Share repurchases, the 'new' view, and the cost of capital

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This paper counters the view that the possibility of share repurchases invalidates the predictions of the 'new' (or 'trapped equity') view of corporate taxation. It is shown that the 'new' view's basic cost of capital expression which distinguishes it from the 'old' view remains valid regardless of the proportions in which corporate distributions of earnings split into share repurchases and ordinary dividend payments.

It is widely held that the 'new' view of corporate taxation put forward by Auerbach (1979, 1983), Bradford (1981), King (1977), Fullerton and King (1984), and others is incompatible with the phenomenon of share repurchases. Share repurchases, it is maintained, undermine this view's basic premise that the corporate firm is an equity trap and thus invalidate its predictions of the firm's investment behavior.

In my letter I argue that this verdict may be premature. While I certainly do not want to claim to have isolated the forces that determine the firm's choice between dividend payments and share repurchases, I hesitate to accept the argument that the invalidity of one of a theory's assumptions will necessarily render its predictions incorrect. To be precise, I will show that the new view's basic cost of capital expression that distinguishes it from the old view stays valid regardless of the proportions in which corporate distributions of earnings split into share repurchases and ordinary dividend payments.

Consider a stylized class of capital income tax systems that resembles the class operative in the OECD countries. Let τ_r be the rate of corporate tax on retained earnings, τ_d the rate of corporate tax on dividends (which equals τ_r in the US), τ_c the effective rate of tax on accrued capital gains, τ_{dp} the rate of personal tax on dividend income, and τ_i the rate of personal tax on interest income, where $1 > \tau_i \geq 0$, $i = r, d, dp, i$.

Consider a competitive firm that employs capital $K(t)$ and labor $L(t)$ to produce its single output by means of a well-behaved production function $f(K, L)$. Let all prices be equal to one and abstract from depreciation, debt financing, money holding, the employment of further factors of production, and similar complications. Expressed in terms of before-tax profits the distributions to shareholders, $X(t)$, are given by

$$X = f(K, L) - wL - \dot{K}/(1 - \tau_r),$$ (1)

whereby $w(t)$ is the exogenously given, but not necessarily time-invariant, wage rate and $\dot{K}(t)/(1 - \tau_r)$ the before-tax profit retained for internal investment. Assume that the proportion α of the distribution occurs in the form of dividend payments $D(t)$ and $1 - \alpha$ in the form of share repurchases $R(t)$, D and R being expressed in units of profits before tax:

$$D = \alpha X, \quad R = (1 - \alpha) X, \quad 0 \le \alpha \le 1. \tag{2}$$

How do the taxes affect this firm's cost of capital, i.e., the minimum pre-tax rate of return to capital, $f'(K)$, given the interest rate $i(t)$?

To answer this question suppose the firm seeks to maximize its market value $M(t)$ at the beginning of its planning problem, $t = 0$. The market value is determined by an arbitrage condition that requires the shareholders to be indifferent between converting their shares into bonds and keeping them, and that has to hold at each instant of time:

$$iM(1 - \tau_i) = D(1 - \tau_d)(1 - \tau_{dp}) + n\dot{m}(1 - \tau_c). \tag{3}$$

Here, $n(t)$ denotes the number of outstanding shares and $m(t)$ the market value per share. The left-hand side of eq. (3) is the net-of-tax interest income the shareholders would receive by converting their share capital M into bonds. The right-hand side is the income from shareholding. It consists of dividends net of corporate and personal taxes and capital gains on existing shares net of the capital gains tax. When the firm repurchases its shares at their current market value,

$$R(1 - \tau_r) + \dot{n}m = 0, \tag{4}$$

the capital gain on existing shares, $n\dot{m}(1 - \tau_c)$, is the only benefit shareholders can enjoy from share repurchases. Share repurchases will make each single one of the remaining shares more valuable than in the case of dividend payments.

Dividing eq. (3) by $1 - \tau_c$, adding it to (4) and using $\dot{M} = \dot{n}m + n\dot{m}$ results in the differential equation

$$\dot{M} = iM\frac{1 - \tau_i}{1 - \tau_c} - D\frac{(1 - \tau_d)(1 - \tau_{dp})}{1 - \tau_c} - R(1 - \tau_r). \tag{5}$$

Using the definition

$$\beta \equiv \alpha\frac{(1 - \tau_d)(1 - \tau_{dp})}{1 - \tau_c} - (1 - \alpha)(1 - \tau_r), \tag{6}$$

and eq. (2) makes it possible to express (5) as

$$\dot{M} = iM\frac{1 - \tau_i}{1 - \tau_c} - \beta X, \tag{7}$$

or, upon integration, as

$$M(t) = \int_t^\infty \beta X(v) \exp - \int_t^v i(u)\frac{1 - \tau_i}{1 - \tau_r} \, du \, dv + C, \tag{8}$$

where C is an integration constant. Equation (8) is the expression for the firm's market value which was sought.

If the firm acts on behalf of the shareholders' interest, it will carry out investment and employment policies so as to

$$\max_{(I,L)} M(0) \text{ s.t. } (1), \quad I = \dot{K}, \quad K(0) = K_0, \tag{9}$$

where $t = 0$ is the start of the planning problem and K_0 the initial stock of capital predetermined by history. Following the basic premise of the new view it is assumed that the firm is mature and has an initial capital stock large enough to ensure that its distributions $X(t)$ as given by (1) can always be positive. [For an analysis of immature firms see Sinn (1988).]

The Hamiltonian of problem (9) is

$$H = \beta X + qI \tag{10}$$

wherein q is the co-state variable of K (the marginal 'Tobin's q). The necessary conditions for a maximum include, from $\partial H/\partial I = 0$ and (6),

$$q = \alpha \frac{(1 - \tau_d)(1 - \tau_{dp})}{(1 - \tau_r)(1 - \tau_c)} + 1 - \alpha, \tag{11}$$

and, from $\dot{q} - qi(1 - \tau_i)/(1 - \tau_c) = -\partial H/\partial K$ and (11),

$$f_K = \frac{1 - \tau_i}{(1 - \tau_r)(1 - \tau_c)} i. \tag{12}$$

Equation (12) is the new view's fundamental cost of capital expression that distinguishes it from the old view's expression $f_K = i/(1 - \tau_d)$ (where $\tau_{dp} = \tau_i$). It is obviously independent of α, the parameter that determines how the distributions split into ordinary dividend payments and share repurchases. This proves that the investment behavior predicted by the new view is compatible with corporate distributions in the form of share repurchases.

The reason for the robustness of (12) is that a change in α operates like a change in the overall tax burden on dividends. It alters the magnitude of the constant β in (8), but clearly this does not change the solution of the optimization problem. The constant β can be pulled in front of the optimization operator in (9) and is therefore irrelevant for the solution. The neutrality of dividend taxation carries over to the neutrality of share repurchases.

This does not mean that *all* conclusions of the new view can be maintained. One of the conclusions that needs revision concerns the marginal value of equity, q. Under the new view, q equals $(1 - \tau_d)(1 - \tau_{dp})/[(1 - \tau_r)(1 - \tau_c)]$. This value is typically less than one since $\tau_d = \tau_r$ and $\tau_{dp} > \tau_c$. By way of contrast, eq. (11) shows that, in the present context, q is a weighted average of one and the new view's value, whereby the weights are the fractions of share repurchases and dividends respectively. In the extreme case where all distributions are channelled to the household sector via share repurchases ($\alpha = 0$) q equals one. Even in this case, however, the cost of capital is the same as if all distributions had to take on the form of dividend payments. Unlike the verdict cited above, the new view's predictions concerning a mature firm's investment behavior are indeed compatible with the observation of share repurchases.

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