p = \alpha\Psi_0 [1-(1-\delta)L]\ y_t^e + \Psi_1 G_y + \Psi_2 \Delta C_r^p + \Psi_3 I_{go} +$$

$$\Psi_4 \Delta I_{go} + (1-\Psi_0) I_{t-1}^p \quad \ldots \quad \ldots \quad \ldots \quad (16)$$

A priori, we expect the following signs for the coefficients

$$\alpha\Psi_0 > 0;\ \alpha \approx 1;\ \Psi_1 \gtrless 0;\ \Psi_2 > 0;\ \Psi_3 \gtrless 0;\ \Psi_4 \gtrless 0$$

To make our specification straight, the unobservable expected output (y_t^e) has to be transformed into observable one. There are various methods of transformation

that have been used in the literature.[8] The most widely used method is the adaptive expectations model given by Cagan (1956) in which the expected output depends upon its previous expected value and upon the fractional difference between the actual output and its previous expected output, i.e.,

$$\Delta y_t^e = \lambda [y_t - y_{t-1}^e] \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (17)$$

where λ is the coefficient of expectations which is always positive and less than unity, i.e. $0 \leqslant \lambda \leqslant 1$. Using lag-operator notation we can write Equation (17) as

$$y_t^e = \lambda y_{t_t} + [(1-\lambda)L]\ y_t^e \quad \ldots \quad \ldots \quad \ldots \quad (18)$$

Further manipulation of Equation (18) yields

$$y_t^e = \frac{\lambda y_t}{[1-(1-\lambda)L]} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (19)$$

We substitute Equation (19) in Equations (15) and (16) to get Equations (21) and (22).[9]

$$I_t^p = \alpha\Psi_0 [1-(1-\delta)L]\ \frac{\lambda y_t}{[1-(1-\lambda)L]} + \Psi_1\ G_y + \Psi_2 \Delta C_r^p +$$

$$\Psi_3 I_{go} + (1-\Psi_0) I_{t-1}^p \quad \ldots \quad \ldots \quad \ldots \quad (20)$$

After some tedious calculation we arrive at Equation (21)

$$I_t^p = \lambda\alpha\Psi_0 [y_t - (1-\delta) y_{t-1}] + [1-(1-\lambda)L] \left\{\Psi_1 G_y + \Psi_2 \Delta C_r^p + \right.$$

$$\left.\Psi_3 I_{go}\right\} + \left\{[1-(1-\delta)L]\ (1-\Psi_0) + (1-\lambda)\right\} I_{t-1}^p \quad \ldots \quad (21)$$

[8] On this issue see Hall (1977), Bischoff (1971) and Blejer and Khan (1984).

[9] We also specified the adaptive expectations model in Equation (17) as

$$\Delta y_t^e = \lambda [y_{t-1} - y_{t-1}^e] \quad \ldots \quad \ldots \quad \ldots \quad (17a)$$

The only difference it would make in Equations (21) and (22) is that the first term in these equations would now be written as

$$\lambda\alpha\Psi_0 [y_{t-1} - (1-\delta) y_{t-2}]$$

By substituting Equation (19) in Equation (16) and going through tedious calculation we arrive at Equation (22).

$$I_t^p = \lambda\alpha\Psi_0[y_t - (1-\delta)y_{t-1}] + [1-(1-\lambda)L]\left\{\Psi_1 G_y + \Psi_2 \Delta C_r^p + \Psi_3 I_{go} + \Psi_4 \Delta I_{go}\right\} + \left\{[1-(1-\lambda)L](1-\Psi_0) + (1-\lambda)\right\} I_{t-1}^p \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (22)$$

Although Equations (21) and (22) represent the specification of aggregate private investment function we use the same specification for private investment in manufacturing and agricultural sectors. By doing so, we implicitly assume the same technology for agriculture, manufacturing and for the private sector economy as a whole. As mentioned earlier, the choice of technology is made on the basis of its simplicity because no matter what technology we use, it will only be an approximation [see Klein (1974)].

Data

The quality of empirical research depends on the quality of the data base. In a developing country like Pakistan one would expect serious deficiencies in the basic quality of economic data. In recent years, however, the data base of Pakistan has considerably improved. For our purposes, the data regarding all the variables for the period 1959-60 to 1985-86 are taken from *Pakistan Economic Survey, 1986-87* and are restated in constant prices of 1959-60. Since the consistent time-series data for investment (both private and its various components and public investment) are published by government sources only from the period 1963-64 onward, therefore, for the period 1959-60 to 1962-63, these are taken from Naqvi *et al.* (1983).

As regards public sector investment, a clear distinction is made between the public sector investment in infra-structural development and in the manufacturing sector. For our purpose, we use the former one because this is more akin to government's fiscal duty. Furthermore, public sector investment in manufacturing is the postnationalization (1972 onward) phenomenon and the series have fluctuated irratically.

As regards the variable to represent general market condition we use the difference between actual and trend GDP. The trend level of GDP is calculated as $y_T = y_0 e^{gt}$ where y_T is the trend GDP, y_0 is the initial value of GDP (in our case the GDP in the year 1959-60), g is the average growth rate of GDP and t is the linear time trend. The general market condition (G_y), therefore, is calculated as $G_y = y - y_T$ where y is actual GDP. For the rate of depreciation (δ) that appears in Equations (21) and (22) we use an arbitrary value of 5 percent per year because no such rate is available from government sources.[10] The first term in Equations (21) and (22) is calculated as follows.

$$\Delta y_t = y_t - (1-0.05)y_{t-1} \quad \ldots \quad \ldots \quad \ldots \quad (23)$$

If we use Equation 17(a) as an adaptive expectations model then Equation (23) would be written as

$$\Delta y_{t-1} = y_{t-1} - (1-0.05)y_{t-2} \quad \ldots \quad \ldots \quad \ldots \quad (24)$$

III. RESULTS

Aggregate private investment function as well as private investment in manufacturing and agriculture given in Equations (21) and (22) are estimated by using annual time-series data for the period 1959-60 to 1985-86 with the help of Ordinary Least Squares (OLS) technique.[11] The results corresponding to aggregate private investment are reported in Table 1. It can be seen from the result that the coefficient of changes in output, though possess an expected positive sign, failed to reach the 5 percent level of significance in both the specification. The short-run accelerator coefficient is similar in both the specification.

Unlike Blejer and Khan (1984) the response of private investment to the general market condition appears to be strong as the coefficient for this variable (G_y) is statistically significant at the 5 percent level across specifications. The coefficients are more or less same across specifications and possess a positive sign. This is an important finding as it suggests that the economy has been operating below the capacity level and as such private investors tend to react quickly in a situation of excess capacity.

As regards the effects of changes in bank credit to the private sector on private investment it can be seen from the results that the coefficient for this variable is statistically significant at the 5 percent level and bears a positive sign. This result implies a direct role of monetary policy in influencing private investment behaviour. 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 [see Fry (1982)]. This finding, in a way confirms the existence of financial repression in Pakistan. Furthermore, given the limited amount of

[10] A 5 percent rate of depreciation is a standard one in developing countries and has been used widely, for example, Khan (1987), Blejer and Khan (1984).

[11] In a single equation model like this the problems of reverse causation cannot be ruled out. However, it has been observed, for example in Naqvi *et al.* (1983), Naqvi and Ahmed (1986) and Khan (1987) that the reverse causation problems are not serious in the case of Pakistan.

Table 1

Results of Total Private Investment, Private Investment in Manufacturing and Agriculture

Independent Variables	Total Private Investment		Private Investment in Manufacturing		Private Investment in Agriculture	
	Equation (21)	Equation (22)	Equation (21)	Equation (22)	Equation (21)	Equation (22)
$\Delta y_g(1)$	0.11 (1.40)	0.09 (1.31)				
$\Delta y_m(1)$			0.03 (1.46)	0.02 (1.15)		
$\Delta y_A(1)$					0.05 (0.83)	0.01 (1.14)
G_y	0.12 (2.17)*	0.13 (2.38)*	0.08 (1.58)**	0.09 (1.91)*	–0.08 (1.34)	–0.09 (1.73)*
ΔC_r^p	0.10 (2.09)*	0.14 (2.07)*	0.05 (1.88)*	0.05 (2.18)*	0.004 (0.01)	0.17 (1.49)**
I_{go}	0.14 (2.32)*	0.24 (2.94)*	0.04 (2.62)*	0.04 (2.03)*	0.04 (1.87)*	0.07 (2.01)*

Continued –

Table 1 – (*Continued*)

ΔI_{go}		–0.16 (2.44)*		–0.006 (0.13)		–0.06 (1.02)
$I_p(1)$	0.72 (6.04)*	0.66 (5.31)*				
$I_{pm}(1)$			0.82 (9.75)*	0.81 (8.17)*		
$I_{pa}(1)$					0.76 (5.79)*	0.63 (4.12)*
$\bar{R}^2$	0.83	0.83	0.81	0.81	0.88	0.89
h	0	0.76	1.63	0.29	0	0.41

Notes: (i) The *t*-values are given in parentheses.
*The coefficients are statistically significant at 5-percent level
**The coefficients are statistically significant at 10-percent level.

(ii) h is the Durbin h-statistic defined as $h = (1 - \frac{DW}{2})\sqrt{\frac{T}{1 - T[var\ (\hat{\beta})]}}$

where T is the number of observations and $var\ (\hat{\beta})$ is estimated as, the square of the standard error of the coefficient of the lagged dependent variable.

(iii) In the first column of the Table '(1)' appearing with the variables indicate one period lag.

financial resources available if government attempts to siphon the resources by dint of its dominant role it will adversely affect private investment and most likely would lead to a fall in total investment as well.

In order to determine whether public investment (I_{go}) is a complement or substitute for private investment, this variable was introduced in the investment function. It can be seen that the coefficient for the variable (I_{go}) turned out to be statistically significant with a positive sign, hence confirming its complementary role in the case of Pakistan. This finding supports the argument of Ahluwalia (1982) and Srinivasan and Narayana (1977) while it differs with Sundararajan and Thakur (1980) and Blejer and Khan (1984). The coefficient for public sector investment is large and establishes a relatively important role for this sector in the process of private sector capital formation. This finding is true across the various specifications. However, on the other hand, the coefficient for changes in public sector investment (ΔI_{go}) turned out to be statistically significant with a negative sign implying a substitution role in Equation (22). This finding is consistent with Blejer and Khan (1984) and suggests that if government diverges from the established investment pattern on infrastructure this would crowd out private investment.

Private Investment in Disaggregated Form

The results corresponding to private investment in manufacturing and agriculture for the general form of Equations (21) and (22) are also reported in Table 1. It can be seen from the results that like total private investment the accelerator coefficients of manufacturing and agriculture though bear a positive sign are statistically insignificant across the different specifications. The response of private investment in manufacturing to the general market condition appears to be strong as the coefficient for this variable (G_y) is statistically significant at the 5 percent level only in the extended specification i.e. Equation (22). Like total private investment the coefficient of G_y bears a positive sign and suggests that our manufacturing sector has been operating below the full capacity level. The private investor tend to react quickly in a situation of excess capacity. The situation is, however, quite different in the case of private investment in agriculture where the coefficient of G_y is statistically significant with the negative sign only in the extended specification. The negative sign implies that our agricultural sector has been operating above capacity and investment in this sector was constrained by resource availability.[12]

As regards the availability of funds to the private investor in these two sectors it can be seen that the coefficients of changes in bank credit to the private sector bear a positive sign and are statistically significant at the 5 percent level across specification only in the manufacturing sector. In the case of the agricultural sector the

[12] See Blejer and Khan (1984).

coefficient is statistically significant at the 10 percent level only in the extended specification.[13] These results indicate that the monetary authority can influence private investment in the manufacturing sector by the use of bank credit (monetary policy). However, the effect of monetary policy on private investment in the agricultural sector appears to be weak.

Fiscal policy on the other hand, appears to have a strong influence on private investment in the manufacturing and agriculture sectors. The coefficients of public sector investment (I_{go}) are statistically significant at the 5 percent level across specifications and sectors. It is important to note that the coefficients of I_{go} have positive signs and hence, confirm the complementary role of public sector investment even at the disaggregated level. This finding suggests a reltively important role for fiscal policy in the process of private sector capital formation. Unlike total private investment, the substitution role of changes in public sector investment (ΔI_{go}) could not be confirmed in the disaggregated level. The coefficients of ΔI_{go}, though bearing a negative sign, were statistically insignificant. The coefficients of the lagged private investment in both the sectors are statistically significant at the 1 percent level and it takes approximately three years in the case of the manufacturing sector and two years in the case of the agriculture sector to adjust between the actual and desired level of investment due to variation in output.[14]

IV. CONCLUDING REMARKS

While it has been demonstrated that a theoretically consistent investment function for a developing country like Pakistan can be specified and estimated, the major findings of this paper can be summarized as follows:

(i) On the one hand, changes in output appear to have minor impact on private investment while on the other hand, the general market condition appears to have a strong influence on private capital formation. It is also found that Pakistan's economy with the exception of the agricultural sector has been operating below full capacity levels and, thus the private investor tends to react quickly in a situation of excess capacity.

(ii) Private investment in Pakistan is found to be constrained by the availability of funds. Thus, the monetary authority can influence private investment behaviour by changing bank credit to this sector. Fiscal policy appears to have a relatively stronger effect on private investment.

[13] Instead of credit to the private sector we used credit disbursed to the agricultural sector.

[14] The time lag in the adjustment of private investment is calculated as $(1-\Psi_o)/\Psi_o$.

It is also found that public sector investment in providing infrastructure clearly augments private capital formation in Pakistan thereby confirming its complementary role.

As regards the policy implications of the analysis it is clear that the proper use of bank credit as a policy instrument can influence the level of private capital formation in Pakistan. Credit rationing which is itself a component of financial repression is a major impediment to financial deepening, hence to savings, investment and growth, the interest rate should be left to find their equilibrium levels in a free market environment. With respect to fiscal policy, public sector investment is found to play an important role in augmenting private capital formation. A reduction in investment on infrastructure by this sector as a policy would discourage private investment and may retard growth.

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