Taxation and Financial Management: Theory Versus Fact

by

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Introduction

The intent of this paper is to set forth an integrated set of propositions that relate to the manner in which individual and corporate income taxes (including capital gains, investment tax credit and other special features) affect financial decision making. Earlier papers have dealt with specific tax effects and, in a limited number of instances, with the general question under restrictive assumptions, but comprehensive treatments are lacking.

Aspects considered include tax implications for (1) corporate risk taking, (2) level and mix of capital expenditures, (3) capital structure and cost of capital, and (4) dividend policy and share repurchase. In the matter of risk taking, it is interesting to contemplate whether conclusions drawn in the literature to the effect that a proportional income tax (with full loss offset) encourages risk taking holds at the corporate level. In a related vein, the tax treatment of capital expenditures has implications for (a) the maturity of physical assets acquired, (b) the comparative tax advantage of such expensed items as research and development and advertising, and (c) the substitution of capital for labor.

Cost of capital, capital structure and dividend policy are allegedly conditioned by the tax treatment of capital gains and of interest. While we hesitate to take issue with received theory, we do propose to consider the implications of departures from the purely competitive and unregulated market assumptions that have characterized most previous analyses. It is pertinent in this connection to take account of the findings of various studies on corporate tax incidence.

As a point of departure, this study presumes that the objective of corporate management is to maximize share value. Such an objective

function has normative properties and supports our dual focus upon the individual and corporate income tax. The consequences of alternative management goals will also be evaluated.

Although maximization of share value is taken to be the end product of financial decision making, the process is viewed through the eyes of the financial manager. Corporate taxes directly affect the corporate earnings stream and presumably occasion direct response by management. Individual taxes operate indirectly through the share pricing mechanism and are reflected in the cost of capital.

In the treatment that follows, attention is directed, first, to the determinants of share value and, second, to management's rational response to corporate income taxation. The impact of both individual and corporate income taxation upon risk-taking is then evaluated. Consideration is given, finally, to certain discrepancies between hypothesized and actual behavior.

Maximization of Share Value

Consistent with received theory, share value is presumed to depend upon the anticipated stream of cash flows accruing to the investor and the return required by the investor to compensate him for assuming the risks involved. The finite valuation model, given below, identifies prospective cash returns to the investor as comprising dividends (D_t) and terminal share price (P_H).

$$(1) \qquad P_o = \sum_{1}^{H} D_t(1+r)^{-t} + P_H(1+r)^{-H} \quad ,$$

where r is the required rate of return, and H is the investor's holding period. Allowance for individual taxes modifies equation (1) in the following manner:

$$(1') \qquad P_o = \frac{1}{1-T_g(1+r')^{-H}} \left[(1-T_p) \sum_{1}^{H} D_t(1+r')^{-t} + (1-T_g)P_H(1+r')^{-H} \right]$$

where T_p is the marginal tax rate on individual income, T_g is the capital gains tax rate, and r' is the after-tax required return.[1]

The effect of a change in T_p upon P_o depends, among other things, on the generality of the tax. If the investor has no place to hide, the after-tax required return (r') may be scaled at least in part according to the change in T_p. If T_g is held constant as T_p changes, the capital gains component of the cash flow stream to the investor will become more or less favored.

Analysis of the trade-off between current dividends and future share price is revealing. The net return (X) that the company must achieve to render the investor indifferent between dividends now and incremental future share price (ΔP_H) generated by their retention in the business is given by

$$X = \left[\frac{1-T_p}{1-T_g}\right]^{\frac{1}{H}} \cdot (1+r') - 1, \tag{2}$$

provided $\Delta P_H = D_o(1+X)^H$.

Suppose, for example, that T_p and T_g are respectively .50 and .25, that H is five or ten years, and that r' is .10. If H equals five, X is .014; if 10, X is .056. As H becomes large, X approaches r'.

An apparent anomaly exists between the investor's opportunity cost (r') and the return (X) that company must make to justify retention under equation (2). The before-tax return (X*) to shareholders needed to warrant equity investment in the company, given H = 1, is[2]

$$X^* = \frac{r'}{a(1-T_p) + (1-a)(1-T_g)}, \tag{3}$$

where a represents the portion of the return realized in the form of dividends and (1-a) is the part realized in the shape of capital gains. Interestingly

enough, Baumol et al. [3] conclude, that the return on ploughback is "suprisingly small", varying between 3.0 and 4.6% for 900 industrial firms.[3]

Cash Dividends

Differential tax treatment notwithstanding, the larger public corporations commonly base current period dividends (D_t) upon lagged dividends (D_{t-1}) and current period earnings, e.g.,

$$(4) \qquad D_t = D_{t-1} + \alpha\left[p^* \cdot E_t - D_{t-1}\right],$$

where p* refers to the target payout ratio and α is the coefficient of adjustment.[4] Since E_t represents net earnings after corporate taxes, it follows that, other things being equal, D_t will vary inversely with the corporate tax rate (T_c).

The target payout ratio reflects management's beliefs as to growth prospects, its recognition--if any--of investors' tax treatment, and other factors. The fact that p* generally exceeds zero, despite the implications of equations (1'), (2) and (3), suggests the alternative possibilities of low marginal rates of return on added investment, less than full recognition by management of differential tax treatment, and market imperfections that favor dividend payout.

Terminal Share Price

Terminal share price (P_H) is commonly represented as the product of projected earnings per share [E_H] and a multiplier (M_H) that reflects risk and prospective growth subsequent to period H. The equation for the latter (before individual income taxes) is

$$(5) \qquad M_H = p \sum_{t=1}^{S-H} \left(\frac{1+g}{1+r}\right)^t + M_S\left(\frac{1+g}{1+r}\right)^{S-H},$$

where p is the dividend payout ratio (assumed constant), g is the anticipated

growth rate for dividends and earnings, and M_S is the steady state multiplier reached after S periods.

In this context, it apparently follows that a change in the corporate tax rate (T_c) has two consequences. One, it scales cumulative earnings on all past investments up or down, thus affecting reinvestment from internal sources. Two, it scales earnings on new investments up or down, thus modifying return on investment.

Discount Factor

The discount factor, defined as the set of weights that equates after-tax returns to the marginal investor with share value, can be viewed as an opportunity cost; it is the highest after-tax return the investor could obtain on investments entailing the same degree of risk.

Consistent with received theory, the discount factor is presumed to comprise a risk free (or zero beta) component and a risk premium. For the i^{th} security (or firm), the discount factor (r) is given by

$$E(\tilde{r}_i) = r_f + \beta_i\left[E(\tilde{r}_M) - r_f\right], \tag{6}$$

where r_f is the risk free (or zero beta) rate, $E(\tilde{r}_M)$ is the expected market return, and β_i equals $Cov(\tilde{r}_i,\tilde{r}_M)$ divided by $Var(\tilde{r}_M)$. The underlying hypothesis that investors (being generally risk averse) diversify fully implies that the risk premium is determined by the nondiversifiable risk component.

To the degree that individual and corporate taxes affect returns to capital in general, the level and composition of the market discount factor ($\tilde{r}_M$) may be modified. To the degree that their impact is specific in nature, individual beta values may be modified, thus changing relative risks.

Recapitulation

In brief, emphasis upon share value implies that the proper focus is upon the consequences of individual and corporate taxes for (1) the level

and growth of earnings, (2) dividend payout, and (3) nondiversifiable risk. At the level of the individual income tax, questions arise as to impact of taxation upon (1) trade-off between dividends and future share value and (2) investor attitude toward risk taking. At the level of the corporate income tax, queries arise as to tax effect upon (1) corporate earnings and (2) corporate attitude toward risk taking.

The impact of differential tax treatment between dividends and capital gains upon dividend policy is not clearcut. In the dividend model set forth above (Equation (4)), differential tax effects are buried in the target payout ratio (p^*). Differential capital gains taxation may motivate firms to repurchase shares upon occasion rather than to increase dividends; indeed, share repurchases have been substantial in recent years.[5]

Taxation and Corporate Earnings

In the absence of risk considerations, management's rational response to corporate taxation is twofold. One, the broad burden is shifted to the degree possible. Two, specific tax burdens and concessions are reflected in investment mix and financial leverage.

For competitive enterprise, the precise nature of management's response hinges upon the composition of taxable income. Should management endeavor to invest to the point at which incremental revenues equate with incremental costs (after due allowance for risk) and should taxable income include elements of cost, any change in the corporate tax rate will affect the marginal relationship and, hence, modify investment decisions.

Tax Incidence

Crucial to the analysis of tax effects upon financial management is the question of tax incidence. Is management able to pass along all, or some portion, of its tax burden to other parties? The extensive literatue [7,9, and 10] on the subject is inconclusive.

Factors influencing the ability to transfer the burden include (1) degree of competition, (2) pricing strategies followed by management, (3) character of industry demand curves, (4) nature of production and input

supply functions, (5) extent of industry regulation, and (6) pervasiveness of the corporate tax. Consider, first, the case of pure competition and suppose that taxable earnings represent income from capital.

If--as hypothesized by Harberger [9]--differential, i.e., two sector, taxation is introduced into a competitive market environment, capital will flow into the less heavily taxed sector, thus elevating before-tax earnings in the taxed area and lowering returns in the lightly taxed sector. In capital budgeting parlance, fewer projects satisfy the cost-of-capital criterion in the taxed area; the demand for funds declines, as does the cost of capital; additional projects become attractive in the less taxed sector; and the readjustment process continues until balance is attained.[6] Depending upon the elasticities of demand and of substitution, a portion of the tax burden may be transferred to labor, as well as to the less taxed sector.

Additional shifting of the tax burden is possible under imperfectly competitive circumstances whenever (1) the pricing strategies of unregulated firms fail to maximize profits and (2) firms in regulated industries are permitted to treat taxes as costs for rate setting purposes. Moffat [10] derived diverse price-strategy equations, utilized least-square regression analysis to obtain best fits for rubber and textile industry data, and found that inclusion of tax terms helped to explain price behavior for both textiles and rubber.

Full-or near full-shifting may occur, provided three conditions obtain. One, demand is inelastic. Two, regulation, based upon full cost pricing, occasions intra-marginal pricing.[7] Thus, the imposition of--or increase in--a corporate income tax increases costs, prices, and total revenues. Three, corporate taxes are treated as a cost of doing business.

Taxable Income

Taxable income, defined as gross revenues minus allowable deductions,

differs markedly from pure return on capital. Included among the components of taxable income are (1) return on equity (but not borrowed funds), (2) windfall gains or losses, (3) monopoly profits (where such exist), and (4) certain legitimate expense items. Excluded are (1) a variety of specific tax concessions, (2) items accepted as capital gains, (3) interest on borrowed funds, and (4) amounts equal to certain immediately expensed assets, e.g., research and development, that contribute to future revenues.

Under inflationary conditions, the grounding of allowable expense deductions in historical costs has noteworthy consequences. The inability to adjust depreciation expense for price-level change implies changing effective tax rates through time. Consider, for example, a $100,000 investment generating $40,000--in real terms--annually for five years.[8] Suppose further that the rate of inflation is seven percent, the real discount rate is 10%, straight-line depreciation is utilized, and the corporate tax rate is 50%. Under these circumstances, effective (real) tax rates become

	1st Year	2nd Year	3rd Year	4th Year	5th Year
Tax Rate	53.3%	56.3%	59.2%	61.9%	64.4%

Other assumptions produce other effective tax rates.

Consider also the same investment (a) expensed immediately (e.g., research and development) and (b) capitalized (e.g , capital expenditure). Assume double-declining-balance depreciation, with other features remaining unchanged. Present value indexes, defined as ratios of present value to investment base, favor immediate expensing for tax purposes by a substantial margin.

Present Value Index	Immediate Expensing	Capitalized
(1) Zero Inflation	1.52	1.17
(2) Seven Percent Inflation	1.54	1.12

These examples suggest that the burden imposed by the corporate income tax lacks uniformity among firms and industries. Allowable deductions motivate management to employ financial leverage and to direct fund flows into tax-advantaged areas. As illustrative, the FMC Corporation recently stipulated that the DISC provision of the tax law providing "partial deferral of taxes on export sales when these funds are invested in export-related assets...has been an important factor in the growth of FMC's export sales from an 11% growth rate prior to the establishment of DISC to a 40% growth rate thereafter."[9]

Rental Value of Capital Services[10]

Maximization of share value presupposes that anticipated contributions to operating income before depreciation, interest and taxes by new investments at least cover the rental value of associated capital services. Should allowable tax deductions interfere with this relationship, management may be encouraged to modify its capital expenditure program.

The rental cost (value) of capital services is taken to be that periodic payment which just covers the cost of capital, together with the underlying capital outlay, over the life of the capital investment. Before allowance is made for the idiosyncrasies of the corporate income tax, the rental cost (c) is:

$$(7) \qquad c = \frac{rI}{1-(1+r)^{-H}}$$

where I is the price of the capital asset, r is the required rate of return and H is the anticipated asset life. With adjustment for taxes, the rental cost, defined as the before-tax cash flow that must be generated to warrant investment, becomes

$$(8) \qquad c' = \frac{1}{1-T_c}\left[\frac{I(1-ITC) - T_c(PV(D))}{\frac{1}{r}\ 1-(1+r)^{-H}}\right],$$

where T_c is the corporate tax rate, ITC is the investment tax credit in rate terms, and PV(D) is the present value of the depreciation tax shelter.

Interestingly enough, the rental cost of research and development (or any other asset that can be immediately expensed for tax purposes) is unaffected by the tax rate, i.e.,

$$(9) \qquad c' = \frac{1}{\left[1-T_c\right]}\left[\frac{(1-T_c)I}{\frac{1}{r}\left[1-\frac{1}{(1+r)^H}\right]}\right] = \frac{rI}{1-(1+r)^{-H}}$$

The rental cost of working capital in turn is simply $r/(1-T_c)$ times the number of units of working capital.

If the capital outlay is financed partly by debt, allowance should be made for the effect of the tax deductibility of interest in computing the rental cost. The procedure--analogous to the treatment of depreciation effects--is to subtract the product of the tax rate and the present value of the interest payments from the capital outlay.

Suppose I is set at $1, after-tax r at 10%, H at five years, ITC at 10%, interest rate at 10%, and the ratio of debt to equity at one. Waiving the effect of debt upon r, the rental cost of capital under different sets of assumptions is:

Assumptions	Rental Cost Per Dollar
1. No tax (or immediate expensing)	.264
2. No ITC, no debt, and double-declining balance depreciation	.314
3. ITC, no debt, and double-declining balance depreciation	.261
4. ITC, debt, and double-declining balance depreciation	.236[11]

Financial Leverage

Exclusion of interest on borrowed funds from taxable income encourages management to include debt as a component of capital structure. Subject to constraints imposed by the financial markets and by management itself, the higher the tax rate, the greater is the stimulus.

The precise impact of corporate income taxes upon the management of the corporate financial structure is difficult to determine. Retirement of debt at discount from book value involves the treatment of the discount as taxable income. Should the retirement be financed by new debt at a higher interest rate, the tax deductibility of the added interest offsets the added tax attributable to the discount from book. The argument--in reverse form--is analogous to that underlying equation (9) above. The financing of debt retirement at discount by nondebt sources is rendered correspondingly less attractive by the tax treatment of discounts from book.

Call premiums and other expenses associated with the refunding process constitute current period expense for tax purposes. Thus, the tax costs and benefits of refunding at lower interest rates tend to cancel.

Capital Gains

Earnings and therefore financial decision-making may be affected by the alternative tax rate of 30% imposed on net capital gains. Application of the alternative tax is confined to the excess over accumulated depreciation in the case of depreciable property and to situations in which long-term capital gains are not paired against operating losses. By judicious planning, management can time the realization of gains and losses so as to optimize its tax position.

Corporate income subject to capital gains taxation differs markedly from so-called windfall gains or losses. The distinction between ordinary taxable income and capital gains hinges partly upon whether the asset in question is held primarily for sale in the normal course of business and partly upon a variety of ad hoc legislative and regulatory decisions.

The alternative tax rate encourages moderate speculation in marketable securities and in the futures market. The failure of most firms to respond to such an incentive apparently stems from an emphasis upon operations and a need to have authority for speculative activity provided in the corporate charter.

The alternative tax rate may also induce firms to liquidate older, less productive, segments of the business. Suppose, as seems reasonable, that the asset's selling price reflects the present value of the anticipated stream of services (cash) generated by the asset in question. As long as the slice taken by the capital gains tax is less than that taken by the corporate income tax from each element of the cash flow stream, the alternative tax rate favors early sale.

Given straight-line depreciation applicable to the total purchase price and a constant cash flow (F) per annum, the value (P) of an asset to the potential buyer is given by

$$(10) \qquad P = (1-T_c)F \frac{\sum_{1}^{N} (1+r_1)^{-t}}{1 - \frac{T_c}{N} \sum_{1}^{N} (1+r_1)^{-t}} ,$$

where T_c is the corporate tax rate, N is the number of periods over which cash flow is expected to continue, and r_1 is the buyer's required rate of return. The value (P') of the same asset, assuming it to be fully

depreciated, to the potential seller (corporation) is

$$(11) \qquad P' = (1-T_c)F \sum_{1}^{N} (1+r_2)^{-t} ,$$

where r_2 is the selling corporation's required rate of return. If $r_1 = r_2 = r$, the break-even point for the capital gains tax rate (G) is

$$(12) \qquad G = \frac{T_c}{N} \sum_{1}^{N} (1+r_1)^{-t} .$$

The foregoing is illustrative. Numerous possibilities exist. The finding that the alternative tax rate facilitates the use of capital gains as a vehicle for reshaping corporate earnings seems inescapable.

Individual Taxation and Risk-taking

Emphasis upon maximization of share value requires that management pay attention to the effect of changes in the individual income tax rate upon attitude toward risk-taking. Should higher taxes encourage risk-taking as some writers [Cf. 5] have suggested, the market risk premium would fall with attendant reductions in the cost of capital for risky firms.

Proportional Tax With Full Loss Offset

It is well established that positive changes in a proportional income tax with full loss offset will encourage risk taking under plausible assumptions. Following Mossin [11], suppose that risk-averse investors endeavor to maximize expected utility value and let $\tilde{r}_i$ be the random return on the risky asset (portfolio); r_f, the risk-free return; W_o, the initial wealth position; W_1, the terminal wealth position; A, the amount invested in the risky asset; T, the tax rate; and U(W), the investor's utility function.

Thus,

$$(13) \qquad W_1 = (W_o - A)(1+r_f(1-T)) + A(1+\tilde{r}_i(1-T))$$

$$= W_o(1+r_f(1-T)) + (\tilde{r}_i - r_f)(1-T)A$$

$$(14) \quad \underset{A}{\text{Max}} \; E\left[U(W_1)\right] = E\left[U\left\{W_o(1+r_f(1-T) + (\tilde{r}_i - r_f)(1-T)A\right\}\right]$$

$$(15) \qquad E\left[U'(W_1)(\tilde{r}_i - r_f)\right] = 0 \quad \text{(condition for an interior maximum)}$$

$$(16) \qquad \frac{\partial A}{\partial T} = \frac{A}{1-T} + \frac{r_f W_o E\left[U''(W_1)(\tilde{r}_i - r_f)\right]}{\left[1-T\right] E\left[U''(W_1)(\tilde{r}_i - r_f)^2\right]}$$

$$(17) \qquad \frac{\partial A}{\partial W} = - \frac{\left[1 + r_f(1-T)\right] E\left[U''(W_1)(\tilde{r}_i - r_f)\right]}{(1-T)\, E\left[U''(W_1)(\tilde{r}_i - r_f)^2\right]}$$

Substituting (17) into (16),

$$(18) \qquad \frac{\partial A}{\partial T} = \frac{A}{1-T} - \frac{r_f W_o}{1 + r_f(1-T)} \cdot \frac{\partial A}{\partial W_o}$$

$$= \frac{A}{1-T}\left[1 - \frac{r_f}{1 + r_f(1-T)} \cdot \frac{EA}{EW_o}\right]$$

The term, $r_f/\left[1 + r_f(1-T)\right]$, is substantially below unity. With decreasing absolute risk aversion and increasing relative risk aversion (that is, $\frac{\partial AT}{\partial TA} = \frac{EA}{EW_o} < 1$), $\frac{\partial A}{\partial T}$ must exceed 0.

Application to the U.S. System

Application of the prior reasoning to the U.S. individual income tax system involves recognition of (1) the progressive and differential nature of the tax and (2) the limited loss offset possibility. The matter of the specific character of the marginal investor also needs to be resolved.

1. Progressive Taxation

Following Ahsan [1], consider a linear tax with an exemption level (B) and a marginal rate (T); the average tax rate varies directly with the tax base.

The set of equations now becomes:

$$W_1 = W_o + B + (1-T)\left[W_o r_f + A\left[\tilde{r}_i - r_f\right] - B\right] \tag{19}$$

$$E\left[U'(W_1)(\tilde{r}_i - r_f)\right] = 0 \tag{20}$$

$$\frac{\partial A}{\partial T} = \frac{E\left[U''(W_1)(\tilde{r}_i - r_f)(W_o r_f + A\left[\tilde{r}_i - r_f\right] - B)\right]}{E\left[U''(W_1)(\tilde{r}_i - r_f)^2(1-T)\right]} \tag{21}$$

$$= \frac{A}{1-T} + \frac{(W_o R_1 - B)\ E\left[U''(W_1)(\tilde{r}_i - r_f)\right]}{(1-T)\ E\left[U''(W_1)(\tilde{r}_i - r_f)^2\right]}$$

$$\frac{\partial A}{\partial W_o} = -\frac{E\left[U''(W_1)(1+(1-T)r_f)\right]}{(1-T)\ E\left[U''(W_1)(\tilde{r}_i - r_f)^2\right]} \tag{22}$$

Substituting (22) into (21),

$$\frac{\partial A}{\partial T} = \frac{A}{1-T} - \frac{(W_o r_f - B)}{(1+(1-T)r_f)} \frac{\partial A}{\partial W_o} \tag{23}$$

$$= \frac{A}{1-T}\left[1 - \left\{\frac{r_f(1-T)}{1 + r_f(-T)} \cdot \frac{EA}{EW_o}\right] + \frac{B}{1 + (1-T)r_f} \frac{dA}{dW_o}\right.$$

Again, the effect of changes in the tax rate upon the demand for risky assets hinges on whether absolute risk aversion is decreasing and relative risk aversion is increasing (or constant). The conditions for greater

risk taking as the tax rate increases are satisfied by a logarithmic utility function.

No one really debates the proposition of decreasing absolute risk aversion. At the empirical level, however, the concept of constant or increasing relative risk aversion is subject to question. Friend and Blume [6] conclude, for example, that the assumption of constant relative risk aversion for households is a reasonably accurate depiction of the market place. Their finding follows from their treatment of investment in housing; other plausible treatments suggest moderately increasing or decreasing relative risk aversion.

More complicated progressive tax schedules complicate the analysis. Given discrete magnitudes and imperfect matching, moreover, losses may offset income at lower rates than gains are taxed.

2. Differential Taxation

Consider now the polar case in which safe income is taxed progressively while risky income avoids taxation. Under this circumstance,

$$W_1 = (1+r_f)W_o + A(\tilde{r}_i - r_f) - T(r_f W_o - B) \tag{24}$$

$$E\left[(U'(W_1)\tilde{r}_i - r_f)\right] = 0 \tag{25}$$

$$\frac{\partial A}{\partial T} = + \frac{\left[r_f W_o - B\right] E\left[U''(W_1)(\tilde{r}_i - r_f)\right]}{E\left[U''(W_1)(\tilde{r}_i - r_f)^2\right]} \tag{26}$$

$$\frac{\partial A}{\partial W_o} = - \frac{1 + r_f(1-T)\, E\left[U''(W_1)(\tilde{r}_i - r_f)\right]}{E\left[U''(W_1)(\tilde{r}_i - r_f)^2\right]} \tag{27}$$

$$\frac{\partial A}{\partial T} = (-) \frac{(r_f W_o - B)}{(1+r_f)(1-T)} \cdot \frac{\partial A}{\partial W_o} \tag{28}$$

Evidently, decreasing absolute risk aversion implies that the demand for risky assets will vary directly with the tax rate on safe income. Given the comparatively low tax actually imposed on capital gains, it appears that a similar result may well obtain for the real-life tax situation in which r_f is the dividend rate and $(\tilde{r}_i - r_f)$ represents capital gains.

3. Restrictions on Loss Offsets

Restrictions on loss offsets disturb the symmetry of the tax. Full loss offset with r_f set at zero implies that the slope of the risk-return line is unaffected by changes in the tax rate; mean and variance are scaled proportionately. Loss of symmetry skews the distribution of possible returns toward the loss side and conditions both the mean and variance.

Fortunately, the asymmetry in the application of the individual income tax is less than might be supposed. Capital gains can be paired against capital losses; realization can be deferred until matching possibilities exist; and limited offset of capital loss against taxable income is permitted.

The Marginal Investor

Whenever the marginal investor in any stock is an institution--as distinct from an individual taxpayer, the direct impact of changes in the individual income tax upon risk-taking may diminish. Pension funds, the fastest growing institutional component, are not subject to taxation; mutual funds act simply as conduits; and corporations generally benefit from the intercorporate dividend exemption. The fact that institutions pool the funds of individual investors further complicates the matter of

establishing investment objectives that optimize any specific investor's tax position.

Rational individuals can, of course, be expected to transfer funds from institutions that fail to optimize their particular investment objectives to those that meet their requirements (or to their own individual management). However, tax and other considerations interpose a barrier to the readjustment process. Self-employed individuals can defer taxes by placing their savings with institutions. Employees frequently have no individual control over pension funds. Economies of scale in turn may counter the less than optimal behavior (in other respects) of institutions.

The highly concentrated nature of institutional holdings in a limited number of stocks suggests that institutions constitute the marginal investor in some instances, but not others. Depending upon the specific character of present and prospective investors, then, share value may or may not reflect individual tax considerations.

Corporate Taxation and Risk-Taking

Management's differential response to changes in the corporate income tax depends upon (1) the consonance of its objective function with share value maximization, (2) the degree of its reliance on internal sources of funds, and (3) special tax incentives or disincentives.

Objective Function

Despite our initial presumption, it is doubtful whether any management endeavors to maximize share value to the exclusion of all other considerations. Share value may be maximized subject to liquidity and solvency constraints,

on the grounds that management cannot diversify its position. Sales maximization subject to a minimum rate of return has been put forth as an alternative possibility [10]. Other surrogatives for share value maximization include target rates of return and percentage markups.

If management is concerned with share value and liquidity and solvency, both diversifiable and nondiversifiable risk enter the decision picture. A proportional corporate tax with full loss offset affects expected return, total risk (as measured by total variance), and nondiversifiable risk (as measured by β^2 times market variance). Since no reason exists a priori to suggest proportional variation in total and nondiversifiable risk, it follows that parallel changes in the corporate and individual income tax rates need not give rise to equivalent modifications in corporate risk-taking.

Granted that risk and return go hand in hand, alternative objectives may well occasion a positive association between the corporate income tax rate and risk-taking. Higher taxes reduce both rates of return and after-tax mark ups and motivate the search for higher (and perhaps more risky) before-tax returns and margins.

Satisficing, a substitute for maximization, also implies that taxes and risk-taking vary directly. Higher taxes reduce profits; reduced profits stimulate efforts to restore prior profit levels.

Internal Sources of Funds

Firms that gear their capital spending to cash flows generated internally feature cut-off rates that vary directly with the corporate tax rate. While the impact upon risk-taking is far from clearcut, higher taxes render internal sources scarce relative to debt sources and encourage management to opt for more leverage.

The observed effect of the de facto increase in corporate taxes attributable to inflation is consistent with the hypothesis that risk taking varies inversely with the level of internal sources. A sample of the 40 largest industrial corporations (based on sales), drawn from the IMS data base, showed substantial deterioration in liquidity and increase in debt during the past decade.[12]

Special Tax Incentives

Deductions allowed (or disallowed) in computing taxable corporate income encourage (or discourage) risk taking in a before-tax sense. Each investment and financing decision involves an explicit or implicit balancing of incremental risk and return. Since tax deductions affect the relative profitability of specific choices, it follows that the incremental return attributable to any tax benefit will encourage management to expand "beneficiary" investment (or increase borrowing in the case of interest deductibility) to the point where the marginal rate of substitution between risk and return is again consistent with management's orientation.

Theory Versus Fact

Management, through specialized personnel, does endeavor to minimize its tax bill. Where permitted and deemed desirable for reporting purposes, it even keeps the equivalent of two sets of books. Whether tax implications for financing and investment decision-making are ever really made known to operating personnel is, however, doubtful. The bureaucratic, specialized decision process that characterizes large organizations may well limit selective adjustment to tax incentives.

Dividend Payout

1. Theory

Given efficient capital markets and marginal investors subject to taxation, differential taxation at the individual level implies that share value varies inversely with dividend payout. Should the return on incremental investment be low or negative, share repurchase in the market is the recommended alternative to dividend payout.

2. Fact

Most large, profitable corporations pay out a substantial portion of their reported earnings in dividends. Share repurchase is commonplace, but is not generally viewed as an alternative to cash dividends.

Corporate Taxes and Earnings

1. Theory

Management is motivated to counter the impact of corporate taxes by (a) directing fund flows toward less heavily taxed areas, e.g., immediately expensed versus capitalized assets, (b) adjusting prices wherever the imperfectly competitive environment and other factors permit, (c) employing financial leverage, and (d) converting regular income into capital gains.

2. Fact

The bureaucratic character of large firms complicates and muddies the adjustment process. Capital budgets are initiated at operating unit levels subject to ground rules that may not adequately reflect tax considerations. Book rather than tax depreciation may, for instance, be utilized in estimating return on investment. Prospective investments need not be subjected to the uniform decision criteria.

Major differences exist in the ability of firms to counter the tax effect upon earnings. The most successful candidates are likely to be those economically viable public utilities that are permitted to treat taxes as a cost of doing business. Indeed, one consequence of such regulation may be the apparent invariance of cost of capital with respect to capital structure that has been observed for utilities. For large industrial firms, the tax factor undoubtedly encourages management to employ financial leverage, but inadequacy of internal sources may be the most compelling factor in influencing capital structure.

Individual Income Taxation and Risk-Taking

1. Theory

Under plausible assumptions, higher individual taxes induce investors to take greater risks of a nondiversifiable character. The effect on cost of capital operates through adjustments in the market risk premium rather than through changes in individual beta values (since both covariance and variance are affected similarily).

2. Fact

No direct evidence is available.

Corporate Taxation and Risk-Taking

1. Theory

Management need not react to higher corporate taxes in the same manner as to higher individual income taxes. For one thing, maximization of share value is not likely to be the sole factor affecting management's behavior. For another, total risk may not be modified in the same way as nondiversifiable risk.

2. Fact

Share value is not the exclusive concern of management.

Footnotes

1. Note the deferral feature of the capital gains tax. Bailey [2], for example, finds that the ratio of average capital gains realizations to mean accruals of capital gains in corporate shares was .168 for the period 1926-1961.

2. As H increases, X* approaches $\frac{r'}{a(1-T_p) + (1-a)}$

3. Cf. Friend and Husic [7], however, for a different conclusion.

4. Fama and Babiak [4] find that the two-variable Lintner model performs well, although inclusion of a lagged earnings variable improves predictive power slightly.

5. See, for example, Walter and Milken [13].

6. The analogy is not entirely complete, since Harberger assumes mobile, but fixed, capital.

7. That is, marginal revenue exceeds marginal cost.

8. That is, actual cash flow generated in period t equals \$40,000 times $\pi_1^t (1+i_\tau)$, where i_τ is the rate of inflation in the τ^{th} period.

9. FMC Corporation, Second Quarter Report, June 30, 1975.

10. See Hall and Jorgenson [9] for an extended treatment of this concept.

11. Interest is computed on the remaining balance, i.e., $C(1 - \frac{2}{H})^{t-1}$, $t = (1,\ldots,H)$, where C is the remaining balance. The assumption that the after-tax r and the interest rate are equal by passes normal cost differentials and limits the focus to the tax effect.

12. Cf. J. M. Fox, "Liquidity Crunch Impedes Corporate Earnings Growth," IMS Digest, August, 1975.

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