Tax Reform, Firm Valuation, and Capital Costs

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■ Received doctrine in finance has stressed the important influence of corporate and personal income taxes on the design of the capital structure of the firm and on the determination of acceptance criteria for real-asset investment selection. While certain securities market imperfections have yet to be fully accommodated in a comprehensive valuation framework, there has been general agreement that judicious amounts of debt financing should give rise to tax-related benefits for shareholders and lower firm capital costs [3, 8, 16, 25, 28]. Even in a recent demurral, Miller [21] argues that when all taxes are considered, there will be a macro-leverage reward that will be reaped by at least some investors. Current proposals for broad-scale tax reform, however, may require qualification of many of the standard assertions. In particular, some apparently serious legislative sentiment is evolving in favor of integrating the taxation of personal and corporate income and thereby removing the so-called "double tax" burden on equity investors [5, 10, 29, 30]. Our objective here is to examine the implications of such a tax scheme for corporate capital structure policies and investment acceptance criteria. Although many of the conclusions will not be regarded as terribly surprising, we feel that it is useful to reconsider explicitly the influence of taxes on firm valuation, to emphasize those elements of tax design that may be critical for managerial decision making, and to address the new role any differential between ordinary and capital gains tax rates may have on capital costs and dividend policies, if tax reform should in fact come about.

Tax Revision

Although a variety of different tax proposals have been advanced, their dominant common characteristic is a provision for the elimination of the corporate income tax as a separate levy and its replacement with a scheme of including each year in the taxable ordinary

income of stockholders their respective *pro rata* shares of that year's reported earnings of the firms in which they hold an ownership position. Under this approach, frequently referred to as the "partnership method," taxes due would be independent of the extent of corporate earnings actually distributed as dividends, but the original cost basis of stock purchased would be adjusted upward every year by the *pro rata* amount of corporate retentions to determine the eventual taxable capital gain component of securities sale proceeds.

Thus, if an investor acquired 100 shares of stock in a corporation on January 1 of a given year at $40 per share, and if the firm paid a $3 cash dividend out of reported earnings of $4 per share, the investor would record $400 of taxable income for the year and would have a corresponding adjusted per share cost basis of $41 on December 31. The attendant administrative mechanisms — including the procedures for handling earnings imputations for firms whose fiscal years do not match the normal calendar year tax period used by most investors, for allocating corporate earnings and retentions to less-than-full-year stockholders, and for establishing an appropriate withholding scheme and rate — obviously require careful consideration. Nonetheless, the substantive core of the majority of current tax integration proposals is as indicated, and it is to their valuation and decision making consequences that our attention will be directed.

Enterprise Valuation

In standard fashion, we shall assume here that the market in which corporate securities trade is competitive and free of either material transactions costs or institutional imperfections — most particularly, that bankruptcy is costless. Such a framework allows a convenient comparison with most prior treatments of corporate financing strategies under the present tax structure, and it has ample precedent as an analytical starting point. Moreover, because the immediate concern *is* with tax effects, a deferral of the recognition of other environmental peculiarities does not seem unwarranted. In a market with the prescribed attributes, the principle of value additivity [3, 8, 27] will apply, and an examination of the valuation implications of tax integration will be reasonably straightforward.

Consider initially the case of a levered firm whose long-run investment plan calls for the expenditure of the dollar amounts $Z_1, Z_2, \ldots, Z_t$ in future years on the acquisition of additional productive assets, all to be financed out of retained earnings. Upon the public announcement of the plan, investors will arrive at a forecast of the firm's corresponding annual earnings and dividend payment potential. Because neither the earnings nor the ultimate actual investment expenditures are certain, of course, both will be regarded *ex ante* as random variables. Accordingly, if $\tilde{X}_t$ is used to denote the (post-depreciation but pre-finance charge) uncertain year-t operating earnings of the firm, and $\tilde{I}_t$ the year's also uncertain interest payments on the firm's debt, stockholders can look forward to aggregate year-t cash dividend receipts amounting to $\tilde{X}_t - \tilde{I}_t - \tilde{Z}_t$ if no corporate income tax is imposed.

Under the above-described tax reform proposals, however, stockholders will be required to pay taxes on the full amount of the firm's *reported* earnings — *i.e.*, on the quantity $\tilde{X}_t - \tilde{I}_t$. Letting T_o denote the applicable "ordinary" income tax rate for investors, institutional as well as individual, and taking into account the fact that bondholders must also pay taxes at "ordinary" rates on interest receipts, the combined net *after-tax* cash return prospects for both classes of the firm's securityholders for year t are

$$\tilde{X}_t^T = \tilde{X}_t^S + \tilde{X}_t^B = [\tilde{X}_t - \tilde{I}_t - \tilde{Z}_t - T_o(\tilde{X}_t - \tilde{I}_t)] + \tilde{I}_t(1 - T_o) \quad (1)$$

where $\tilde{X}_t^S$ and $\tilde{X}_t^B$ refer, respectively, to stockholder and bondholder post-tax cash flows. If we collect terms, this expression resolves simply to

$$\tilde{X}_t^T = \tilde{X}_t(1 - T_o) - \tilde{Z}_t \quad (2)$$

which is precisely the after-tax year-t cash dividend payment which would be available entirely to the *shareholders* of the firm if it were *unlevered* but had the same investment plan. Inevitably, then, it must be the case that leverage will have no impact on enterprise valuation in the indicated tax milieu since — in contrast to the situation under the present tax system [16, 25] — aggregate securityholder returns are unaltered by corporate borrowing.

At the level of the single investor, the logic of this result can be seen by examining the circumstances of an individual who might purchase the fraction γ of both the bonds and the stock of the levered company. On that investment, he or she would enjoy $\gamma[(\tilde{X}_t - \tilde{I}_t)(1 - T_o) - \tilde{Z}_t]$ of post-tax equity returns and $\gamma[\tilde{I}_t(1 - T_o)]$ of interest earnings in any given year — the combination of which obviously replicates exactly the post-tax income $\gamma[\tilde{X}_t(1 - T_o) - \tilde{Z}_t]$ that would be received from ownership of the same fraction of the shares of an identical unlevered firm.

In such a context, therefore, the perfect market principle of value additivity dictates that the current (t = 0) market prices of the two sets of income streams must be equal. Specifically, the present worth, V_o^L, of the combined cash-flow prospects of the stockholders and bondholders of a levered corporation will be

$$V_o^L = V_o(\tilde{X}^T) = V_o(\tilde{X}^S) + V_o(\tilde{X}^B) = V_o[\tilde{X}(1 - T_o) - \tilde{Z}] \quad (3)$$

or

$$V_o^L = S_o + B_o = V_o^U \quad (4)$$

where the $\tilde{X}$ and $\tilde{Z}$ denote the complete vectors of earnings and reinvestment cash flows over all t, S_o and B_o represent the current total market prices of the levered firm's outstanding stock and bonds, and V_o^U is the aggregate worth of an equivalent unlevered company. This result will obtain regardless of the equilibrium capital market pricing process which converts future return prospects into current values [3, 8], and the expressions may thereby be left in their most general form. Equation (4), of course, suggests that the classic Modigliani-Miller "no tax" valuation propositions [24] would apply under the proposed tax reform scheme, the present tax bias in favor of corporate debt financing would disappear, and the debt/equity composition of a firm's capital structure would indeed become irrelevant to its value.

External Financing

These conclusions also prevail when opportunities for external debt and equity financing are recognized. Given an established investment plan, external funds inputs will simply reduce the need for earnings retention, dollar for dollar, and raise the firm's dividend-paying potential. Accordingly, on the convention of *end*-of-year timing of both dividend and interest payments and new security issues, the total cash distributions in prospect for a firm's *beginning*-of-period-t securityholders will be

$$\tilde{R}_t = [\tilde{X}_t - \tilde{I}_t - (\tilde{Z}_t - \tilde{S}_t - \tilde{B}_t)] + \tilde{I}_t \quad (5)$$

since, as noted, the funds received from the additional stock and bond sales, $\tilde{S}_t$ and $\tilde{B}_t$, are directly available for dividend declarations if the $\tilde{Z}_t$ do not change. This last condition is necessary if we are to avoid mixing changes in investment policy with changes in financing strategy.

After investor tax payments, then — and maintaining our previous notation — aggregate securityholder receipts may be expressed as

$$\tilde{R}_t^T = \tilde{X}_t^S + \tilde{X}_t^B = (\tilde{X}_t - \tilde{I}_t)(1 - T_o) - (\tilde{Z}_t - \tilde{S}_t - \tilde{B}_t) + \tilde{I}_t(1 - T_o) \quad (6)$$

$$\tilde{R}_t^T = \tilde{X}_t(1 - T_o) - \tilde{Z}_t + \tilde{S}_t + \tilde{B}_t \quad (7)$$

which match those in Equation (2), with the addition of the $\tilde{S}_t$ and $\tilde{B}_t$ — and interest payments again net out. In valuation terms,

$$V_o(\tilde{R}^T) = V_o(\tilde{X}^T) + V_o(\tilde{S}) + V_o(\tilde{B}) \quad (8)$$

where the $V_o(\tilde{X}^T)$ is that of Equation (3). Now, while the apparent implication of Equation (8) is an increase in the present worth of the enterprise, the set of cash flows identified encompasses not only the payments which will accrue to the firm's *existing* securityholders, but also those to *future* suppliers of capital. Correspondingly, the collection of *claims* explicitly being valued also includes those of future investors. Therefore,

$$V_o(\tilde{R}^T) = S_o + B_o + S' + B' \quad (9)$$

where, as before, S_o and B_o denote the market prices of currently outstanding shares and bonds, and the S′ and B′ represent the latent worth of all subsequent securities issues. In a perfect competitive market, such issues will always sell — and will always be anticipated to sell — at fair *ex ante* prices. Thus, it should be the case that, as investors appraise at t = 0 the prospects for future securities sales, the sequence of issue proceeds to be realized by the firm will be expected to match in value the cash flows thereby committed to the new securityholders. That is, $S' = V_o(\tilde{S})$ and $B' = V_o(\tilde{B})$, and from Equations (8) and (9),

$$S_o + B_o = V_o(\tilde{X}^T) = V_o[\tilde{X}(1 - T_o) - \tilde{Z}] \quad (10)$$

indicating that, even when future external financing is on the horizon, the combined market value of a levered firm's existing bonds and common shares will be independent of capital structure and equal to the present worth of the dividend stream from a similar unlevered company which finances all its investments internally. In essence, with a fixed real asset expenditure plan, the value of the portion of the firm's total cash flows that future securityholders divert to

themselves will be just offset by the contributions they make — via securities purchases — to the cash flows of previous investors [20]. Debt issues having finite maturities, of course, fit comfortably into this framework. In Equation (6), the $\tilde{B}_t$ would merely be negative for a year in which any bonds mature that are not simultaneously replaced with new debt. The $\tilde{I}_t$ for following years would then diminish and could at some point become zero if *all* debt were retired, without destroying the generality of the formulation.

Capital Gains

Although we have thus far ignored capital gains taxes, it turns out that neither their presence nor any differential between the tax rates on such gains and those on ordinary income alters the conclusion that capital structure will be irrelevant to firm valuation, because, under the tax integration proposals of concern here, corporate retentions become part of the adjusted cost basis of shares in determining capital gains liabilities. This proposition can be demonstrated most easily by considering first a one-period corporate production setting; by recursion, the result can be extended to the multi-period case.

In a single-period context, the firm will be liquidated at the end of the period and the proceeds from the sale of its assets distributed to securityholders. Let $\tilde{V}_1$ denote the (uncertain) end-of-period market value (sale price) of those assets, $\tilde{X}_1$ the period's earnings, and $\tilde{Z}_1$ the firm's retentions — where the latter, obviously, contribute to what $\tilde{V}_1$ will be. If the firm is unlevered, an investor who purchases the percentage γ of its shares at the beginning of the period will experience end-of-period after-tax cash receipts amounting to

$$\begin{aligned}&\gamma[\tilde{X}_1(1 - T_o) - \tilde{Z}_1 + \tilde{V}_1 - T_g(\tilde{V}_1 - \tilde{Z}_1 - S_o^U)]\\ &= \gamma[\tilde{X}_1(1 - T_o) + (\tilde{V}_1 - \tilde{Z}_1)(1 - T_g) + T_g S_o^U]\end{aligned} \tag{11}$$

where T_g is the applicable capital gains tax rate and S_o^U is the aggregate beginning-of-period market value of the equity of the enterprise (the investor's initial cost basis).

Were the same firm levered, and the investor purchased at t = 0 the fraction γ of both its outstanding bonds and common stock, he or she would receive interest as well as dividend payments at the end of the period and still be entitled to $\gamma\tilde{V}_1$ of end-of-period liquidation proceeds. Accordingly, the after-tax cash flows would become

$$\begin{aligned}&\gamma\{[\tilde{X}_1 - \tilde{I}_1)(1 - T_o) - Z_1] + \tilde{I}_1(1 - T_o)\\ &\quad + \tilde{V}_1 - T_g[\tilde{V}_1 - \tilde{Z}_1 - (S_o + B_o)]\}\\ &= \gamma[\tilde{X}_1(1 - T_o) + (\tilde{V}_1 - \tilde{Z}_1)\\ &\quad (1 - T_g) + T_g(S_o + B_o)]\end{aligned} \tag{12}$$

on an original investment of $\gamma(S_o + B_o)$.

In anticipation of these two sets of outcomes, the beginning-of-period market values of the securities involved would be

$$\begin{aligned}\gamma S_o^U &= \gamma V_o[\tilde{X}_1(1 - T_o)\\ &\quad + (\tilde{V}_1 - \tilde{Z}_1)(1 - T_g)] + \gamma V_o[T_g S_o^U]\end{aligned} \tag{13}$$

$$\begin{aligned}\gamma(S_o + B_o) &= \gamma V_o[\tilde{X}_1(1 - T_o)\\ &\quad + (\tilde{V}_1 - \tilde{Z}_1)(1 - T_g)] + \gamma V_o[T_g(S_o + B_o)]\end{aligned} \tag{14}$$

which implies, elininating the common scalar γ and subtracting Equation (13) from Equation (14), that

$$\begin{aligned}&(S_o + B_o) - S_o^U\\ &= V_o[T_g(S_o + B_o)] - V_o[T_g S_o^U]\end{aligned} \tag{15}$$

or

$$\begin{aligned}&V_o[T_g S_o^U] + (S_o + B_o)\\ &- S_o^U = V_o[T_g(S_o + B_o)]\end{aligned} \tag{16}$$

where the V_o terms represent the present (t = 0) values of the *end*-of-period capital gains tax savings associated with the respective initial purchase price cost bases of the investments in the levered and unlevered firms. Because the period's retentions, $\tilde{Z}_1$, will be the same in both situations with a given investment plan, they disappear from the expression.

For the capital-gains/ordinary-income tax rate differential not to affect firm value, then, it must be the case that $S_o + B_o = S_o^U$. We can see that this *will* occur by documenting — in a fashion similar to the original Modigliani-Miller "arbitrage" proof [24, 25] — that any other outcome is impossible in a rational market environment. Thus, if $S_o + B_o$ did differ from S_o^U by some dollar amount ϵ, this would require in Equation (16) that

$$\begin{aligned}V_o[T_g S_o^U] + \epsilon &= V_o[T_g(S_o + B_o)]\\ &= V_o[T_g(S_o^U + \epsilon)]\end{aligned} \tag{17}$$

or

$$V_o[T_g S_o^U] + \epsilon = V_o[T_g S_o^U] + V_o[T_g \epsilon] \qquad (18)$$

which plainly *is* impossible, whether ϵ is positive or negative, since the present worth of a capital gains tax saving of $T_g\epsilon$ one period hence — *i.e.*, the second term on the right hand side of Equation (18) — cannot be as great as ϵ for any positive rate of time preference or any capital gains tax rate less than 100%. Therefore, only if ϵ is zero can Equation (18) be satisfied — necessitating that $S_o + B_o = S_o^U$ in equilibrium.

Generalization of this result to a multi-period framework is straightforward. We may simply regard the "period" under consideration as the *last* — presumably, far future — one in which the firm is to operate and at the end of which it is to be liquidated. If the total worth of the firm at the beginning of that interval is independent of its capital structure, as shown, so must it also be recursively at the beginning of every prior period — given that each beginning-of-period market value derived becomes, successively, the end-of-period value for the next-previous interval. As long as the final element in the sequence is unaffected by leverage and the differential tax rate on capital gains, none of its predecessors will be. Since we determined earlier that, if tax reform takes place, future period external financing opportunities similarly will not cause levered and unlevered firm aggregate values to differ (in a market where securities sell at fair *ex ante* prices), dividend policy will also be irrelevant once an investment plan is established and announced. Complete tax neutrality for financing choices will prevail.

Investment Decisions

On the basis of these conclusions, the acceptance criterion for corporate real asset investment decisions is easily obtained. From Equation (3) above, the total market value of a levered firm's outstanding bonds and shares was found to be

$$V_o^L = V_o[\hat{X}(1 - T_o) - \hat{Z}] \; . \qquad (19)$$

Assuming, then, that management acts in the interest of existing securityholders, the minimum requirement for an investment project to be worthwhile is the standard one that it not diminish securityholder wealth — *i.e.*, that it raise the total value of the firm by the amount of its cost. For a project necessitating an expenditure of dI to undertake, this condition requires

$$\frac{dV_o^L}{dI} = 1 = \frac{dV_o[\hat{X}(1 - T_o) - \hat{Z}]}{dI} \qquad (20)$$

or, simply

$$dV_o[\hat{X}(1 - T_o) - \hat{Z}] = dI. \qquad (21)$$

Whatever form of financing is employed, therefore — since firm value is independent of the finance mix — an investment must promise an incremental stream of cash flows which, after allowance for investor taxes at ordinary rates and any future reinvestment needs associated with the project, will raise the total market value of the enterprise by at least as much as the initial cost of the project. That condition is completely general and — with the exception of the entry now of T_o rather than a corporate tax rate — fully consistent with received capital budgeting doctrine [3, 8, 20].

There may, of course, be some redistribution of wealth effects *among* the competing claimants to firm value attendant upon the specific financing package adopted for a project. Thus, if bankruptcy can occur — even if that event is costless and even if new securities are always sold at "fair" prices — the relative market values of existing bonds and shares can be altered by a change in the firm's leverage posture [3, 7, 9, 13, 14, 15]. The particular seniority provisions in the bond indentures in question will determine exactly what sort of redistribution will take place. While such concerns may separately influence a firm's financing strategy, and require corporate management to be careful in defining which set of securityholders it regards as its constituency [6], the point here is that *taxes* will have no effect on the respective merits of financing alternatives, and the project acceptance criterion in Equation (21) *is* the one which serves the cause of preserving total securityholder wealth.

That criterion may be cast in the form of the usual cost of capital hurdle-rate test of project worth if we adopt the popular convention of representing the underlying market valuation process as one in which investors capitalize the expected values of uncertain future cash returns at risk-adjusted discount rates. In such a framework, the expression in Equation (3) for

the aggregate market value of a levered firm translates into

$$V_o^L = \sum_{t=1}^{\infty} [\bar{X}_t(1 - T_o) - \bar{Z}_t]/(1 + \rho)^t \quad (22)$$

where ρ is the *after-tax* capitalization rate applied by investors to the after-tax cash flow prospects associated with the firm's securities, and $\bar{X}_t$ and $\bar{Z}_t$ denote the expected values of annual reported earnings and retentions. Since the constituent $\tilde{X}_t$ and $\tilde{Z}_t$ are of the same size and have the same stochastic properties as the cash flows from an unlevered firm having the same real asset investment plan, ρ is also equal to the capitalization rate that would be applied in the market to such an equivalent unlevered company's expected post-tax dividend stream.

In discounted cash flow terms, then, the minimum condition for project acceptability is

$$\frac{dV_o^L}{dI} = 1 = \frac{d}{dI}\left[\sum_{t=1}^{\infty} [\bar{X}_t(1 - T_o) - \bar{Z}_t]/(1 + \rho)^t\right] \quad (23)$$

or

$$\sum_{t=1}^{\infty} [d\bar{X}_t(1 - T_o) - d\bar{Z}_t]/(1 + \rho)^t = dI \quad (24)$$

which requires that the incremental expected cash flows produced, when discounted at the rate ρ, have a present value equal to the initial investment expenditure. This is the counterpart of the typical DCF computation of investment value in the literature but with the important difference that, under a tax-integration scheme, it is the *investor* marginal ordinary tax rate rather than a corporate rate which is of concern. Implicit in the indicated criterion, of course, is the assumption that the project under consideration will generate cash flows having stochastic qualities like those associated with the firm's existing assets — in the vernacular, is in the same risk class. On that basis, the prevailing capitalization rate ρ for the firm *will* be the relevant one [3, 8], and it represents what has come to be called the firm's cost of capital, in the specific sense of the appropriate threshold rate of return for testing investment attractiveness.

The import of Equation (24) therefore is that an estimate of investor marginal tax circumstances will still be necessary if tax reform comes to pass — just as it is now necessary if the "cost" of retained earnings is to be determined in the current tax environment [1, 4, 16, 28]. On the other hand, because firms' dividend policies will have no impact on investor tax liabilities and all financing sources will become equally attractive, as we have observed, there would be no reason to anticipate a "clientele" effect [2, 22] in stock ownership patterns. The weighted average marginal tax rate of investors in the *aggregate* should thereupon become the pertinent T_o for capital budgeting analyses for all firms, and estimates of this parameter should not be difficult to obtain [12].

Commentary and Conclusions

We have not attempted to address here the associated macroeconomic consequences of tax integration for the over-all level of stock and bond prices, the likely resulting influence on total real asset investment outlays by corporations, nor the wealth redistribution effects on various broad categories of securityholders in any transition period. While all are obviously not trivial matters from a public policy standpoint, all are well beyond the jurisdiction of our immediate analytical objectives.

Nonetheless, the *managerial* messages which follow from an examination, in standard valuation theory terms, of the implications of tax reform seem clear. If the corporation income tax is eliminated, and stockholders are taxed on allocated corporate income at their personal ordinary rates under a scheme wherein corporate retentions are a cost basis adjustment for capital gains purposes, capital structure design becomes irrelevant to firm valuation — at least in the perfect market setting we have considered. Although taxes would continue to play an important role in the asset acquisition decision process through their impact on project cash flows, that role would be different from the present one, and investments could be financed either with debt, retained earnings, or new common stock issues without affecting their desirability or the firm's cost of capital.

Because much of the debate in the literature about appropriate corporate financing policy has centered on questions of tax effects — *e.g.*, potential leverage benefits from merger [9, 15, 17] and opportunities for exploiting asset leasing arrangements [19, 23] — presumably most of those concerns would become moot. Instead, issues relating to market imperfections would have the major bearing on what scope there would remain for clever capital structure design. To the extent, for example, that bankruptcy has some dead weight costs, one would expect firms to cut back

sharply on the volume of debt financing they undertake since, absent tax advantages, — any such latent costs can only imply, *ex ante*, a reduction in the market value of the firm as compared with its worth as an unlevered enterprise [15]. On the other hand, these may not in fact be sizeable enough [31, 32] to offset the generally lower securities flotation costs associated with debt issues, to overcome the possible opportunities for wealth transfers to stockholders by manipulating the claim-seniority features of bonds [13], or to dissuade corporate management from attempting to test its skills at outmaneuvering the market in predicting future interest rates by offering bonds containing call provisions [18, 26]. Similarly, there would be agency costs to be considered in having several classes of securities outstanding [11], and retentions would have a corresponding flotation cost advantage over new common stock financing. Hence, the capital structure design problem would by no means disappear even if the tax reform proposals treated here were enacted. Our goal has been to focus specifically on the valuation effects of taxes themselves, in hopes of placing these other concerns in the proper perspective for both private and public policy deliberation.

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