A Study of Investment Behaviour in Pakistan, 1962-70

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The purpose of this paper is to test how far investment by individual firms was related to profits and to sales in Pakistan in the sixties, and to explore in particular how the relationship differed between the first and second halves of the decade. These periods correspond roughly to the Second Five Year Plan (1960/61 to 1964/65) and the Third Five Year Plan (1965/66 to 1969/70). Between these two periods, 'boom' gave way to 'stagnation' and the availability of loans to firms on favourable terms shrank considerably. These loans had an important influence on the financing of investment and the behaviour of firms in Pakistan, where the institutional framework was very different from that of a market economy of the advanced industrial countries in the West.

The paper starts by setting up a simple model of investment behaviour based on the conventionally accepted profit and accelerator theories to ascertain as to what extent they provide an explanation of firms' investment behaviour in the sixties. The model is then modified to take into account the peculiar institutional setting in which firms operated in Pakistan, especially the dependence of firms on loans from financial institutions at favourable terms. This institutional setting termed here as the 'corporate environment' is briefly explained and the extent of dependence of firms on loans from financial institutions is investigated specially to bring out the differences over the two Plan periods. We then discuss the conditions under which external funds can be incorporated in our model as a factor influencing investment behaviour. Finally, the empirical results of the model incorporating external funds are set out and the broad conclusions that can be drawn from our study are put forward.

I

A Simple Model of Investment Behaviour

We start by testing the hypothesis that entrepreneurs' investment decisions were principally based on expectations of the future and that these expecta-

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tions were determined by some index like the level of profits¹ or changes in sales.

That profits influence the decision to invest [14, 15, 20] is based on the assumption that entrepreneurs wish to maximise the present value of expected future profits through investment activity and would invest according to present profits since they closely reflect expected future profits. As current profits are not known when investment decisions are taken, we use lagged profits since they are the latest information available to management. Another view of influence of profits on the rate of investment stresses the supply effects as well as institutional barriers and entrepreneurial caution. Capital market imperfections may lead to limited availability of funds and self-imposed restrictions on the business firm designed to avoid external financing and the actual investment rate could, therefore, be restricted predominantly to maximum level of retained earnings. However, the influence of profits would be diminished if profits fluctuated violently or to the extent that imperfections in the capital market are overcome by government or other institutional help in the financing of investment.

The accelerator principle rigidly construed asserts that the change in the capital stock per unit of time is a function of the rate of change in output and is based on the critical assumption that firms prior to an increase in output are working at their desired level of capacity utilisation. That the accelerator hypothesis might not work or work less effectively could be because of any one of these reasons: (a) Industries experience fluctuations in sales and in some cases (e.g., jute in Pakistan during the period under study) large ones, (b) Because of excess capacity especially in firms belonging to the capital and intermediate goods industries, (c) If replacement of obsolescent capital makes up a large part of gross fixed investment and this item is not sensitive to changes in sales, (d) In cases where firms go in for the production of new products which were previously imported, this would not be reflected in any increase in previous year's sales, (e) In those cases where the direct control by the government precludes firms from investing even if sales have increased over the previous period.

Model A

The above version of the profit and accelerator hypothesis is tested in a model of the following specifications²:

$$I_{it}/K_{it-1} = a_0 + a_1 \frac{(S_{it-1} - S_{it-2})}{K_{it-1}} \cdot \frac{\bar{K}_i}{\bar{S}_i} + a_2 \frac{(S_{it-2} - S_{it-3})}{K_{it-1}} \cdot \frac{\bar{K}_i}{\bar{S}_i}$$

¹The only existing study which has tested the profit hypothesis for Pakistan is Islam [12, p. 48]. In his study he related the level of investment to the level of profits based on cross-sectional data on firms for the large scale manufacturing sector for E. Pakistan—the data being obtained from the Census of Manufacturing Industries for 1959/60. The results of his model were:

$$I_p = -1.00 \quad 0.14S_p \quad R^2 = 0.99$$

(0.004)

Where I_p is the average investment per firm and S_p the average profit per firm. Although he found a very strong relationship between profits and investment, the fact that he did not normalize his data for size (a larger value of investment would be associated with a large value of profits even if there is no behavioural relationship between the two) makes it difficult to place great confidence in his results.

²This model is in many ways similar to those used by Meyer and Kuh [18] and Kuh [17] for a study of investment based on cross-sectional data for the United States and that of Dimsdale and Glyn [3] for investment in British industry, based again on a cross-section of firms. For a comprehensive survey of the literature on studies of investment behaviour see Jorgenson [13].

$$+ a_3 \frac{P_{it-1}}{K_{it-1}} + a_4 \frac{P_{it-2}}{K_{it-1}} + a_5 \frac{P_{it-3}}{K_{it-1}} + U_{it}$$

Where

- I_{it} = Investment of the i th firm measured as the difference in gross fixed assets at cost in year t minus that in $t-1$.
- K_{it-1} = Gross fixed assets at cost of the i th firm at the end of the year $t-1$.
- S_{it-1} = Sales of the i th firm in year $t-1$.
- P_{it-1} = Gross Profits (i.e. net pre-tax profits plus depreciation) of the i th firm in year $t-1$.
- $\bar{K}_i$ = Three year average of fixed assets and sales of the i th firm.
- $\bar{S}_i$
- U_{it} = Error term.

According to the above model investment in any period is assumed to correspond to the investment decision of the entrepreneur in some earlier period because of a time lag³ involved between the decision to invest and the actualisation of investment. Two main hypothesis relating to the investment behaviour of firms, using the method of least squares are tested: (1) Current gross fixed investment (in period t) is a linear function of past profits⁴ (i.e., profits in period $t-1$, $t-2$ and $t-3$ of the respective firms). (2) Current gross fixed investment is a linear function of past changes in sales (i.e., changes in sales in period $t-1$ over those in period $t-2$).

Normalisation of Data

For carrying out cross-section analysis based on a sample of firms, the change in sales variable was multiplied by the average ratio of fixed assets to sales for adjustment of inter-firm variations in capital intensity. In order to eliminate the effect of size on the relationship between gross fixed investment, profits and changes in sales, the three variables were deflated by the stock of fixed assets at the beginning of the year. This would eliminate heteroscedasticity on the assumption that the standard error of the disturbance term U_{it} would otherwise be proportional to the size of the firm.

Data: Composition of the Sample

The data used to test the model consists of 39 firms quoted on the Karachi Stock Exchange for the period 1961-65 and 96 firms for the period

³This time lag would vary depending on the procedure followed to get the investment sanctioned. It would be between one and a half to two years for those involving sanctions and loans by the government or the financial institutions [4, p. 18] and about a year for those investments for which machinery was imported on bonus and slightly less for investment involving domestically produced machinery.

⁴The figure for gross profits before tax was used because of accelerated depreciation allowances and tax holidays which were given to firms during this period.

1965-70. The basic source of data for these firms was [19], but this was supplemented by [9] and actual balance sheets of the firms.*

To the extent that they were the larger firms which sought public subscription of shares and tried to obtain the status of being included on the list of Karachi Stock Exchange, our sample of firms and their investment behaviour should only be taken as representative of larger firms in the country. Our sample of 39 firms accounted for about 19 percent of sales of the whole large-scale manufacturing sector in 1962/63. This figure had come down to about 16 percent by 1964/65. The sample of 96 firms accounted for about 32 percent of total sales in 1969/70.*

Problems with Data in Testing of the Model

One major shortcoming of this study is that since our data covers the period 1962-70⁷, we could not cover the first two years of the Second Five-Year Plan. This is indeed unfortunate. For one thing, the boom in private industrial investment especially in the cotton textile and jute industry in the early sixties was very much in response to the increase in profits and sales which took place after the introduction of the export bonus scheme in 1959. For another, the first two years of the Second Plan were those which experienced hardly and direct controls by the government over industrial investment.

The other major drawback of the study is that in testing the accelerator hypothesis, our figures for sales are in terms of current prices. The reason why the sales figures could not be deflated by a price index was that, in the case of major industries like cotton and jute textiles, the existence of the export bonus scheme made it impossible to deflate sales figures, as the proportion of the firms' sales in the export market were not known. Our results for the testing of the accelerator hypothesis, especially in our study of investment behaviour for individual years must, therefore, be interpreted with caution and keeping in mind this shortcoming of the data.

Empirical Results

Model A was tested for the individual years 1962-70, for the smaller sample of 36 firms for the period 1962-65⁸ and for 1966-70 with our larger sample of 94 firms.⁹ The results are given in Table 1.

The results clearly show that the change in sales variable was not significant for both samples of firms for all the years covered with the sole exception of 1965 and, in fact, had a negative sign for a number of years. Changes in sales in previous years was, therefore, insignificant in explaining investment behaviour in our study.

*For a list of the firms included in the sample, see Appendix A.

*See Appendix B.

⁷Data for earlier years is not published by the State Bank. For details see Appendix C.

⁸Out of our original sample of 39 firms, three were left out for the years 1962-65. These were Asbestos Cement, Packages and Chittagong Jute. They were left out because their rate of growth of investment was more than double that of the highest figure in the remaining sample.

⁹For similar reasons Rana Tractors and Sandoz Ltd., were left out for the years 1966-70.

Table 1
Regression Results^c for Model A

Year	Intercept	Sales t_1	Sales t_2	Profits t_3	Profits t_2	Profits t_3	No. of observation (Firms)	$\bar{R}^2$
1962	13.16	—	—	0.12 (0.620)	—	—	36	0.01
1963	12.01	-0.09 (0.871)	—	0.03 (0.308)	0.02 (0.122)	—	36	0.03
1964	9.76	-0.15 (0.9751)	0.07 (0.3962)	-0.11 (0.3493)	0.07 (0.3194)	0.31 (1.303)	36	0.10
1965	7.46	0.18 ^b (2.151)	0.02 (0.2)	0.07 (0.401)	-0.12 (0.685)	0.05 (0.30)	36	0.26
1966	11.84	—	—	0.03 (0.307)	—	—	94	0.001
1967	7.44	0.03 (0.683)	—	—	0.06 (1.115)	—	94	0.003
1968	3.14	0.03 (0.964)	-0.03 (0.880)	—	0.25 ^a (4.609)	—	94	0.23
1969	6.75	-0.04 (0.708)	-0.2 (0.379)	—	0.20 ^a (2.736)	—	94	0.10
1970	3.72	0.001 (0.032)	-0.02 (0.504)	—	0.21 ^a (4.406)	—	94	0.19

Notes: (a) Significant at the 1 percent level.

(b) Significant at the 5 percent level.

(c) Figures in parenthesis in the table are t-ratios

— Indicates that the variable was not used in the regression equation.

The profit variable was also not significant for the period of the Second Plan but it was significant at the 1 percent level for the last three years of the Third Plan i.e., 1968, 1969 and 1970¹⁰. There is some support, therefore, that profits were significant in explaining investment behaviour in the last three years of the plan, although it must be borne in mind that the explanatory power of the model is still very limited in that their^a are very low and indicate that our model explained a very small portion of the variation in firms' level of investment.

Pooled Data Studies

Studies on behaviour of profits in the sixties [1, 11] have shown that they were subject to considerable year to year fluctuations because of changes in government policy, especially the bonus rate, and this was particularly true of the two major industries, cotton textiles and jute textiles, which also accounted for a large portion of the sample of firms we have used to test our model. It was not surprising, therefore, that both the profit and accelerator hypothesis provide to be inadequate in explaining investment behaviour in individual years for the period covered.

To take into account these wide fluctuations in year to year profits and sales figures, it was decided to test the model not for individual years but over a longer period of time. Because of the differences in the economic conditions over the two plan periods, both in respect to government controls over industrial investment as well as overall investment climate (with lower profitability and shortage of foreign exchange during the Third Plan) it was decided to test the model for the years 1961-65 and 1965-70 respectively.

The model using pooled data for investment, profits and sales was specified in the following form:

Model B

$$\frac{\sum I_i}{K_{it-1}} = a_0 + a_1 \frac{\sum P_i}{K_{it-1}} + a_2 \frac{\Delta S_i}{K_{it-1}} \cdot \frac{\bar{K}_i}{\bar{S}_i} + e$$

Where for the period 1961-65

$\sum I_i$ = Sum of investments of the *i*th firm for the years 1962 to 1965

$\sum P_i$ = Sum of profits of the *i*th firm for the years 1961 to 1964

ΔS_i = Change in sales of the *i*th firm between 1961 and 1964

K_{it-1} = Gross fixed assets at cost of the *i*th firm in 1961

$\frac{\bar{K}_i}{\bar{S}_i}$ = Four year average of gross fixed assets and sales of the *i*th firm i.e. from 1961-64

e = error term

¹⁰For these years because of the existence of a high degree of multi-collinearity between profits in the preceding three years, the variable for profits in the year *t*-1 and *t*-3 was dropped. The profits in year *t*-2 was chosen since in most cases the lag involved in the decision to invest and the actual decision being carried out was about 2 years; it was the most appropriate one to use.

For the period 1965-70

ΣI_i — Sum of investment of the i th firm for the years 1966 to 1970

ΣP_i — Sum of profits of the i th firm for the years 1965 to 1968

ΔS_{it} — Change in sales of the i th firm between 1965 and 1968

K_{it-1} — Gross fixed assets at Cost of the i th firm in 1965

$\frac{\bar{K}_i}{\bar{S}_i}$ — Four year average of gross fixed assets and sales of the i th firm
i.e. from 1965-68

e — error term

According to the above model, a 'representative' firm which earned higher profits over the Plan period would undertake a greater amount of investment both because it would act as a greater inducement to invest, as well as make available to the firm more internal funds to finance this investment. The change in sales variable is now interpreted not in terms of the accelerator hypothesis i.e., increase in capital stock in response to change in previous years sales, but more in terms of the 'capacity hypothesis' i.e. firms adjust their capital stock in line with the higher level of sales [2, 16]. Our main interest in testing the capacity hypothesis would be to see whether during the period of greater government stringency during the Third Plan, firms found it more difficult to increase their capital stock in response to increases in sales in comparison with the period of the Second Plan when government controls were almost negligible.

In order to minimise the effects of a simultaneous equation bias in testing investment behaviour in this form i.e. of pooling data over a number of years, figures for profits and changes in sales were not taken over the entire plan period. Assuming a two year gestation period (which would normally be the case) our figures for profits and sales taken in the present form would be affected for only one year by the investment undertaken during the previous two years (i.e. 1964 and 1968 respectively in the two periods). For the rest of the period our figures for both profits and sales would be independent of the investment undertaken in the period. By treating the problem in this way, although we do not remove completely the effects of investment over the period on profits and sales, its actual impact is restricted to only one year and the problem of a simultaneous equation bias in the model is to a large extent removed.

Table 2
Regression Results^c for Model B

Industry	Time period	Intercept	Profit Variable	Sales Variables	No. of Observations (Firms)	R ²
All Firms	1961/65	45.18	0.14 ^b (1.939)	—	36	0.10
All Firms	1961/65	51.86	—	0.29 ^b (1.725)	36	0.08
All Firms	1961/65	42.39	0.11 (0.983)	0.18 (1.298)	36	0.13
Cotton Textiles	1961/65	50.62	0.10 (0.322)	—	11	0.01
—do—	1961/65	38.47	—	1.27 ^a (2.792)	11	0.46
—do—	1961/65	58.71	-0.28 (1.10)	1.56 ^a (2.999)	11	0.53
Other Industries* Besides Textiles	1961/65	28.51	0.17 ^b (2.191)	—	16	0.26
—do—	1961/65	42.56	—	0.30 (1.073)	16	0.08
—do—	1961/65	25.16	0.17 ^b (1.803)	0.09 (0.310)	16	0.26
All Firms	1965/70	21.24	0.25 ^a (5.451)	0.32 ^a (3.379)	94	0.30
Cotton Textiles	1965/70	-6.51	0.66 ^b (1.765)	0.15 ^a (5.248)	29	0.54
Other Industries Besides Textiles	1965/70	27.53	0.21 ^a (3.368)	0.41 ^a (2.523)	47	0.28

Notes: a: significant at the 1 percent level.

b: significant at the 5 percent level.

c: Figures in parenthesis are t-ratios.

* Excludes textiles, jute textiles and other textiles.

— indicates that the variable was not used in the regression equation.

Results

The results of Model B are given in Table 2 for the years covered of the Second Plan and the period of the Third Plan. Because of the existence of multicollinearity between the profit and sales variable during the Second Plan the simple regression of each of these variables with investment is given separately. Besides giving the results for our sample of all firms, we have also given separately the results for the cotton textile industry as well as for all firms besides textiles. The main points which emerge from the pooled data study are:

- (i) Both profit and sales variables are now significant for our all firms sample during the two Plan periods but both are *more significant* during the period of the Third Plan as compared to the Second Plan period. Whereas both variables are significantly related with investment at the five percent level for the Second Plan, during the Third Plan they are significant at the one percent level.
- (ii) The results for the firms belonging to the cotton textile industry are slightly different to that of the overall sample results. In this case the profit variable is *not* significant at all during the Second Plan period whereas the sales variable is significant at the one percent level. During the Third Plan both the profit and sales variables are significant at the five percent level.
- (iii) In the case of the sample of firms belonging to other industries besides textiles for the Second Plan the results are opposite that of the textile industry. In this case the profit variable is significant at the five percent level (as for our all firms sample) but the sales variable is not. For the Third Plan, both profits and sales are significant at the one percent level.

The main conclusion that emerges from the pooled data study is that during the Third Plan period, whether we took the all firms sample, or that for cotton textiles, or for firms in other industries besides textiles, both profits and change in sales were an important influence on the investment behaviour of firms during this period. The results for the Second Plan are not only less significant but also display inter-industry variations. Whereas for our all firms sample both profits and sales were significant at the five percent level, in the case of cotton textile industry the profit variable was not significant at all whereas the sales variable was at the one percent level and for firms in other industries besides textiles the reverse was the case with the profit variable being significant at the five percent level and the sales variable not being significant at all.

II

Before undertaking a detailed explanation of what could be the possible reasons for the greater importance of profits in explaining investment in the Third Plan period than in the Second Plan, we must first look at some of the peculiar characteristics of the 'corporate environment' in which firms operated in Pakistan during this period.

From the viewpoint of the investor these were:¹¹

- (1) If he got the 'official' approval to undertake a particular investment project he could obtain the *foreign exchange component* of the investment as loan from Pakistan Industrial Credit and Investment Corporation (PICIC) or Industrial Development Bank of Pakistan (IDBP) or from the Provincial governments (if the loan was small) at the *official exchange rate*. He could also apply in certain cases for a loan for the rupee component of the investment from these two financial institutions but this was a very small percentage of the total loans sanctioned by these institutions.¹²

For a firm which was able to get these loans there were two main advantages. Firstly, it could now import machinery at the far cheaper 'official' exchange rate which was overvalued to the extent of two to two and a half times the market rate. Secondly, it would also have the added advantage of getting the loans at very low rates of interest which were charged by these institutions.

- (2) If the investor, however, felt that either the time taken for getting the loan from these institutions was too long¹³ or the chances of his getting the loan were bleak¹⁴, or if the financial institutions were themselves facing severe shortages of foreign exchange loans, then he could either import machinery on bonus vouchers at a premium which varied between two and two and a half times the official rate or buy machinery from commercial importers who also imported it on bonus.
- (3) There were also 'direct'¹⁵ controls by the government regarding the industries in which one could invest, but the government's intention of enforcing these controls varied over the two Plan periods. In the Second Plan investors were on the whole free to invest in any industry but during the Third Plan (except for the two years from mid-1966 to mid-1968) they could invest only in those industries which were export-oriented or saved foreign exchange or were based mainly on domestic raw material. This was because of the severe foreign exchange constraint felt by the government during this period.

The existence of this peculiar institutional setting in which firms operated in Pakistan, especially the advantages accruing to a firm getting loan from PICIC or IDBP to finance its investment, must, therefore, be taken into account in studying the investment behaviour of firms. Especially what is important to establish was the extent of firms borrowings from these financial institutions

¹¹For details see Durrani [4] and the various Investment Schedules published by the Investment Promotion and Supplies Department during the periods of the Second and Third Five Year Plans.

¹²During the period 1960-70 the rupee loans amounted to about 5 per cent of total loans sanctioned in the case of PICIC and about 22 percent in the case of IDBP.

¹³Durrani estimated this as being between one and a half to two years [4].

¹⁴This situation could arise, for example, if he had already received a large number of loans.

¹⁵By 'direct' controls is meant the government having the power of not giving permission to invest in a particular industry.

over the two Plan periods, since the extent of availability of external funds would have reduce the importance of retained profits as a source of finance required for investment.

Availability of External Funds

A detailed exercise was, therefore, undertaken to establish the exact amount of borrowings by firms from PICIC and IDBP for our smaller sample of 39 firms for the period 1961-70. The information was collected from various agencies and official publications as follows:

- (1) All loans sanctioned by PICIC during the period 1961-70 were obtained from the bank.
- (2) Since IDBP would not disclose the amount of loans given to the individual firms an indirect method was used.
 - (a) For the Second Plan the list of projects sanctioned by the IDBP was published by the Investment Promotion and Supplies (I.P.&S.) Department [5,6,7]. This gives both the foreign exchange and rupee component of the investment.
 - (b) For the Third Plan period the list of projects sanctioned by IDBP for firms in West Pakistan were obtained from the I.P. and S Department [8].
 - (c) Since the I.P. and S. Department would not disclose investments in East Pakistan during the Third Plan, loans sanctioned by IDBP for East Pakistan based firms were obtained from the balance sheets of companies as published by the State Bank which also includes the Annual Reports of the companies. Since these are only summary reports, our figures for IDBP loans for these companies could be somewhat underestimated.
- (3) For the Second Plan figures for foreign investment or loans from the Provincial Governments were obtained from the same source [5,6,7]. However, figures for these loans were not available for the Third Plan period.

The results of this detailed investigation are given in Table 3. In the Second Plan for the years 1961-65, PICIC and IDBP financed 32.2 percent of the total gross fixed investment undertaken by the 39 firms. If we include loans by Provincial governments and foreign investors (including direct foreign investment) the figures comes to about 40 per cent. If we were to see the results only for the domestically owned companies (30 out of our firms sample of 39) the figure comes to over 40 per cent of total gross investment.

Our figures, however, refer only to the foreign exchange loans¹⁶ which

¹⁶The reason why we took only the foreign exchange loans was because it was not possible to establish the amount of Rupee loans given to the firms by IDBP both for the Second and Third Plans. Although this was possible in the case of PICIC in order to maintain consistency they were, therefore, not included. However, as pointed out earlier they were only 5 per cent of total loans in the case of PICIC and about 20 percent in the case of IDBP over the period.

Table 3

Dependence of Some Selected Firms on Borrowed Capital for Financing Investment

Firms	Time Period	Total gross fixed investment in (Rupee plus foreign exchange component) Figures are in Lakh Rupees	Borrowings for Foreign Exchange Component				
			Total in Lakh Rupees	As percent of total gross fixed investment			
1	2	3	4	5			
All 39 firms in the sample	1961/65	5090.0	1959.8	40.5			
30 domestically owned firms	1961/65	N.A.	N.A.	N.A.			
9 foreign owned or firms with a large scale of foreign investment	1961/65	N.A.	N.A.	28.4			
All 39 firms in the sample	1965/70	6056.0	N.A.	N.A.			
30 domestically owned firms	N.A.	N.A.	N.A.	N.A.			
Borrowings from Different Financial Institutions							
PICIC		IDBP		Provincial Governments		Foreign Investors	
Total in Lakh Rs.	As % of gross fixed investment	Total in Lakh Rs.	As % of gross fixed investment	Total in Lakh Rs.	As % of gross fixed investment	Total in Lakh Rs.	As % of gross fixed investment
6	7	8	9	10	11	12	13
1125.8	24.1	412.2	8.1	9.1	0.2	412.7	8.1
N.A.	30.4	N.A.	10.6	N.A.	N.A.	N.A.	N.A.
N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
548.8	9.7	223.6	3.7	N.A.	N.A.	N.A.	N.A.
	12.5		9.4	N.A.	N.A.	N.A.	N.A.

were made available to the firm. There is evidence¹⁷ that half the total investment typically consisted of imported plant and machinery. Thus, the loans from these financial institutions provided over 80 percent of the foreign component of investment in our sample during the Second Plan.

For the Third Plan, figures were only available for PICIC and IDBP loans. The results showed that there was a substantial decline in the investment financed by loans from these institutions. It was only 13.4 percent as compared to the figure of 32.2 percent during the Second Plan period. In the case of domestically owned companies, on the average, 21.9 percent of total investment was financed through loans from these institutions as compared to almost double this figure during the Second Plan.

Our study, therefore, clearly brings out the fall in loans made available to firms in the Third Plan as compared to the Second Plan period. The main reason for this was the slowing down of foreign aid in the Third Plan which was the source of funds for both PICIC and IDBP loans.

III

Incorporating External Finance in a Model of Investment Behaviour

In looking at external finance as a determinant of investment behaviour, two important considerations must be kept in mind. The first is that, given the system of multiple exchange rate and the fact that loans from the two financial institutions PICIC and IDBP were available at the official overvalued exchange rate, firms would in all case have preferred to finance their investment from these funds rather than from their own internal funds or from any other source of borrowing. The second point to be considered is the *extent of availability* of these loans from these financial institutions. Since the latter point i.e. availability of funds varied in the two Plan periods, in trying to incorporate external finance in our model of investment behaviour we must take into account these changed conditions and hence look at each of the Plan periods separately.

During the period of the Second Plan (1961-65), it could be convincingly argued that firms in most cases were not constrained by the availability of foreign exchange loans from PICIC and IDBP since these were quite readily available. In the case of these firms, therefore, whose major investments were financed by funds from these institutions it could be argued that the causation was from investment to external finance. In this case firms might still respond to profits or changes in sales to determine their level of investment. It was, therefore, decided to break up the sample of firms and to see whether this was true for firms who had financed the major portion of their foreign exchange component (taken here as 40 per cent of total investment or 80 percent of foreign exchange component of investment on the assumption that the rupee and foreign exchange component was about equal by loans from these two financial institutions.

During the period of the Third Plan, our study of the sample of firms had clearly shown that firms were able to get far less loans to finance their

¹⁷The actual figure for the foreign exchange component of *all* investment projects actually implemented came out as 56.8 per cent and for cotton textiles and jute the figure is around 60 percent [6, Appendix C]. However, since this includes both new plants as well as those already in production we decided to take a slightly lower figure of 50 percent as all our firms were already in production during this period.

investment from these financial institutions. In these conditions, external funds available to firms could be incorporated into our model of investment behaviour as the *minimum* amount of investment that these firms would undertake. Also since almost all the firms were in the same category i.e. far less than 40 percent of their industrial investment was financed from these loans we did not have to break up our sample of firms into any sub-sample as had to be done for the earlier period.

For the period of the Third Plan, therefore, external funds could be incorporated as an independent variable in our model as follows:

Model C

$$\sum I_i / K_{it-1} = a + a_1 \frac{\sum P_i}{K_{it-1}} + a_2 \frac{\Delta S_i}{K_{it-1}} \cdot \frac{\bar{K}_i}{\bar{S}_i} + \sum F_i / K_{it-1} + e$$

Where

$\sum I_i$ = Sum of investment of the *i*th firm for the years 1966-70

$\sum P_i$ = Sum of profits of the *i*th firm for the years 1965-68

ΔS_i = Change in sales of the *i*th firm between 1968 and 1965

K_{it-1} = Gross fixed assets at cost of the *i*th firm in 1965

$\bar{K}_i / \bar{S}_i$ = Four year average of gross fixed assets and sales of the *i*th firm i.e. 1965-68

$\sum F_i$ = Increase in long term liabilities (excluding debentures) of the *i*th firm during the period 1965-70

e = error term.

Empirical Results

(i) Second Plan (1960-1965)

For the period of the Second Plan we separated from our sample of domestically owned companies (30 firms) those which were dependent on over 40 percent of their total investment on loans sanctioned in foreign exchange from the two financial institutions i.e. PICIC and IDBP. For these firms (16) we regressed both the profit and sales variable separately on investment and got the following results:—

$$(i) \begin{matrix} 65 \\ \sum I_{it} / K_{it-1} \\ 62 \end{matrix} = -28.4 + 0.30^a \begin{matrix} 64 \\ \sum P_i / K_{t-1} \\ 62 \end{matrix} \quad R^2 = 0.61$$

(4.758)

$$(ii) \begin{matrix} 65 \\ \sum I_{it} / K_{it-1} \\ 62 \end{matrix} = -52.2 + 0.38^b \begin{matrix} \Delta S_i / K_{it-1} \end{matrix} \quad R^2 = 0.22$$

(1.977)

a : Significant at the one per cent level

b : Significant at the five per cent level

Even though our sample of firms is not very large, it is interesting to see that the profit hypothesis is now far more significantly related with investment as compared to the weaker result for our all firms sample. In the case of the

profit variable the result is now significant at the one percent level and the explanatory power of the profit variable is greatly increased. For the sales variable the results are, however, not significantly different as compared to the earlier result for the all firms sample.

For those firms, therefore, that were dependent on borrowings from financial institutions for the bulk of their foreign exchange component of investment, we, therefore, do find that there is support for the profit hypothesis discussed earlier. It seems that in this case, therefore, although the early availability of foreign exchange at the official rate could itself have been an important influence, the amount that the firms did invest was influenced by the profits earned by the different firms. This influence of higher profits could have been both as a source of funds for the rupee component of the investment undertaken as well as inducement to invest from the demand side i.e., expectation of earning high profits in the future.

(ii) *Third Plan 1965-70*

The results of Model C incorporating external finance in our model of investment behaviour for the period of the Third Plan are given in Table 4. In all three cases, external finance is significantly related with investment at the one percent level of the inclusion of external finance in the above model greatly increases the explanatory power of the model as compared to Model B for the same period. Both the profit and sales variable are also significant at the one percent level.

Table 4
Regression Results^c for Model C

Industry	Intercept	Profit Variable	Sales Variable	External Finance Variable	No. of Observations	R ²
All Firms	20.36	0.21 ^a (6.030)	0.24 ^a (3.212)	1.31 ^a (7.931)	94	0.59
Cotton Textiles Firms	-0.21	0.51 ^a (3.898)	0.19 ^a (2.482)	0.63 ^a (2.474)	29	0.63
Other Firms Besides Textiles i.e. Cotton, Jute and Others	28.12	0.20 ^b (3.933)	0.20 ^a (1.505)	1.36 ^a (5.394)	47	0.57

a: Significant at the one per cent level.

b: Significant at the five per cent level.

c: Figures in parenthesis are t-ratios.

Conclusions

The major conclusions which emerge from our study are as follows:

1. Profits emerge as an important influence on investment by firms during the period covered by us. Although this influence is difficult to identify for the individual years, when we aggregate the figures for profits and investment over the Plan period there is a significant relationship between them.

The manner and extent of the influence of profits on investment, however, was different over the two Plan periods. In the period of the Second Plan it seems to have been an important inducement to investment from the demand side whereas during the Third Plan the influence seems to have worked through the supply side, as a source of funds to finance investment.

The reason for this lies in the peculiar institutional environment in which firms operated in Pakistan and the availability of loans at the official 'overvalued' exchange rate from the financial institutions. When these funds were readily available during the period of the Second Plan the influence of profits on investment diminished. However, for these firms for which finance was a constraint during the same period we found that profits were significantly related to investment, indicating its importance from the demand side on influencing investment undertaken by these firms.

However, during the period of the Third Plan profits were significantly related to investment. This period was one in which there was a large fall in the availability of loans from the financial institutions principally because of a slowing down of foreign aid, the main source of these loans. Internal funds were the major source of finance for investment and we, therefore, find that profits were far more important in explaining investment as compared to the earlier period.

2. Our testing of the influence of the change in sales variable on investment was severely hampered because we could not adjust our sales figures for price changes and given the fact that the bonus on exports varied over the years meant that changes in sales need not necessarily mean changes in actual production levels.

We attribute the failure of the accelerator hypothesis in our year to year study of investment mostly because of this weakness in our data, especially during the boom conditions of the early sixties when '*a priori*' it should have worked best.

The influence of year to year price changes in sales would, however, be diminished when we look at changes in sales over the Plan period. Here we find that change in sales variable was significantly related to investment although it was more significantly related to investment for the Third Plan as compared to the period of the Second Plan. This suggests that the more severe restrictions on investment by the government during this period of the Third Plan did not affect our sample of firms. Two factors could lead to this. For one thing, our sample of firms mostly belonged to industries which were not subject to these restrictions. Secondly, since the firms quoted on the Stock Exchange were among the larger ones they would have found it easier to 'overcome' these restrictions as compared to the smaller sized firms.

References

1. Amjad, R. "Growth Profitability and Savings of Quoted Companies, 1964-70." *Pakistan Economic and Social Review*. Vol. XI, No. 4. 1973.
2. Chenery, H.B. "Overcapacity and the Acceleration Principle." *Econometrica*. January 1952.
3. Dimsdale, N.H. and A.J. Glyn. "Investment in British Industry: A Cross-Sectional Approach." *Bulletin of the Oxford University Institute of Economics and Statistics*. Vol. 33, No. 3.
4. Durrani, M.T. *The Pattern of Private Industrial Investment in Pakistan During the Second Plan Period (1960-65)*. Karachi: Pakistan Institute of Development Economics, Research Report No. 54, 1966.
5. Government of Pakistan. *Directory of Industrial Units Sanctioned During Second Five Year Plan Period (1960-65)*. Karachi: Department of Investment Promotion and Supplies, 1966.
6. ———. *Evaluation of Performance of Private Industrial Sector During Second Five Year Plan*. Karachi: Department of Investment Promotion and Supplies, 1966.
7. ———. *Comprehensive Industrial Investment Schedule for Third Five Year Plan (1965-70)*. Karachi: Department of Investment Promotion and Supplies, 1966.
8. ———. *Priority List of Industries of Comprehensive Industrial Investment Schedule (1965-70)*. Karachi: Department of Investment Promotion and Supplies, 1968.
9. Haidari, I. and A.H. Khan. *Stock Exchange Guide of Pakistan*. Karachi: Economic and Industrial Publications, 1968.
10. Haidari, I. *Corporate Companies at a Glance*. Karachi: Economic and Industrial Publications, (Various Issues).
11. Haq, K. and Baqai, M. "Savings and Financial Flows in the Corporate Sector, 1959-63." *Pakistan Development Review*. Autumn 1967.
12. Islam, N. *A Short Term Model for Pakistan Economy*. Lahore: Oxford University Press, 1965.
13. Jorgenson, D.W. "Econometric Studies of Investment Behaviour: A Survey." *Journal of Economic Literature*. December 1971.
14. Kalecki, M. *Studies in the Theory of Business Cycles*. 1933-39. Oxford, 1966.
15. Klein, L.R. *Economic Fluctuations in the United States, 1921-41*. New York, 1950.
16. Loyck, L.M. *Distributed Lag and Investment Analysis*. Amsterdam: 1954.
17. Kuh, E. *Capital Stock Growth: A Micro-Economic Approach*. Amsterdam: 1953.
18. Meyer, J.R. and E. Kuh. *The Investment Decision*. Cambridge: 1957.
19. State Bank of Pakistan. *Balance Sheet Analysis of Joint Stock Companies Listed on the Karachi Stock Exchange*. (Various Issues).
20. Tinbergen, J. "Statistical Evidence on the Acceleration Principle". *Economica*. May 1938.

THE SAMPLE: INDUSTRY AND FIRM COVERAGE**1961-65***Cotton Textiles*

1. Burewala Textiles
2. Colony Textiles
3. Colony (Thal)
4. A. Bawany Textiles
5. Hussain Industries
6. Fateh Textiles
7. Bahawalpur Textiles
8. Dost Mohd. Cotton
9. Khairpur Textiles
10. F.P. Textiles
11. Hafiz Textiles

Other Textiles

12. Harnai Wollen
13. National Silk and Rayon

Jute Textiles

14. Adamjee Jute Mill
15. Latif Bawany Jute
16. Amin Jute Mills
17. Karim Jute Mills
18. Victory Jute Mfg.
19. Chittagong Jute Mfg.
20. Platinum Jubilee

Others

21. Charsaddah Sugar Mills
22. Premium Sugar Mills
23. Frontier Sugar Mills
24. Souvenir Tobacco
25. Asbestos Cement
26. Brooke Bond
27. Lipton (Pak.)
28. Karnaphilly Paper Mills
29. Packages
30. Pakistan Oxygen
31. I.C.I.
32. Glaxo Laboratories
33. Steel Corporation of Pakistan
34. Pakistan Cables
35. Kohinoor Industries
36. Adamjee Industries
37. Wazir Ali Industries
38. Hashim Can
39. Murree Brewery

1965-70

Cotton Textiles

1. Burewala Textiles
2. Colony Textiles
3. Colony (Thal)
4. A Bawany Textiles
5. Hussein Industries
6. Fateh Textiles
7. Bahawalpur Textiles
8. Dosi Mohd. Cotton
9. Khairpur Textiles
10. F.P. Textiles
11. Hafiz Textiles
12. Dawood Cotton Mills
13. Valika Textiles
14. Colony (Sarhad)
15. Nishat Mills
16. Crescent Textiles
17. Gulbert Textiles
18. Olympia Textiles
19. Bawany Industries
20. Nishat Industries
21. Tangail Cotton Mills
22. Amin Textiles
23. Janana de Malucho
24. Khyber Textiles
25. Satrang Textiles
26. Feroz Sultan Industries
27. Indus Dyeing and Mfg.
28. M.F.M.Y. Industries
29. Arag Industries

Other Textiles

30. Harnai Woolen
31. National Silk and Rayon
32. Valika Woolen Mills
33. Valika Art Fabrics
34. Lawrencepur Woolen and Textile Mill
35. H.M. Silk Mill
36. Fulbrite

Jute Textiles

37. Adamjee Jute Mill
38. Latif Bawany Jute
39. Amin Jute Mills
40. Karim Jute Mills
41. Victory Jute Mfg.
42. Chittagong Jute Mfg.
43. Platinum Jubilee
44. United Jute Mills
45. Bawa Jute Mills

Others

46. Pak. Jute Mills
47. Amin Fabrics.
48. Charsaddah Sugar Mills
49. Premium Sugar Mills
50. Frontier Sugar Mills
51. Souvenir Tobacco
52. Asbestos Cement
53. Brooke Bond
54. Lipton (Pak.)
55. Karnaphilly Paper Mills
56. Packages
57. Pakistan Oxygen
58. I.C.I.
59. Glaxo Laboratories
60. Steel corporation of Pakistan
61. Pakistan Cables
62. Kohinoor Industries
63. Adamjee Industries
64. Wazir Ali Industries
65. Hashmi Can
66. Murree Brewery
67. Pakistan Tobacco
68. Premier Tobacco
69. Crescent Sugar Mills
70. Habib Sugar Mills
71. Hyeson Sugar Mills
72. Thal Industries
73. Pakistan Paper Products
74. Chittagong Board Mill
75. Pakistan Industrial Gases
76. Sandoz (Pak.)
77. Ferozsons Laboratories
78. B.E.C.O.
79. Mack Trucks of Pakistan
80. Ghandara Industries
81. Rana Tractors
82. Shaigan Electric and Engineering
83. Johnsons and Phillips
84. Haji E. Dossa and Sons
85. Burmah Oil Mill
86. Maqbool Co.
87. Associated Industries
88. East Pakistan Lubricants Blenders
89. Haroon Oils
90. Pakistan Refinery
91. Pakistan Rope Works
92. Usmania Glass Sheet Factory
93. Hilal Tanneries
94. Valika Cement
95. Ismail Cement
96. Zeal Pak. Cement.

Appendix B

SALES OF SAMPLE COMPANIES IN RELATION TO SALES OF LARGE SCALE MANUFACTURING SECTOR

	All Pakistan		Rs. million
	<u>1962/63</u>	<u>1964/65</u>	(%) <u>1969/70</u>
Total Large Scale Mfg.	6790.8	9284.0	15962.8 ^a
Sample			
(1) 39 Continuous Companies	1274.2 (18.8)	1522.9 (16.4)	2396.6 (15.0)
(2) 96 Continuous Companies	—	—	5078.2 (31.8)

^aThe figure for 1969/70 was obtained by adding to the figure for West Pakistan (for which the Census is available) a figure for E. Pakistan obtained by blowing up the figure for the 1965/66 Census (the last one available for East Pakistan) by the index of industrial production for the province taking into account price changes over the period.

- Sources:**
- (i) Summary Statistics of Census of Manufacturing Industries 1962/63 to 1964/65 (Central Statistical Office, Government of Pakistan).
 - (ii) Census of Manufacturing Industries—W. Pakistan 1969/70 (Government of Pakistan).
 - (iii) Balance Sheet Analysis of Joint Stock Companies Listed on the Karachi Stock Exchange. (State Bank of Pakistan).

Appendix 'C'

PROBLEMS WITH DATA

It should be pointed out that for the earlier years i.e. 1961-65 the State Bank publication, *Balance Sheet Analysis of Joint Stock Companies Listed on the Karachi Stock Exchange* 1961-66, (the basic sources for the data used in this study) had some shortcomings. The major problem was that for companies where the data for one year was missing it was substituted by the figures for earlier or later years, and this was *not* subsequently corrected. The data for companies was, therefore, re-checked wherever possible from the actual balance sheets of companies or from Haidari and Khan [9] and figures for the missing year were substituted. Where the figures for the missing years could not be obtained the company was dropped from the sample.

The data published by the State Bank for the period 1965-70 is fortunately more reliable. However, the major problem for this series is that in 1969 (because of a directive by the Central Board of Revenue that all companies should change over to the accounting year beginning October to end September) a number of companies drew up their accounts for a period ranging from 9 to 14 months. For these companies the accounts had to be readjusted to a one year period so as to make the series consistent. All figures for sales, profits, dividends and retentions were, therefore, proportionately changed.