Volume Title: A General Equilibrium Model for Tax Policy Evaluation

Volume Author/Editor: Charles L. Ballard, Don Fullerton, John B. Shoven, and John Whalley

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-03632-4

Volume URL: http://www.nber.org/books/ball85-1

Publication Date: 1985

Chapter Title: Integration of the Corporate and Personal Income Taxes

Chapter Author: Charles L. Ballard, Don Fullerton, John B. Shoven, John Whalley

Chapter URL: http://www.nber.org/chapters/c11220

Chapter pages in book: (p. 153 - 170)

8 Integration of the Corporate and Personal Income Taxes

It has long been recognized that the existence of separate taxes on corporate income and personal income may reduce the efficiency of the allocation of capital. This recognition has given rise to proposals to integrate the two taxes in a variety of ways. This chapter presents estimates of static and dynamic general equilibrium resource allocation effects for four integration plans for the United States. Our results indicate that total integration of personal and corporate taxes would yield an annual *static* efficiency gain of around $4 billion to $8 billion, in 1973 dollars. Partial integration plans yield less of a gain. Our analysis indicates that full integration may yield *dynamic* gains whose present value is at least $300 billion, and could be as large as $695 billion. This is about 1.4 percent of the discounted present value of consumption and leisure in the U.S. economy, after correction for population growth. The plans differ in their distributional effects. Both the distribution and efficiency results depend on the replacement taxes used to preserve government revenues.

8.1 The Taxation of Corporate Income

A corporate tax that operates separately from the personal income tax is widely acknowledged to lead to a number of problems associated with the "double" taxation of corporate income (see McLure 1979). Dividends are paid out of corporate profits net of corporate taxes. Dividends are further taxed under the personal income tax. Retained earnings are also taxed twice, to the extent they are capitalized in higher share values.

This chapter is a revised version of an article by Don Fullerton, A. Thomas King, John B. Shoven, and John Whalley, "Corporate tax integration in the United States: A general equilibrium approach," *American Economic Review* 71 (September 1981): 677–91. Reproduced by permission.

(However, the capital gains resulting from retained earnings are not fully taxed by the personal income tax, and they are taxed on a deferred basis.)

One problem with this double taxation is that it may reduce overall rates of return and affect capital accumulation adversely. A second problem is that the deferral advantage given to retained earnings impairs the efficiency of capital markets. This is sometimes referred to as the "lock-in" effect. Firms can invest retained earnings in projects with a below-market yield, and their shareholders can still earn a higher net-of-tax return than if the funds were distributed as dividends and invested elsewhere.

A third problem is that there is a bias toward debt finance, since only equity returns are subject to corporate taxes. This bias may distort corporate financial policies. A fourth distortion may exist to the extent that firms can choose whether or not to incorporate, as in Ebrill and Hartman (1982).

A final problem is that the corporate tax introduces higher effective tax rates in some industries than others, due to special provisions in the corporate tax law and to the varying degrees to which industries are incorporated. These tax rate differentials further disrupt an efficient allocation of capital. Refer back to figure 2.1, in which a fixed amount of capital is allocated between two sectors such that the net-of-tax rate of return is equalized. Here we can interpret sector X as the corporate sector and sector Y as the noncorporate sector. Without any partial capital taxes, the equalized rate of return (on value of marginal product) is $\bar{r}$ and the capital allocation is K_x^0 and K_y^0. If a tax is imposed on capital in sector X, the new allocation is given by K_x^1 and K_y^1 with the equalized net rate of return being r_n. The tax is the difference between r_g and r_n in sector X. The value of the foregone output in sector X is given by the area $ABK_x^0K_x^1$, whereas the value of the increasing output in sector Y is $EFK_y^1K_y^0$. The difference is the area of the two triangles in area ABCD. This is the efficiency cost or deadweight loss of the differential tax.

As we noted in section 3.2 when we described our modeling of the corporation tax, economists disagree on the importance and even the direction of these biases. Stiglitz (1973), for example, points out that a corporate tax on properly measured income could have a neutral effect on incentives if the marginal investment is entirely financed by debt. For equity finance, Feldstein and Slemrod (1980) point out that the corporate tax system can *shelter* income for a high-bracket stockholder. Especially when personal tax brackets extended up to 70 percent, the owners of corporations could have their total taxes reduced by paying only the corporate rate on retained earnings. Even the extra tax on dividends may not distort investments at the margin, if the market values of shares already reflect the fact that these taxes must be paid eventually when profits are distributed. For elaboration of this argument, see Auerbach (1979b), Bradford (1981), and King (1977). Finally, we note here that the corporate tax may be greatly reduced or eliminated by some depreciation allowances and by interest deductions on the part of the marginal investment financed by debt.

In our model, personal taxes combine with corporate taxes to raise effective tax rates in industries that are highly incorporated, but observed corporate taxes are still reduced by the extent to which each industry makes use of credits, deductions, and allowances. Also, we note that our model considers intertemporal and intersectoral distortions in the allocation of real capital, but does not include endogenous financial decisions or distortions in the choices among debt, retained earnings, or dividend policy.

Integration plans seek to remove or mitigate the adverse effects of the two separate tax systems by linking the personal income tax liabilities of stockholders to the corporate tax liabilities of the firms. In this chapter we consider four corporate tax integration alternatives. The plans differ in the extent to which they remove the undesirable features of the present corporate income tax.

For three of the four plans, we consider two "subplans." In one case the second distinction has to do with whether we index capital gains for inflation. In the other cases the subplans differ from each other according to the way in which we model corporate dividend/retention policies. Finally, we consider the case in which capital tax rates are made equal for all industries. This last case is not being offered as a realistic policy proposal. Rather, we consider it as a basis for comparison.

Thus, while we have four main types of plans for integration of the corporate and personal income taxes, we will present results for seven integration plans and one plan for complete capital tax rate equalization. We will now describe each of the integration plans in turn.

Plan 1: Total Integration. Under this alternative, the corporate income tax is eliminated, and the personal income tax is modified to tax total shareholder earnings, rather than just dividends. When capital gains are realized, the tax basis is set at the original purchase price plus the retained earnings accumulated during the holding period. This feature avoids a double tax on retained earnings capitalized in higher stock prices. However, if the basis is not reset for inflation, capital gains taxes will be assessed on purely nominal appreciation. This amounts to a capital wealth levy. We evaluate this total integration plan with and without inflation indexation of capital gains.

These total integration plans are the most comprehensive we consider. They contain modifications to the income tax which, if they had been made originally, would have dispensed with the need for a separate corporate tax. Industrial distortions through the corporate tax are removed, as is the corporate tax distortion of intertemporal consumption choice.

Plan 2: Dividend Deduction from Corporate Income Tax Base. This approach simply removes the "double" taxation of dividends by making them deductible from taxable corporate income. Capital gains taxation of individuals is unaltered, and the corporate income tax is effectively converted into a tax on retained earnings. Unless differences in retention policies by industry were to disappear, the corporate tax would continue to result in some discrimination among industries. Plan 2 would result in an incentive to pay out more dividends. In section 8.3, we will discuss the dividend/retention behavior of corporations. We will also present a model alternative that will test the sensitivity of our results to changes in corporate financial policies.

Plan 3: Dividend Deduction from Personal Income Tax Base. An alternative way of removing the "double" taxation of dividends is to allow a dividend deduction from the personal income tax rather than from the corporate income tax. Capital gains taxation is again unaltered. As with plan 2, differences in retention policies by industry will perpetuate the industrial discrimination caused by the corporate tax. However, it will also once again be true that corporations will have an incentive to pay out more dividends. As mentioned earlier, we will discuss this in section 8.3.

Plan 4: Dividend Gross-Up. This was the plan most actively discussed in the U.S. tax reform debate during 1977. It only seeks a partial reduction of the double taxation of dividends. The taxable incomes of individual shareholders are "grossed up" by some proportion of the corporate income taxes paid by corporations. Then the shareholders receive a corresponding tax credit. Individuals whose personal tax rates are lower than the corporate tax rate will effectively receive a rebate. Individuals with higher personal tax rates will end up paying additional taxes at the personal level. Because of the partial nature of the credit, none of the distortions listed above will be removed entirely.

8.2 Representing the Tax Integration Plans in Model Equivalent Form

Each of the four tax integration plans described in section 8.1 must be represented in model equivalent form for the purpose of analyzing its general equilibrium effects. Each plan implies a different set of values for the capital tax rates and for f_i, the proportion of capital income from industry i which is taxable at the personal level (see chapter 3).

Plan 1: Total Integration. Under this plan, corporate taxes are eliminated from the numerator of the new capital tax rate calculation. The personal income tax is changed to tax all earnings rather than just dividends. This means that g_{RE}, the fraction of retained earnings taxed at the personal level, is set to one. We calculate new f_i parameters using this new g_{RE}, but with the same capital income weights as before. These changes imply new personal factor taxes and thus new capital tax rates by industry.

Plan 2: Dividend Deduction from Corporate Income Tax Base. This plan's corporate income tax base is the undistributed profits of corporations. It is represented in model equivalent terms for each industry by removing a portion of the corporate tax paid from the 1973 capital taxation figures and recalculating the capital tax rate. The portion of corporate tax removed is given by the ratio of dividends to net-of-tax corporate profits by industry (U.S. Dept. of Commerce, BEA 1976b). (We thus assume no change in corporate financial policy.) The f_i and the personal income tax functions do not change.

Plan 3: Dividend Deduction from Personal Income Tax Base. This plan removes dividends from the income tax system. In model equivalent terms it is specified by considering the effect of dividend deductibility on the income tax functions of households. We set g_D, the proportion of dividends taxable by the personal income tax, to zero, and all f_i are recalculated. Other adjustments are analogous to those made for plan 1.

Plan 4: Dividend Gross-Up. This scheme gives stockholders an income tax credit of 15 percent of the corporate taxes paid by the firms in which they own an interest. It is most satisfactorily modeled as a reduction in the corporate taxes of each industry by the amount of the credit. This amount is then treated as an increase in dividends in the calculation of new f_i values. The new effective tax rates include 85 percent of corporate income taxes and the new personal factor taxes. The higher dividends relative to retained earnings result in higher f_i and $\bar{f}$ values, so that consumers experience an increase in taxable capital income.

8.3 Corporate Financial Policies

Our model does not consider corporate financial policies directly, although we have made some attempts to examine the sensitivity of our findings to alternative assumptions about these policies.

In recent years a number of authors (Stiglitz, 1973, 1976; King, 1974) have viewed the corporate tax as a differential tax on the various financial instruments that are available for transferring capital income from firms to individuals. According to this view, the capital income of corporations can be "paid" to the owners of capital by interest payments, dividends, or retentions (which are assumed to be converted into capital gains). Each of these instruments has tax and nontax advantages and disadvantages that govern its relative use by industry. The firm that uses debt finance can deduct interest from its corporate tax base. This tax advantage is counteracted by the disadvantage that a heavily debt-financed company has a higher probability of bankruptcy and/or takeover. Equity financing cannot avoid corporate taxation. However, equity financing may result in a large reduction in personal taxes if earnings are retained. Dividends may be paid for a variety of reasons, even though they do not have any tax advantage. For a recent study of the reasons for dividends, see Feldstein and Green (1983).

For the purposes of this chapter, the important point is that when the tax laws change, firms can be expected to modify their financial policies. For example, if plan 2 (dividend deduction from the corporate tax) encourages firms to pay out all earnings in dividends, then plan 1 (total integration) and plan 2 are identical in their effects.

We do not have good estimates of the elasticities of financial policies with respect to changes in the tax law. Therefore, we model various extreme behavioral reactions and calculate the effects of the integration plans, given these extreme assumptions. The two assumptions we will use are, first, that corporate policies do not change, and second, that all corporate income is paid in dividends. We cannot claim that we have a "true" general equilibrium treatment of corporate financial policies. This is because we adjust the dividend/retention ratio to estimate model equivalent tax rates *before* we make our general equilibrium calculations. Endogenous financial behavior in general equilibrium models has been explored by a number of authors in recent years (see, for example, Slemrod 1983, Feltenstein 1984, and Galper and Toder 1982).

8.4 The Lock-in Effect

The deferral advantage under the existing personal and corporate tax structure gives a tax preference to retention by existing firms. This is the *lock-in effect.* New firms entering financial markets must borrow at higher interest rates than the required rate of return on retentions of existing firms. Thus, if existing firms are more slowly growing and less efficient, the proper allocation of resources to new firms may not take place.

Our general equilibrium model employs constant returns to scale technology. We do not incorporate an explicit theory of individual firm behavior, and a reallocation of capital among firms within an industry does not affect the industry production function. Therefore, we are unable to model the efficiency aspects of the lock-in effect.

Our analysis of integration of the corporate and personal taxes will consider interindustry and intertemporal distortions. Interindustry distortions enter through differences in rates of tax on capital income by industry. Intertemporal distortions enter through the taxation of saving generally.

8.5 Results

In table 8.1 we present the static efficiency effects of the integration plans. Table 8.2 contains the static distributional effects. In table 8.3 we present our calculations of dynamic effects.[1]

To obtain the static measures of efficiency changes displayed in table 8.1, we first calculate the changes in national income plus leisure, valued at prices before the policy change and after the policy change. We use these Passche and Laspeyres quantity indexes (rather than compensating or equivalent variations) because the consumers may assess the utility contribution of saving inaccurately, due to their myopic expectations. Instead of showing both the Laspeyres and Passche indexes, we merely report the geometric mean of the two.

The main effect of corporate tax integration is that the capital stock is allocated more efficiently among the industrial sectors. To get some idea of the magnitude of these changes, let us focus on eight industries. Four of these (agriculture, petroleum refining, real estate, and government enterprises) have low rates of capital tax under the current law. The other four (chemicals and rubber, metals and machinery, transportation equipment, and motor vehicles) have high capital taxes. The differences are due largely to differences in the degree of incorporation in these industries.

When the corporation income tax is removed, capital in the industries that were previously more heavily taxed becomes a better buy than it was before. Table 8.4 shows how capital gets reallocated among industries. Seven industries end up using less capital in the first equilibrium under corporate tax integration than they had used in the base case. These are agriculture, mining, crude petroleum and gas, petroleum refining, real estate, services, and government enterprises. Some 6.5 percent of the total capital stock is reallocated in the first period under integration from these seven industries to the other twelve industries.

Table 8.4 shows that the outputs of industries that were previously treated more favorably have increases in price as a result of the tax

1. The figures in tables 8.1 and 8.3 are presented in billions of 1973 dollars. It may be useful to give some idea of how large a 1973 dollar was. The Commerce Department's GNP deflator stood at 105.8 in 1973 (with the 1972 value set to 100.0). By 1982 the GNP deflator had risen to 213. Thus, if the structure of the economy were unchanged in the intervening seven years, the welfare gain figures in tables 8.1 and 8.3 would have to be increased by about 100 percent in order to bring them up to 1982 levels. However, we must urge caution in making this kind of extrapolation.

Table 8.1 **Static Welfare Effects: Change in Annual Real Expanded National Income (in billions of 1973 dollars)**

	Tax Replacement			
Plan	Lump-Sum Scaling	Multiplicative Scaling	Additive Scaling	VAT Scaling
Plan 1: Full integration with indexing	9.671	2.192	2.695	4.917
Plan 1: Full integration without indexing	7.855	4.234	4.381	5.291
Plan 2: Dividend deduction from corporate income tax[a]	3.580	0.063	0.230	0.985
Plan 2: Dividend deduction from corporate income tax, with extreme behavior assumption[a]	8.061	4.230	4.388	5.380
Plan 3: Dividend deduction from personal income tax[a]	4.068	2.873	2.928	1.841
Plan 3: Dividend deduction from personal income tax, with extreme behavior assumption[a]	4.539	2.903	2.965	3.390
Plan 4: Dividend gross-up	3.450	2.455	2.486	2.719
Equal capital tax rates on industry[b]		10.912		

Notes: Real expanded national income incorporates the change in the valuation of leisure through induced variations in labor supply. The numbers reported are the geometric means of Paasche and Laspeyres index numbers, for each tax replacement, as described in the text.

[a]The standard simulations for dividend deduction plans 2 and 3 assume that corporate financial policies do not change. In particular, the new f_i parameters are calculated with the old levels of dividends and retained earnings as weights for g_D and g_{RE}. However these dividend deduction plans might encourage greater distribution of corporate profits. The extreme behavior assumption uses the sum of dividends and retained earnings as the weight on g_D, with no weight on g_{RE}.

[b]This result is for complete equalization of capital tax rates by industry. The property tax, corporate franchise tax, corporate income tax, and personal factor tax are included in this equalization. This result is presented for comparison purposes.

change. It is not surprising that these price changes lead to changes in the prices of consumer goods. Two consumer goods have large increases in their relative prices. These are housing and gasoline and other fuels. Among the consumer goods with the largest *decreases* in relative prices are nondurable, nonfood household items, motor vehicles, appliances, and clothing and jewelry.

Because the total capital stock has not changed in just the first period of the revised-case simulation, the social marginal product or gross return to capital changes only slightly. However, overall taxes are reduced as a result of corporate tax integration, so the net return to capital (P_K) rises sharply. Capital also earns a higher net return because it is allocated more

Table 8.2 Percentage Changes in Expanded Real Income after Income Taxes and Transfers by Income Class, for Each Tax Replacement

Income of Consumer Group (1973 dollars)	Equal Capital Tax Rates on Industry[b]	*Plan 1* Full Integration with Indexing (additive scaling)	*Plan 1* Full Integration with Indexing (multi-plicative scaling)	*Plan 2*[a] Dividend Deduction from Corporate Income Tax (multi-plicative scaling)	*Plan 2*[a] With Extreme Behavior (multi-plicative scaling)	*Plan 3*[a] Dividend Deduction from Personal Income Tax (multi-plicative scaling)	*Plan 3*[a] With Extreme Behavior (multi-plicative scaling)	*Plan 4* Dividend Gross-Up (multi-plicative scaling)
0–2,999	1.763	1.935	3.981	2.393	3.632	0.270	0.291	0.897
3,000–3,999	1.329	1.210	2.939	1.767	2.647	0.283	0.311	0.685
4,000–4,999	1.063	0.592	2.045	1.239	1.863	0.258	0.285	0.519
5,000–5,999	1.055	0.624	1.946	1.166	1.789	0.272	0.296	0.504
6,000–6,999	1.118	0.595	1.830	1.061	1.693	0.284	0.317	0.488
7,000–7,999	1.036	0.431	1.468	0.839	1.406	0.269	0.296	0.425
8,000–9,999	0.920	0.244	1.033	0.587	1.070	0.238	0.253	0.344
10,000–11,999	0.961	0.478	0.991	0.523	1.031	0.274	0.294	0.336
12,000–14,999	1.035	0.527	0.888	0.420	0.945	0.283	0.311	0.325
15,000–19,999	0.938	0.741	0.608	0.214	0.686	0.312	0.338	0.266
20,000–24,999	1.012	1.310	0.809	0.223	0.730	0.426	0.486	0.296
25,000+	0.651	6.501	3.970	1.125	1.330	1.992	2.515	0.656

Notes: Expanded real income includes leisure, valued at the household net-of-tax wage rate. Numbers shown are the arithmetic means of percentage changes to income based on Paasche and Laspeyres price indexes.

[a]See footnote a, table 8.1.

[b]See footnote b, table 8.1.

Table 8.3 Dynamic Welfare Effects: Present Value of Equivalent Variations Over Time (in billions of 1973 dollars)

	Tax Replacement			
Plan	Lump-Sum Scaling	Multiplicative Scaling	Additive Scaling	VAT Scaling
Plan 1: Full integration with indexing	695.0 (1.394)	310.6 (0.623)	418.2 (0.839)	559.6 (1.122)
Plan 1: Full integration without indexing	473.5 (0.950)	288.2 (0.578)	339.7 (0.681)	408.6 (0.819)
Plan 2: Dividend deduction from corporate income tax[a]	259.8 (0.521)	57.6 (0.115)	114.5 (0.230)	188.6 (0.378)
Plan 2: Dividend deduction from corporate income tax, with extreme behavior assumption[a]	492.9 (0.989)	295.8 (0.593)	351.0 (0.704)	424.0 (0.850)
Plan 3: Dividend deduction from personal income tax[a]	263.7 (0.529)	208.1 (0.417)	222.4 (0.446)	238.4 (0.478)
Plan 3: Dividend deduction from personal income tax, with extreme behavior assumption[a]	315.7 (0.633)	236.1 (0.475)	256.9 (0.515)	286.8 (0.575)
Plan 4: Dividend gross-up	179.0 (0.359)	128.8 (0.258)	142.3 (0.285)	160.8 (0.323)
Equal capital tax rates on industry[b]		544.8 (1.093)		

Notes: We consider eleven equilibria, five-years apart, in order to project annual consumption values over the fifty intervening years. For consumption beyond year fifty, we have an appropriate treatment of the terminal conditions. The dynamic equivalent variations are analogs of static concepts applied to the consumption sequence over time, assuming the first-period discount factor is unchanged.

The numbers in parentheses represent the gain as a percentage of the present discounted value of welfare (consumption plus leisure) in the base sequence. The value is $49 trillion for all comparisons, and only accounts for a population the size of that in 1973.

[a]See footnote a, table 8.1.

[b]See footnote b, table 8.1.

efficiently. In the base sequence of equilibria, all prices are equal to unity in all periods by our units convention and the assumption that the benchmark equilibrium lies on a steady-state growth path. In the first equilibrium period under full corporate tax integration, the relative price of capital rises to 1.208 (we normalize by setting the price of labor equal to 1.0). However, the price of capital does not stay so high in later periods because more saving occurs under integration than in the base case. In the first equilibrium period, the higher net rate of return to capital leads to a 14.5 percent increase in saving. By the second equilibrium period, which occurs five years after the first period, the relative price of capital

Table 8.4 **Changes Resulting from Full Corporate Tax Integration for Selected Industries, in First Equilibrium Period**

	Capital Tax Rates		Relative-Output Prices (price of labor = 1.0)		Percentage of Total Capital Stock Used by Given Industry	
Industry	Before Integration	After Integration	Before Integration	After Integration	Before Integration	After Integration
Industries currently lightly taxed						
Agriculture	0.54	0.46	1.0	1.059	15.4%	13.5%
Petroleum refining	0.46	0.44	1.0	1.060	4.8	4.5
Real estate	0.63	0.56	1.0	1.084	36.1	32.7
Government enterprises	0.26	0.26	1.0	1.051	4.4	3.8
Industries currently heavily taxed						
Chemicals	1.87	0.60	1.0	0.943	2.0	2.8
Metals and machinery	1.72	0.67	1.0	0.959	5.4	6.9
Industries heavily taxed						
Transport equipment	23.50	4.88	1.0	0.936	0.04	0.10
Motor vehicles	1.29	0.47	1.0	0.941	2.5	3.2

drops to 1.188. In the third period it reaches 1.171, in the fourth 1.151, and so on. By the tenth equilibrium period, the price of capital services stands at 1.111, and it drops to 1.107 by the eleventh and final period. Notice that the decreases in the relative price of capital become smaller over time as the economy approaches a new steady-state growth path asymptotically.

The distributional effects reported in table 8.2 depend upon both the sources side and the uses side of each consumer's budget. As we have indicated, the price of capital rises in the simulated equilibrium. It turns out that low-income consumers tend to spend a large proportion of their income on consumer goods that are produced by lightly taxed, capital-intensive industries such as agriculture and real estate. For example, the poorest group spends 19.7 percent of its net money income on food and 21.8 percent on housing, while the richest group spends 14.6 percent on food and 12.5 percent on housing. Therefore, the uses side of the consumer's budget has some regressive effects on the income distribution, when corporate tax integration occurs.

On the sources side, the distributional impact of any policy change is driven by the fact that the capital/labor ratio of income is bowl-shaped across our twelve consumer groups. That is, the very-low-income groups and the highest-income group have factor endowments that are more heavily weighted by capital. The capital/labor ratios for the incomes of the twelve consumer groups are shown in table 8.5. With corporate tax integration, the various consumers have slightly higher capital/labor ratios, but the overall picture is preserved almost precisely. The higher price of capital leads to U-shaped gains by consumer groups when we

Table 8.5 **Ratio of Capital Income to Labor Income for Twelve Income Classes**

Income Class (1973 dollars)	Capital Income/ Labor Income in Base Case
0–2,999	0.547
3,000–3,999	0.337
4,000–4,999	0.227
5,000–5,999	0.203
6,000–6,999	0.178
7,000–7,999	0.149
8,000–9,999	0.123
10,000–11,999	0.123
12,000–14,999	0.106
15,000–19,999	0.111
20,000–24,999	0.139
25,000+	0.424

simulate corporate tax integration (see the columns under plan 1 in table 8.2).

The U-shaped character of the gains from corporate tax integration is interesting, but it may be more important to bear in mind that *all groups gain*. Thus, we have a Pareto improvement. However, although the simulated equilibrium is a Pareto improvement over the benchmark 1973 equilibrium, we have said nothing about the possible paths between the two. Short-run losses and transition costs should be considered before enacting such a change. Our model is essentially comparative static and does not measure these disequilibria or temporary influences.

We now report further results for each of the integration plans.

Plan 1: Total Integration. This plan only removes part of the industrial discrimination in the taxation of capital income, because property taxes remain as differential capital taxes by industry. Property taxes are particularly important in the agriculture and real estate industries.

Interindustry discrimination is reduced enough to provide a $4 billion annual static welfare gain in each year (table 8.1, in 1973 dollars) for the cases with either multiplicative or additive scaling and inflation indexation of capital gains taxes. Without this correction for inflation, the efficiency gains are slightly less. Table 8.3 shows that dynamic gains are sensitive to the replacement yield–preserving tax considered. With additive scaling a gain of $418 billion occurs, and with multiplicative scaling a gain of $311 billion occurs. To give the reader a better feel for the relative magnitude of these numbers, we should mention that the discounted present value of the future income stream for the population living in 1973 is about $49 trillion under the present tax system. (This figure is also in 1973 dollars.) The sensitivity of these dynamic results to the replacement tax can be explained by the positive correlation between income and the proportion of income saved. Since multiplicative scaling collects more tax revenue from high-income groups, it creates a greater distortion in their intertemporal choices. Less saving occurs, and the new balanced growth path has a lower capital/labor ratio than it would have had with other kinds of replacement.[2]

Before going on, let us give a somewhat fuller indication of the relative magnitude of these gains. As shown in table 8.3, the $311 billion gain resulting from integration with multiplicative scaling is equal to about

2. The reader may wonder exactly how much effect the multiplicative or additive scaling schemes have on marginal income tax rates. The marginal rates in the base case can be found in table 5.8. They range from .01 for the poorest consumer to .41 for the one with the highest income. Under additive replacement, in the first period, all marginal rates are increased by 3.98 percentage points. Thus, the new rate schedule ranges from 5 percent to 45 percent. By the eleventh period, the additive tax scalar is slightly lower, at 2.90 percentage points. Under multiplicative replacement, in the first period, all marginal rates are multiplied by the same factor of 1.163. Under this scheme, the marginal rates on the lowest groups hardly increase, whereas the marginal rate on the top income class rises to over 47 percent.

0.62 percent of the present value of expanded national income (including the value of leisure) after correction for population growth. (See chapter 7 for the details of our dynamic welfare analysis.) It is also equal to about 0.91 percent of the present value of population-corrected national income. These figures may not be striking. However, when we see that the gain is 16.5 percent of the present value of the revenue that the corporate income tax would collect, is appears that the gains are quite substantial.

We do not need to consider changes in financial policies under this plan. With full integration, all forms of corporate capital income are taxed identically. The tax does not depend on whether corporate capital income is paid in interest, paid in dividends, or retained. Therefore, a change in either the debt/equity or dividend/retention ratio will not alter the new effective tax rates or the new f_i for the revised equilibrium calculation. The resulting solution would be the same even if the ratios changed.

Plan 2: Dividend Deduction from Corporate Income Tax Base. Here dividends are treated like interest for tax purposes, and we first assume that corporations continue to retain the same portion of income. The reduction of the corporate income tax base causes some leveling of capital tax rates and results in a small increase in yearly welfare. Dynamic gains under multiplicative scaling of tax rates are $58 billion. Under lump-sum replacement, dynamic gains are $260 billion. The reduced spread of dynamic results is due to the smaller revenue loss associated with plan 2. When the amount of revenue to be replaced is small, the additive or multiplicative replacement schemes do not add as much distortion of intertemporal choice.

Under our "standard" treatment of plan 2, the dividend/retention ratio is assumed constant even though an incentive exists to replace retained earnings with dividends, which are no longer taxed. For this reason we also consider the extreme case where all corporate earnings are distributed. The corporate income tax would thus be effectively eliminated, and f_i calculations would proceed on the assumption that all corporate earnings are multiplied by the higher .96 for g_D, the proportion of dividends that is taxable at the personal level. The static gain for such a tax replacement is around $8 billion per year under lump-sum replacement, $4 billion under additive or multiplicative scaling, and $5 billion under a sales tax replacement. The dynamic gains are comparable to the gains under full integration. These welfare gains are substantially above the gains calculated using the assumption of fixed dividend/retention policies. This is because corporate decision makers have, in effect, reduced the distortion of the corporate income tax with its differing effective capital tax rates. The Plan 2 extreme-behavior case leads to U-shaped gains among consumers, similar to those for the case in which corporate financial policies are assumed to remain unchanged.

Plan 3: Dividend Deduction from Personal Income Tax Base. The reduced tax on dividends again implies lower tax rates on heavily incorporated industries and a leveling of all rates in general. This occurs through the lower f_i for dividend-paying industries. Static welfare gains are about $3 billion per year. With multiplicative scaling, dynamic gains are $208 billion. Under lump-sum replacement the gains here are about $264 billion, which is about the same as under plan 2. The multiplicative results reflect the importance of the deduction from the upwardly scaled income tax. As might be expected, table 8.2 shows that plan 3 has less progressive effects than the second plan, since dividend income is all taxed at the corporate rate instead of at progressive personal tax rates.

Under extreme financial policy behavior, where firms no longer retain earnings, both the static and dynamic gains are somewhat larger. The corporate tax remains the same, but the new f_i include all corporate earnings as dividends with a g_D of zero. Less corporate income is subject to the personal income tax. The difference between results with and without the extreme-behavior assumption is less than for plan 2, because the personal income tax deduction does less to eliminate interindustry discrimination than does the corporate income tax deduction for dividends. The distributional effects for the extreme-behavior case of plan 3 are generally regressive, although the middle groups all have similar relative improvements. This pattern is similar to the pattern for the case in which we assume no change in financial policies.

Plan 4: Dividend Gross-Up. All plans that decrease the corporate income tax only on dividends can be termed partial integration plans. The fourth plan might be called a partial partial plan, because it reduces only part of the tax on dividends. The static welfare gain is $2.5 billion per year when personal tax rates are scaled upward in order to maintain real government expenditure. Dynamic gains under multiplicative scaling are $129 billion, under additive scaling are $142 billion, and under VAT replacement are $161 billion. Here, again, the spread between the dynamic welfare gains is less than that of full integration because this plan involves smaller revenue loss than full integration. Multiplicative scaling makes up most revenue from high-income, high-saving consumers, and it thus reduces future capital stocks and incomes. The dynamic lump-sum and additive cases show that the dividend gross-up does substantially less to improve the interindustry resource allocation than other plans.

As a basis for comparison we will now report the effects of complete equalization of capital tax rates by industry. We report these results even though we realize that complete equalization of capital tax rates is not a realistic policy proposal. In this case we eliminate all tax discrimination on capital use among industries, use a single tax rate for all industries, and tax equally all capital income at the personal income tax level. Capital tax rates are set to a common rate, providing government with enough revenue to maintain its real purchases. The f_i parameters are all reset to $\bar{f}$—the overall fraction of capital income that is effectively fully taxed by the personal income tax system. The resulting efficiency gains are larger than those of the four integration plans. These gains represent the maximum possible increase in expanded national income from the elimination of *interindustry* capital tax distortions.

Results in table 8.1 indicate that the efficiency gain from equalizing capital taxes by industry is about $10.9 billion per year in 1973 dollars. Table 8.2 shows that the gain turns out to be distributed in such a way that every group experiences an increase in real income. Thus, this change would be a Pareto improvement. Dynamic gains in this case (table 8.3) are $545 billion, which is about 1.1 percent of the discounted present value of the future U.S. income stream after correction for population growth. It is also about 14.7 percent of the discounted present value of the revenues from all taxes on capital (including corporate taxes and property taxes).

The capital tax equalization removes all interindustry distortions, but it leaves intertemporal distortions because the common capital tax rate is scaled to preserve total tax revenue. Full integration with lump-sum replacement, described above, has larger efficiency gains in table 8.3, because it removes some interindustry distortions *and* some intertemporal distortions.

The last results we will report deal with inflation and inflation indexing. As we explained in chapter 3, our model treats nominal capital gains and real capital gains separately. The effects of indexation of nominal capital gains depend on the rate of inflation. We specify the rate of inflation as an exogenous parameter, and we assume that the same rate of inflation persists throughout each sequence of equilibrium calculations. Our standard case sets the inflation rate at 7 percent. In table 8.6 we present the

Table 8.6 **Sensitivity of Dynamic Welfare Effects Due to Full Integration with Indexing, to the Assumed Rate of Inflation (in billions of 1973 dollars)**

	Type of Scaling to Preserve Equal Yield			
	Lump-Sum	Multiplicative	Additive	VAT
2 percent inflation	475.9	220.6	283.0	377.2
	(0.974)	(0.451)	(0.579)	(0.772)
7 percent inflation	695.0	310.6	418.2	559.6
	(1.394)	(0.623)	(0.839)	(1.122)
12 percent inflation	949.4	430.3	593.5	781.1
	(1.862)	(0.844)	(1.164)	(1.532)

Note: Numbers in parentheses represent the gain as a percentage of the present value of welfare in the base sequence.

Table 8.7 **Sensitivity of Dynamic Welfare Effects Due to Indexing of Nominal Capital Gains, to the Assumed Rate of Inflation (in billions of 1973 dollars)**

	Type of Scaling to Preserve Equal Yield			
	Lump-Sum	Multiplicative	Additive	VAT
2 percent inflation	66.2	29.6	38.0	51.4
	(0.135)	(0.060)	(0.078)	(0.105)
7 percent inflation	254.0	123.0	158.4	205.8
	(0.509)	(0.247)	(0.318)	(0.413)
12 percent inflation	474.5	245.8	314.9	397.5
	(0.931)	(0.482)	(0.618)	(0.780)

Note: Numbers in parentheses represent the gain as a percentage of the present value of welfare in the base sequence.

dynamic welfare gains from full integration with indexing (plan 1), for different levels of the inflation rate. It should not be surprising that the gains are greater when the inflation rate is greater, since a higher inflation rate leads to greater distortionary taxation, which can be removed if we index.

In table 8.7 we show that the economy can derive substantial welfare gains from merely indexing nominal capital gains, without integrating the corporate and personal income taxes. Once again, the gains depend on the method of equal yield replacement and on the rate of inflation.

8.6 Conclusion

In this chapter we have analyzed four plans for corporate and personal income tax integration in the United States.

Total integration of the personal and corporate income taxes is shown to yield static efficiency gains of about $4 billion to $8 billion per year, in 1973 dollars. The present value of the dynamic gains range from $311 billion to $695 billion, depending on the yield-preserving tax. Without indexing, these gains ranged from $288 billion to $474 billion. The dynamic gains results from the other plans are generally lower, although they exceeded $100 billion in every case.

The static distributional effects vary among plans. Full integration with multiplicative scaling leads to a progressive change in the distribution of real income over most of the income range. In addition, every class is better off. Dividend deductibility from the personal income tax has a beneficial effect that is more advantageous to high-income groups. Dividend deductibility from the corporate income tax redistributes from upper-middle-income groups to low-income groups and the highest-income group. The dividend gross-up plan is roughly proportional, with slightly greater gains at the top and bottom of the income scale. We want to emphasize the sensitivity of dynamic gains to the yield-preserving tax. This suggests that the potential gains under integration from removal of intertemporal distortions would be significantly reduced if marginal income tax rates are raised, particularly if the higher-income groups, who are also larger savers, face larger tax rate increases.

We have tried to emphasize that our analyses of dividend deductions from *either* tax are not fully general equilibrium analyses. This is because we cannot estimate the change in corporate financial policies. As a partial remedy for this shortcoming we have analyzed the dividend deduction plans under two assumptions about corporate dividend policies. The first assumption is that these policies do not change. The second is that all corporate income is paid out in dividends. The second assumption leads to greater gains in both the static and dynamic cases and under all three kinds of equal yield replacement. The gains are greater because complete dividend payout implies greater equalization of tax rates on capital.

Finally, we have analyzed the effects of complete equalization of the tax rates on capital for all industries. The resulting gains are the largest that can result from the removal of interindustry distortions. Our results suggest that the gains from such tax rate equalization would be substantial. In the static case we found the gains to be almost $10.9 billion, in 1973 dollars. All consumer groups share in the gains. In the dynamic case, the present value of the gains was in excess of $545 billion.

Among the most interesting of the results in this chapter are the dynamic results, which suggest that there are significant potential gains from corporate tax integration, provided that replacement taxes do not excessively interfere with intertemporal consumption choice. A trade-off appears to occur between achieving progressive or proportional income gains through multiplicative scaling and maximizing the dynamic efficiency gain. Larger intertemporal gains can be secured by keeping the taxes on high-income groups low, because these are the groups that do the most saving.