TAXES, CORPORATE FINANCIAL POLICY AND THE RETURN TO INVESTORS: COMMENT

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PROFESSORS FARRAR AND SELWYN have made an important contribution to the theory of optimal capital structure. However, their note does not exhaust the implications of their analysis. The purpose of this comment is, first, to push their argument somewhat further and, second, to consider the implications of their findings. The topics discussed are:

Section I: Some qualifications,
II: Transaction costs,
III: The possibility of "negative leverage,"
IV: An extension to capital budgeting decisions, and
V: Implications.

Credit should be given at the outset to Professor Franco Modigliani, who first noted the possibility of negative leverage for corporations.

I. A RESTATEMENT OF THE ARGUMENT, WITH QUALIFICATIONS

The following discussion is restricted to Farrar and Selwyn's "Case 4," in which corporate income, personal income, and capital gains all are taxed. Several additional assumptions will be adopted in order to keep the exposition as brief and simple as possible. The first two are:

1. That net income of the hypothetical firm is not expected to grow or decline over time; [1] and
2. That the firm's dividend policy is optimal—i.e., stock is always repurchased in lieu of paying cash dividends.

An investor holding one share of the hypothetical firm's stock expects to receive annual capital gains equal to the firm's earnings per share. In Farrar and Selwyn's notation, the amount is $(\bar{X} - rD_c)(1 - T_c)$, where $\bar{X} = E[\tilde{X}]$, which we have assumed constant for $t = 1$ and all subsequent periods. The investor allocates this income over time and among (1) consumption, (2) after-tax interest charges on personal debt and (3) capital gains taxes.

It is evident that the effective cost of capital gains taxes depends on when the investor realizes these gains. If he anticipates selling all his holdings of the firm's stock at the end of period $t = 1$, the present value (at $t = 0$) of the expected tax on period one's income is simply [2] $\frac{T_g(\bar{X} - rD_c)(1 - T_c)}{1 + k}$. (Here k is the investor's required rate of return on his _stockholdings_—i.e., before deduction of after-tax personal debt charges. It is not, in general, the same as ρ, the rate Farrar

[1] For analysis of optimal financing decisions for "growth" firms, see Robichek and Myers [7] and Modigliani and Miller [4].

[2] The investor will also have to pay taxes on any accumulated capital gains from income in previous periods. But we are concerned only with the _incremental_ effect of income in $t = 1$ on the investor's tax bill.

and Selwyn use to discount income after deduction of all interest and taxes.) On the other hand, if realization of capital gains is delayed indefinitely, the present value of the tax is zero. These are the two polar cases.

To further simplify matters, we will assume that capital gains are "realized immediately" in the following special sense. The investor is assumed to hold N_o shares at the end of $t = 0$. At the end of the period $t = 1$ he sells that proportion of his shares necessary to transmute the period's income into cash. Thus the expected value of his stockholdings at the end of $t = 1$ is the same, *ceteris paribus*, as at the end of $t = 0$; if P_o and P_1 are share prices at the end of periods $t = 0$ and $t = 1$, then the investor expects $N_1 P_1 = N_o P_o$. The number of shares the investor expects to sell is

$$N_o - N_1 = \left[\frac{(\overline{X} - rD_c)(1 - T_c)}{P_o + (\overline{X} - rD_c)(1 - T_c)} \right] N_o.$$

Note that $(\overline{X} - rD_c)(1 - T_c)/P_o$ is simply k, the rate of return the investor expects to receive. Therefore

$$(1) \qquad N_o - N_1 = \left(\frac{k}{1 + k} \right) N_o.$$

The investor is assumed to follow the same procedure in subsequent periods, so that $N_t - N_{t+1} = \left(\frac{k}{1 + k} \right) N_t$ if the rate of return k is actually realized.

The *present value* of the expected capital gains taxes incurred on period one's income is clearly less than $\frac{T_g (\overline{X} - rD_c)(1 - T_c)}{1 + k}$. Only $100 \left(\frac{k}{1 + k} \right)$ per cent is actually paid at the end of $t = 1$; $100 \left(\frac{k}{1 + k} \right)$ per cent of the *remaining* tax is then paid at the end of $t = 2$, and so on.

In general, the present value of the stream of tax payments associated with period one's income may be written as $\frac{N_o\, a\, T_g\, (X - rD_c)(1 - T_c)}{1 + k}$, with $0 \leq a \leq 1$. The *expected* value of the tax in $t = 1$, when the income is received, is simply $N_o\, a\, T_g\, (\overline{X} - rD_c)(1 - T_c)$. The variable a is defined as the ratio of (1) the *actual* present value of tax payments on period one's income to (2) the value of the payment if the investor had decided to sell all of his shares at the end of the period. It is shown in the Appendix that $a = \frac{k + 1}{k + 2}$ if capital gains are realized immediately in the manner just described. This is in contrast to Farrar and Selwyn's implicit assumption that $a = 1$ in these circumstances.

In $t = 1$ the investor expects to receive an *effective income*, after allowance for interest payments, personal taxes, and the present value of capital gains incurred, of $\overline{Y}$ per share held at the end of $t = 0$. This is given by:

$$(2) \quad \overline{Y} = E[\tilde{Y}] = (\overline{X} - rD_c)(1 - T_c) \times (1 - aT_g) - rD_p(1 - T_p).$$

We have assumed that this amount is the same for $t = 2$ and all subsequent periods.

Now we can write $V(Y)$, the present value per share *to this investor* of his portfolio's income stream. From Eq. (2),

$$(3) \quad \overline{Y} = [\overline{X}(1 - T_c)(1 - aT_g)] - r[D_c(1 - T_c)(1 - aT_g) + D_p(1 - T_p)].$$

Let $V(F)$ denote the present value of the stream $[\overline{X}(1 - T_c)(1 - aT_g)]$. The present value of the stream of debt payments, $V(D)$, can be estimated by capitalizing $r[D_c(1 - T_c)(1 - aT_g) + D_p(1 - T_p)]$ at the investor's marginal rate of time-preference. We will approximate this rate

by $r(1 - T_p)$, the after-tax rate of return on personal debt.[3] Therefore,

$$(4) \quad V(Y) = V(F) - \frac{r[D_c(1 - T_c)(1 - \alpha T_g) + D_p(1 - T_p)]}{r(1 - T_p)}.$$

Differentiating with respect to corporate debt, subject to the constraint

$$(5) \quad D_c + D_p = D^* = \text{a constant,}$$

we obtain

$$(6) \quad \frac{\delta V(Y)}{\delta D_c} = 1 - \frac{(1 - T_c)(1 - \alpha T_g)}{(1 - T_p)}.$$

The expression is positive (i.e., corporate debt is preferred to personal debt) only if $(1 - T_p) > (1 - T_c)(1 - \alpha T_g)$. This is Farrar and Selwyn's conclusion—except that Eq. (6) is more general, since it is not restricted by their assumption that $\alpha = 1$.

II. TRANSACTION COSTS

We have assumed thus far that there are no costs or benefits associated with the *transactions* required to change the mix of corporate and personal debt. This assumption is not always descriptively accurate. To be specific, suppose the firm increases corporate borrowing per share from D_c^o to $D_c^o + \Delta D_c$ in $t = 0$. If Eq. (5) is to be satisfied, the investor must obtain funds in order to reduce his personal debt by ΔD_c. If the amount ΔD_c can be paid out by the firm as a return of capital, then no tax is incurred, and Eq. (6) is correct. However, any cash payout would be taxed at the rate T_p if the firm is reporting an accounting profit. If the firm purchases a portion of the investor's shares instead of paying cash, the investor is forced to pay taxes on any capital gains accumulated on the

repurchased shares. These taxes could otherwise have been postponed.

Now consider a decrease in corporate debt. The firm could effect the change by issuing shares and using the proceeds to retire debt; the investor would purchase these shares by borrowing ΔD_c more. However, note that the firm is also repurchasing shares in $t = 0$ in order to distribute *current* income to its stockholders. If the firm allocates ΔD_c less per share to repurchases, a stock issue is not necessary. Moreover, the investor is able to postpone capital gains taxes which otherwise would be due at that time.

In both cases, the transactions required to effect a change in corporate debt affect the present value of the capital gains taxes paid by the investor. This is a type of transaction cost. Suppose the investor purchased the hypothetical firm's shares several years ago at the price B. At $t = 0$, he has accumulated an unrealized capital gain of $(P_o - B)$ on each of the N_o shares in his portfolio. We have assumed that the investor expects to sell 100 $\left(\frac{k}{1 + k}\right)$ per cent of his remaining shares in each future year. If the firm's financing policies are unchanged, therefore, the present value of future taxes on the accumulated capital gain is $\frac{N_o \alpha T_g(P_o - B)}{1 + k}$. This follows by the same logic used to show that the present value of *incremental* taxes on expected income in $t = 1$ is

$$\frac{N_o \alpha T_g[(\overline{X} - rD_c)(1 - T_c)]}{1 + k}.$$

On the other hand, if corporate debt is increased by ΔD_c per outstanding share, and if the firm uses the proceeds to repurchase additional shares from the investor in period $t = 0$, then part of the accumulated capital gains are realized

immediately. For every additional share repurchased, an immediate tax of $T_g(P_o - B)$ is incurred. The net increase in the present value of the investor's tax liability is $T_g[1 - a/(1+k)](P_o - B)$ for each of these shares. Since $1 - \frac{a}{1+k}$ $= a$, this amount is simply $aT_g(P_o - B)$.

Note that $\Delta D_c/P_o$ shares must be repurchased for every share outstanding, so that the total increase in the present value of the investor's tax liability is $N_o \Delta D_c T_g a(1 - B/P_o)$. To simplify notation, we will let $\beta = a(1 - B/P_o)$ from this point on.[4] It is easy to verify that β takes the same value if $\Delta D_o < 0$.

The effect of this transaction cost can be summed up by recomputing the partial derivative $\frac{\delta V(Y)}{\delta D_c}$. Given an incremental change δD_c which is accompanied by an equal change in the aggregate value of the shares repurchased by the firm,

$$(7) \quad V(Y) = V(F) - 1/r(1 - T_p)$$
$$\times [r(D_c + \delta D_c)(1 - T_c)(1 - aT_g)$$
$$+ r(D_p - \delta D_o)(1 - T_p)] - \beta T_g \delta D_c.$$

$$(8) \quad \frac{\delta V(Y)}{\delta D_c} = 1 - \frac{(1 - T_c)(1 - aT_g)}{1 - T_p}$$
$$- \beta T_g.$$

Whether $\frac{\delta V(Y)}{\delta D_c}$ is positive or negative depends not only on the investor's personal tax rate, but also on k, P_o, and B, which determine the coefficients a and β. Suppose that $k = .10$ and $B/P_0 = .8$. Under present assumptions, $a = .524$ and $\beta = .1048$; T_p^*, the maximum personal tax rate for which increases in leverage are desirable, is approximately 55.5 per cent if $T_c = .5$.

The results in this case are consistent with Farrar and Selwyn's conclusion that

[4] Unlike a, β may be negative if $B/P_o > 1$.

$.50 \leq T_p^* \leq .625$. However, it is possible that $T_p^* > .625$ if $\beta < 0$, or that $T_p^* < .5$ if capital gains are not realized immediately. If the shares were obtained free, and if capital gains would otherwise be postponed indefinitely, then the transaction cost per share associated with δD_o is simply $\delta D_c T_g$. In this extreme case, $T_p^* = .38$.

III. NEGATIVE LEVERAGE

Once it is determined that a change in the mix of corporate and personal debt is desirable, we are faced with the problem of determining the optimal change (from a particular investor's point of view). If $\frac{\delta V(Y)}{\delta D_c}$ is negative, for instance, how far should corporate leverage be reduced?

For simplicity, assume that there are no costs or benefits associated with the transactions required to change the debt mix, so that Eq. (6) holds. We will consider a firm wholly owned by an investor so wealthy that $\frac{\delta V(Y)}{\delta D_c} < 0$.

If T_p is constant, the optimal corporate policy appears to be all-equity financing. Actually, this is not correct, since the firm can borrow *negative* amounts—that is, it can become a net creditor. This "negative leverage" is perfectly consistent with the constraint $D_c + D_p = D^*$ so long as $D_p > D^*$.

It is not hard to show that negative leverage is justified. Suppose the firm had been all-equity financed, so that $D_p = D^*$. The firm now issues additional shares which the investor purchases by increasing his personal borrowing. The firm lends the funds at the rate r, becoming a net creditor. Once the transactions have taken place, the investor's expected annual income is

(9) $$Y = [X + r(D_p - D^*)](1 - T_c)$$
$$\times (1 - aT_g) - rD_p(1 - T_p).$$

The present value of this stream is

(10) $$V(Y) = V(F) - V(D),$$
$$V(D) = \frac{r}{r(1 - T_p)}$$
$$\times [-(D_p - D^*)(1 - T_c)(1 - aT_g)$$
$$+ D_p(1 - T_p)].$$

Differentiating,

(11)

$$\frac{\delta V(Y)}{\delta D_p} = \frac{(1 - T_c)(1 - aT_g)}{1 - T_p} - 1.$$

Since $\frac{\delta V(Y)}{\delta D_c} = - \frac{\delta V(Y)}{\delta D_p}$, this is equiv-

alent to Eq. (6). And since $\frac{\delta V(Y)}{\delta D_c} <$

0, the transactions are worthwhile.

The limit on the amount of personal borrowing this investor should undertake is not set by the constraint $D_c + D_p = D^*$, but by the amount of income the investor receives from other sources. Since interest payments on personal borrowing are tax-deductible, the proportion of the investor's total income which is taxed at personal income tax rates decreases as D_p increases. With a progressive rate schedule the marginal rate T_p will eventually be reduced to the point at which $\frac{\delta V(Y)}{\delta D_c} = 0$. This is the point of optimal leverage.

Thus far, only the possibility of negative corporate leverage has been considered. However, negative *personal* leverage is equally possible.[5] Consider a firm controlled by a (relatively) poor investor for whom $\frac{\delta V(Y)}{\delta D_c} > 0$. Suppose that initially $D_c = D^*$ and $D_p = 0$. It is possible to go further, so that $D_c > D^*$

[5] Farrar and Selwyn also make this point. I repeat it here to show that the argument is symmetrical.

and $D_p = D^* - D_c < 0$. The firm simply issues additional bonds and exchanges them for the same proportion of each invesor's stock-holdings. It pays the investor to do this until T_p is sufficiently high to satisfy the condition $\frac{\delta V(Y)}{\delta D_c} = 0$.

It is admittedly unlikely that an adjustment in the mix of corporate and personal debt would be made in precisely this way. Nevertheless, the argument up to this point can be extrapolated to yield fairly definite predictions. First, low-income investors should tend to borrow less, or lend more, than high-income investors. Second, the lower the investor's marginal tax rate, the more likely he is to hold stocks in firms with a relatively high degree of financial leverage.

The implication for corporate financial management is that a firm can adjust its financial policies to appeal to particular "clienteles" of investors—e.g., a low-payout, low-debt policy would attract a clientele of relatively wealthy stockholders.

However, it is important to note that these predictions do not specify the relationship of stock *prices* to corporate financial policies. That the firm can appeal to a high-income clientele with a low-payout, low-debt policy does not imply that this policy will maximize share price, since low-income shareholders might be willing to pay even more per share if a low-payout, *high*-debt policy were adopted.

IV. CAPITAL BUDGETING DECISIONS

Negative leverage is positive investment in financial assets. Once this is recognized, an analogy to capital budgeting problems is apparent. The analogy is significant. It should be emphasized,

however, that this section is intended only to indicate the factors which are relevant if taxes are considered explicitly. The formulas presented are illustrative, not general, guides to capital budgeting decisions.[6]

We have already analyzed the choice among repurchasing shares and lending. Now consider a third option: a risky asset (either real or financial) requiring an investment of Z dollars per share in $t = 0$ and yielding a constant expected cash flow of $k(Z)Z$ per year, beginning in $t = 1$. Thus the project offers an expected rate of return $k(Z)$. Assuming that the project is financed entirely with retained earnings, $\overline{Y}$ is given by

$$(12) \quad \overline{Y} = (\overline{X} - rD_c)(1 - T_c)(1 - aT_g) + k(Z)Z(1 - T_c)(1 - aT_g) - rD_p(1 - T_p).$$

A shareholder's valuation of the project's incremental returns is determined by the *after-tax* rate of return he can expect to receive by investing in securities with similar characteristics. We will imagine that the investor is willing to invest, at the margin, in security A, which offers an expected rate of return $k_T(A)$ after taxes. Security A's after-tax returns have the same characteristics as the stockholder's after-tax returns from the project.

If the project is accepted, the shareholder invests Z dollars per share *before taxes*. However, if the project is financed by a reduction in the number of shares repurchased by the firm in $t = 0$, he is able to postpone a tax of $T_g(P_o - B)$ on each of the shares which would have been repurchased if the project were not undertaken. Overall, this amounts to a net decrease in the present value of the investor's tax liability. This is given by

[6] For instance, the formulas would be somewhat different for "growth" firms.

$$N_o\left(\frac{Z}{P_o}\right)T_p[1 - a/(1 + k)](P_o - B) = N_o\beta ZT_g.$$

Therefore, if the project is accepted,

$$(13) \quad V(Y) = V(F) - V(D) + \frac{k(Z)Z}{k_T(A)}$$
$$\times (1 - T_c)(1 - aT_g) - Z + \beta ZT_g.$$

Differentiating,

$$(14) \quad \frac{\delta V(Y)}{\delta Z} = \frac{k(Z)}{k_T(A)}(1 - T_c)(1 - aT_g) - 1 + \beta T_g.$$

For the project to be desirable, from this investor's point of view, it is sufficient that $\frac{\delta V(Y)}{\delta Z} > 0$.[7]

Let $k(A)$ be the *pre-tax* expected rate of return for security A. If b is the proportion of A's return which is expected to be realized as capital gains, then

$$(15) \quad k_T(A) = k(A)[b(1 - aT_g) + (1 - b)(1 - T_p)].$$

We now see that Eq. (8) is that special case of Eq. (14) for which $k(Z) = K(A) = r$, $b = 0$, and Z is the absolute amount of a *reduction* in corporate debt. In other words, the decision to accept a project is equivalent to the decision to reduce corporate leverage [8]—the variables are different but the analysis is the same. Although Farrar and Selwyn do not mention the point explicitly, their paper is good illustration of a basic similarity of logic in theories of capital

[7] Assuming the investor does not sell his shares, he is better off if $\delta V(Y)/\delta Z > 0$, regardless of change in share price. However, he may be better off even if $\delta V(Y)/\delta Z < 0$, provided that share price rises enough to cover any costs incurred in selling.

[8] To put it another way, a firm which reduces its borrowing is effectively making an investment. It can either (1) retire x dollars of outstanding debt, or (2) *invest* x dollars in bonds with the same risk characteristics as the debt that otherwise would be retired. The firm's net borrowing is the same in either case.

budgeting and optimal capital structure. It should be possible to exploit this similarity to generate further insights into the theory of financial management.

V. IMPLICATIONS

It should be emphasized again that Farrar and Selwyn's analysis is not intended to predict the market's valuation of corporate securities. Therefore, it is not *directly* helpful in determining optimal capital structure if "optimal" is defined in the usual way. That is, the argument does not specify which debt-equity mix maximizes the market value of the firm.

Nevertheless, one thing seems clear: Modigliani and Miller's prediction that the firm's market value increases with leverage (up to some unspecified limit) is likely to stand as before in many, if not most, cases. Low-debt policies could increase market value only for firms which (1) are controlled by, or wish to attract, investors with tax rates substantially higher than average,[9] and (2) follow optimal or near-optimal dividend policies. Such firms seem to be relatively rare, at least among large, publicly-owned corporations.

A careful distinction should be made among the empirical and normative implications of the Farrar-Selwyn argument. On the one hand, it seems reasonable to predict a tendency for firms' market values to be positively related to corporate leverage. This is an empirical statement: we expect to find such a tendency because it appears that

corporate leverage will be desirable for *most* firms. Therefore we infer that the statement will be true *on the average.*

It is quite another thing to propose the decision rule that all firms *should* borrow. The main point of Farrar and Selwyn's argument is that all-equity financing (or even negative leverage) will be appropriate for *some* firms. At present, there is no way to tell *a priori* which firms these are.

APPENDIX

Our task is to determine the value of the coefficient α, which is the ratio of (1) the present value of expected tax payments on capital gains in $t = 1$ to (2) the amount $\frac{T_g(\overline{X} - rD_c)(1 - T_c)}{1 + k}$. The following is generally similar in logic to arguments used by Bierman and West in their analysis of "The Acquisition of Common Stock by the Corporate Issuer." [5]

Under present assumptions, the entire amount $T_g(\overline{X} - rD_c)(1 - T_c)$ is paid eventually. The expected initial payment in $t = 1$ is $\left(\frac{k}{1+k}\right) T_g(\overline{X} - rD_c)(1 - T_c)$. The same proportion of the remaining tax is paid at the end of $t = 2$, and so on. The result is this stream of expected tax payments:

$$\gamma T_g Q + \gamma(1 - \gamma) T_g Q + \gamma(1 - \gamma)^2 T_g Q + \ldots$$
$$\gamma = \frac{k}{1+k}$$
$$Q = (\overline{X} - rD_c)(1 - T_c).$$

Discounting at the investor's expected rate k, the present value of this stream is [10]

$$\sum_{t=1}^{\infty} \frac{\gamma T_g Q (1-\gamma)^{t-1}}{(1+k)^t} = \frac{\gamma}{1+k} \sum_{t=0}^{\infty} \frac{T_g Q (1-\gamma)^t}{(1+k)^t}$$

[9] For empirical evidence, see Jolivet [6], who estimates the weighted average marginal tax rate on dividends as 36 per cent in 1965. This rate may be an underestimate of the weighted average rate for all investors if those in high tax brackets tend to hold stocks with low dividend payouts. On the other hand, untaxed institutional investors are important in the market.

[10] I use k as the discount rate because the actual tax payment in any period depends on, and has risk characteristics similar to, that period's capital gain. This is certainly not tight logic. I would not be surprised if a more thorough analysis indicated that a different rate should be used. However, such a modification would not affect this paper's main points.

$$\approx \frac{T_0 Q}{1+k} \left[\frac{\gamma}{1 - \left[(1-\gamma)/(1+k) \right]} \right].$$

Therefore, $\underline{a}$ is given by

$$a = \frac{\gamma}{1 - \left[(1-\gamma)/(1+k) \right]}.$$

This can be simplified to:

$$a = \frac{k+1}{k+2}.$$

REFERENCES

Note: References [1] through [4] are as cited in the Farrar-Selwyn paper, above.

[5] Bierman, H. and R. West, "The Acquisition of Stock by the Corporate Issuer," *Journal of Finance*, XXI (December 1966), 687-98.

[6] Jolivet, V., "The Weighted Average Marginal Tax Rate on Dividends Received by Individuals in the U.S.," *American Economic Review*, LVI (June 1966), 473-77.

[7] Robichek, A. and S. Myers, "Problems in the Theory of Optimal Capital Structure," *Journal of Financial and Quantitative Analysis*, I (June, 1966), 1-35.