ASSESSING THE INTERNATIONAL SPILLOVER EFFECTS OF CAPITAL INCOME TAXATION[1]

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I. Introduction

One of the most significant economic developments of the 1980s has been the expansion of international capital flows. Technological advances, removal of exchange controls and financial deregulation have all contributed to this phenomenon. Direct investment has increased as multinational corporations have grown in importance and exploited locational advantages, including those associated with differences in tax regimes.

These developments are likely to continue, and they have important implications for policy. To the degree that capital is internationally mobile, capital tax policies initiated by one nation, through their effects on international capital flows, may have important impacts on incomes and tax revenues in other nations. Such *international spillover effects* make international coordination of tax policies more attractive, even if such coordination requires a relinquishing of some national autonomy on tax matters. The completion of the European internal market is at least partly a response to the pressures for coordination associated with internationally mobile capital. In the European Economic Treaty, EC and EFTA member states have pledged to establish by 1994 an area without internal frontiers in which free movement of goods, services and capital is ensured.

Despite the significance of international spillovers in taxation, there has been very little empirical work in this area. This paper provides an empirical assessment using a dynamic applied general equilibrium model which incorporates international capital movements. Two main experiments are performed. The first considers the spillover impacts of a unilateral re-introduction of specific investment incentives. Such incentives were reduced in most OECD countries by 1990 in response to the 1986 U.S. tax reform. The other experiment considers the spillover impacts from a unilateral cut in personal taxes on capital income. Both types of tax changes are among the policy initiatives currently being contemplated by several OECD countries in order to stimulate economic activity.

The structure of the paper is as follows. Section II provides a conceptual framework for analyzing spillover effects. Section III offers a brief description of the numerical model used to assess these effects. Section IV presents simulation results, while Section V provides an assessment of the sensitivity of the results to changes in key parameters of the model, including those determining the degree of international capital mobility. Section VI summarizes the main findings and offers conclusions.

II. A Framework for Assessing International Fiscal Spillovers

A. Concepts and Issues

Fiscal spillovers are the impacts of one country's tax decisions on other countries. These impacts operate through several channels. First, the fiscal policy changes of a given country influence capital flows. This reallocation of the capital stock has important efficiency implications, and in general it will be accompanied by changes in rates of return, savings rates, and the rate of capital accumulation. These dynamic changes have further efficiency consequences. In addition, by altering the size and allocation of capital stocks, policy changes alter tax bases and the revenues accruing to national governments.[1]

The ultimate impacts on the economic well being of different nations depend on the induced changes in private and public consumption in each country. The overall impacts can be complex and difficult to gauge, as the following example is meant to illustrate. Consider the international spillover effects on a given country resulting from a foreign country's reduction in its corporate income tax. The foreign "tax shock" is likely to lure capital from the home country; this capital outflow tends to reduce the domestic corporate income tax base. On the other hand, the reduction in the foreign corporate tax increases the taxable returns from abroad earned by domestic portfolio investors. Thus, the net effect on domestic tax revenues (*public* consumption) is ambiguous. In this example, the direction of the impact on *private* consumption is clearer. It is likely to be beneficial, thanks to the increased returns earned by domestic investors on the capital flowing towards the country that reduced source-based taxation. When assets located at home and abroad are not perfect substitutes in portfolios, the relative rates of returns offered by the two types of assets can differ. The difference may not become too large, though, so that domestic interest rates are likely to rise. There follows a detrimental domestic growth effect, which may offset some of the positive private consumption spillover.

The purpose of the present paper is to examine the key elements determining the magnitude of spillover effects and to assess the extent to which foreign fiscal shocks have domestic consequences. The model that we employ to perform this investigation distinguishes two regions, the United States and rest of the world (ROW). The policy change is assumed to be introduced by the ROW.

Both economies in our model are large in that each can influence the prices and interest rates of the other country. A given change in capital income taxation affects the allocation of resources across regions and industries, and over time. As indicated above, the channels are capital flows, commodity flows, and tax revenue effects. In the model,

these effects stem from optimizing assumptions applied to domestic and foreign producers and households. In particular, the portfolio decisions of domestic and foreign households derive from utility maximization. Similarly, investment decisions of firms stem from the objective of each firm to maximise its equity value. Households and firms are forward-looking: today's decisions depend not only on current prices and interest rates but also on the prices and interest rates that will occur in the future. A change in tax policy will alter such expectations and lead to a new dynamic equilibrium with a different system of prices and distribution of income.

To assess international spillover effects, two tax shocks imposed unilaterally by the ROW are considered: (1) a reduction in corporate income taxation, and (2) a reduction in the taxation of personal capital income (dividend, interest, and capital gains). The two policies obviously differ in that one concentrates on firm-level income and the other on personal-level income. It is equally important, however, that the corporate tax is primarily source-based, while the personal tax is mainly residence-based. Simulation results will reveal that this difference is very important in explaining differences in spillover effects.

B. Relationship to Other Studies

The complexity of the channels by which private and public consumption effects may be transmitted impose substantial requirements on the type of model needed for a quantification exercise. That may explain the paucity of studies assessing international spillover effects of taxation and, *a fortiori*, capital income taxation.

Masson and Knight (1986) examine fiscal spillovers in the context of investment incentives. Their study shows how a given nation's investment incentives can negatively affect another nation through higher world interest rates, as wealth is reduced in spite of increased claims on assets of the policy-initiating economy. Contrary to the model used here, however, their model rests on empirical aggregate investment and savings equations, which are not derived explicitly from individual intertemporal optimization. Nor does its simple structure fully account for general equilibrium interactions.[2]

In Frenkel, Razin and Symansky's (1990) two-country model, a representative agent in each economy consumes one traded good and leisure. The budget constraint is function of labor, capital accumulation and borrowing. The authors show analytically the effects of tax conversions from an income to a consumption tax system over a two-period horizon. Illustrative parameter values allow them to plot production and consumption paths for longer horizons. Our model differs from Frenkel, Razin and Symansky's work notably in its separation of the saving and investment decisions and its richer tax structure. It allows for

where AC represents capital adjustment costs; f(.) is a Leontief matrix and g(.) and h(.) are CES functions. Firms choose the quantity of labor that maximizes profits, given the composite capital stock. Labor and capital combine to produce a value-added composite, which then combines with intermediate inputs in fixed proportions to generate output. Adjustment costs are treated as internal to the firm: to add capital, currently available resources (labor, existing capital, and intermediate goods) must be devoted to installation. They are a convex function of the rate of investment.

Industry outputs serve both as intermediate inputs and as final goods for purchase by the government. These outputs also combine in fixed proportions to create 17 different consumer goods as well as the new capital goods used in production.[6] Intermediate inputs are composites of foreign- and domestically-supplied intermediate goods. Each type of intermediate input is a CES composite of foreign- and domestically-supplied intermediate goods of that type. To minimize costs, firms alter the mix of domestic and foreign inputs that make up each composite.

b. Producer behavior.

The representative firm in each sector behaves as a price-taker on the markets for its output and inputs. It chooses levels of employment, intermediate inputs, and investment to maximize the equity value of the firm (V). This equity value can be expressed as the discounted value of net payments to shareholders:

$$V_t = \sum_{s=t}^{\infty} \left[\frac{1-\theta}{1-\kappa} DIV_s - VN_s \right] \mu_t(s) \quad (2)$$

$$\mu_t(s) = \prod_{u=t}^{s} \left[1 + \frac{r_u}{1-\kappa} \right]^{-1} \quad (3)$$

where DIV are dividends and VN are share issues. The parameter θ is the marginal personal income tax rate, κ is the effective capital gains tax rate, and r is the risk-adjusted rate of return that the firm must offer to stockholders. Equation (2) derives from the arbitrage condition requiring risk-adjusted rates of return to be equal across financial assets.

2. Foreign industry

The structure of foreign production is identical to that of domestic production, except for aggregation. A single representative foreign firm produces output using inputs of capital, labor, and domestic and foreign intermediate inputs. Input levels as well as levels of investment are chosen to maximize the value of the firm.

C. Consumption and Saving

1. Preferences and budgets

Households are forward-looking and endowed with perfect foresight. In each region, a representative, infinitely-lived household solves a multi-level decision problem, choosing a path of labor, consumption and portfolio holdings. Its preferences are represented by a nested utility function of the following form:

$$U_t = \sum_{s=t}^{\infty} \frac{1}{\zeta (1+\omega)^{s-t}} u_s^{\zeta} \quad (4)$$

$$u_s = u[Z(C_s, E_s), A_s] \quad (5)$$

$$C = C(\bar{c}_{1s}, \bar{c}_{2s}, \ldots, \bar{c}_{ms}) \quad (6)$$

$$\bar{c}_{is} = \bar{c}_i(c_{is}, c_{is}^*) \quad (7)$$

$$A_s = k\left[\alpha_0^{1-\rho} \alpha_{s+1}^{\rho} + (1-\alpha_0)^{1-\rho}(1-\alpha_{s+1})^{\rho}\right]^{\frac{1}{\rho}} \quad (8)$$

In equation (4), ω is the rate of time preference and $1/(1-\zeta)$ is equal to the intertemporal elasticity of substitution. Equation (5) defines annual utility, a Cobb-Douglas composite of full consumption (Z) and portfolio satisfaction (A). Full consumption is a CES

composite of the consumption of goods and services (C) and leisure (E). The consumption of goods and services is a Cobb-Douglas composite of the 17 consumer goods, as shown in equation (6). The consumer goods themselves are CES aggregates of domestic and foreign consumer goods (equation (7)). Equation (8) finally shows that portfolio satisfaction is a CES function of the shares of the portfolio held in domestic assets (α) and foreign assets, $1/(1-\rho)$ being equal to the elasticity of substitution between domestic and foreign assets.

The specification of each household portfolio preference index and its inclusion in the utility function derives from the observation that households exhibit home-country preference: assets from their own country typically make up the bulk of their portfolios, even when rates of return on foreign assets are comparable or higher.

The domestic household's wealth evolves according to:

$$W_{t+1} = [1 + \alpha_t r_{DD,t} + (1-\alpha_t) r_{DF,t}] W_t + w_t(L_t - E_t) - \bar{p}_t C_t - T_t \quad (9)$$

where W is the total financial wealth owned by the household, r_{DD} and r_{DF} are the annual after-tax returns offered to the domestic household on its holdings of domestic and foreign assets respectively, w is the after-tax wage rate, L is the household's total time endowment, $\bar{p}$ is the price index for overall consumption, and T is the sum of lump-sum taxes minus transfers. The aggregate endowment of time is exogenous: it grows at a constant rate, g, which determines the long-run (steady-state) real growth rate of the economy. This growth represents Harrod-neutral technical progress in producing labor or leisure services per unit of actual time. Labor is perfectly mobile across sectors.

Condition (9), together with a transversality condition that imposes a zero lower bound on terminal wealth, determines the household's intertemporal budget constraint:

$$\sum_{s=t}^{\infty} p_{Z,s} Z_s v_t(s) = W_t + \sum_{s=t}^{\infty} [w_s L_s - T_s] v_t(s) \quad (10)$$

$$v_t(s) = \prod_{u=t}^{s} [1 + \alpha_u r_{DD,u} + (1-\alpha_u) r_{DF,u}]^{-1} \quad (11)$$

The term on the left-hand side of equation (10) is the present value of full consumption; p_Z is the composite price of full consumption. The present value of full consumption must not exceed the sum of initial financial wealth and total human wealth, which is the present value of the infinite stream of after-tax earnings minus net lump-sum taxes. Future incomes and expenses are discounted using the factor ν, which reflects the average return to assets held at home and abroad.

2. Optimization

The portfolio trade-off for the household becomes apparent from equations (8) and (11). When $r_{DD} = r_{DF}$, it maximizes utility by optimizing portfolio satisfaction (A), that is by choosing $\alpha = \alpha_0$ in equation (8). When rates of return differ, however, maintaining the same portfolio shares has a cost in terms of a lower overall return than that which could be obtained if the household held more of the asset with the higher return. The household chooses the path of α that balances the rewards of approaching preferred shares against the costs in terms of lower consumption as a result of a lower overall return on the portfolio.

The parameter ρ in the portfolio preference function is related to σ_A, the elasticity of substitution between asset shares ($\rho = 1 - 1/\sigma_A$). When $\sigma_A = 0$, households maintain shares α_0 and $1-\alpha_0$ of domestic and foreign assets, irrespective of differences in rates of return. As σ_A approaches infinity, household behavior approaches the limiting case of perfect substitutability, where the slightest difference in returns leads households to hold only the asset offering the better yield.

Similarly, optimal full consumption involves balancing the marginal utility of consumption and leisure against the "cost" of reduced wealth, i.e. reduced future consumption. The trade-off depends on the discount rate (and thereby on portfolio choices) and on the prices of the consumption baskets. The latter depend on the composition of the baskets. In other words, the household will select, for every year, the mix of consumer goods of domestic and foreign origin that produces the preferred consumption bundle at the lowest cost. It combines, in turn, consumption of goods and services with leisure with the objective of maximizing full consumption at the lowest cost. Finally, it trades full consumption today against full consumption in later periods.[7]

Current consumption depends on total (human and financial) wealth and the expected interest rates. Higher future interest rates diminish wealth and thereby reduce consumption. Savings are the residual of the comparison between current income and intertemporally optimal current consumption. Changes in the relative returns offered by home and foreign assets induce households to raise the portfolio share of the asset whose

relative return has increased. The treatment of the foreign household is the same as that of the domestic household.

Welfare is based on the utility function of the representative household. The welfare effect of a policy change is measured as the Hicks equivalent variation, transformed into a permanent stream of income and expressed as a percentage of GDP. It is measured either for the full horizon after the shock or it is based only on a comparison of utilities between the new steady state and the benchmark.

D. Taxation and Government Behavior

The tax treatment of international capital flows is simplified, although it reflects the main features of actual tax systems.[8] Domestic households are taxed on their world-wide income, which includes income from assets held abroad. No taxes are levied on non-residents' income. Thus, personal income taxation is based on a pure residence principle.[9] On the contrary, corporate income is assumed to be taxed at source. In absence of multinational corporations, firms' taxable income only includes revenues from domestic sales. As corporate taxes are source-based and personal taxes are residence-based in both regions of the model, no cross-border flows of income are subject twice to the same type of tax.[10] Therefore, we need not worry about tax credits, imputations, and the like and enforcement is assumed throughout.[11]

Real government spending (transfers plus purchases) is exogenous and increases at the steady-state growth rate, g. The model is parameterized so that, in the base case, government expenditures exceed revenues in each period by the amount of a deficit that grows at the nominal steady-state growth rate of the economy; the deficit remains constant relative to government debt and to GNP along the base case path. The foreign government performs the same functions and uses the same tax instruments as the domestic government. In policy change simulations, real government spending is the same as in the base case, and the same deficit is maintained through lump-sum adjustments to personal income taxes.[12]

The model incorporates specific elements of the U.S. tax system. The set of capital tax instruments applying to firms and investors includes the corporate income tax, depreciation allowances, investment tax credits, the effective tax on capital gains, property taxes, and the tax on capital income at the individual level. Together, these taxes determine marginal effective total tax rates applying to real investment.[13]

E. Equilibrium Conditions

The model is calibrated to exhibit steady-state growth in the base case (benchmark) equilibrium. Following a policy shock, temporary equilibria (in the sense employed by Grandmont (1977)) with market-clearing are generated in every period. These temporary equilibria form a transition path on which the economy gradually approaches a new long-run, steady-state equilibrium.

The requirements of temporary equilibrium are, for each country in each period: (1) demand for labor equals supply; (2) demand for output from each industry equals supply; (3) total external borrowing by firms equals total saving by residents of the given country plus the net capital inflow; (4) government revenues plus borrowing equal government spending. Equilibrium is established by adjusting the exchange rate, domestic and foreign output prices, domestic and foreign interest rates, and lump-sum domestic and foreign personal taxes.[14]

In the short run, shocks give rise to divergences in marginal products of capital across industries and in average portfolio returns to domestic and foreign residents. Over time, long-run equilibrium is restored as savings and investment decisions equalize marginal products of capital across industries (adjusted for taxes) and bring overall portfolio returns back to equality.

Since households and firms are forward-looking with perfect foresight, solution of the model requires that expectations conform to the actual future values. Using an approach similar to that of Fair and Taylor (1983), the model obtains perfect foresight expectations and the consistent intertemporal equilibrium path.[15]

F. Data and Parameters

The model is benchmarked to the year 1983. Our initial data were drawn from the general equilibrium data set assembled by Scholz (1987). They were complemented with official source data and econometric estimates. Remaining parameters are obtained through a calibration method in which the requirements of utility maximization, cost minimization, balanced growth, and equilibrated current and capital accounts serve as identifying restrictions.

Values for the parameters most closely related to the simulations of this paper are listed in Table 1.

**** insert table 1 ****

The fully parameterized data set generates a base case simulation in which the domestic and foreign economies exhibit balanced growth at rate g, the rate of growth of effective labor services. Policy shocks cause growth rates to differ from g during transition periods but to return asymptotically to that rate in a new steady state.

In the benchmark, the component accounts of the balance of payments are each in equilibrium. No region holds a net foreign asset position. Therefore, no economy can be qualified as capital exporter or importer. Initial cross holdings and flows are not nil, however. The own share of financial wealth of U.S. residents is set at 91 per cent, which implies an own share of 95 per cent for the foreign asset positions of the two economies of unequal size to be balanced.[16]

IV. Simulation Results

To quantify the importance of the main channels by which international spillovers operate, two simulations are performed. In the first policy experiment, effective corporate-level tax rates are lowered in the foreign country by raising depreciation allowances. In the second simulation, the personal tax rate on dividends and interest income in the foreign country is unilaterally lowered by 2.4 percentage points. The rate changes applied here are such as to imply the same budgetary impact to the initiating country. This helps make the policies comparable.

The tax policy changes originate from the foreign economy and produce spillover effects in the United States. In these experiments, the governments of both the U.S. and the foreign economy maintain necessary revenues (exogenous spending less the exogenous deficit) through lump-sum adjustments to household taxes. Results from both experiments are shown in Tables 2 and 3.

**** insert table 2 ****

A. Unilateral Reduction in Foreign Corporate Income Taxation

In this simulation, depreciation allowances are increased: lifetimes are halved and the double-declining balance method is extended to all assets.[17] There is no "grand-fathering", i.e. the new rates of tax depreciation apply also to existing and partially depreciated capital. The only policy reaction of the U.S. government is to adopt lump-sum taxes to restore its budget balance.

1. Aggregate effects on the policy-initiating (foreign) economy

The initial impact of the increase in depreciation allowances is to stimulate real investment in the initiating economy by 2.4 per cent, as the policy lowers the effective cost of capital.[18] Total capital income increases due to greater dividends, but so does the capital invested. The more favorable treatment of depreciation and the increase in investment demands puts upward pressure on the rate of return to capital. But higher returns induce a significant (corporate) savings response, so there is a fairly small increase in the equilibrium rate of return.[19]

On impact, foreign household incomes decline as lump-sum taxes must be levied to make up for the lowered taxation of capital. As a result, foreign households consume and save less. Thus, the increase in investment from the policy change is largely financed from higher retained earnings brought about by the reduced effective tax rates on capital.

In the long run, interest rates return to their benchmark levels. Under steady-state conditions, the households' net rate of return on their wealth is determined by the rate of time preference, the rate of real growth, the rate of inflation, and the intertemporal elasticity of substitution.[20] Since the policy under consideration did not involve a change in personal tax rates, before-tax returns must also be the same as in the benchmark.

Towards the end of the transition period, the rise in GDP made possible by the extra investments also lifts household incomes, allowing them to contribute to the financing of the increased investments. A second effect, emphasized by Bovenberg (1989), induces foreign households to finance their investments: in the absence of perfect substitution between domestic and foreign goods, investment crowds out consumption, directly and indirectly through lower terms of trade. Table 2 shows, however, that increased incomes account for almost all of the rise in domestic savings.

Higher aggregate savings result in a welfare gain for foreign households of 0.9 per cent of GDP at the end of the transition period, against only 0.3 per cent when transition consumption is included: see Table 3. The welfare gain would reach 1 per cent (0.6 per

cent with the transition) if the government did not have to levy higher lump-sum taxes in order to maintain a constant budget deficit.

**** insert table 3 ****

2. International spillovers: effects on capital flows and tax bases

On impact, the reduction in the foreign CIT introduces a differential between returns on capital located in the foreign and U.S. economies. This differential, together with lower savings by foreigners imply a sharp reduction in savings flowing to the United States from the reform-initiating region. U.S. households, on their part, devote a larger share of their overall saving to the foreign region, helping it to finance its extra investments. Although cross flows change by almost 10 percent compared to the benchmark, they do not make for a large U.S. capital account deficit (0.2 per cent of GDP in first years). In later years, foreign households finance their investments themselves as the capital account returns to (near) balance (see graph 1).

Tax competition is often depicted as having potentially negative effects on national budgets because it contributes to the erosion of the tax base.[21] The foreign reduction in corporate taxes might be expected to erode the U.S. tax base (by luring capital abroad) and reduce U.S. government revenues. However, these simulation results reveal the opposite revenue effect. The reason is that the policy change leads to increased incomes earned abroad by U.S. households; since the U.S. taxes personal income on a worldwide or residence basis, the higher income leads to an increase in U.S. tax revenues. The revenue gain is large enough to permit the U.S. to reduce lump-sum taxes by 0.02 percent of GDP (as a yearly average). These results highlight the importance of considering general equilibrium impacts on incomes in gauging the revenue effects of fiscal policy changes in an open economy. The revenue impact to the U.S. is small relative to the impact of the foreign policy change on revenues to the foreign government.

3. Aggregate impact on the U.S. economy

U.S. households seize the opportunity to earn a better return abroad by increasing and exporting their savings. Their financial wealth located abroad increases initially before it finally returns to its initial level. Those extra portfolio investments yield U.S. households a positive, although small net income flow and a temporary increase in their net foreign asset position. That allows them to increase their consumption after an initial decline that made room for the savings flowing abroad. Over all, intertemporal utility increases marginally, by the equivalent of 0.05 per cent of GDP, compared with a gain of 0.3 per cent in the initiating region.

Why do domestic households not gain more from the higher returns earned abroad on their savings? As soon as U.S. households divert their savings abroad and foreigners stop investing in the United States, the U.S. interest rate increases in order to retain enough savings to finance even the reduced investments. As a result, the gap between the domestic and foreign return never widens to a significant extent. This general equilibrium impact -- the higher domestic interest rate -- is detrimental to the economy's growth, offsetting partly what U.S. households earn in larger returns abroad.

B. Unilateral Reduction in Foreign Personal Income Taxation

Having investigated the transmission effects of a reduction in corporate taxation, we now consider the effects of an equivalent policy change on the personal side. In this simulation, the foreign personal income tax rate, restricted to capital income, is lowered so that the impact on the budget of the initiating (foreign) government is equivalent to that of the corporate tax reduction in the previous subsection.[22] A reduction of 2.4 percentage points (from 22.0 per cent to 19.6 per cent) implies the same revenue cost. The results of this simulation are presented in Tables 2 and 3.

1. Aggregate effects on the policy-initiating (foreign) economy

The short-run impact of a 2.4-per-cent reduction of the foreign personal capital income tax rate is to increase the after-tax returns of foreign residents. Had the pre-tax interest rates remained at their pre-shock level, the decline in the income tax would have accounted for an increase in after tax (nominal) returns from 9.0 to 9.3 per cent. In fact, pre-tax returns decline because savings increase (by 3.1 per cent in real terms on impact), so that after-tax returns hardly change. Savings increase both because real consumption declines (by 0.4 per cent) and because real income grows (by 0.3 per cent). Strong home-country preferences imply that a substantial share of the additional foreign saving remains in the foreign economy. The resulting decline in the real before-tax rate of interest has a positive impact on investment, which increases by about 1.6 per cent in the short run and by 2.7 per cent in the long run.

Real GDP of the foreign economy rises as a result of increased investment and exports. At the end of the transition period, a greater stock of capital, more holdings abroad and improved terms of trade (see below) result in a welfare gain for foreign households of 0.9 per cent of GDP, or 0.3 per cent when transition consumption is included in the comparison.

2. International spillovers: effects on capital flows and tax bases

The spillover effects onto the United States caused by the tax initiative abroad operate mainly through (1) changes in savings propensities accompanied by (before-tax) interest rate movements, which affect the regional reallocation of savings; and (2) changes in the real exchange rate, which influence import and export flows.

Some of the increased foreign savings is directed to the United States, lowering U.S. returns. The reduction in pre-tax U.S. interest rates offsets some of the advantage to foreigners associated with the cut in their personal tax rates. The situation for U.S. residents is different, however. Since these residents receive no reduction in their income tax rates, the lower pre-tax returns both at home and abroad translate directly into lower post-tax returns for U.S. savers.[23] Overall, interest income, both from U.S. and foreign assets, falls. Combined with the replacement of foregone tax income by lump-sum taxes, that has the effect of reducing real income of U.S. residents by 0.2 per cent in the short run. On the other hand, the lower interest rate and the momentarily improved terms of trade induce U.S. households to increase their consumption by 0.3 per cent on impact. The result of these two opposed movements is that U.S. household savings fall permanently by 1.9 per cent below the base case level after the policy shock.

The change in relative saving propensities in the two economies has important consequences for the balance of payments (see graph 2). The shifts in the composition of world saving (more saving by foreigners) and in its allocation (increased net flows towards the U.S.) imply an improvement in the U.S. capital account. The surplus of the U.S. capital account must be offset by a deficit in the current account balance. The decline in foreign interest rates, stronger than in the U.S., moves the balance of investment incomes in favor of foreigners. Thus, net interest receipts in the U.S. become substantially negative, although not enough to offset entirely the surplus in the capital account in the short run. As a result, the real exchange rate rises to generate a trade deficit over the transition period.

The persistent net inflow of capital to the U.S. ultimately produces large effects on net income flows between countries. Indeed, there is a dramatic deterioration of the difference between U.S. asset holdings abroad and foreign assets, that is, of the net foreign asset position of the United States. The deficit in the balance of investment incomes comes to exceed the continuing surplus in the capital account, calling for a surplus in the trade balance. Thus, one spillover effect from the foreign-initiated fiscal policy is an initial deterioration of the trade balance, which later switches to an improvement. The terms-of-trade follow an inverse path, deteriorating over time.[24]

The impacts on U.S. government revenues are opposite to those under the first policy. When the foreign economy lowers its capital income tax rate, interest income to U.S. residents declines because they earn smaller returns on reduced wealth. This is reflected in lower tax revenues for the U.S. government. It has to increase other taxes in order to maintain tax revenues. Table 2 shows that, on impact, the revenue loss before lump-sum adjustments amounts to 0.1 per cent of total revenues; in the long run, the revenue loss is 0.3 percent of total revenues. That is almost half the long run revenue impact of the region that lowers its income tax. As a yearly average, these changes represent a negative public consumption effect of 0.1 per cent of real GDP (Table 3).

3. Aggregate impact on the U.S. economy

U.S. households, which face lower rates of return and lower after-tax incomes, reduce their savings substantially after the shock. Nevertheless, the additional inflow of savings from abroad is sufficient to offset the lower domestic savings for almost half of the transition period, so that savings available to U.S. firms and government are higher than in the base case. Investment increases in the short run, allowing ultimately for greater production. But the additional production generates income to foreigners, not to U.S. residents. Increased production is not even sufficient to service the foreign debt, so that U.S. households' consumption must recede.

The private and public consumption loss sum to a full welfare loss for U.S. households of 0.4 per cent of GDP when steady states are compared, 0.1 when the transition is included. In terms of standard equivalent variation measures, this is equivalent to a permanent reduction in household consumption by 0.3 per cent (0.1 per cent with the transition).

In sum, these results reveal very different spillover effects for the two policies. The differences reflect the fact that the corporate tax is source-based, while the personal tax is residence-based. The different bases underlie the contrasting impacts on the allocation of global savings and investment, and give rise to marked differences in the impacts along other dimensions. Indeed, these two policies have opposite impacts not only in terms of balance-of-payments elements (capital account, net foreign asset position, and short-run trade balance) but also in terms of public consumption, private consumption, GDP, and welfare.

C. The Importance of Dynamics

Both policy experiments encourage investment in the foreign economy. This allows foreign households to enjoy more consumption and leisure ultimately, after initial sacrifices. The CIT reduction, which promotes investments in the foreign economy, attracts U.S. savings first, but that incentive vanishes over time as the marginal product of foreign capital declines. Furthermore, foreign households use their growing incomes to finance the larger capital stock themselves. As a result, the CIT reduction does not durably modify net foreign asset positions.

The PIT reduction, which promotes savings by foreign households, gives them a lasting interest in buying U.S. assets. Over time, their share in the total value of U.S. assets increases from 9 per cent to 10.2 per cent, and their capital income from the U.S. (interest, dividends, but also capital gains which do not enter the current account) exceeds its benchmark value by 13 per cent in the new steady state. The U.S. economy is not performing worse at the end of the transition than in the base case, but foreigners are now entitled to a larger share of its product.

V. Sensitivity Analysis

It is important to assess the sensitivity of the simulation results to key parameters. As these hinge on changes in portfolio composition and the responsiveness of savings and investment to policy changes, the sensitivity analysis focuses on the parameters that regulate these changes.[25] Selected results are reported in Table 4.

**** insert table 4 ****

Before looking at the results in detail, some general observations can be made. The magnitude of spillover effects, as measured by the welfare effects in the U.S., is fairly robust to changes in individual parameters. The spillovers from the change in corporate income taxation never exceed those of the change in personal taxation. That is true even though individual channels like the capital account or the real exchange rate may considerably expand or contract with different values of the critical parameters.

The first parameter of interest is the intertemporal elasticity of substitution, as it affects the response of consumption to savings incentives and changes in interest rates. In place of the central value of 0.5, the experiments are repeated with a lower elasticity of 0.4 and a higher elasticity of 1. As expected, consumption response is stronger with a

higher elasticity. That makes little difference for the corporate tax experiment. It makes a difference for the experiment that raises savings incentives in the ROW: foreigners channel more savings towards the U.S., where consumption swings more widely.

The incidence of the experiment that raises investment incentives might depend crucially on the magnitude of adjustment costs. Lower adjustment costs imply more elastic investment functions. Both sets of experiments are repeated with lower (zero) and higher (doubled) adjustment costs.[26] Following the increase in investment incentives, the ROW attracts much more capital on impact with lower adjustment costs. That has no lasting effects, though, so that the overall spillovers are unchanged.

The elasticity of substitution between domestic and foreign assets in portfolios, which equals 4 in the central case, is changed to low and high values of 0.9 and 8 respectively. The results of the CIT experiment are quite robust to that parameter because interest rates never change much. With lower mobility, a somewhat wider gap develops between U.S. and foreign returns, but it has little impact on welfare. In the PIT experiment, reduced substitutability of domestic for foreign assets lowers the impact on the capital account. Foreigners devote a smaller share of their additional savings to new assets located in the United States. Consequently, the capital account surplus is smaller and the real exchange rate appreciation less pronounced. As a result, the welfare loss in the United States is half that which is obtained when capital is highly mobile across countries.

The degree of international capital market integration is measured by the shares of financial wealth in each economy owned by residents of the other economy. In the central case, this share is 9 per cent for U.S. wealth. Here we lower it to 4 per cent and raise it to 14 per cent. That hardly changes the results of the CIT reduction, except maybe for greater imbalances in international transactions in the short run when markets are more integrated. Still, the exchange rate effects never even come close to those of the PIT experiment. The degree of international capital market integration is more relevant for the PIT experiment, particularly in the long run. If initial cross holdings are higher by five percentage points, the negative welfare effects for the U.S. are almost doubled. As shown in Table 4, the path of the real exchange rate is even more tilted than in the central case because the flow of savings from the policy initiating region to the passive region is greater. Rates of return decline somewhat more for U.S. households. Under both effects, they increase their consumption after the reform substantially more than in the base case, a typical Laursen-Metzler (1950) effect. That induces the impoverishment of the residents of the passive region.

The last model parameter of specific interest is the relative size of the policy-initiating economy compared to the other one (and hence to the world). In the central case,

it is assumed that the real stocks, and consequently most flows, of the foreign economy are 1.75 times the size of the corresponding U.S. values. Table 4 reports results for the two experiments when that multiple is 0.5 and 3.5 respectively. When the foreign economy is smaller, the flow of foreign savings to the U.S. is less after the reduction in the PIT. U.S. households increase their consumption less in the early years. That is not offset by a smaller decline in consumption in the later years, so that the negative overall private consumption spillover is larger when the foreign economy is smaller.

VI. Conclusions

This paper has explored the spillover effects of two policies in which a foreign government reduces capital income taxation. Each of the policies yields efficiency gains in a world characterized by existing distortionary taxes on capital income.[27] This outcome prevails even though the unilateral changes in personal and corporate taxation considered represent a move away from initial capital import and export neutrality.

Although the two policies yield similar welfare improvements for the initiating foreign region, they produce very different welfare effects for the passive region (the U.S. economy). The corporate tax reduction, although a source-based tax, creates marginal benefits for the United States, while the personal tax reduction imposes sizable losses. In other respects, too, the results show very different short-and long-run impacts for the two investment enhancing policies, particularly with respect to the passive region. The changes in the source- and residence-based taxes generate opposite effects in terms of exchange rates, the capital account, and net foreign asset positions.

The explanation for the different impacts on the U.S. welfare lies in the nature of the tax policy itself: investment- versus savings-promoting. The reduction in corporate income taxation influences mainly investment decisions in the ROW. That raises world-wide interest rates and attracts U.S. savings. The policy has no lasting effects for the United States, though, because the ROW soon dispenses with funds from abroad and finances its growth itself. In contrast, the personal tax policy has a direct impact on foreign savings. Increased foreign savings flow to the United States, causing a sharp deterioration in the U.S. net foreign asset position.

The spillovers of the change in the personal income tax are quite sizable. The magnitude of the policy shock can be measured by full revenue loss for ROW: it is equivalent, in present value, to 0.3 per cent of benchmark GDP every year. This shock imposes a welfare loss on the United States of 0.1 per cent of GDP. Spillovers, whether

measured by the welfare effect or by the balance of payments, are much larger for the personal than for the corporate income tax.[28] The reasons are now clear. While the initial impact of the reduction in the source-based CIT is to attract U.S. savings to the foreign economy, induced growth in that region ultimately leads to a reversion of capital flows. The impact on capital accumulation is concentrated in the foreign economy. In contrast, the reduction in the residence-based PIT strongly encourages saving in the foreign economy, of which much flows to the United States. The impact on capital accumulation is spread among the two regions, but that does not benefit U.S. residents. The fruits of the additional investments are reaped by the foreign investors.[29]

Thus, contrary to the result of partial equilibrium analysis, the change in the residence-based tax induces more international capital flows than the change in the source-based tax. The income effects generated by the former dominate the substitution effects (portfolio) initiated by the latter in terms of influencing the flow of funds. Arbitrage corrects differentials between rates of return fairly swiftly.

As expected, those spillover effects are magnified with a higher intertemporal elasticity of substitution, lower adjustment costs, greater international capital mobility and with more extended cross-ownership of assets. None of those parameters alters the results substantially by itself, though. The simulation results illustrate rather well that personal and corporate income taxation yield very different conclusions in terms of macroeconomic consequences for passive regions and that it is important to distinguish between near-term and long-run policy implications of the two types of capital income tax policies.

NOTES

1. See Mintz (1992) for a thorough analysis of these effects.

2. While no attention is devoted to international fiscal spillovers, Bovenberg's (1989) open-economy dynamic model represents an interesting policy experiment where a source-based corporate income tax is lowered in one country, with the revenue losses replaced by increasing residence-based lump-sum taxes. Bovenberg (1993) adds distributional effects to the model, between overlapping generations and between domestic and foreign owners of the domestic capital stock. Analytical results are derived of the incidence of source-based tax changes on welfare and trade in the initiating economy and provides orders of magnitude, with parameters chosen to represent the U.S. economy. The paper by Nielsen and Sørensen (1991) is in the same vein, with adjustment costs to capital accumulation but without international distribution effects.

3. They conclude that the introduction of an investment tax credit would yield a larger welfare gain to the United States than a reduction in the corporate income tax of equal revenue cost. The ITC is more effective at promoting investment for the same budgetary costs as, by imposing a windfall loss on existing capital, it amounts to an implicit wealth tax, also borne by foreign owners of domestic capital stock.

4. In the same vein, Goulder (1990) assesses the implications of the introduction of U.S. withholding taxes on foreigners' interest income using a similar model to the one presented in the present paper. The results from a unilateral imposition of the withholding tax by the U.S. suggest a welfare loss to foreigners of 0.1 per cent of total wealth, compared with a welfare gain to U.S residents of 0.3 per cent. Goulder and Eichengreen (1989a) use the same model to assess the consequences for exports and imports of domestic policies designed to promote investments or savings. It is found that international capital mobility introduces a difference between the two types of policies which relates to capital account effects. Lowering corporate income taxation hurts U.S. export industries in the short run but helps them in the long run. The reverse is true for a reduction of personal income taxation.

5. See for example Abel (1979) and Summers (1981b).

6. There are four types of capital goods: structures and equipments for non-residential and residential use. They are produced with specific combinations of sectoral contributions.

7. The solution to the household's decision problem is shown with more detail in Goulder and Eichengreen (1989a).

8. For an analysis of the U.S. taxation of international transactions, see Ault and Bradford (1990).

9. Capital gains are taxed at a constant fraction of the income tax rate. If one region systematically paid a greater share of returns in the form of capital gains, that could invalidate the pure residence principle: see Bovenberg et al. (1990, p.296) and the

references therein. That effect is negligible here because the underlying inflation rates are calibrated to be equal in the two regions.

10. For the incidence of withholding taxes in the present model, see Goulder (1990).

11. For a review and analysis of the problems faced by capital income taxation in the absence of full enforcement, see Gordon (1990).

12. This facilitates welfare evaluations, since household utility functions do not incorporate welfare derived from government-provided goods and services. The public consumption effect of policy changes measures the impact on household utility of the changes in lump-sum taxes needed to maintain public consumption. It is evaluated as the present value of replacement taxes, with an opposite sign, and is comparable in definition to the equivalent variation measure of the full welfare effect.

13. The U.S. tax system before and after the 1986 Tax Reform is described and effective tax rates are calculated in Goulder and Thalmann (1993).

14. The number of equilibrating "prices" is one less than the number of equilibrium conditions, as one of the equilibrium conditions is redundant form Walras's Law. Both domestic and foreign nominal wages are fixed in their respective currencies. The exchange rate variable permits the relative prices of domestic and foreign labor to vary. It may be noted that the balance of payments equilibrium does not require an additional equilibrium condition: Walras's Law assures that this equilibrium is established when the other markets clear.

15. For details, see Goulder and Eichengreen (1989b).

16. French and Poterba (1991) estimate that U.S. residents own 92.2 per cent of the U.S. stock market in 1989.

17. The effect of these changes is to increase the present value of (pre-tax) depreciation allowances on a dollar of investments from 38 cents to 62 cents for structures, and from 76 cents to 82 cents for equipments. Depreciation allowances have been preferred to the statutory corporate income tax rate as the tax instrument used in this simulation. This is because, as shown by Summers (1981a), a reduction of the statutory corporate rate has an ambiguous effect in an intertemporal context as the corporate tax cut reduces the value of depreciation deductions. Although the tax cut provides a windfall to firms, it does not necessarily make investment in new capital attractive.

18. The effective tax rate (ETR) on foreign investments (combining structures and equipments) declines from 24.2 per cent to 21.8 per cent.

19. It is only immediately after the policy shock that investors enjoy an extraordinary return on assets located in the initiating economy. That abnormal return originates in the windfall on equity when depreciation allowances are increased for all capital, including capital already partly depreciated.

20. That condition ensures that households choose to allocate their consumption over time in a fashion that is compatible with steady-state growth.

21. A number of authors favor the base-eroding effects of tax competition as this limits the size of the public sector. See, for instance, Salin (1990).

22. This is achieved when the discounted government revenue loss over the whole transition period is equivalent between two simulations.

23. Equity values in the foreign economy increase on impact by 1.2 per cent when corporate income taxation is reduced and by 3.2 per cent when personal income taxation is lowered. U.S. households participate in those windfall gains in proportion of their share in the foreign stock. Such windfall gains play a major role in Bovenberg and Goulder's (1993) experiments which compare two types of corporate tax cuts. In the present experiments, they are dwarfed by more durable changes in returns and terms of trade.

24. The deterioration in the terms of trade is partly due to the downward sloping demand curve facing U.S. exporters in the absence of perfect substitutability of their goods with those of the rest of the world, as in Burgess (1988).

25. In a previous application (Delorme, Goulder and Thalmann, 1993) we examined the sensitivity of model results to values of other parameters, including trade elasticities, elasticities of substitution between goods and leisure, and elasticities of substitution between structures and equipment.

26. Adjustment costs per unit of investment take the form $\frac{1}{2}\beta(I/K-\alpha)/(I/K)$ for $I/K>\alpha$, and zero otherwise. The central value of β is 20 for structures and 10 for equipments. In the sensitivity analysis, β is set to zero in one case and doubled in the other case.

27. In this model of infinitely-lived households, the economy is intertemporally efficient in the absence of taxation. Since the effective tax rate on marginal investment is positive, the social benefits associated with a marginal investment exceed the social costs: see Goulder and Thalmann (1993). Replacing capital income taxes by lump-sum taxes encourages investment, generating a welfare gain.

28. Could it still be argued that the CIT experiment, which causes less spillover, is a smaller shock? Since the to tax changes are designed to lower the cost of capital, it is natural to compare their effects on effective tax rates. The average foreign ETR decreases from 24.19 per cent in the benchmark to 22.25 per cent after the PIT shock, and to 21.75 per cent after the CIT shock. Thus, the CIT change seems actually to be the greater tax cut.

29. That scenario resembles, of course, the U.S. experience since 1983: large inflows of foreign credit were used not to increase the capital stock but to compensate for lower domestic private and public saving (see Friedman, 1986).

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Table 1
MAIN MODEL PARAMETERS[1]

Intertemporal elasticity of substitution [$1/(1-\zeta)$]	0.5
Rate of time preference [ω]	0.007
Elasticity of substitution between domestic and foreign consumer goods[2]	2.0/4.0
Elasticity of substitution between domestic and foreign assets [$1/(1-\rho)$]	4
Elasticity of substitution between domestic and foreign intermediate goods[2]	0.07
Elasticity of substitution between domestic and foreign investment goods	0
Adjustment cost parameters[3] [a] [b]	0.05 17.5
Initial share of domestic assets in portfolios (α_0)	0.91/0.95
Initial share of financial wealth owned by residents	0.91/0.95
Marginal personal income tax rate [θ]	0.22
Effective capital gains tax rate [κ]	0.07
Corporate income tax rate	0.37/0.30
Present value of depreciation allowances[4]	0.60
Relative size of foreign economy to U.S. economy	1.75

(1) These are the parameters for the United States economy. Those of the foreign economy are generally the same, except when two values are indicated.
(2) Differs across goods, so the table reports a weighted average value.
(3) Adjustment cost per unit of investment are $\frac{1}{2}b(x-a)^2/x$, where x is the rate of investment. The adjustment cost parameters differ for structures and equipments and across industries. The coefficients in the table are weighted averages.
(4) Weighted average of structures and equipments.

Table 2
IMPACT OF LOWERING FOREIGN CORPORATE AND PERSONAL INCOME TAXES WITH INTERNATIONAL CAPITAL MOBILITY

	Corporate income tax reduction[1]				Personal income tax reduction[2]			
	United States		Foreign economy		United States		Foreign economy	
	Short run	Long run	Short run	Long run	Short run	Long run	Short run	Long run
Real consumption	-0.05	0.03	-0.39	1.26	0.26	-0.38	-0.44	1.14
Real income	0.11	0.01	-1.20	1.31	-0.16	-0.77	0.26	1.89
Real household saving	0.74	-0.09	-4.31	1.53	-1.81	-2.26	2.97	4.80
Employment	0.04	0.00	0.40	-0.04	-0.21	0.29	0.41	-0.16
Real GDP	0.02	0.04	0.23	1.55	-0.09	0.13	0.14	1.25
Real investment	-0.09	0.01	2.40	3.32	0.21	0.00	1.63	2.72
Real interest rate (Δ%)[3]	0.03	0.00	0.12	0.00	-0.06	0.03	-0.19	-0.34
U.S. residents net rate of return on assets in: (Δ%)	0.02	0.00	0.04	0.00	-0.04	0.02	0.00	-0.23
Foreigners' rate of return on assets in: (Δ%)	0.01	0.00	0.03	0.00	0.01	0.24	0.05	-0.01
U.S. residents' wealth located in:	0.00	-0.11	0.69	-0.11	0.05	-1.52	-0.53	-8.63
Foreign residents' wealth located in:	-0.80	0.71	-0.12	0.71	2.43	12.59	1.72	3.65
Own share of financial wealth (Δ%)[4]	0.06	-0.11	-0.04	0.07	-0.12	-1.27	0.07	0.64
Net foreign asset position (%GDP)	0.41	0.01	-	-	-0.93	-5.76	-	-
Capital account (%GDP)[5]	-0.18	-0.03	-	-	0.38	0.24	-	-
Investment income balance (%GDP)	0.10	0.02	-	-	-0.07	-0.62	-	-
Trade balance (%GDP)	0.08	0.01	-	-	-0.31	0.38	-	-
Real exchange rate (Δ%)	-0.09	0.26	-	-	0.70	-0.52	-	-
Equal yield taxes required[6]	-0.05	-0.03	3.58	0.24	0.09	0.29	1.33	0.67

(1) The corporate income tax reduction consists of a halving of depreciation lifetimes and an extension of the DDB rule to all assets in the foreign economy. The figures in the table are deviations from the base case path in per cent, except when noted otherwise. The symbol Δ% signifies that the deviation is measured in percentage points.

(2) The personal income tax experiment simulates the impacts of a reduction of 2.4 percentage points of the foreign personal tax rate on capital income. The reduction is set such the intertemporal revenue loss for the foreign government is the same (*ex post*) as that of the CIT reduction.

(3) Real rate of interest paid on government bonds, before personal taxes. It serves as the reference for arbitrage between debt and equity.

(4) Proportion of total financial wealth (equity and debt) that is owned by the residents of that region. The initial values are: 91 percent for the Unites States and 95 per cent for the rest of the world.

(5) In the base case, all the sub-balances of the balance of payments are in equilibrium.

(6) As a percentage of total tax revenue.

Table 3
EFFICIENCY EFFECTS OF LOWERING FOREIGN CORPORATE AND PERSONAL INCOME TAXES

	Corporate income tax reduction				Personal income tax reduction			
	United States		Foreign economy		United States		Foreign economy	
	Overall	Steady state	Overall	Steady state	Overall	Steady state	Overall	Steady state
Welfare effect (%GDP)[1]	0.05	0.02	0.27	0.89	-0.12	-0.42	0.29	0.87
Private consumption effect	0.03	0.01	0.62	0.98	-0.05	-0.31	0.63	1.11
Public consumption effect	0.02	0.01	-0.35	-0.09	-0.07	-0.11	-0.34	-0.24
Welfare effect (%consumption)[2]	0.04	0.02	0.21	0.67	-0.09	-0.31	0.21	0.65

(1) The welfare effect, also defined as a change in real income, is measured as the Hicks equivalent variation, transformed into a permanent stream of income and expressed as a percentage of GDP. It is measured either for the full horizon after the shock (in the "short-run" column) or it is based only on a comparison of utilities between the new steady state and the benchmark (in the "long-run" column).

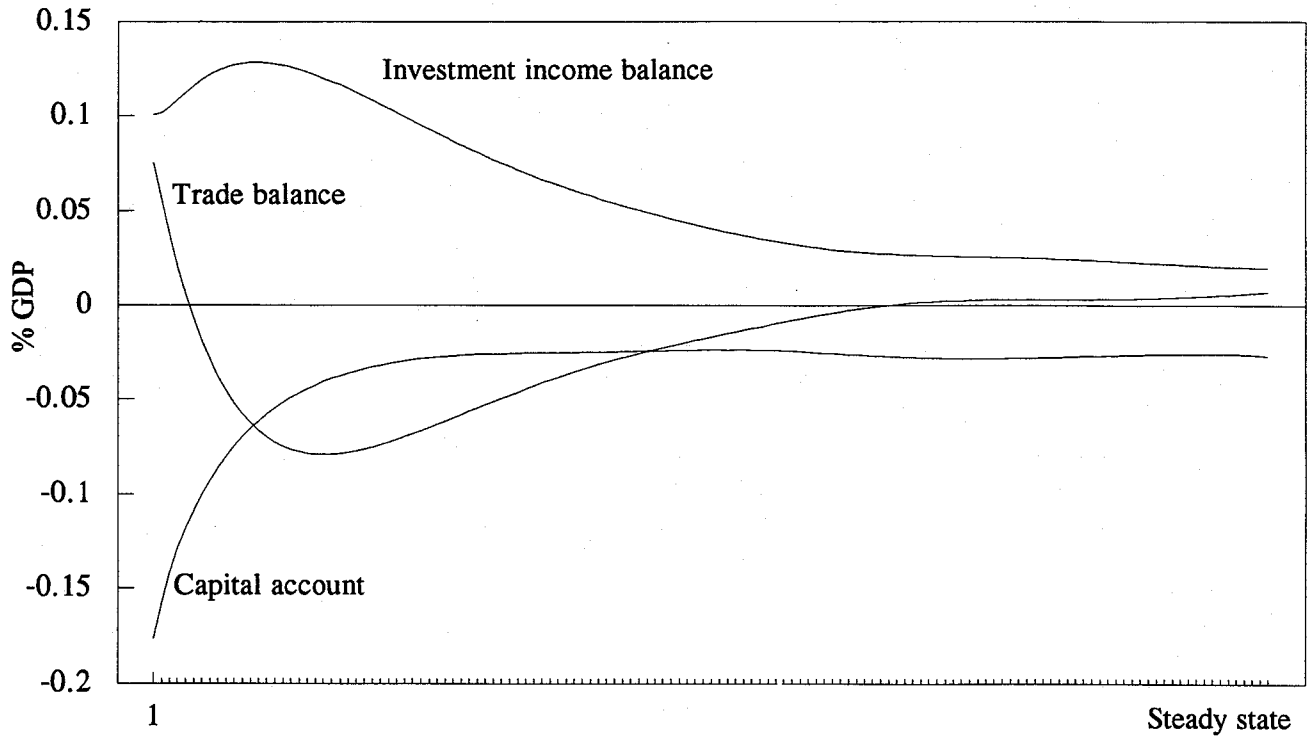
(2) Equivalent variation, expressed as a proportion change in total initial wealth. It is equivalent to the percentage increase in the benchmark stream of consumption that yields the same utility gain as the stream of consumption resulting from the reform.

Table 4
SENSITIVITY ANALYSIS: IMPACT ON U.S. AND FOREIGN ECONOMY OF LOWERING CAPITAL TAXES ABROAD

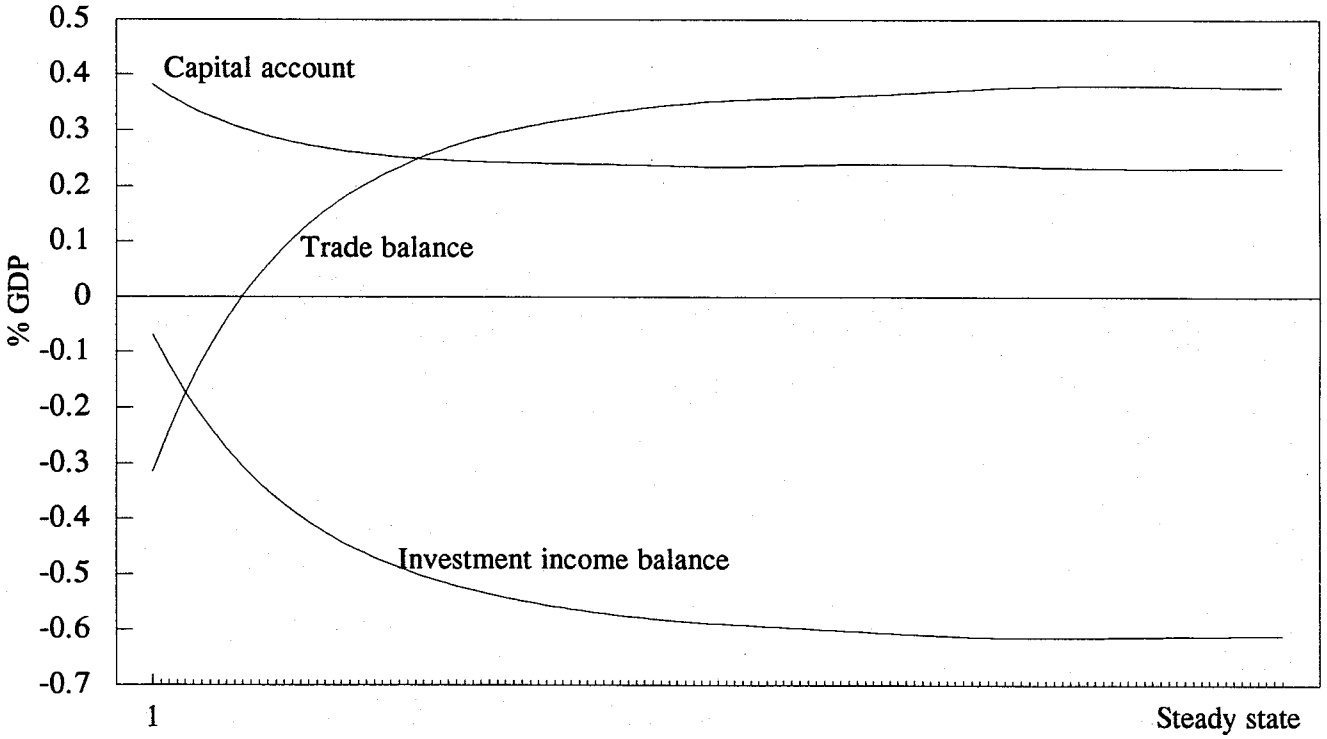
	U.S. welfare effect (transition included)		Real household saving (short run)		Real household consumption (short run)		Real interest rate (Δ%) (short run)		Capital account (%GDP)		Real exchange rate (Δ%)	
	Private	Public	U.S.	Foreign	U.S.	Foreign	U.S.	Foreign	Short-run	Long-run	Short-run	Long-run
CORPORATE INCOME TAX[1]												
Central case	0.03	0.02	0.74	-4.31	-0.05	-0.39	0.03	0.12	-0.18	-0.03	-0.09	0.26
Intertemporal elasticity of substitution[2]												
Low	0.03	0.02	0.75	-4.43	-0.05	-0.33	0.04	0.13	-0.19	-0.03	-0.09	0.24
High	0.03	0.01	0.70	-3.79	-0.06	-0.58	0.02	0.09	-0.16	-0.03	-0.12	0.29
Adjustment costs[3]												
Low	0.03	0.02	1.35	-2.12	-0.17	-0.78	0.06	0.49	-0.56	-0.04	-0.51	0.32
High	0.03	0.02	0.48	-4.20	-0.02	-0.31	0.01	0.08	-0.12	-0.02	-0.01	0.21
International capital mobility[4]												
Low	0.03	0.02	0.41	-4.18	-0.01	-0.41	0.02	0.13	-0.12	-0.03	0.02	0.26
High	0.03	0.03	0.93	-4.46	-0.08	-0.38	0.04	0.11	-0.22	-0.03	-0.16	0.26
Cross holdings[5]												
Low	0.02	0.01	0.54	-4.24	-0.04	-0.40	0.03	0.12	-0.10	-0.01	-0.05	0.27
High	0.03	0.03	0.86	-4.41	-0.06	-0.39	0.03	0.12	-0.24	-0.04	-0.11	0.24
Size of foreign economy[6]												
Small	0.03	0.02	0.69	-1.51	-0.05	-0.11	0.03	0.09	-0.12	-0.04	-0.06	0.31
Large	0.04	0.02	0.96	-8.34	-0.06	-0.79	0.03	0.13	-0.25	-0.01	-0.16	0.22
PERSONAL INCOME TAX[7]												
Central case	-0.05	-0.07	-1.81	2.97	0.26	-0.44	-0.06	-0.19	0.38	0.24	0.70	-0.52
Intertemporal elasticity of substitution												
Low	-0.03	-0.06	-1.52	2.48	0.22	-0.35	-0.07	-0.19	0.33	0.19	0.58	-0.60
High	-0.09	-0.13	-2.93	5.35	0.45	-0.75	-0.05	-0.19	0.58	0.44	1.23	-0.32
Adjustment costs												
Low	-0.06	-0.08	-1.30	3.65	0.17	-0.72	-0.03	-0.07	0.28	0.32	0.55	-0.52
High	-0.04	-0.07	-2.18	3.45	0.31	-0.42	-0.08	-0.21	0.45	0.22	0.82	-0.63
International capital mobility												
Low	-0.04	-0.04	-1.44	2.77	0.18	-0.39	-0.06	-0.17	0.27	0.08	0.48	-0.15
High	-0.06	-0.11	-2.56	3.59	0.37	-0.53	-0.07	-0.20	0.53	0.47	0.98	-1.08
Cross holdings												
Low	-0.01	-0.02	-1.19	2.51	0.15	-0.35	-0.05	-0.17	0.22	0.08	0.43	-0.07
High	-0.09	-0.13	-2.48	3.57	0.36	-0.53	-0.07	-0.20	0.55	0.48	0.95	-1.22
Size of foreign economy												
Small	-0.06	-0.05	-2.05	1.61	0.25	-0.26	-0.10	-0.12	0.37	0.17	0.62	-0.48
Large	-0.05	-0.10	-1.79	5.02	0.30	-0.72	-0.04	-0.19	0.42	0.37	0.96	-0.71

(1) The corporate income tax change is the same as in Table 2. The data series reported in this table are defined as in Table 2.
(2) The intertemporal elasticity of substitution takes values of 0.4 (low), 0.5 (central) and 1 (high).
(3) Adjustement costs are set to zero in the "low" case and doubled in the "high" case.
(4) The international mobility of capital is characterised by the elasticity of substitution between domestic and foreign assets. This elasticity equals 0.9 and 8 in the low and high mobility scenarii, against 4 in the central case.
(5) The proportion of total financial wealth in the United States that is owned by U.S. residents equals 0.96 and 0.86 in the low and high cross holdings scenarii, compared to 0.91 in the central case. The corresponding values for the larger foreign economy (which are set so as to yield equal cross holdings in the benchmark) are 0.98 and 0.92, which bracket the central value of 0.95.
(6) Real stocks of the foreign economy are calibrated as a multiple of the corresponding U.S. stocks. This multiple equals 0.5 and 3.5 in the scenarii with small and large policy-initiating economies, against 1.75 in the central case.
(7) The change in the personal tax is adapted so as to yield the same impact on the present value of tax revenues as the CIT change under the specific parameter configuration.

Graph 1: Effects of foreign CIT reduction
on the U.S. balance of payments



Graph 2: Effects of foreign PIT reduction
on the U.S balance of payments



Graph 3: Effects of CIT and PIT reduction
on U.S. full consumption