INVESTMENT ALLOWANCE AND PRIVATE
CORPORATE INVESTMENT IN INDIA

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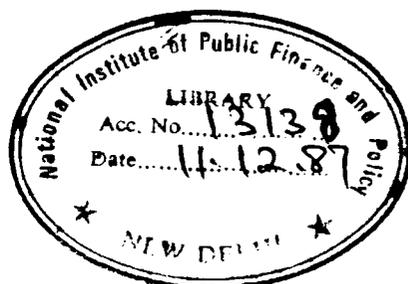
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1. Introduction

Tax incentives linked to the investment efforts
of the corporate sector are a common feature of almost all
national economies. Outside the communist bloc, there is
hardly any country which does not allow its private enter-
prise some form of income tax deduction for encouraging
investment activity. India is no exception. The Indian
income tax law has a provision[1] that if a company acquires
machinery and plant and puts it to use, it can claim a
deduction of around 25 per cent of the cost of the newly
acquired machinery, from its tax base. This provision is
intended to persuade companies to acquire new machinery,
for the purpose of expanding capacity, modernising the
plant, or even merely replacing worn-out machinery. The
element of persuasion is expected to act in two ways:
First, the tax liability of a company intending new invest-
ment is reduced, and second, additional internal financing
is generated for new investment. For this, the tax pro-
vision imposes a condition, that a major portion, i.e., 75
per cent of the deduction due to investment allowance,
should be put into a reserve called "investment allowance
reserve", which cannot be used for any purpose other than
buying machinery. Thus, the investment allowance reserve
along with the depreciation reserve is supposed to provide
for raising sufficient sources internally, to finance the

[1] Section 32A of Income Tax Act, 1961.

new investment. Further, to some extent investment allowance
also compensates for inflation in the equipment costs. In
fact, inflation compensation was the main motive when invest-
ment allowance was re-introduced in 1976-77. Prior to
1974-75, the investment allowance was called development
rebate. After this rebate was abolished, for the two inter-
vening years, 1975-76 and 1976-77, companies were allowed to
claim initial depreciation. While presenting the 1976-77
budget, the Finance Minister noted that companies were
finding it difficult to replace or modernise equipments in
the face of inflation and therefore, as a compensation for
the price rise, the investment allowance was introduced[2].
Originally, only some industries as specified in the Ninth
Schedule were allowed this facility, but by 1978 the facility
was extended to most of the industries; those not eligible
for investment allowance are specified in the Eleventh
Schedule. However, currently a feeling has gained ground,
that since investment allowance is being claimed by almost
all companies, it would simplify matters if it is converted
into a straight, unconditional reduction in the corporation
income tax rate. The budget for the year 1984-85 affirmed
this view by indicating that in the following year, the
investment allowance would be replaced by a reduction of
5 per cent in the tax rate on companies. Finally, it has
been proposed in the new Long Term Fiscal Policy to replace
the investment allowance from 1987-88, by a scheme which
allows companies to deduct a specified fraction of their
profit from taxable income if it is deposited with the
Industrial Development Bank of India and other specified
institutions.

2/ Union Budget 1976-77. Government of India.

Given this background, this study aims at examining the impact of investment allowance on the corporate sector. This is attempted in an integrated model of corporate behaviour covering its three major aspects, namely, investment, financing and dividend decisions. It is essential to study the effect in an integrated model, as the tax provisions relating to investment allowance contain a bias in favour of internal financing, and thereby have a tendency to alter the pattern of financing new investment.

2. The Framework

a. The investment function. Briefly, the investment function is derived as follows:

First, gross fixed investment I_t is defined as change in the capital stock K_t,

$$I_t = K_t - (1 - \delta) K_{t-1} \tag{1}$$

where δ is the natural rate of depreciation, or in terms of rates,

$$I_t/K_{t-1} = K_t/K_{t-1} - (1 - \delta) \tag{2}$$

Second, following the neoclassical approach, it is contended that companies first arrive at the level of capital stock K_t^* required for meeting the expected demand in the output. Because of various delays, such as due to placement of orders for equipment, installation, phasing and so on, it takes some time to realise the planned change in the capital stock. And these capital stock growth plans are also prone

to revisions, depending upon any revised expectations with regard to the output demand. The adjustment of actual change in the capital stock to its desired change is assumed to be such that

$$K_t/K_{t-1} = (K_t^*/K_{t-1})^\gamma \text{ where } 0 \leq \gamma \leq 1 \qquad (3)$$

Third, assuming that output level Q_t is guided by a CES type of production function, and that the objective of companies is maximisation of profits over time, the first order condition, that the marginal productivity of capital equals the ratio of the rental cost of capital and the price of output, yields a behavioural function for determination of the desired stock of capital as

$$K^* = A^\sigma \ P^{\sigma-1} \cdot \bar{c}^{-\sigma} \cdot PQ^* \qquad (4)$$

where P denotes the price per unit of output Q, c denotes the capital rental cost per unit of capital, and σ denotes the elasticity of substitution between capital and labour.

Substituting equation (4) in (3) the rate of change in the capital stock is obtained as

$$K_t/K_{t-1} = A^{\gamma\sigma} \ P^{\gamma(\sigma-1)} \ c^{-\gamma\sigma} \ (PQ^*)^\gamma \ K_{t-1}^{-\gamma} \qquad (5)$$

b. **Taxes and the cost of capital.**

Fourth, taxes on company income are assumed to affect investment, by altering the notions regarding the rental cost of capital, c, which is the minimum expected rate of return. The notions about the level of 'c' depend

upon various factors, namely, machinery prices, debt-equity, dividend payout policies, profitability as well as various tax factors affecting corporate decisions. Since our aim is to quantify the impact of the tax policy on investment, it is necessary to depict in detail how exactly the taxes affect the rental cost of capital. Let us denote the various elements of the rental cost by the following symbols:

q = machinery price,

Y = gross cash flow,

α = proportion of dividends in the after-tax profits,

β = proportion of debt in the capital,

δ = real rate of depreciation,

r = discount rate of shareholders,

i = rate of interest on debt, and

p = inflation rate.

Besides these the tax elements considered in this study are:

τ = corporation income tax rate (including surcharges),

τ_1 = average rate of personal income tax on dividend incomes,

d = rate of tax depreciation,

k = rate of investment allowance/development rebate, and

a = proportion of investment allowance to be retained in order to claim the investment allowance.

The condition for the cost effectiveness of any investment in machinery is that the price of the machine, as viewed by shareholders, would be at least equal to the sum of the present values return generated over the lifetime of the asset. In other words, let R denote a total gross minimum return before taxes, Tc denotes tax liability at the company level and, Tp denotes tax liability at the shareholders' level. The cost effectiveness condition would be

$$(1- \beta)q = R - Tc - Tp \tag{6}$$

where

$$R = c \int e^{-(r+\delta)t} \, dt - \beta qi \int e^{-(r+p)t} \, dt$$

$$TC = (R-qd \int e^{-(r+p+d)t} \, dt - qk)$$

$$TP = \alpha\tau_1 (R-TC)$$

Solving (6) for the rental cost c,

$$c = q(r+\delta)\{\frac{1-\beta}{(1-\tau)(1-\tau_1)} \quad \frac{z}{1-\tau} +\beta \frac{i}{r+p}\} \tag{7}$$

where[3]

$$z = (d/(d+r+p)) + k$$

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[3] In the case of initial depreciation $z = ((1-k)d/(d+r+p))+k$ where k is rate of initial depreciation.

The rental cost of capital is depicted to have been composed of three main components:

(i) the minimum return required in the face of classical tax regime,

(ii) the tax saving per unit due to tax depreciation and investment allowance, and

(iii) the extra return required to pay for the real interest payment on borrowed funds.

The rental cost of capital expression contains the relevant aspects of the tax system in this country. It shows, for example, what would be the likely change in c when and if investment allowance is raised. However, in order to have an idea of the complete impact on corporate behaviour, one should know how α and β themselves are affected by the investment allowance, particularly due to the inbuilt bias in the investment allowance provision in favour of profit retentions and internal financing.

c. <u>Effect on dividend policies</u>. Following the literatur rature on corporate dividend behaviour, the most plausible hypothesis regarding dividends appears to be the long-run of desired dividends.

$$D^{*} = A_0 \ Y(i - \tau_e) \ \emptyset^{\sigma} \tag{8}$$

where $\emptyset$ represents the relative opportunity tax cost of paying one rupee of net dividends in terms of net retentions and τ_e represents the effective rate of tax on corporate income (before dividend payments). In other words, if P_d denotes the tax price of D, and P_r the tax price of retentions, then $\emptyset = p_r/p_d$. For example, under the current tax

system $p_r = 1/(1-\tau_e)$ and $p_d = 1/(1-\tau_e)(1-\tau_1)$ so that $\emptyset = (1-\tau_1)$.

To quantify the impact of the investment allowance through the investment allowance reserve condition, a component needs to be added so that D^* function would be

$$D^* = A.Y(1-\tau_e)(1-\tau_1)^{\sigma_1}(\frac{1-\tau_e'}{1-_e})^{\sigma_2} \qquad (9)$$

where τ_e' is the likely effective corporation income tax rate in the absence of the investment allowance provision. This should take care of the extra cost of dividend payments due to investment allowance provision.

The actual dividends D_t are determined in a partial adjustment framework as

$$D_t = A.Y^\lambda (1-\tau_e)^\lambda (1-\tau_1)^{\lambda\sigma_1}(1-\tau_e'/(1-\tau_e))^{\lambda\sigma_2} \qquad (10)$$

e. <u>Effect on debt-equity ratio.</u> Regarding β the gearing ratio, a simple hypothesis could be that the long run substitution between debt and equity financing is a function of their relative costs. Thus,

$$(\frac{\beta}{1-\beta})^* = A_2 (\frac{1-i/r+p}{(1-\tau)(1-\alpha\tau_1)})^{\sigma_3} \qquad (11)$$

so that with the dynamic adjustment process

$$(\frac{\beta}{1-\beta})_t = A_2^\gamma (\frac{1-i/r+p}{(1-\tau)(1-\alpha\tau_1)})^{\gamma\sigma_3} (\frac{\beta}{1-\beta})_{t-1}^{1-\gamma} \qquad (12)$$

Equations (10) and (11) indicate the tax impact on
α and β including the effect of investment allowance which,
when plugged into equation (7), would help in estimating the
total impact of investment allowance on the investment.

3. Empirical Results

a. Data and interpretation of variables. Equations (5),
(10) and (12) are fitted to aggregate time-series data per-
taining to medium and large public limited companies for
the period 1960-61 to 1982-83. The data source for financial
variables in the Reserve Bank of India's publications,
Financial Statistics of Joint Stock Companies as well as the
Reserve Bank of India Bulletins. The financial variables are
interpreted as follows:

The variable K is taken as the stock of fixed assets
(machinery and plant) in real terms. For this, first the
net investment series are deflated by the wholesale price
index relevant to machinery and plant, and then the series
are cumulated to obtain the capital stock in constant prices.
The variable Q is proxied by real income from sales (net of
excise duties). The gross cash flow variable, Y is inter-
preted as profits before tax plus depreciation and other
provisions. The discount rate relevant to corporations is
proxied as profits after tax per rupee of net worth.
Interest rate i is taken as interest payments on outstanding
borrowings. Debt-equity ratio (β/1-β) is represented as a
ratio of long-term debt over equity capital. Corporation
income tax rate is proxied by tax provision over gross cash
flow, while the individual income tax rate relevant to

dividend incomes is computed from the All·India Income Tax Statistics. The tax depreciation rate, d, rate of investment allowance, k, as well as the·proportion of investment allowance required to be retained, are taken as the statutory rates. Finally, inflation rate is interpreted as change in the wholesale price index.

b. Estimation and the regression results. The estimation procedure adopted here is, briefly, as follows: First the dividend equation (10) was estimated which yielded estimates for the lag parameter λ and the sensitivity coefficients σ_1 and σ_2 Using these estimates the long-run optimal dividend payout ratio series are generated as $D^*/Y(1-\tau_e)$. Next, the debt-equity equation (12) was estimated and estimates for the lag parameter γ and the sensitivity coefficient σ_3 were obtained. With the help of these, the long-run debt-equity ratio $(\beta/(1-\beta))^*$ and from that, the long-run gearing ratio (proportion of debt in total capital) series were obtained. Using the estimates for α and β and other variables, the rental cost series eere computed. Three-year moving·average series of the rental cost as well as real sales, and price variables are used in estimating the final K_t/K_{t-1} function (equation 5). The regression (OLS) results are as follows:

The dividend equation

$$\ln D_t = \underset{(0.461)}{0.041} + \underset{(2.157)}{0.177} \ln Y_t + \underset{(0.922)}{0.318} \ln (1-\tau_e)_t$$

$$+ \underset{(1.006)}{0.121} \ln \phi_{1t} + \underset{(0.037)}{0.024} \ln \phi_{2t} + \underset{(4.689)}{0.755} \ln D_{t-1} \quad (13)$$

$$\bar{R}^2 = 0.95; \quad F = 126.87; \quad SEE = 0.096; \quad D.W. = 2.16$$

The estimate for the lag parameter λ works out to be 0.245. Contrary to our expectations the income-elasticity and the elasticity for the tax depression variable $(1-\tau_e)$, turn out to be non-unitary. The long-run coefficient for Y works out to be 0.735 and for $(1-\tau_c)$ it is 1.303. This could be because of a specification bias. (A more correct way of specification for dividend function will result in a non-linear equation. But for this slight inaccuracy, the model fits well to the data). What is important from the point of view of this study is the estimate of the coefficient for $\emptyset_2$, the variable representing the additional inducement for companies to prefer profit retentions due to the investment allowance reserve condition. The coefficient is not significant, indicating that dividend retention policies are not affected by the special reserve creating condition of investment allowance. It is quite possible that companies might be availing investment allowance benefits even without retaining any extra portion of profits. They might be simply switching over the funds from other non-statutory and non-obligatory reserves to investment allowance reserve. Dividend policies are also expected to be more directly influenced by investment allowance by increasing the tax depression variable, as the deduction cuts down the effective tax rate. However, in our equation even such an effect is not evident, because of the insignificance of the coefficient for $(1-\tau_e)$ variable. The only tax variable that turns out to be effective is the tax differential variable $\emptyset_1$, or more particularly the individual income tax rate on dividends. By and large, we may conclude that the investment allowance provision has no perceptible effect on dividend policies.
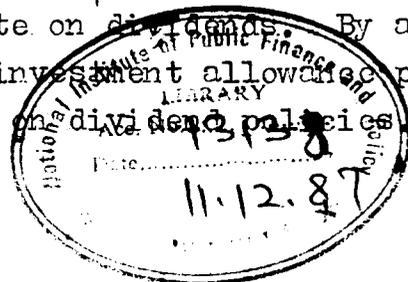
(ii) <u>The debt-equity equation</u>. The other variable indicating the capital structure is the debt-equity ratio. The equation has two explanatory variables, namely, lagged debt-equity ratio and, ratio of real cost of borrowing to cost of internal financing. The real cost of borrowing is denoted by $1-(i/r+p)$ while the cost of internal financing is denoted by $(1-\tau)(1-\alpha\tau)$. For some reason, regression results in terms of fit etc., turn out to be better when these two cost variables are separately introduced into the equation, than when their ratio is used as a variable. The results are as follows:

$$Ln\ (\beta/(1-\beta)) = \underset{(2.218)}{2.007} + \underset{(4.506)}{2.086}\ ln\ (1-i/r+p) - \underset{(-4.297)}{10.48}\ ln$$

$$((1-\tau)\ (1-\alpha\tau)) + 0.624\ ln\ (\beta/1-\beta)_{t-1} \quad (14)$$

$$\bar{R}^2 = 0.88; \quad F = 79.04; \quad SEE = 0.40; \quad D.W. = 0.49$$

The lag parameter is estimated at 0.376 which makes the long-run coefficients to be 5.548 for the cost of borrowing variable and 27.87 for the cost of internal financing. The low D W Statistic indicates the presence of auto-correlation which is supported by a rather high coefficient for the lagged debt-equity variable. The impact of taxation is evident in the significant coefficient for tax cost variable.

The effect of investment allowance on the debt-equity ratio is felt through the tax rate reduction as in the case of dividend equation. The much talked about effect of the investment allowance, namely, its bias towards

internal financing, is empirically not significant. However, its effect of reducing the effective rate has a strong bearing on the decisions regarding pattern of financing. Between debt and equity financing, investment·allowance makes equity more attractive and within equity part, internal financing is considered to be a better alternative to raising funds through new issues.

(iii) _The investment function._ The function is estimated as follows:

$$\text{Ln } (K_t/K_{t-1}) = \underset{(2.906)}{0.198} + \underset{(2.493)}{0.03} \text{ ln } (p/c) + \underset{(9.467)}{0.152} \text{ ln}(Q/K_{t-1})$$

(15)

$$\bar{R}^2 = 0.82; \quad F = 62.48; \quad SEE = 0.05; \quad D.W. = 1.48$$

Basically the coefficients consist of two parameters γ and σ. The intercept is $\gamma\sigma$ ln A, the coefficient of ln (p/c) is $\gamma\sigma$ while the coefficient of ln (Q/K_{t-1}) is γ. The estimate for the lag parameter γ is 0.152 while the elasticity of substitution is estimated to be 0.197.

(iv) _Quantification of the impact of investment allowance._ Equation (15) is used to quantify the likely impact of abolition of investment allowance without any compensatory provisions. The effect is quantified in three steps. First, the variable Z would consist of only the deduction due to tax depreciation. Second, the effective corporation tax rate would go up to·the extent the investment allowance provision is availed, which would alter the dividend payout ratio as well as the gearing ratio.

Finally, the rental cost of capital c, thus recomputed, is substituted for the actual series in equation (15), to arrive at the hypothetical investment series. The difference between the fitted investment and the hypothetical investment represents the effect of the investment allowance. The simulation results are presented in Table 1.

Column (4) of Table 1 indicates the difference between the hypothetical investment had there been no development rebate or investment allowance, and the fitted investment, through the years 1955-56 to 1982-83. The effect varies from year to year, ranging from Rs 1.6 crore in 1955-56 to Rs 34.2 crore in 1978-79. It makes a difference of of 1 to 4 per cent of the investment. More noticeable is that the effect is substantially higher after 1977-78, when development rebate and initial depreciation allowance were replaced by the investment allowance. The effect averages 1.4 per cent during 1955-56 and 1959-60, the initial years of development rebate, and 1.47 per cent during 1960-61 and 1974-75, while in the later years it averages 2.2 per cent after the investment allowance was introduced. The reason, at least to a certain extent, could be that in the later years there has been greater awareness of the tax benefits due to investment incentives.

4. Summary and Conclusion

The study briefly attempts measurement of the impact of investment-linked tax incentives, in particular, the investment allowance and development rebate, on private corporate investment behaviour. While doing so, the study implicitly takes into account the possible effect on the capital structure. The main conclusions are:

TABLE 1

Impact of Investment Incentives on Private
Corporation Investment - Medium and
Large Public Limited Companies
(1955-56 to 1982-83)

(Rs crore)

Year	Fitted Investment	Hypothetical investment in the absence of incentives	Difference between Col.2 & 3	Percentage difference
1955-56	133.67	132.03	1.64	1.23
1956-57	183.64	181.47	2.17	1.18
1957-58	225.41	222.21	3.20	1.42
1958-59	202.80	198.85	3.95	1.95
1959-60	279.30	275.79	3.51	1.26
1960-61	354.65	342.22	3.43	0.99
1961-62	370.28	366.06	4.22	1.14
1962-63	391.44	384.08	7.36	1.88
1963-64	483.30	475.67	7.63	1.58
1964-65	422.56	415.47	7.09	1.68
1965-66	438.98	431.56	7.42	1.69
1966-67	550.65	543.73	6.92	1.26
1967-68	568.57	560.88	7.69	1.35
1968-69	570.21	557.79	12.42	2.18
1969-70	569.23	561.08	8.15	1.43
1970-71	713.90	707.67	6.23	0.87
1971-72	725.00	717.27	7.73	1.07
1972-73	633.59	626.11	7.48	1.18
1973-74	313.52	305.28	8.24	2.63
1974-75	1134.11	1115.92	18.19	1.60
1975-76	1144.77	1127.17	17.60	1.54
1976-77	1155.44	1138.42	17.02	1.47
1977-78	708.96	690.01	18.95	2.67
1978-79	789.63	755.41	34.22	4.33
1979-80	1072.96	1044.24	28.72	2.68
1980-81	1158.84	1134.54	24.30	2.10
1981-82	1597.77	1572.39	25.38	1.59
1982-83	997.91	978.23	19.68	1.97

(i) Cost considerations do play a significant
    role in investment decisions, taxes being
    important constituents of the expectations
    regarding the rental cost of capital;

(ii) Investment allowance reduces the effective
     tax liability and lowers the cost of capital;

(iii) Between debt and equity financing, the
      reduced tax liability makes equity financing
      more attractive. However, the debt-equity
      equation (14) cannot be taken to mean that
      availability of credit has no influence on
      financing pattern.

(iv) Investment allowance is supposed to encourage
     profit retentions vis-a-vis dividends, because
     of the condition that profits to the extent
     of 75 to 80 per cent of the investment
     allowance are to be retained in order to claim
     the deduction. However, our study fails to
     provide empirical evidence to prove that
     companies retain extra amounts of profits for
     the purpose. They might be simply switching
     funds from other reserves to the statutory
     reserve for investment allowance.

(v) The simulation exercise shows that between
    the development rebate and investment
    allowance, the latter proves to be more
    effective.

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