

## TAXATION, EQUITY, AND GROWTH: EXPLORING THE TRADE-OFF BETWEEN SHAREHOLDER DIVIDEND TAX RELIEF AND HIGHER CORPORATE INCOME TAXES

SERGE J. NADEAU AND ROBERT P. STRAUSS

The double taxation of corporate income in the United States has been criticized on several grounds. Among these are that it (1) encourages high rates of profit retention, thus allowing profitable firms to reinvest without passing the test of the marketplace, (2) encourages debt over equity financing, and (3) increases unduly the cost of equity financing and thereby reduces investment and capital formation. Hence, there has been active consideration of some form of integration of personal and corporate income taxes or, at least, dividend tax relief in the United States in recent years. The major impediment to its enactment is probably the fear that it would incur substantial tax revenue losses without providing significant welfare gains. Dividends are valued as a signal of the firm's future prospects, as a method of monitoring managers and as a hedge against an uncertain future income stream). If the revenue costs of dividend tax relief are compensated for by higher corporate income taxes, then, given constant before-tax corporate income, the effective tax rate on corporate equity income is unchanged but shareholders are better off because the costs of using dividends as a signal and as a way of monitoring managers are reduced. The extent of such efficiency gains depends on the sensitivity of the intrinsic value of dividends to the dividend payout rate: the more sensitive it is, the larger are the expected efficiency gains.

This paper estimates the impact of this tax integration policy on economic efficiency using a macroeconomic model of the real and financial decisions of the firm. The

This paper examines the economic impact of the following revenue neutral, partial integration tax policy: a reduction in dividend income tax rates compensated by an increase in corporate income tax rates. This tax integration policy has, irrespective of its welfare impact, two virtues: first, it is, administratively speaking, relatively easy to implement; and, second, it does not significantly alter the equity of the current tax system, because its direct impact is only on corporate shareholders (e.g., it does not externalize the "cost" of integration).

The possibility of this tax integration policy increasing economic welfare depends on the empirically verified assumption that dividends have some intrinsic value (e.g., dividend analysis shows that moderate shareholder dividend tax relief (e.g., a 10 percentage point shareholder credit for dividends received), whose revenue costs are compensated for by an increase in corporate income taxes, is very likely to increase the taxable shareholder's rate of return on corporate equity investment (or, equivalently, to reduce the cost of equity), to decrease leverage, the corporate financial cost of capital, and the user cost of capital, and to increase real investment. The analysis also shows that the tax-exempt shareholder is very likely to be better off under this tax integration policy than under the current tax system. The analysis thus suggests that this tax integration policy is welfare improving: the government collects the same amount of taxes, but the typical shareholders (both taxable and tax-exempt) are better off (the welfare of current corporate management is ignored in the analysis).

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*Abstract - This paper explores the economic impact of trading off higher corporate income taxes for shareholder dividend tax relief. This partial integration policy is found to be, in the context of the assumptions of this model, Pareto improving: the tax burden on corporate equity income is not shifted from corporate shareholders to other economic agents and corporate shareholders are better off because the costs of using dividends as a signal and as a way of monitoring managers are reduced. Moreover, this partial integration policy is found to increase dividends, reduce leverage and the financial cost of capital, and increase real investment. Statistically based sensitivity analyses are performed.*

"To change the present U.S. tax system, reformers will have to convince the public of two things. One is that the economic gains from shifting to a more integrated income tax system are significant. The second is that the revenues lost by eliminating the separate corporation tax can, and will, be replaced by equitable sources

of federal funds." *Break and Pechman* (1975, p. 344)

### INTRODUCTION

Under the current U.S. federal tax system, corporate source income is subject to "double taxation." It is taxed once at the corporate level (at rates up to 34 percent) and then again when distributed as dividends at the individual shareholder level at rates up to 31 percent. Thus, unlike other sources of income, corporate source income is taxed under two different income taxes: corporate and personal.

The double taxation of corporate income has been criticized on several grounds. Among these are that it distorts the allocation of capital and other resources between corporate and noncorporate forms of business. The argument is that it biases

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after-tax returns on investment in favor of noncorporate enterprises; hence, firms may choose not to incorporate with a resulting loss of efficiency in the economy (Harberger, 1962; Ballentine and McLure, 1980; Ebrill and Hartman, 1982; Gentry, 1992). Another criticism of the present tax system is that it distorts the real and financial decisions of the firm. More specifically, it is argued that such differential tax treatment (1) encourages high rates of profit retention, thus allowing profitable firms to reinvest without passing the test of the marketplace (Poterba, 1987), (2) encourages debt over equity financing (Litzenberger and Van Horne, 1978), and (3) increases unduly the cost of equity financing and thereby reduces investment and capital formation (Poterba and Summers, 1985). As a result, there has been active consideration of some form of integration for tax purposes of the personal and corporate income (or, at least, dividend tax relief) in recent years, while some form of dividend relief has been available in most other industrialized countries.<sup>2</sup> The major impediment to its enactment is probably, as expressed in the above quote, the fear that tax integration would incur substantial tax revenue losses without providing significant efficiency gains (Bradford, 1981; Sinn, 1990).

The objective of this paper is to examine a tax integration policy which we think meets, in terms of efficiency and equity, the challenge put forth by Break and Pechman. The tax integration policy examined is a decrease in shareholder's dividend income tax rates compensated by an increase in corporate income tax rates so that the policy is revenue neutral and so that the effective tax rate on corporate equity capital income is unchanged. The principal finding of the analysis is that this partial integration policy is, in the context of the assumptions of the model, Pareto improving: the government collects the same amount of tax revenue (without the equity

of the current tax system being significantly altered), but the representative shareholder is better-off because the cost of using dividends as a signal and as a way of monitoring managers is reduced. This integration policy is also expected to increase dividends, reduce leverage and the financial cost of capital, and increase real investment. Compared to the integration policies examined in the recent Treasury Department Report (U.S. Department of the Treasury, 1992), this integration policy is found to be less ambitious (in terms of attaining the goals of integration) but more easily implementable and less disruptive in terms of the equity of the current tax system.

#### A PARTIAL INTEGRATION TAX POLICY

The most comprehensive study yet of the economic impact of tax integration in the United States is undoubtedly the Treasury Department Report on Integration (U.S. Department of the Treasury, 1992).<sup>3</sup> The Treasury Department Report examines the economic impact of three specific integration proposals: the dividend exclusion proposal, the shareholder allocation proposal, and the Comprehensive Business Income Tax (CBIT) proposal.<sup>4</sup> The Treasury analysis is performed in a general equilibrium framework and the estimates are computed under two types of replacement taxes: (1) lump-sum taxes and (2) equal proportional adjustments to all tax rates on capital income. From a methodological point of view, arguably the most important contribution of the Treasury Department Report is that unlike previous integration studies (e.g., Ballard *et al.*, 1985), it treats the firm's financial behavior as endogenous. Estimates of the total welfare impact of these integration proposals range from 0.19 (dividend exclusion) to 0.73 (CBIT) percent of current consumption under the scaled tax rate replacement scenario, and the range goes from 0.29 (dividend exclusion) to 0.74 (CBIT) under the lump-sum

tax replacement scenario. The Treasury Department Report seems to favor the dividend exclusion proposal, because it would achieve most of the goals of integration in a relatively simple manner (U.S. Department of the Treasury, 1992, p. 15).

The integration tax policy studied here is a tax rebate (or shareholder credit) on dividend income, *i.e.*, dividend tax relief. Thus, under this tax integration scheme, dividend income is taxed at lower rates than other types of income (e.g., interest income) to compensate for the fact that it is taxed at the corporate level. For reasons of simplicity, we set the reduction in tax rates equal across all statutory individual income tax rates. We also assume that the law would be written in such a way that tax-exempt shareholders (e.g., pension funds and foreign shareholders) could not benefit directly from dividend tax relief. In particular, we assume that the tax deduction on dividend income would apply only if the taxpayer owns the stock at the time the dividend is distributed so that tax-exempt organizations could not benefit from dividend tax relief by "selling" their dividends to taxable investors.<sup>5</sup> This integration policy does not integrate corporate and personal income as completely as the policies studied in the Treasury Department Report, but it is more easily implementable and, because it can be coupled with the revenue replacement tax suggested later, reduces the distortions associated with the double taxation of corporate source income without significantly altering the equity of the current tax system.

#### Revenue Replacement Tax

A tax rebate on dividend income would substantially reduce tax revenue. In order to keep the budget balance unchanged, we must specify a replacement tax that would raise equivalent revenue. The nature of the revenue replacement tax is evidently critical in assessing, in terms of equity and efficiency, the impact of a tax integration

policy. For reasons of simplicity, lump-sum taxes are the most often assumed replacement taxes (for example, Gravelle and Mackie, 1992). A major problem with lump-sum taxes is that they are usually judged unacceptable in equity terms. Furthermore, lump-sum replacement taxes bias comparisons among integration policies in favor of the policy that loses the most revenue, because the efficiency gain from replacing distorting taxes by nondistorting lump-sum taxes increases with the amount of revenue that must be replaced.

Another possible mechanism to keep dividend tax relief revenue neutral is to proportionately increase the tax rates on all forms of capital income as in the Treasury Department Report. Although this tax replacement mechanism is more equitable than lump-sum replacement taxes,<sup>6</sup> it has an important drawback: it shifts part of the tax burden on corporate equity capital income to other types of capital income (e.g., home mortgages). Hence, although it increases efficiency by making more uniform the taxation of returns on alternative investments, dividend tax relief coupled with this revenue replacement mechanism may alter the equity of the current tax system. It must also be pointed out that, although to a lesser extent than lump-sum replacement taxes, a proportional tax adjustment revenue replacement mechanism is biased in favor of the integration policy that loses the most revenue, because the efficiency gain from shifting the tax burden on heavily taxed corporate equity income to less heavily taxed forms of capital income increases with the amount of revenue that must be replaced.<sup>7</sup>

Here, revenues are recovered by increasing all the corporate income statutory tax rates by the same number of percentage points. One advantage of this tax replacement scheme is its simplicity. Also, this tax replacement scheme, unlike other proposed tax integration schemes (e.g., those proposed in the Treasury Department Report),

does not alter significantly the equity of the current tax system and may thus be politically more agreeable: the tax burden on corporate equity income is not shifted from corporate shareholders to other economic agents, and, since the reduction in dividend tax rates is constant across all tax rates, the vertical equity of the tax system is improved. One possible drawback of this tax integration scheme is that part of the tax burden on corporate equity income is shifted from taxable corporate shareholders to tax-exempt corporate shareholders (e.g., pension funds and foreign investors); however, it is probable that tax-exempt investors will be made better off under this tax integration scheme, because the return on their corporate equity investment is predicted to increase. The next section summarizes the model which is used, in a subsequent section, to analyze the efficiency impact of this tax integration policy.

#### SUMMARY OF THE MODEL

Integration may increase welfare in at least two ways: first, by reducing the difference between the financial cost of capital in the corporate sector and the financial cost of capital in the noncorporate sector, and, second, by reducing the distortions in the real and financial decisions of the firm. A complete analysis of the economic impact of tax integration thus requires the use of a model in which the real and financial decisions of the firm are endogenous.

The efficiency impact of corporate integration tax policies is usually studied in a general equilibrium framework. The focus is typically on the estimation of the welfare gains associated with the potential reduction in intersectoral distortions; the firm's financial behavior is typically overlooked, and, as a result, the welfare gains associated with the reduction in the distortions in the real and financial decisions are often ignored.<sup>9</sup> In addition, because of limitations in the computable general equilibrium methodology, the typical study of the ef-

fects of tax integration does not provide statistically based sensitivity analyses of its predictions.

In this paper, the analysis of the efficiency impact of trading off higher corporate income taxes for dividend tax relief is carried out in a partial equilibrium framework: it focuses on the impact on the corporate financial cost of capital and on corporate investment in equipment and thus on the reduction in the real and financial distortions associated with the double taxation of corporate income. A shortcoming of this analysis is that it ignores the general equilibrium effects of this tax integration policy (e.g., the reduction in intersectoral distortions) and thus provides only a partial picture of the efficiency impact of this integration policy. On the other hand, it has a very important advantage: statistically based sensitivity analyses of the predicted impact of this tax integration policy on the corporate financial cost of capital, on the corporate user cost of capital, and on the corporate financial structure can be performed. The importance of this can be seen as follows: since the direct impact of trading off higher corporate income taxes for dividend tax relief is only on corporate shareholders, if it can be shown that there is a strong likelihood that a particular form of this tax integration policy would decrease the cost of corporate equity and the corporate user cost of capital, then it can be concluded that there is a strong likelihood that this integration policy would be welfare improving (because the second-order effects—e.g., reduction in intersectoral distortions—would then only reinforce the first-order effects). A partial equilibrium analysis therefore allows us to ponder the uncertainty attached to the outcome of the implementation of this integration policy and, consequently, to better judge whether or not it should be implemented.

The partial equilibrium analysis adopted in this paper is based on the macroeconomic model of the real and financial deci-

sions of the firm developed and tested in Nadeau and Strauss (1991b).<sup>9</sup> Table 1 lists the endogenous and exogenous variables of the model. The key assumptions of the model are the following:

- (1) the objective of the firm is the maximization of the present value of the net returns to its stockholders under the constraint of a constant returns to scale, putty-clay production technology;
- (2) the supply of real capital goods, the supply of saving to corporations and the supply of labor are perfectly elastic;
- (3) the supply price of debt increases exponentially with leverage;
- (4) the shareholders discount rate is independent of the firm's financing policies;<sup>10</sup>
- (5) the firm always has sufficient earnings before interest and taxes (EBIT) to claim interest expenses;
- (6) dividends have some *intrinsic value* which is a concave function of the dividend payout rate; and
- (7) the economy is closed.<sup>11</sup>

The most critical of these assumptions is that dividends have some intrinsic value; the reasonableness and the consequences of this assumption need to be addressed in detail.

#### Tax Integration and the Views on Dividend Taxation

There is no consensus in the literature on the influence of dividend income taxation on the firm's financing and investment behavior (for an elaborate discussion, see Gerardi *et al.*, 1990; Zodrow, 1991). One view, the so-called *new view* of dividend taxation, assumes that the firm never needs to issue new shares and that corporate profits can be distributed to shareholders only in the form of dividends. As a result, this view contends that dividend taxation does not affect the firm's financing and investment behavior and, consequently, that partial integration would not increase corporate investment. Under this view, partial integration provides only a windfall gain to existing shareholders (see, for example, Bradford, 1981).

TABLE 1  
THE VARIABLES IN THE MODEL

Exogenous Variables	
$D$	depreciation schedule
$\delta$	depreciation rate
$i_f$	riskless rate of interest
$\bar{\omega}$	long run expected inflation rate for wages
$\pi$	price of output
$q$	net of tax considerations purchase price of real capital
$Q$	expected output level
$\rho$	shareholders' discount rate
$w$	wage rate
$\bar{p}$	long run expected inflation rate in the price of capital goods
$\tau_c$	tax rate on corporate income
$\tau_g$	accrual-equivalent tax rate on capital gain income
$\tau_i$	tax rate on interest income
$\tau_D$	tax rate on dividend income
Endogenous Variables	
$\theta$	payout rate
$RS$	cost of equity (taxable investor's rate of return on corporate equity investment)
$RS_x$	tax-exempt investor's rate of return on corporate equity investment
$p$	debt to asset ratio
$RB$	cost of debt
$R$	financial cost of capital
$c$	user cost of capital
$I^*$	real investment

Another view, the so-called *traditional view*, assumes that dividends have some *intrinsic value* that compensates for their unfavorable tax treatment: shareholders may value dividends as a signal of the firm's future prospect (John and Williams, 1985), as a method of monitoring managers (Jensen and Meckling, 1976; Easterbrook, 1984), and as a hedge against an uncertain future income stream (Shefrin and Statman, 1984). Under this view, dividend taxation influences the firm's financing and investment behavior. Hence, under this view, partial integration can reduce the firm's financial cost of capital and increase corporate real investment.

Thus, whether partial integration has a beneficial impact on investment and economic welfare depends on the view of dividend taxation to which one subscribes. As pointed out earlier, there is no consensus in the theoretical literature on which view is more reasonable.<sup>12</sup> On the other hand, empirical evidence on the relationship between dividend taxation and dividend payout seems to favor the traditional view (for example, Poterba and Summers, 1985; Poterba, 1987; Nadeau, 1988; Nadeau and Strauss, 1991b). Thus, our model of the real and financial decisions of the firm is consistent with the traditional view.

### The Econometric Model

The econometric model, on which the subsequent analysis is based, is composed of three equations: a dividend equation, a debt equation, and an investment equation. The first two equations determine the financial cost of capital, and the third equation uses the financial cost of capital as a determinant.

### The Dividend Equation

In this model, the optimal dividend payout rate maximizes the shareholder's benefit of 1 dollar of after-tax corporate income. Let  $\theta$  denote the dividend payout rate,  $\tau_p$  denote the tax rate on the shareholder's divi-

dend income, and  $\tau_g$  denote the *accrual equivalent* tax rate on the shareholder's capital gains income. The intrinsic value of dividends is specified as  $\beta\theta^{\alpha}$  and, so that this function is concave, the constants  $\alpha$  and  $\beta$  are assumed to satisfy one of these conditions:

$$\beta > 0, 0 < \alpha < 1 \quad \text{or} \quad \beta < 0, \alpha < 0.$$

Thus, the shareholder's benefit of 1 dollar of after-tax corporate income is specified as

$$SB(\theta, \tau_g, \tau_p) = \beta\theta^{\alpha} + (1 - \tau_g)$$

$$(1 - \theta) + (1 - \tau_p)\theta$$

and, assuming a partial adjustment process, the observed dividend payout rate is modeled as

$$\theta_t = (1 - g_{\theta}) \cdot \theta_{t-1} + g_{\theta} \cdot \left( \frac{\tau_{pt} - \tau_{gt}}{\alpha\beta} \right)^{\frac{1}{\alpha-1}} + \epsilon_{\theta t}$$

where  $g_{\theta}$  is an adjustment constant ( $0 < g_{\theta} < 1$ ) and  $\epsilon_{\theta t}$  is a stochastic error term. Observe that, according to this model, the equilibrium dividend payout rate increases exponentially as the tax penalty on dividend income decreases. In fact, this model implies that if there is no tax penalty on dividend income, then corporate income is distributed fully.

### The Debt Equation

The model in Nadeau and Strauss (1991b) assumes that the cost of debt  $RB$  is an increasing function of the riskless rate of interest  $i_t$  and of leverage  $p$ . More specifically, the cost of debt is specified as

$$RB(i_t, p) = i_t + \lambda p^{\gamma}$$

where  $\lambda$  is a positive constant and  $\gamma$  is the

elasticity of the risk premium with respect to leverage. The constant  $\gamma$  is expected to be greater than one.

Let  $\tau_c$  denote the tax rate on corporate income,  $\mathcal{T}$  denote the vector of tax variables  $(\tau_p, \tau_g, \tau_c)$ , and  $\rho$  denote the after-tax rate of return required by taxable investors to hold equity. The cost of equity is, by definition, the before-corporate tax rate of return that the firm must achieve on a dollar of real capital for the stockholders to obtain an after-tax rate of return of  $\rho$  if real capital is financed completely by equity. Hence, given equation 1, it is derived as<sup>13</sup>

$$RS(\theta, \mathcal{T}, \rho) = \frac{\rho}{SB(\theta, \tau_g, \tau_p) \cdot (1 - \tau_c)}$$

In this model, the optimal financing mix,  $p$ , minimizes the financial cost of capital:

$$R(p, \theta, \mathcal{T}, \rho, i_t) = pRB(i_t, p) + (1 - p)RS(\theta, \mathcal{T}, \rho).$$

Thus, assuming a partial adjustment process, the observed financing mix is approximated by the form:

$$p_t = (1 - g_p) \cdot p_{t-1} + g_p \cdot \left( \frac{RS(\theta_t, \mathcal{T}_t, \rho_t) - i_{t-1}}{\lambda(\gamma + 1)} \right)^{1/\gamma} + \epsilon_{pt}$$

where  $g_p$  is the response adjustment constant ( $0 < g_p < 1$ ) and  $\epsilon_{pt}$  is a stochastic error term. Equilibrium leverage is therefore, in this model, a concave function of the differential between the cost of equity and the riskless rate of interest.

### The Investment Equation

Let  $w$  denote the wage rate,  $q$  denote the effective purchase price of real capital goods (i.e., the price of capital goods corrected for any investment tax credit),  $\delta$  denote the rate of capital decay, and  $\bar{D}_t$  de-

note the present value of depreciation allowance of 1 dollar of capital stock purchased at time  $t$ . In this model, it is assumed that, at time  $t$ , the firm acts as if wages and the price of capital stock will increase at constant rates  $\bar{\omega}_t$  and  $\bar{v}_t$ , respectively. It is also assumed that at time  $t$  the firm acts as if tax variables, the discount rate,  $\rho$ , and the riskless rate of interest,  $i_t$ , will remain constant over the future; the firm's expectations about future output demand at time  $t + i$  given time  $t - 1$ , denoted  $Q_{t+i|t-1}$ , are *economically rational* in the sense of Feige and Pearce (1976); and the production technology is Cobb-Douglas with an elasticity of output with respect to labor equal to some constant  $a$ .

Let

$$w_{t+i|t} \equiv w_t(1 + \bar{\omega}_t)^i$$

$$q_{t+i|t} \equiv q_t(1 + \bar{v}_t)^i$$

$$R(p_{t+i}, \theta_{t+i}, \mathcal{T}_t, \rho_t, i_{t-1}) \equiv p_{t+i} RB(i_{t-1}, p_{t+i})$$

$$+ (1 - p_{t+i}) RS(\theta_{t+i}, \mathcal{T}_t, \rho_t)$$

$$c_{t+i|t} \equiv q_{t+i|t} \left( \frac{\rho_t + \delta - \bar{\omega}_t}{\rho_t} \right)$$

$$\left[ R(p_{t+i}, \theta_{t+i}, \mathcal{T}_t, \rho_t, i_{t-1}) - \frac{\tau_{ct} \bar{D}_t}{1 - \tau_{ct}} \right]$$

and

$$\Delta Q_{t+i|t-1} = Q_{t+i|t-1} - (1 - \delta)Q_{t+i-1|t-1}.$$

Note that  $R(p_{t+i}, \theta_{t+i}, \mathcal{T}_t, \rho_t, i_{t-1})$  is this model's anticipated financial cost of capital at time  $t + i$  given time  $t$  and that  $c_{t+i|t}$  is this model's expected user cost of capital at time  $t + i$  given time  $t$ .<sup>14</sup> Given this notation, investment expenditures at time  $t$  are expressed as

$$I_t = \varphi + \sum_{i=0}^h \phi_i \cdot \left[ \frac{w_{t+i|t}}{c_{t+i|t}} \right] \cdot \Delta Q_{t+i-1|t-1} + \epsilon_{It}$$

where  $\phi$ ,  $a$ , and the  $\phi_i$ 's are coefficients to be estimated and  $\epsilon_{it}$  is a stochastic error term.

### The Estimated Model

The estimation of equations 2, 4, and 6 is performed using U.S. aggregate time-series data. A short description of the data is contained in Appendix A.<sup>15</sup> Each equation is estimated by nonlinear least squares. The results of the estimation are presented in Table 2. The results are discussed in detail in Nadeau and Strauss (1991b). The usual statistical tests indicate that the model is statistically consistent with the data, and thus that our assumptions are not overly restrictive. In particular, the estimated correlation of the residuals across equations reported in Table 3 are not large enough to require a joint estimation procedure, and do not contradict our assumption that the financial decisions are independent of real investment decisions.

### ESTIMATED IMPACT

The following tax integration scheme was proposed in Section 2: a tax rebate on dividend income compensated by an increase in corporate income tax rates to keep tax revenues unchanged. It was then noted

that this tax integration policy does not significantly alter the equity of the current tax system. The purpose of this section is to use the macro-econometric model summarized in the previous section to analyze the efficiency of this tax integration policy.

### Methodological Issues

Two scenarios are examined: a 5 percentage point dividend tax rebate and a 10 percentage point dividend tax rebate. The analysis is based on counterfactual simulations over the 1946–1986 time period, but the statistics are computed over the 1962–1986 period to eliminate the effects of starting conditions. The simulations ignore second order effects. In other words, it is assumed that output, corporate taxable income, depreciation allowances, interest income, and interest rates are not affected by the integration policy under study. These assumptions are important<sup>16</sup> but necessary, because specifying a credible general equilibrium model would go far beyond the scope of this study. The results of the simulations are reported in Table 4. As suggested in Gerardi *et al.* (1991, p. 313), lower and upper bounds for the predictions are reported. These bounds are constructed using boundaries of 95 percent confidence intervals for the elasticity

Coefficient	Estimate	Standard Error	t-Ratio
<b>Dividend payout rate equation 2</b>			
$g_p$	0.387	0.035	11.057
$\alpha$	-1.654	0.328	-5.055
$\beta$	-0.007	0.003	-2.333
$R^2 = 0.93; \hat{\rho} = 0.14$			
<b>Debt equation 4</b>			
$g_D$	0.075	0.024	3.125
$\lambda$	0.047	0.019	2.473
$\gamma$	6.210	2.001	3.103
$R^2 = 0.98; \hat{\rho} = 0.11$			
<b>Investment equation 6</b>			
$\phi$	-11.799	5.047	2.338
$\phi_0$	0.056	0.024	2.333
$\phi_1$	0.025	0.022	1.136
$\phi_2$	0.195	0.082	2.378
$a$	0.419	0.157	2.669
$R^2 = 0.98; \hat{\rho} = 0.64$			

TABLE 3  
CROSS-CORRELATION OF THE RESIDUALS

	$\hat{\epsilon}_x$	$\hat{\epsilon}_p$	$\hat{\epsilon}_i$
$\hat{\epsilon}_x$	1.00	-0.19	-0.12
$\hat{\epsilon}_p$	—	1.00	-0.12
$\hat{\epsilon}_i$	—	—	1.00

TABLE 4  
PREDICTED IMPACT OF TWO DIVIDEND TAX RELIEF SCENARIOS

	Lower Bound ( $\alpha = -1, \gamma = 2.2, a = 0.1$ ) $\Delta\tau_p = -5.0 \quad \Delta\tau_D = -10.0$		Expected ( $\alpha = -1.7, \gamma = 6.2, a = 0.4$ ) $\Delta\tau_p = -5.0 \quad \Delta\tau_D = -10.0$		Upper Bound ( $\alpha = -2.3, \gamma = 2.2, a = 0.7$ ) $\Delta\tau_p = -5.0 \quad \Delta\tau_D = -10.0$	
	$\theta$	9.59	26.31	12.95	34.48	14.04
$\Delta\tau_c$	0.64	1.33	0.56	1.20	0.53	1.16
RS	-0.32	-0.69	-1.12	-2.28	-3.45	-6.39
RS <sub>x</sub>	-0.27	-0.52	0.53	1.07	2.73	5.16
p	-0.24	-0.52	-0.33	-0.68	-0.61	-1.17
RB	-0.13	-0.27	-0.17	-0.34	-0.17	-0.32
R	-0.14	-0.30	-0.40	-0.83	-1.20	-2.25
$c_{HI}$	-2.08	-4.39	-2.70	-5.76	-4.10	-8.32
I	0.13	0.27	1.37	3.00	6.19	13.09

All figures in the table are in average annual percentage relative terms except for the figures associated with  $\Delta\tau_p$  and  $\Delta\tau_c$ , which are in average annual percentage point terms.

parameters:  $\alpha$ ,  $\gamma$ , and  $a$ . The analysis concentrates on the effects of the 10 percent dividend tax reduction scenario, because only the magnitude, not the nature, of the predictions changes by going from a 5 percentage point reduction to a 10 percentage point reduction. In fact, one observes that, except for the dividend payout rate, the predicted changes in the endogenous variables are approximately proportional to  $\Delta\tau_p$ .<sup>17</sup>

### Results

Reducing the tax burden on dividend income provides an additional incentive to the firm to pay dividends. Hence, corporate tax integration is expected to increase the dividend payout rate. According to this model, a continuing 10 percentage point reduction in the taxation of dividend income is expected to increase the average dividend payout rate by about 34.48 percent in the long run (the *probable* range goes from 26.31 to 36.73 percent).

Not surprisingly, a reduction in dividend in-

come tax rates requires a less than commensurate increase in corporate income tax rates to keep integration revenue neutral. The reasons are that: (1) a reduction in the dividend income tax rates increases substantially the dividend payout rate (thus increasing the dividend income tax base), (2) capital gains income is taxed much less heavily than dividend income (even after the reduction in the taxation of dividend income), and (3) the corporate income tax applies to all of corporate income whether distributed or not and whether distributed to taxable shareholders or non-taxable shareholders. In fact, the model estimates that a 10 percentage point reduction in the effective dividend income tax rate coupled with a 1.2 percentage point increase in the effective tax rate on corporate income leaves total tax revenues unchanged.<sup>18</sup>

Whether trading off shareholder dividend tax relief for higher corporate income taxes is an integration policy worthy of consideration hinges on the form of its impact on

the cost of corporate equity investment (or, equivalently, on the rate of return on corporate equity investment). In fact, since this tax integration policy does not involve a tax shift from corporate equity income to other forms of income or consumption, its direct impact is solely on the cost of corporate equity investment and on corporate equity investors.<sup>19</sup> Hence, if it can be shown that, under this tax integration policy, the cost of equity is lower and that no corporate equity investors are worse off, then it can be concluded that this tax integration policy is Pareto improving.

The tax integration policy proposed here affects the cost of equity (*i.e.*, the returns to taxable shareholders) in two ways. First, dividend tax relief increases unambiguously the taxable shareholder's benefit of 1 dollar of after-tax corporate income,  $SB(\theta, \tau_g, \tau_p)$ , but the magnitude of this increase depends critically on the magnitude of the parameter  $\alpha$ : the larger the magnitude of  $\alpha$  is, the larger the increase in  $SB(\theta, \tau_g, \tau_p)$  will be. Second, the increase in the corporate income tax rate (to keep total tax revenues unchanged) decreases after-tax corporate income. The magnitude of this decrease also depends critically on  $\alpha$ . The total impact of this tax integration policy on the cost of equity is thus ambiguous and depends on  $\alpha$ . According to this model, a 10 percentage point reduction in the effective dividend income tax rate decreases the cost of equity (or, equivalently, increases the returns to taxable shareholders) by 2.28 percent (with a *probable range* of  $-0.69$  to  $-6.39$  percent).

Since trading off higher corporate income taxes for shareholder dividend tax relief partly shifts the tax burden on corporate equity investment from taxable shareholders to tax-exempt shareholders and assuming that tax-exempt shareholders cannot sell their dividends to taxable shareholders, the welfare of tax-exempt shareholders can be adversely affected if the increase in the intrinsic value of dividends (brought about

by a higher payout rate) is not large enough to compensate for the increase in the effective tax rate on the returns on their corporate equity investments. According to this model, however, these investors are also better off: the tax-exempt investor's rate of return on corporate equity investment increases by 1.07 percent (with a *probable range* of  $-0.53$  to  $5.16$  percent).<sup>20</sup> This tax integration policy therefore represents, in the context of the assumptions of this model, a Pareto improvement: the cost of equity decreases, shareholders are better off, and the government collects the same amount of taxes.<sup>21</sup>

The other effects that this tax integration policy is expected to cause are a decrease in leverage, the cost of debt, and the financial cost of capital and an increase in real investment. In numerical terms, a 10 percentage point reduction in the effective shareholder dividend income tax rate, compensated by a 1.2 percentage point increase in the effective corporate income tax rate, is expected to decrease leverage by 0.68 percent (with a *probable range* of  $-0.52$  to  $-1.17$  percent) and increase investment in equipment by 3.0 percent (with a *probable range* of 0.27 to 13.09 percent). Although numerical estimates cannot be provided, this tax integration scheme is also likely to increase investment in other types of productive assets (*e.g.*, nonresidential structures) because, as noted earlier, it is expected to reduce the cost of equity and the financial cost of capital and because an increase in corporate income tax rates decreases, in general, the user cost of capital (holding the financial cost of capital constant).<sup>22</sup>

In analyzing the sensitivity of these results, it must be noted that the impact of this tax integration policy on investment increases with the magnitude of  $\alpha$ , the elasticity of the intrinsic value of dividends with respect to the dividend payout rate, increases with  $\gamma$ , the elasticity of the risk premium in the cost of debt with respect

to leverage, and increases also with  $a$ , the elasticity of output with respect to labor. From Table 4, it is also noted that, qualitatively speaking, the predicted effects of this tax integration policy are quite robust to changes in estimated elasticities. The only endogenous variable whose sign is sensitive to changes in estimated elasticities is the tax exempt investor's rate of return on equity investment,  $RS_e$ . These results thus suggest that the integration policy discussed here can worsen, slightly, the lot of tax exempt equity holders if the magnitude of the elasticity of the intrinsic value of dividends with respect to the payout rate is small. It must be pointed out, however, that the likelihood of such an event occurring is quite small. In fact, using the upper bound of a 70 percent confidence interval for  $\alpha$  (instead of the upper bound of a 95 percent confidence interval), the model predicts a 0.05 percent increase in  $RS_e$  if the dividend tax relief is 10 percentage point.

In addition to being sensitive to the parameters of the model, the results of this analysis may also be sensitive to the relaxation of, in particular, two assumptions of the model: the assumption that the supply of saving to corporations is perfectly elastic and the assumption that tax-exempt investors cannot sell their dividends to taxable investors. In theory, this tax integration policy would, by increasing real investment, increase the demand for loanable funds. Thus, under a closed economy assumption, the shareholder's discount rate and the debt holder's discount rate could increase through an increase in  $r$  (see Footnote 11), which would dampen some of the estimated financial efficiency gains. This dampening effect, however, is likely to be negligible in practice. In fact, even under the assumption that the interest-elasticity of the supply of saving to corporations is 0.5, this integration policy is still expected to reduce the cost of equity, leverage, and the financial cost of capital: a 1.33 percent

relative decrease in  $RS_e$ , a 0.57 percent relative decrease in  $p$ , and a 0.03 percent relative decrease in  $c_{dt}$  (if the dividend tax relief is 10 percentage points).

These predictions are, however, more sensitive to the assumption that tax-exempt shareholders cannot benefit directly from this integration scheme by selling their dividends to taxable shareholders. In fact, if our presumed prohibition on such arbitrage can be somehow circumvented and more than about 30 percent of the dividends distributed to tax-exempt shareholders are sold to taxable shareholders who can benefit from the tax reduction on dividend income, then the increase in corporate income taxes needs to be so large that it negates the positive impact of a higher dividend payout rate and a lower dividend income tax rate. This tax integration scheme then becomes a subsidy to tax-exempt shareholders.

## Conclusions

This paper examines the economic impact of the following revenue neutral, partial integration tax policy: a reduction in dividend income tax rates compensated by an increase in corporate income tax rates. This tax integration policy has, irrespective of its welfare impact, two virtues: first, it is, administratively speaking, relatively easy to implement; and, second, it does not significantly alter the equity of the current tax system, because its direct impact is only on corporate shareholders (it does not externalize the "cost" of integration). The possibility of this tax integration policy increasing welfare depends on the empirically verified assumption that dividends have some intrinsic value: if the revenue costs of dividend tax relief are compensated for by higher corporate income taxes, then, given constant before-tax corporate income, the government collects the same amount of taxes (*i.e.*, the effective tax rate on corporate equity income is unchanged), but shareholders are better off because the

costs of using dividends as a signal and as a way of monitoring managers are reduced. The extent of such efficiency gains depends on the elasticity of the intrinsic value of dividends with respect to the dividend payout rate: the larger it is (in magnitude), the larger are the expected efficiency gains.

In this paper, the impact of this tax integration policy on economic efficiency is estimated using a macroeconomic model linking the real and financial decisions of the firm. This methodology has two advantages over the more traditional general equilibrium methodology of examining the efficiency impact of tax integration: first, it is based on an internally consistent model of the real and financial decisions of the firm; and, second, the sensitivity of the predictions to changes in the parameters of the model can be assessed in a statistical setting. The analysis shows that moderate shareholder dividend tax relief (e.g., a 10 percentage point shareholder credit for dividends received), whose revenue costs are compensated for by an increase in corporate income taxes, is very likely to increase the taxable shareholder's rate of return on corporate equity investment (or, equivalently, to reduce the cost of equity), to decrease leverage, the corporate financial cost of capital, and the user cost of capital, and to increase real investment. The analysis also shows that the tax-exempt shareholder is very likely to be better off under this tax integration policy than under the current tax system. These results thus suggest that this tax integration policy is, statistically speaking, Pareto improving: the government collects the same amount of taxes, but the typical shareholders (both taxable and tax-exempt) are better off. Hence, from a welfare point of view, this tax integration policy is expected to increase welfare even if the reduction in intersectoral distortions is ignored.

Compared to the tax integration proposals examined in the Treasury Department Re-

port, a trade-off between dividend tax relief and higher corporate income taxes is judged to better meet the challenge put forth in the quote at the beginning of this paper: it is, administratively speaking, more easily implementable, and it tampers less with the distribution of the taxes. On the other hand, it may not be as welfare improving, because, unlike the proposals in the Treasury Department Report, it does not reduce the differential between the effective tax rate on corporate equity income and the effective tax rates on other forms of capital income.

The estimates provided in this paper can be fine tuned in a number of ways. First, the impact of this tax integration policy on investment in nonresidential structures should be examined. Second, the impact of this tax integration policy should be examined in a general equilibrium framework which links, in a theoretically consistent manner, the real and financial decisions of the firm. Third, open economy considerations should be incorporated into the model.

#### ENDNOTES

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- <sup>1</sup> McLure (1979) and, more recently, Gerardi *et al.* (1990) provide extensive reviews of the problems associated with the double taxation of dividends.
- <sup>2</sup> Some forms of partial integration were proposed by the Ford, the Carter, the Reagan, and the Bush administrations.
- <sup>3</sup> Alstott and Mackie (1992) summarize and discuss the Treasury Department Report.
- <sup>4</sup> Under the dividend exclusion proposal, dividends paid out of fully-taxed corporate income would be excluded from shareholders's taxable income. Under the shareholder allocation proposal, a corporation would allocate its taxable income—as reported for regular tax purposes—among its shareholders, corporations would pay tax at the corporate level, and shareholders would include in their income their share of the corporation taxable income and would credit against their tax liability their share of corporate taxes paid. The CBIT proposal essentially extends the divi-

dent exclusion proposal to interest and would apply to both corporate and noncorporate businesses: under the CBIT proposal, taxes would be collected at the entity level at the highest individual statutory rate, deduction for interest or dividend distribution would not be allowed, and interest income and dividend income would be excludable at the investor's level.

- <sup>5</sup> The rationale for not extending dividend tax relief to tax-exempt organizations is that no double tax is paid on the dividend they receive. Ensuring that no tax-exempt shareholders (e.g., pension funds and foreign shareholders) benefit directly from dividend tax relief is a genuine administrative problem that cannot be dealt with at any length in this paper (see McLure (1979) for a careful discussion of the administrative problems associated with integration).
- <sup>6</sup> In this paper, it is assumed that the current tax system's vertical and horizontal equity is acceptable and that the impact of integration on the equity of the current tax system should be, ideally, minimal.
- <sup>7</sup> Besides lump-sum replacement taxes and proportional tax adjustments, several other tax replacement mechanisms have been proposed in the literature to keep tax integration revenue neutral. For example, Ballard *et al.*, (1985) employ the four following replacement schemes in their general equilibrium analyses: Lump-Sum Taxes, Additive Changes to Marginal Income Tax Rates, Multiplicative Changes to Marginal Income Tax Rates, and Multiplicative Changes to Consumer Sales Tax Rates. The welfare estimates that they obtain differ considerably between lump-sum taxes, income taxes, and consumption taxes. All these tax replacement mechanisms involve, however, some tax shifting from the owners of corporate equity to some other economic agents. Another form of tax replacement which is not examined in this paper is a partial disallowance of the interest deduction. This tax replacement mechanism has the drawback that it shifts part of the tax burden from the owners of corporate equity to the owners of corporate debt and makes the latter clearly worse off.
- <sup>8</sup> Two exceptions are the study by Gravelle and Mackie (1992) and the Treasury Department Report. The general equilibrium models in these studies endogenize the firm's financial behavior and, therefore, estimate the welfare gains of tax integration resulting from both the reduction in intersectoral distortions and the reduction in the distortions in the real and financial decisions. On the other hand, the modeling of the financing process in these studies does not appear to be internally consistent (in these studies, the relationship between the cost of equity and the dividend payout rate and, therefore, between the dividend payout rate and the debt to asset ratio is unclear and the elasticity estimates come from different studies).
- <sup>9</sup> The model in Nadeau and Strauss (1991b) is conceptually very similar to the models in Nadeau (1988) and Nadeau and Strauss (1991a). The main differences are that the link between the real and financial decisions is derived from first principles in Nadeau and Strauss (1991b) and

that the estimation of the model is performed on an updated data base.

- <sup>10</sup> Let  $r$  denote the investor's rate of time preference,  $i_t$  denote the riskless rate of interest,  $\tau_i$  denote the tax rate on interest income,  $\zeta$  denote the inflation rate relevant to investors,  $\rho$  denote the shareholder's discount rate, and  $\sigma$  denote a risk premium associated with equity investment. Thus, in this model, it is implicitly assumed that

$$i_t = \frac{r + \zeta}{1 - \tau_i}$$

and that

$$\rho = r + \zeta + \sigma$$

where  $r$ ,  $\zeta$ ,  $\tau_i$ , and  $\sigma$  are exogenous. In a more complete model, it would be assumed that  $r$  varies with the amount borrowed (i.e.,  $r$  is not independent of the level of investment) and that  $\sigma$  is not independent of the firm's financial policy.

- <sup>11</sup> The assumption of a closed economy is the usual assumption made when investigating the impact of taxation on corporate financing and corporate investment in the United States. Toder and Hendershott (1992) discuss, however, how an assumption of open economy can alter the analysis of corporate tax integration. Although no formal model is presented in their paper, their discussion suggests that considering international capital flows can change qualitatively the conclusions about the effects of corporate tax integration. To include open economy considerations into our model would go far beyond the scope of this study.
  - <sup>12</sup> In fact, it can even be argued that each view of dividend taxation characterizes different firms at the same point in time or the same firm at different stages in its life cycle (Sinn, 1990).
  - <sup>13</sup> This measure of the cost of equity is very similar to the form which Poterba and Summers (1985) attribute to the old view of dividend taxation. The only difference is that they assume that the intrinsic value of dividends affects the shareholder's discount rate while we assume, instead, that it affects the value of dividends, i.e.,  $SB(\theta, \tau_D, \tau_p)$ .
  - <sup>14</sup> Nadeau and Strauss (1991b) show that several measures of the user cost of capital encountered in the literature are special cases of equation 5. For example, if there is no uncertainty, no personal income taxes, financial markets are perfect, and the firm finances nonetheless solely by equity (or interest payments are not tax deductible), then  $\rho = i_t$ ,  $\beta\theta^a = 0$ ,  $SB = 1$ ,  $RS = i_t/(1 - \tau_c)$  and  $R = RS$ . Hence, under these conditions, equation 5 simplifies to (omitting the time subscripts)
- $$c = q \left( \frac{\rho + \delta - \dot{\omega}}{1 - \tau_c} \right) (1 - \tau_c D)$$
- which is the familiar Hall-Jorgenson measure of the user cost of capital corrected for inflation (Hall and Jorgenson, 1967).
- <sup>15</sup> The typical investor in the estimated model is taxed at the



effective tax rate. Ideally, however, we would need to know the tax bracket of the marginal investor.

<sup>16</sup> For example, if tax integration reduces corporate taxable income, then a higher tax rate on corporate income is required to keep tax integration revenue neutral than if corporate taxable income is unchanged. Also, if tax integration reduces leverage and the cost of debt, then it reduces the amount of tax collected on interest income unless investment increases significantly. The tax integration policy under study is thus only approximately revenue neutral. Another simplification that may have important consequence is that the positive feedback effect between investment and output is ignored.

<sup>17</sup> The results of simulating the impact of dividend tax reductions greater than 10 percentage points are not reported here, because the larger the tax reduction is, the further the endogenous variables are from their means and the less statistically reliable are the simulations. Note, however, that the proportionality property between the predicted changes in the endogenous variables and  $\Delta\tau_D$  is preserved if  $\Delta\tau_D = -15$  percent. Note also that the maximum reduction in  $\tau_D$  that can be simulated is approximately 20 percent (since the minimum value of  $\tau_D$  observed during the simulation period is about 20 percent).

<sup>18</sup> A breakdown of the average expected impact of this integration policy on tax revenues yields the following: a 25 percent decrease in revenues from dividend income taxes, a 15.6 percent decrease in revenues from capital gains income taxes because of the reduction in retained earnings, and a 2.3 percent increase in revenues from corporate income taxes.

We also note that, under this tax integration scheme, although the debt-asset ratio decreases, revenues from interest income taxes increase by approximately 1.95 percent because investment, which is partially debt-financed, increases substantially.

<sup>19</sup> As in other analyses of tax integration, one group whose welfare is ignored in our analysis is current management. The welfare of these individuals could decrease under the tax integration scheme examined in this paper, because they would be subject to more monitoring. One objective reason for not accounting for the change in the welfare of these individuals is that they are not numerous.

<sup>20</sup> Given equations 1 and 3, the tax-exempt investor's rate of return on corporate equity investment (gross of corporate income taxes) is

$$RS_x = \frac{p_x}{(\beta\theta^x + 1) \cdot (1 - \tau_x)}$$

where  $p_x$  is the discount rate of tax-exempt shareholders. Thus, under the tax integration policy of interest and assuming that  $p_x$  (like  $p$ ) is not affected by this integration policy, the relative change in  $RS_x$  is

$$\frac{(\beta\theta^{x1} + 1) \cdot (1 - \tau_{x1})}{(\beta\theta^x + 1) \cdot (1 - \tau_x)} - 1$$

where  $\theta^{x1}$  and  $\tau_{x1}$  are, respectively, the new dividend payout rate and the new tax rate on corporate income.

<sup>21</sup> Since the model does not look at all kinds of firms and investors (e.g., investors who do not use dividends as signals are ignored), one cannot claim a strict Pareto improvement. On the other hand, based on the statistical properties of the model (e.g., goodness of fit), the role of these marginal firms and marginal investors can be considered, statistically speaking, negligible.

<sup>22</sup> The impact of this tax integration scheme on investment in nonresidential structures would not be, however, as important as on investment in equipment, because an increase in corporate income tax rates does not increase as much the after-tax value of depreciation allowances in the case of structures as in the case of equipment (the tax life of structures being longer than the tax life of equipment).

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## APPENDIX

### Data Estimates

Most of the data used for the empirical analysis in this paper is described and given for the period 1934-1980 in Nadeau (1986) and is available upon request. This Appendix describes only key data and those that differ from Nadeau (1986).

The tax rate  $\tau_D$  is measured as the effective tax rate on dividend income. The tax rate  $\tau_C$  is measured as the effective tax rate on corporate income. The variable  $\tau_D$  is constructed using Auerbach (1983), and the holding period for corporate equities is set equal to 40 years (this figure is proposed in Bailey (1969); it is also used in Gravelle (1989) and Nadeau and Strauss (1991a)). The variable  $\rho$  is set equal to the post-tax rate of return on preferred stocks, and the variable  $i_t$  is measured as the yield on U.S. government long-term bonds. The payout rate  $\theta$  is the ratio of cash dividend to cash flow. The variables  $Q$  and  $I$  are measured, respectively, as Business Gross Product and as Producer's Nonresidential Durable Equipment.