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COST OF CAPITAL

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by

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INTRODUCTION

Pakistan like other under-developed countries is faced with a situation where factor prices do not reflect their scarcity values thereby leading to a waste of valuable resources in the form of highly capital intensive techniques and excess capacity in the manufacturing sector. Low costs of using capital in Pakistan have been attributed to a combination of factors e.g.- low rates of interest, overvaluation of domestic corrency, low tarriffs on machine imports, and fiscal incentives such as tax holidays and accelerated depreciation aimed at encouraging investment. In this paper a formula has been devised which incorporates the effect of various such policy packages on the cost of capital. Using this formula the market and "real" cost of capital have been estimated over time (1959-60 to 1970-71) thereby getting an idea of the degree of distort introduced into the factor market via government policies.

An attempt has also been made to examine differentials in capital cost between developed and less developed regions and by firm size. Underdeveloped areas in Pakistan have been the recipients of special fiscal concessions in the form of longer periods of tax holiday and lower rates of tariff on capital inputs. Small and medium sized firms on the other hand have been at a disadvantage vis a vis large established firms which, due to their influence, have been the major beneficiaries of the licensing system, and have been able to borrow funds at very low interest rates.

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This paper is divided into IV sections.

Section I Methodology and data.

Section II Analysis of estimates of market cost of capital overtime and evaluation of

(1)relative importance of accelerated depreciation, tax holiday, and other policy variables in reducing cost of capital to the entrepreneur in general.

(2)The degree of advantage in terms of lower costs of capital enjoyed by investors in backward areas vis a vis those in developed areas.

Section- III.

Computation of equilibrium cost of capital over time, using values for interest and exchange rates which are more realistic approximations of their scarcity prices.

Section-IV.

Calculation of price of capital to small and medium size units with various assumptions pertaining to borrowing rates and price of machinery.

METHODOLOGY[1] AND DATA

Price (or cost) of capital is defined as the minimum rental value which owners of capital would be willing to accept if they were to lease their assets on an annual basis. In the absence of government fiscal policies and under competitive conditions, the minimum rental value of a capital asset would be

$$P_K = K (r+d) \qquad (1)$$

where P_K is the price of capital (minimum rental value)

K is the original cost of the asset

r is the rate of interest

d is the natural (economic) rate of depreciation

the problem of applying equation 1 in empirical studies of the price of capital is that the fiscal and monetary policies which governments pursue have a significant impact on the returns to capital. The minimum rental value required when these

[1] This section is taken from S. Guisinger's working notes on Cost of Capital

policies are in effect may be substantially different from the amount indicated in equation 1. Duties and quantitiative restrictions on imports of capital goods and corporate taxes tend to raise the price of capital, while accelerated depreciation allowances, tax holidays, investment credits, subsidised interest rates and overvalued exchange rates tends to reduce its price. There is a need, therefore, for a general formula, incorporating all of these policies, which can then be used to examine trends in the price of capital over time and between sectors and to assess the degree to which government policies distort the price of capital from its equilibrium value.

The Price of Capital When Policies Are Uniform Over Time

Jorgenson has devised a formula for the cost of capital under the simplifying, but unrealistic, assumption that the various government policies remain fixed over time -i.e. the rates of depreciation allowances and corporate taxes do not vary from year to year. Hufbauer [(1)] has modified Jorgenson's approach to allow for varying depreciation allowances, but does not consider the case, frequently found in developing countries, where corporate taxes are reduced or eliminated during a tax holiday period covering the initial years of the investment's life. The existence of tax holiday schemes causes the rate of taxation to vary over the lifetime of the investment. As a first step in constructing a price of capital formula incorporating variable tax and depreciation rates, it is useful to consider the uniform policy case[2]. If the returns to capital are subject to a tax of u and if the allowable rate of depreciation on a straight-line basis is d', then the price of capital can be derived from equation 1 as follows:

$$P'_K - (P'_K - K.d')\,u = K(r+d) \qquad \ldots.2$$

The second term on the left hand side of the equation 2 represents the tax liability, and the difference between the price of capital, P'_K, and the tax liability must equal the gross tental value in the "no tax" case of equation 1.

2. The effects of tariffs, quantitiative restrictions and exchange rates on the price of capital will be taken up in a later section.

$$P'_K = \frac{K(r+d-u.d')}{1-u} \qquad \ldots\ldots 5$$

This formula is, however, valid only in the special case where d'=d. If d' exceeds the more normal case, the asset will become completely "written-down" before the economic life of the asset is reached, and d', necessarily becomes zero at some point, violating the assumption of uniform rates, A more general formula is, thus, required that lets u and d' very over time.

The Price of Capital With Non-Uniform Policies

Many countries permit their investors to depreciate assets at variable rates as a means of ecouraging investment, and a substantial number of developing countries grant "tax holidays" for the same purpose. The tax holiday is generally granted to individual firms for specified periods of time, the length depending on the geographic location of the firm its export potential, the domestic raw material content of its output and the priority which the government attaches to the type of goods that the firm produces. In most countries, firms have considerable flexibility in the type of depreciation schedule that they follow. A number of countries have adopted a system of "free depreciation", permitting firms to write off the total value of their investment in the first year if they wish.

Given the scope for variation in the rates of taxation and depreciation allowanc s, the price of capital may vary substantially among firms within the same country and even within the same industry. In most firms, the price of capital will be low in the initial years of the investment's life, then rising over time as the tax and depreciation benefits are used up. Importantly, the time pattern of the annual prices of capital may vary substantially among firms, making comparisions of the prices of capital for any given year meaningless. Consider, for example, the case of two firms A and B. A may be in the first year of its two year tax holiday period and have a very low price of capital, while B may be in its ninth year, just having completed an eight year holiday period. It would not be surprising to find

that the price of capital in B is higher than the price in A, if ccomparisions are made for the one year period only. If some form of an average price concept is used, taking into account the longer tax holidays period in B then the "average" rental value in B may well be less than in A.

Where the time patterns of annual capital prices are not uniform, the only appropriate basis for making comparisions is one linked to the concept of the present value of the cost of capital. The present value of the stream of annual capital prices is itself a flow concept but the period over which it is defined is the lifetime of the investment. In order to make comparisions in the price of capital among investments with different life spans and also to compare the price of capital with the wages of labour, some means of "annualizing" the present value of the capital price stream needs to be devised. This can be done by defining a uniform annual rental value such that the present value of the stream uniform rental rates, which are constant in every year of the investment's life, is equivalent to the present value of the variable stream of capital prices, Owners of capital would therefore be indifferent between receiving the uniform rental rate and the fluctuating stream of rental values resulting from the differential impact of tax and depreciation policies. If we assume that a tax holiday of h years is granted during which no corporate taxes are imposed, we can write.

$$\sum_{1}^{n} \frac{p_k^*}{(1+i)^t} = \sum_{1}^{h} \frac{K(r+d)}{(1+i)^t} + \sum_{h+1}^{n} \left\{ \frac{K(r+d)}{(1+i)^t} + u \left(\frac{p_k^* - d_t' K}{(1+i)^t} \right) \right\}$$

Where p_k^* is the uniform rental value, i is the rate of discount, and n is the economic life of the as set. The first term on the right and side is the present value of the cost of capital during the tax holiday period, while the second term represents the present value of the cost of capital for the remainder of the asset's life. The sum of these two present values is equated with the present value of the

uniform rental value. p_K^*

If we use the following notation: 5

$$S_x^y = \sum_{t=x}^{y} \frac{1}{(1+i)^t}$$

then equation 4 can be written as :[3] 6

$$P_k^* = \frac{K(r+d) - \frac{u}{s_1^n} \sum_{h+1}^{n} \frac{d_t'}{(1+i)^t}}{1-u(s_h^n+1)}$$

Extensions

Apart from tax and depreciation plocies, there are other policies having an important bearing on the price of capital. Instead of constructing a cumbersome formula incorporating all the possible policy impacts, the effects of these policies are analysed individually below. They may be easily incorporated in the capital price formula as the case may require.

Tariffs, Quotas and Exchange Rates

Trade and exchange rate policies affect the price of capital principally through their impact on the price of the capital asset[4]. The price of assets composed of tradeable goods can be written as:

$$K = K^* \cdot f(1+t)$$

where K^* is the world price (cif for importables, fob for exportables)

f is the official exchange rate

t is the ad valorem rate of subsidy on exports.

If one wants to compare the price of capital under alternative trade and exchange regimes, equation 7 can be incorporated in the general formula, which can be solved for alternative values of f and t, holding other policy variables constant. Similarly, the impact of changes in the world price of capital goods on the price of capital can be explored by varying the price of K^*.

3. The formula for the price of capital in equation 6 differs from Hufbauer's formula ignoring the capital gains and investment credit factors assuming as Hufbauer implied did that h=0. Since Hufbauer did not provide a complete proof, the causes of this divergence are not clear.

4. Trade and exchange rate policies can also affect maintanance costs but the impact of the price of capital is minimal. Trade and exchange rate policies can also affect the interest rate in conventional general equilibrium fashion, but our analytical focus here is limited solely to direct impacts of policies on the price of capital.

SECTION II

Extensive study has been done on the crucial role played by government policies in promoting capital formation in the industrial sector. The formul presented in the previous section provides a menas of quantifying the effect of fiscal incentives on the cost of capital, making it easier to evaluate and compare the relative attractiveness of various measures to the entrepr-eneur. All forms of fiscal and monetary incentives reduce cost of capital to some extent, the problem is to determine the degree of reduction caused by a particular policy variable. The purpose of this section is to isolate the effect of different devices and to assess their combined impact on the cost of capital over time.

The analysis in the first part of this section will be limited to concessions in the form of accelerated depreciation allowances and tax exemptions granted to industry during the period under study. The no tax incentive case is used as a standard of comparision.

Accelerated depreciation by deferring tax payments, is in effect equivalent to an interest free loan and enhances financial ability of the investor for balancing and expansion of enterprize. During 1959-60 to 70-71 changes made in the procedure for deducting depreciation allowances can be classified by three periods.

Period I - 1959-60 to 1960-65. A firm not eligible for tax holiday was entitled to four different types of allowances computed on written down valu. i.e. original cost of asset less depreciation allowances granted in preceding years.

a) Initial allowance at the rate of 25% cost admissible in the year of installation or in the first year of commercial production.

b) Normal allowance-range from 7% to 40% of written down value. Average rate of 10% applicable to most industries.

c) Additional depreciation allowance, at a rate equivalent to normal depreciation, granted in the first five years of an undertaking.

d) Extra shift allowances at the rate of 50% to 100% of normal depreciation depending on whether plant operating on double or triple shift basis.

Tax holiday enterprizes were not entitled to initial or additional allowances. At the end of the tax holiday period normal and extra shift deductions were admissible on original cost.

Period II- 1965-66 to 1970. Additional allowance was discontinued to undertakings established after July 1965. In the case of tax holiday firms depreciation was computed on written down value instead of original cost i.e. original cost less normal depreciation over the holiday period.

Period III- 1970-71. Special allowance at the rate of 15% of written down value was accorded in the second year of an undertaking. Tax holiday firms could also avail of this allowance in the year immediately succeeding the end of exemption period.

The differential impact on cost of capital of depreciation allowances allowed in period I, II & III is reflected in tax saving potential of each type. Present value of expected tax savings attributable to depreciation deductions over life of machine, is derived by multiplying present value of future depreciation allowances by the tax rate.

$$\sum_{i}^{n} \frac{d' t}{(1+i)^{t}} \cdot u$$

Where u is the tax rate, d' - depreciation allowed i is the discount rate and n is the life of the asset. The higher the tax rate, the more accelerated the depreciation allowances, the greater the reduction in potential capital cost.

Table I

Present value of Depreciation Allowances as percentage of original cost

	$\sum_{1}^{n} \frac{d' t}{(1+i)^t}$	$u. \sum_{1}^{n} \frac{d' t}{(1+i)^t}$	
		u=.5	u=.6
Normal Dep. procedure	47	23.5	28.2
Period I	76	38	45
Period II	67	33.5	40
Period IV	71	35.5	42.6

Normal dep. procedure: deductions at the rate of 10% of written down value

Maximum benefit of accelerated depreciation was provided in period I as reflected in the highest present value of depreciation allowance. Present value of tax savings being 38% and going upto 45% for a tax rate of .6. Substitution of system prevailing in period I for normal depreciation procedure increases the present tax value deductions by 62% from 23.5 to 38.

Table II

Computation of capital cost (exclusive of change in machinery price and tariff rates)

Years	P_{ko}	P'_{ko}
1959-60	18.2	14.7
1960-61	18.2	14.7
1961-62	18.8	15.4
1962-63	18.9	15.5
1963-64	19.3	15.9
1964-65	19.1	15.6
1965-66	21.4	19.1
1966-67	22.4	20
1967-68	23.3	21
1969-70	23.3	21
1970-71	23.1	20.4

P'_{ko} - Capital cost calculated on assumption of normal depreciation procedure.

P_{ko} - Capital cost calculated on the basis of actual depreciation deductions allowed over time.

From table II it may be seen that a shift from accelerated depreciation admissible in period I to normal depreciation procedure would increase cost of capital by 22%. For period II the difference between P_{ko} + P'_{ko} is reduced to 12% depreciation allowances becoming less liberal. As mentioned earlier Additional allowance was discontinued for undertakings installed after 1965. In 1970-71 with the introduction of the special depreciation allowance difference between P_{Ko} + P_{Ko} went up to 13%

Tax holiday: The scheme introduced in 1959 granted complete exemption from income tax to new undertakings provided they used local raw materials and invested 60% of their profits. In1960 these conditions were liberalized and existing firms could avail of tax holiday privileges if development or expansion consisted of an identifiable new unit. Changes over time in duration of holiday for developed, developed and backward regions are summarized as follows:

	Developed	Semi Developed	Under-Developed
Period -I (1961-1965)	4 years	6 years	8 Years
Period-II 1965-66 to 1969-70	2 Years	4 Years	6 Years
Period III	0	3	6

Relative difference in cost of capital for varying Tax Holiday periods.

TABLE IV

	P'_{ko} P_{kud}	P_{ko} P_{kud}	P_{kd} P_{kud}	P_{ksd} P_{kud}	P_{kd} P_{ksd}
Period-I	46%	19.6%	10.5%	4.5%	6%
Period-II	33%	20%	14%	6%	8%
Period-III	3[illegible]%	19%	19%	10%	9%

P'_{ko} - Cost of capital with no tax holiday and normal depreciation procedure

P_{ko} - Cost of capital with no tax holiday and accelerated depreciation.

P_{kud} P_{ksd} P_{kd} Cost of capital for tax holiday firms located in underdeveloped semi-developed and developed regions.

$$P'_{ko}\ P_{kud} = \frac{P'_{ko} - P_{kud}}{P_{kud}} \cdot 100$$

TABLE III

Cost of Capital for varying tax holiday periods exclusive of changes in machinery price and tariff.

Years	P'_{ko}	P_{ko}	P_{k8}	P_{k6}	P_{k4}	P_{k3}	P_{k2}
1959-60							
1960-61							
1961-62	18.8	15.4	12.9	13.5	14.3		
1962-63	18.9	15.5	13.0	13.0	14.3		
1963-64	19.3	15.9	13.2	13.7	14.6		
1964-63	19.1	15.6	13	13.6	14.4		
1965-66	21.4	19.1		16.2	17.2		18.4
1966-67	22.4	20.0		16.8	17.8		19.2
1967-68	22.7	20.3		17	18		19.4
1968-59	23.3	21		17.4	18.5		19.9
1969-70	23.3	21		17.4	18.5		20
1970-71	23.1	20.4		17.1		18.8	

P'_{kO} : Cost of capital with no tax holiday and normal depreciation procedure.

P_{ko} : Cost of capital with no tax holiday and accelerated depreciation.

P_{k8}, k6,k3,k2: Cost of capital for firms benefitting from 8,6,4,3, and 2 years of tax holidays respectively.

Table-IV summarizes information on cost differentials across regions.

Comparison of capital cost for the no incentive case (P'_{kO}) with capital cost for eight year tax holiday firm in Period-I gives the maximum cost differential of 46%. For Period II & III there is a decrease in the differential between P'_{kO} & P_{kud} mainly due to a shorter tax holiday period (from 8 to 6 years) for underdeveloped regions. Furthermore from July 1965 onwards depreciation deductions, in case of tax holiday firms, were made on written down value and not on original cost.

The no incentive case is merely a hypothetical standard of compar Most firms not eligible for tax holiday can avail of accelerated depreci allowances. The differential between P'_{ko} P_{kud} is much lower at 19%, sti to locating industry in underdeveloped areas being considerably reduced.

Comparing firms within the tax holiday scheme - cost differential although not very substantial initially, increased over time. The differ in cost between developed and underdeveloped areas went up from 10% in pe I to 19% in Period III. The difference in exemption periods applicable t developed and backward areas increased from four years to six years. Loo at semi-developed areas vis a vis underdeveloped regions, capital cost w go up by only 4%, in Period I, if the investor chose the semi-developed ation. By Period III the cost difference had gone up to 10% - in terms o length of tax holiday the advantage had increased from 2 to 3 years.

Tariff rates. Underdeveloped regions were granted special concess in the form of lower tariffs on machinery. From 1963-1965 general tariff on machinery was 12.5% while rate on imports into eight year tax holiday was only 7.5%. For 1965-66 general tariff on machinery was raised to 25% while tariff rate for machinery imported into maximum exemption areas wen to 20%

Table V

Relative difference in capital cost (inclusive of tariff concessio between developed, semi developed and underdeveloped regions.

	P_{ko} P_{kud}		P_{kd} P_{kud}		P_{ksd} P_{kud}	
	inclusive of tariff rates		inclusive of tariff		inclusive of tariff	
1963/64 to 1964/65	19%	26%	10%	16%	4%	9%
1965/66 to 1966/67	20%	23.5%	14%	19%	6%	11%

Incorporating tariff rates into cost of capital computations further increased cost differential to the advantage of backward regions as can be seen in Table V.

Tax holiday provides most substantial benefits for undertakings expecting high profits in the initial years. Relatively lower profits in under developed areas due to infrastructural obstacles would considerably dimish incentive impact of tax exemption.

TABLE VI

Market cost of Capital 1959/60 - 1970/71

Years	r'	k	t	P_{ko}
1959-60	5.74	100	10%	16.2
1960-61	5.72	101	12.5%	16.7
1961-62	6.08	101	12.5%	17.5
1962-63	6.13	102	12.5%	17.8
1963-64	6.3	103	12.5%	18.4
1964-65	6.21	105	12.5%	18.5
1965-66	7.36	108	25%	25.8
1966-67	7.84	109	25%	27.3
1967-68	7.98	109	40%	31
1968-69	8.29	112	40%	32.8
1969-70	8.3	119	50%	37.4
1970-71	8.22	126	50%	38.5

Capital cost more than doubled from 1959-60 to 1970-71. Substantial increase in capital cost taok place after 1964-65, rising over the third plan period by 102% as compared to 14%, over 1959-60 to 1964-65.

The slow rate of increase in Period I was due to a combination of factors- negligible rise in interest rates from 5.74 in 59/60 to 6.21 : machinery price index showed on increase of only five points, and tariff rates remained unchanged at 12,5%.

In 1965-66 capital costs shot up by 40% which was nearly triple increase a result registered in the entire preceding period. The su rise in cost was changes in policy objectives over the third plan peri Greater emphasis was placed on the development of the intermediate and capital goods industry. With a view to increasing protection to this s tariff rates on machinery were doubled. In the preceding year, bank ra had been raised from 4% to 5% in recognition of the need to rationaliz the interest rate structure[1], average interest rate on advances went u 18% from 6.2 to 7.3 Additional depreciation allowances were allowed

Cost of capital rose at an annual average rate of 10% over the n four years, annual average increase in interest rates and machinery pr being 2% and 3% respectively. Larger than average increase in capital over 67-68 and 69-70 coincided with increases in tariff rates.

SECTION III

Computations of market cost of capital, i.e. the cost to the er neur, were based on interest and exchange rate at which investors bor funds and bought foreign exchange. These rates were the outcome a sys of exchange control and imperfections in financial institutions and h little to do with the influence of supply and demand factors. To dete the cost to the economy of using a unit of capital, it is necessary to impute scarcity values to foreign exchange and interest charge anc

[1] Excerpt from speech delivered by State Bank Governor in 1966.
"_____with mounting pressure on available resources it is of incre importance to economics in the use of capital. For this it is necessa that the interest rate structure in the country should reflect the sc value of capital

to eliminate the cost reducing effect of fiscal incentives. Scarcity value or shadow prices reflect the marginal value productivity of a factor taking into account all alternative uses and are ideally derived from optimization models given the technological relations and objective function of society.

In the absence of such comprehensive planning models for Pakistan, approximations of shadow prices have been used which, although derived from relatively crude methodologies, are more representative of social opportunity cost than the prevailing market prices.

Lack of any systematic estimate of accounting rate of interest necessitates using some rough indicator. The going rate of profits in the manufacturing sector would set the price of borrowed funds high but would not be appropriate in face of distortions in input and output prices. Shahrukh Rafi [8] revaluing inputs and outputs at world prices, arrived at estimates of rate of return ranging from 11.7 to 15.4 depending on assumption regarding value of shadow wage rate. A.R.Khan [7] argues that potential opportunity cost of capital for the economy as a whole, in terms of foregone alternatives, is likely to be higher than that for any one sector, and feels that the social rate of return is not less than 15%. This is the value we have used in our computations of equilibrium cost of capital.

Capital equipment used in the large scale manufacturing sector was mostly imported. In a system characterized by fixed official exchange rate, rationing of limited foreign exchange by licensing; a tariff structure with lowest rates for machinery, the price paid for imported capital goods by a license holding industrialist greatly understated economic cost measured in terms of the scacity value of foreign exchange.

In the presence of quantitative controls, excess demand at low offiical price of foreign exchange is reflected in high markup over C & F value of imported

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Cost of capital rose at an annual average rate of 10% over the next four years, annual average increase in interest rates and machinery price being 2% and 3% respectively. Larger than average increase in capital cost over 67-68 and 69-70 coincided with increases in tariff rates.

SECTION III

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In the presence of quantitative controls, excess demand at low offiical price of foreign exchange is reflected in high markup over C & F value of imported

goods in the domestic market. Using estimates of markup rates computed b
[14], by direct comparison of C & F and domestic prices of a selected
sample of imports, Islam [5] derives an average markup on all import
rate of markup in the nature of a scarcity premia is arrived at by deduc
normal profits and distribution costs[1] from this average markup rate.
Further assuming that the rate of markup (not of normal profits) is equa
to the ratio of the scarcity price to official price of foreign exchange
overvaluation of domestic currency is defined as

$$\frac{\dot{e}^{*} - \hat{e}}{\hat{e}} \cdot 100 = \frac{[\bar{e}(\quad) - \hat{e}]}{\hat{e}} 100$$

e^{*} = Scarcity price of a unit of foreign exchange

$\hat{e}$ = official exchange rate

α = ratio of market price to c & f value

β = normal profit as a proportion of c & f value

γ = cost of distribution as a proportion of c & f value.

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[1] Normal profits and distribution cost are assumed 30% of c & f value. Lieftinck/ assumed normal markup of 20% on landed cost. Pal - 12% of landed cost.

Since direct price observation were available for 1963/64 only, Islam (5) worked out a formala to compute rate of overvaluation of the remaining years. Using his methodology[1] time series estimates of scarcity value of foreign exchange have been calculated for 1959/71. Details regarding methodology and data used are given in the appendix.

Absolute effect on cost of capital of elminating accelerated depreciation allowances and raising interest and exchange rates to their approximate value is shown in upper half table VII. in columns (3), (5), and (7) respectively. The lower part of the table gives under (a) the cumulated effect of one, two and three adjustments respectively and under (b) the percentage adjustement in relation to the preceding one two adjustments.

Table VII

Alternative estimates of capital costs

Purachase	Actual deprec.	"Normal" deprec. rate	(2) - (1)	"Normal" dep. and return on cap.	(4) - (2)	"Normal" deprec scare & foreign exchan rate(7)	(6)-(1)
(1)	(2)	(3)	(4)	(5)	(6)		
1959/60	16.2	20.0	3.8	40.4	20.4	59.1	1[illegible]
1960/61	16.7	20.6	3.9	41.7	21.1	5[illegible].7	1[illegible].0
196162	17.5	21.5	4.0	41.7	20.2	59.4	1[illegible].9
1962/63	17.8	21.8	4.0	42.1	20.3	72.7	[illegible].6
1963/64	18.4	22.4	4.0	42.5	20.1	72.6	[illegible].1
1964/65	18.5	22.6	4.1	43.4	20.8	78.6	[illegible]
1965/66	25.8	28.9	3.1	49.6	20.7	69.4	[illegible]
1966/67	27.3	30.5	3.2	50.0	19.5	79.2	[illegible]
1967/68	31.0	34.0	3.6	56.0	21.4	90.1	[illegible].1
1968/69	32.8	36.5	3.9	57.5	21.0	106.5	49.0
1969/70	37.4	41.6	4.2	65.5	23.9	110.5	[illegible].0
1970/71	38.5	43.7	5.2	69.4	25.7	152.7	[illegible].3

[1] Shortcomings of this approach may be mentioned briefly: 1) it rests on assumption that foreign exchange earnings will not be significantly increased by changes in exchange rate implying that demand for export goods is price elastic Assumption seems quite plausible considering that Pakistan's export are only a small fraction of world supply. 2) domestic price indcx of imported goods is based on a narrow sample of commodities. Goods and raw materials imported directly by industrial users are also excluded from this analysis.

Percentage increases due to adjustments: (a) in relation to column (1), (b) in relation to preceding column for adjusted figures:

Year	"Normal" Actual depreci-ation	"Normal" return Actual return on capital		Scarcity price Official price foreign exchange	
		(a)	(b)	(a)	(b)
	(8)	(9)	(10)	(11)	(12)
1959/60	23	149	102	265	46
60/61	23	150	102	228	31
61/62	23	138	94	239	42
62/63	22½	137	93	308	73
63/64	22	137	90	295	71
64/65	22	135	92	325	81
65/66	12	92	72	169	40
66/67	12	83	64	190	58
67/68	12	81	62	191	61
68/69	11	75	57	225	85
69/70	11	75	57	195	69
70/71	14	80	59	297	120

Col. (8)=((3) + (1) x 100; (9) = (((4) + (1) - 1) x 100; (10) = ((5) + (2))x 100;
(11) = (((6) + (1)) - 1) x 100; and (12)= ((7) + (4) x 100.

A change in depreciation allowances would result in a fairly small increase in capital cost as compared to an increase in interest or exchange rates. Absolute effect of an increase in interest rate being at least four times as high as that of a switch to normal depreciation prodedure. The relative effect of using an approximate social rate of return has been declining over time specially marked at the beginning of the third plan period due to the steady increase in actual interest rates.

Abs lute effect of capital cost attributable to raising official price of foreign exchange to it's scarcety value is larger than the effect of the other two adjustments put together for the period 1962/65 and 67/68 to 70/71. The relative effect showed marked fluctuations around a rising trend going up very sharply for 1969/70 to 70/71.

TABLE VIII

Estimated Real cost of Capital and Market cost of Capital to Tax Holiday Firms.

Years	p_{ke}	p_{ko}	p_{k8}	p_{k6}	p_{k4}	p_{k2}	
1959/60	59.1	16.2	13.7	14.3	15.1		
60/61	54.7	16.7	14.8	14.8	15.5		
61/62	59.4	17.5	14.67	15.3	16.2		
62/63	72.7	17.8	14.9	15.5	16.5		
63/64	72.6	18.4	14.6	15.9	16.9		
64/65	78.6	18.5	14.7	16.1	17.1		
65/66	69.4	25.8		21	23.2	24.9	
66/67	79.2	27.3		22	24.3	26.2	
67/68	90.1	31		25.89	27.5	29.7	
68/69	106.5	32.8		27.2	29.0	31.3	
69/70	110.5	37.4		21	33.0	35.6	(p_{k3})
70/71	152.7	38.5		32.4			

PKE: Estimated Real Cost of Capital

A comparison of equlibrium and market price of capital indicates the high degree of distortion introduced into market prices by way of government policies. For the years 1962-63 to 1964-65 market cost of capital was as low as one-fourth it's equilibrium price. In the case of eight year tax holiday firms the ratio of market to equilibrium price went to one-fifth reflecting a subsidy on capital use upto 80% of the equilibrium price.

The divergence in costs (equilibrium and market) narrowed appreciably in 1965 equilibrium cost of capital showed a decrease of 11% over 1964 while market cost went up by 40% due to reasons mentioned in section II. Average subsidy for the remaining years of the third plan was reduced to 66% of the equilibrium price for the firm not entitled to exemption and to 75% in the case of eight year tax holiday firms.

The trend towards a reduced differntial between private and social cost was reversed in 1970-71 mainly due to a sharp rise in the scarcity value of foreign exchange. Estimates of scarcity price of exchange for the last three years of period under review seem exaggerated and should be assessed keeping in mind the short comings of method used to estimate overvaluation of domestic currency mentioned earlier in this section.

SECTION IV

Benefits of government measures in terms of low cost of using capital were not spread evenly among the entrepreneurial class, but wor to the advantage of the large, well established, industrialist. Faciliti of low interest charges and cheap foreign exchange were availed of most by large firms whose wealth and power enabled easy access to credit and licences. The extent of their influence is indicated by control of financial institutions and representation on important government bodie like State Bank, National, Bank, and PICIC. Sanction from an agency like PICIC meant not only release of foreign exchange for import requir but also provided for automatic financing at low rates.

On the other hand the small entrepreneur had difficulty obtaining funds from the commercial banks. He was considered a lending "risk" and when he did manage to obtain credit it was available at substatially le favourable terms.

The capital needs of the small scale sector were largely met by l machinery. According to a survey (10) 86% of the machinery used in th sector was produced domestically. Imported machinery was bought at high mark-ups from commercial importers since it was nearly impossible for a producer to obtain a licence. An attempt has been made in this section evaluate the differential impact of incentive measures on the small industrialist vis a vis his more influential compare.

Cost of capital to the small entrepreneur has been estimated on t basis of the following assumptions regarding interest rates and price c domestic machinery.

(1) Capital cost computed for two sets of values for interest rates.

(a) Maximum interest rates charged for advances against machinery - Data taken from the Banking Statistics of Pakist

(b) Interest rate 2% higher than the averave applicable to advances against machinery.

(2) Price of local machinery is assumed to be equal to the domestic price of imported goods. Average mark-ups on landed cost for machinery imported under license are available for 64-65 Pal [14] and 66-67 (Alamgir).

Price of domestic machinery is derived by the following formula:

$$k_d = K(1 + t)\ (1 + \ )$$

where K_d = price of domestic machinery.

K = C & f value of imported machinery

t = tarriff rate on machinery

γ = Markup on landed cost (exclusive of normal profits).

TABLE VIII

Estimates of Cost of Capital to the Small Entrepremeur (P_{k3})

	P_{ks} u=0.5			P_{ko}	P_{ke}	P_{ks} u= .45	
		r_1	r_2			r_1	r_2
64-65	.74	40.4	56.02	18.5	78.6	37.3	51.5
66-67	.71	56	66.1	27.3	79.2	51.5	60.59

r_1 = 2% higher than average rate on advance.

r_2 = maximum rate charged on advanced against machi

From table we see that even under the most favourable assumption ($r = r_1$, $u = .45$) capital cost to the small industrialist in 64-65 was twice as high as the price facing the big industrialist. Use of maxima interest rates (r_2) and average tax rate .5, further increases the difference, costs to the small scale producer going up to three times what they were to the large scale producer.

From 64-65 to 66-67 cost of capital to the small scale entrepreneur increased by 40% as compared to 47% for the large scale industrialist. The relatively shown rate of increase was mainly due to a fall in the markup on imported machinery subsequent to import liberalization.

Looking at the difference between estimated real cost of capital and private cost to the small entrepreneur it is evident that capital use was subsidized to a much lesser degree in the small scale sector.

CONSLUSI N

The market cost of capital showed an appreciable increase over the third plan period attributable to higher tariff rates; less liberal depreciation allowances and rising interest rates. A comparison with estimates for the real estimated cost of capital indicate that although the divergence between private and social cost was reduced slightly in the late sixties, use of capital was still being subsidized to the extent of two-thirds of its' equilibrium price. A much lower level of subsidy to the small entrepreneur, amounting to 17% of the equilibrium price, reflected the inequities generated by the discriminatory policies of commercial banks and licensing authorities.

Use of tax holiday and concessionary tariffs significantly reduced capital costs to underdeveloped areas. The cost of using capital to an undertaking not entitled to exemptions was on the average 25% higher than that to firms availing of eight year and six year tax holiday. However, the potential for increasing the regional cost differential in favour of backward areas was not fully realized due to the availability of very liberal depreciation allowances to non tax holiday areas. It should be pointed out here, that the impact of fiscal incentives on the cost of capital would be overstated if tax practices are characterized by widespread evasion, since the effective tax rate from which exemption is granted is lower than the nominal tax rate.

This study has estimated that degree to which government policies have subsidized the use of capital. To what extent were government objectives met by the artificially low cost of capital? This question requires detailed investigation on various issues. It is necessary to evaluate the responsiveness of investment to capital costs in the context of the Pakistan industrial

sector. How important are factors like risk, uncertainty, economic and political climate which are not considered in the formula? How effective were low capital prices as a means of channelling investment into the approved sectors? To what extent did favourable cost differentials for backward areas compensate for infrastructural obstacles?

Appendix on Data Used

Data

K: Since most of the capital goods are imported, unit value index of exports of manufactured goods from developed countries is taken as a proxy for capital price index. Machinery on the average from 1950-60 to 1971 comprise 40% of manufactured exports. Furthermore changes in unit value index of manufactured experts followed the same pattern as movements in wholesale price index of machinery for the United States as can be seen in appendix table II.

Source: Monthly Bulletin of Statistic - UN Publication.

t: General tariff rate on machinery.

Source: Fiscal Policy in Pakistan Vol. I & II Ministry of Finance publication.

f: Official exchange rate remained unchanged over the period-hence f is assumed to be one for computations of market cost - and a multiple of the official exchange rate for estimating "real" price.

d,n: average rate of economic depreciation in the manufacturing sector is 6.2% life of machine being 16 years.

Source: Schedule of Depreciation rates imn West Pakistan - 1967-68 compiled by the Planning Division.

r: average rate of interest on advances against machinery.

Source: Banking Statistics of Pakistan - 1971-72 published by State Bank of Pakistan.

d': Depreciation deductions for tax purpose applicable at a rate of 10% for most industries. Details about accelerated depreciation given in Section

Source: Income Taxation in Pakistan by Abdur Pal.

u: Nominal tax rate was 60%, however due to various rebates an effective tax rate of 50% is used for calculation of capital cost. Lary White (19) places the average tax rate on profits (exclusive of tax holiday and accelerated depreciation) at 47.9%.

Source: Same as above.

Period				Years	rtd	TH_0	TH_2	TH_4	TH_6 -- TH_8	(S_1)	0	2	4	6	8
1959-60	No.TH	.7624	,0457	1959-60	.1194	.0737		.0972	.1016 .1055	TH_0=.5	.1474		.1379	.1303	.1249
to64-65	TH8	.2323	.0139	1960-61	.1192	.0735		.097	.1014 .1053	TH_2=.65	.147		.1376	.13	.1246
	TH6	.2963	.0178	1961-62	.1228	.0771		.1006	.105 .1089		.1542		.1427	1346	.1289
	TH4	.3703	.0222	1962-63	.1233	.0776		.1011	.1055 .1094	TH_3=.66	.1592		.1434	.1353	.1295
				1963-64	.125	.0793		,1028	.1072 .1111		.1586		.1458	.1374	.1315
				1964-65	.124	.0783		.1018	.1062 .1101	TH_4=.705	.1566		.1444	.1362	.1303
Period II				1965-66	.1356	.0954	.1133	.121	.1262						
1965-66	TH_0	.6708	.0402	1966-67	.1404	.1002	.1181	.1258	.131	TH_8=.78	.1908	.1842	.1716	.1618	
to69-70				1967-68	.1418	.1016	.1195	.1272	.1348 .1324		.2004	.192	.1784	.1679	
	TH_2	.3717	.0223	1968-69	.1449	.1047	.1226	.1303	.1355	TH_8=.845	.2032	.1943	.1804	.1697	
	TH_4	.2431	.0146	1969-70	.145	.1048	.1227	.1304	.1356		.2094	.1993	.1848	.1737	
				1970-71	.1442	.1018	TH3		.1336		.2096	.1995	.1850	.1738	
	TH_6	.1574	.0094				.1242				.2036	TH_3		.1712	
Period III												.1881			
1970-71	TH_0	.7071	.0424												
	TH_6	.1769	.0106												
	TH_3	.3347	.02												

	K	t
1959-60	100	10%
1960-61	101	12.5%
1961-62	101	12.5%
1962-63	102	12.5%
1963-64	103	12.5% (7.5% TH8)
1964-65	105	12.5% (7.5%)
1965-66	108	25% 20% (TH6)
1966-67	109	25% 20%
1967-68	109	40%
1968-69	112	50%
1969-70	119	50%
1970-71	126	

K: Unit value of index

$$K(1+t)\ (r+d - u/s_1^n\ (\sum_{h+1}^{n} \frac{d't}{(1+i)^t}) \Big/ 1-u(s_{h+1}^{n}/s_1^n)$$

K(1+t)	P_{ko}	P_{k2}	P_k4	P_k6	P_k8
110	16.21		15.17	14.33	13.74
113.62	16.7		15.63	14.77	14.16
113.62	17.52		16.21	15.29	14.65
114.75	17.8		16.46	15.53	14.86
115.87	18.38		16.89	15.92	14.56
110.72	18.5		17.06	16.09	14.71
118.12	25.76	24.87	23.17	20.97	
112.87	27.3	26.16	24.31	21.96	
133	31.0	29.65	27.53	25.89	
129.6	32.83	31.25	28.98	27.24	
136.25	37.41	35.61	33.02	31.02	
130.8	38.48	Pk3		32.36	
152.6		35.55			
156.8					
178.5					
189					

of exports of developed countries.

Appendix Table II

Index of Wholesale Price by Commodities
Base 1963-64

Weights	Commodity	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71
.042	Tobacco	95.2	96.2	92.3	88.5	100	101.6	104	102.7	106.7	101.0	111.0	108.3
.013	Tyres & Tubes	101.0	100.9	99.0	97.3	100	104.9	107.3	112.7	120.9	122.0	123.1	123.4
.085	Sugar refined	82.4	82.4	85.2	91.1	100	104.8	95.5	87.6	104.1	97.7	97.7	89.4
.128	Mineral Oil	90.7	90.7	90.7	91.2	100	100	104.1	125.7	127.0	128.6	130.8	138.2
.032	Paper and Newsprint	85.8	85.8	96.8	97.8	100	102.5	106.3	107.2	105.6	112.1	116.1	124.8
.638	Metal	79.2	73.1	79.6	107.2	100	79.2	90.2	94.9	110.6	1[illegible].8	150.5	192.7
.063	Coal & Coke	102.6	92.2	92.2	92.2	100	109.4	122.1	126.6	14k.7	165.5	183.5	182.1
	Index of domestic wholesale price imports: West Pakistan	83.64	79.18	83.71	101.73	100	88.07	95.82	101.27	114.03	13k,89	142.59	169.8
	Unit value Index of Imports into West Pakistan	99.2	102.6	100.4	100.3	100	83.3	105.3	98.6	97.7	97.5	107.7	98.9
		.6	.48	.6	.94	.92	1.04	.75	.98	1.25	1.59	1.53	2.3

Appendix Table III

MONTHLY BULLETIN OF STATISTICS U.N.

MACHINERY PRICE INDEX

Year	(1)	(2)	(3)
1959-60	100	100	100
1960-61	101	-	100
1961-62	101	-	98.9
1962-63	102	-	99.2
1963-64	103	-	99.9
1964-65	105	102	103.6
1965-66	108	-	105.8
1966-67	109	108	107.7
1967-68	109	112	108.4
1968-69	112	115	111.3
1969-70	119	121	112.4
1970-71	126	126	112.4

-.-.-.-.-.-.-.-.-.-.-.-.-.

Column (1) Index of Unit Value of Exports of Manufactured goods from Developed Countries.

Source: Monthly Bulletin of Statistics U.N. Publication

Column (2) Wholesale Price Index of Machinery, United States

Source: U.S Statistical Abstract.

Column (3) Domestic Wholesale Price Index of Machinery-West Pakistan.

Source: 25 years of Pakistan.

Appendix Table IV

REAL ESTIMATED COST OF CAPITAL - MACHINERY

			K	f	K.f	P_{KE}
r	.15	1959-60	100	1.61	161	59.1
d	.062	1960-61	101	1.48	149.5	54.7
r+d	.212	1961-62	101	1.6	161.6	59.4
u	.5	1962-63	102	1.94	197.8	72.7
u/S^n_1	.06	1963-64	103	1.92	197.6	72.6
		1964-65	105	2.04	214	78.6
(a) $n\frac{d't}{1(1+i)^t}$	.4725	1965-66	108	1.75	189	69.4
		1966-67	109	1.98	215.8	79.2
		1967-68	109	2.25	245.3	90.1
(b): $u/S^n_1 \cdot \frac{n}{1}\frac{d't}{(1+i)^t}$	.0284	1968-69	112	2.59	290	106.5
(c): r+d-(b)	.1836	1969-70	119	2.53	301	110.5
(e): $\frac{r+d-(b)}{1-u}$	.3672	1970-71	126	3.3	415.8	152.7

f: Scarcity value of foreign exchange expressed as a multiple of the official rate.

K: Unit value of exports of manufactured goods from developed countries.

P_{KE}: Equilibrium cost of capital.

Appendix Table V

MARKET COST OF CAPITAL - SMALL SCALE SECTOR

	β	Normal markup	γ	K(1+t)	K(1+t)(1+γ)	r_1	r_2	d	(ä)
1964-65	62.2	12%	74%	118.12	205.5	8.21	12	6.2	.7624
1966-67	58.8	12%	71%	136.25	233	9.84	12	-	.6708

β : markup on land cost (exclusive of normal profits) γ : β + normal markup

Calculation $r=r_1$, $u=.5$, $u/s_1^n = .06$

	r + d	(b)	(c)	(e)	P_{ks}
1964-65	.1441	.0457	.0984	.1968	40.44
1966-67	.1604	.0402	.1202	.2404	56

$r=r_2$ $u=.5$, $u/s_1^n = .06$

1964-65	.182	.0457	.1363	.2726	56.02
1966-67	.182	.0402	.1418	.2836	66.09

$r=r_1$, $u=.45$ $u/s_1^n = .058$

1964-65	.1441	.0442	.099	.1816	37.32
1966-67	.1604	.0389	.1215	.2209	51.47

$r=r_2$ $u=.45$, $u/s_1^n = .058$

1964-65	.182	.0442	.1378	.251	51.06
	.182	.0389	.1431	.26	60.59

(a): $\leq_1^n \frac{d't}{(1+i)^t}$

(b): $u/s_1^n \leq_1^n \frac{d't}{(1+i)^t}$

(c): r+d - (b)

(f) 1-u

(e) $$\frac{r+d-u/s_1^n \leq_1^n \frac{d't}{(1+i)^t}}{1-u}$$

Construction of wholesale Domestic Price Index of Imported Commodities

Following commodities used to construct domestic wholesale price index.

1) Tobacco
2) Refined sugar
3) Mineral Oils (Kerosene Oil & Motor Spirit)
4) Paper and newsprint
5) Tyres and tubes
6) Coal & Coke
7) Metal

Indices of wholesale prices of these commodities for West Pakistan[1], were weighted by a five year (1960-65) average of their value in total imports to arrive at the composite index - value of imports were taken from Nurul Islam's Imports of Pakistan - Growth and Structure.

Index numbers of unit value of imports and wholesale price indices for selected commodities (both for West Pakistan) were taken from 25 years of Pakistan and were recomputed with 1963-64 as base.

APPENDIX II

Indirect method of estimating overvaluation of domestic currency evolved by Islam is given below.

ρ_b = rate of overvaluation of domestic currency at the official exchange rate in period

$$\rho_{b'} = \left[\frac{\dot{e}_b - \hat{e}b}{\hat{e}b} \right] = \left[\frac{e^*_b - e^c_b}{e^c_b} \right]$$

P_c = domestic wholesale price index of the major imported goods; with $P_b = 100$

m_c = import price index; with $m_b = 100$

Subscript b = base period, July 1963-June 1964

Subscript c = current period, i.e., each of the years under consideration except the base year.

By definition

$(e^*_c / e^*_b) \cdot 100 = P_c$: or, $(e^*_c) \cdot 100 = P_c\, e^*_b$

and $(e^c_c / e^c_b) \cdot 100 = m_c$; or $(e^c_c) \cdot 100 = m_c\, e^c_b$

$$\rho_{e_c} = \frac{(e^*_c - e^c_c)}{e^c_c}$$

$$= \left[(P_c\, e^*_b) - (m_c\, e^c_b) \right] / m_c\, e^c_b$$

$$= (p_c/m_c) \left[(e^*_b) - (m_c/P_c) \right]$$

$$= (P_c/m_c) \left[\left((e^*_b/e^c_b) - 1 \right) - \left((m_c/P_c) - 1 \right) \right]$$

$$= (P_c/m_c)\ (\rho_b - \lambda c)$$

where

$$\lambda c = \left[(m_c/P_c) - 1 \right]$$

Data requirements for calculating scarcity values by this formula are as follows:

1) domestic wholesale price index of imported commodities with base 1963-64

2) Import price index with base 1963-64

3) ρ_b : markup of scarcity price of foreign exchange on official price in the base year.

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