In Canadian-American Economic Relations: Conflict and Cooperation on a Continental Scale, edited by David McKee. New York: Praeger, 1988, pp. 121-51.

9

The Impacts of Tax and Tariff Reform on U.S. Direct Investment in Canadian Manufacturing

Lorraine Eden

INTRODUCTION

In the Canadian manufacturing sector in 1981, U.S.-controlled enterprises generated 38.2 percent of shipments (i.e. $83.5 billion), 34.2 percent of value added ($26.8 billion) and 36.9 percent of investment ($4.7 billion). Foreign-controlled (mainly U.S.) firms owned 44.9 percent of the assets ($167.9 billion) and generated 76.2 percent of the imports of this sector. Since the largest U.S.-controlled manufacturing firms bought more than 70 percent of their imports from, and sold over 76 percent of their exports to parents and affiliates, probably 60 percent of traded goods and services in the Canadian manufacturing sector could be classified as intrafirm, moving between countries at transfer prices set within multinational corporations.[1]

Given the close links between the U.S. and Canadian manufacturing sectors, it is not surprising that the current changes in U.S. and Canadian corporate income tax and tariff rules should be causing much uncertainty and controversy on both sides of the border. Tariff rates have been falling in response to the Tokyo Round; by 1988 close to 90 percent of U.S. exports will enter Canada with levies of less than 5 percent (Lush, 1987). A new GATT round is now underway in Uruguay. Declining tariffs, if not offset by increasing nontariff barriers to trade imposed by a protectionist U.S. Congress, are expected to bring Canadian and U.S. commodity and factor prices more closely in line and stimulate trade and output in both countries. In addition, the two countries are currently engaged in talks to create a bilateral free trade area where tariffs would be eliminated, nontariff barriers severely constrained, and investment flows liberalized. If this happens, trade flows between the two countries could be further enhanced with some trade diversion against third countries. The net impact on U.S. foreign investment in Canadian manufacturing is unclear. Labor unions and the Canadian public expect a large outflow as branch plants close down and production is shifted to the United States; however, most specialists in the area expect net movements to be small, although within certain industries there may be large dislocations (Burgess, 1985b; Rugman, 1987). If the talks fail, rising U.S. protectionism may offset much of the earlier gains under the Tokyo Round, causing increased dislocations in intrafirm trade flows between Canada and the United States.

Coupled with tariff reductions under the Tokyo Round, the United States is reforming its personal and corporate income tax structure, shifting its emphasis from an instrument of social and economic policy to one of revenue collection and neutrality.[2] Statutory rates are being lowered, the numbers of rates reduced and tax exemptions severely restricted. The U.S. federal statutory rate of corporate income tax (CIT) will fall from 46 percent to 34 percent by 1988 with estimates of a combined federal/state CIT of 40.6 percent across all industries. Because many tax exemptions are also being reduced, most commentators expect the average burden of CIT to rise, particularly in those industries where exemptions are large, such as oil and mining, although the burden could fall for manufacturing. In addition, the lower statutory rate reduces the U.S. foreign tax credit available to offset foreign taxes on dividends remitted from abroad. Coupled with the change from an overall to a per-country limitation on the credit, countries like Canada with high tax rates are widely expected to lose U.S. investments.[3] With lower tax rates in the United States there is an incentive to take interest deductions in Canada, price intrafirm imports higher and exports lower and allocate more management fees to Canada, in order to shift profits to the U.S. As tariff rates fall, the incentive to price Canadian imports high will be accentuated.

These predicted effects on Canada may be less likely in the manufacturing sector, because manufacturing and processing profits are currently subject to a 40 percent Canadian CIT rate, compared to the general statutory rate of 46 percent. However, although Canadian CIT rates have been lower than U.S. ones on manufacturing, the gap between statutory rates falls substantially after U.S. reform which may strengthen the incentive to shift profits and investments to the U.S. For example, *The Globe and Mail*, Nov. 11, 1986, argued that the gap between Canadian and U.S. tax rates was "unlikely to provoke a wholesale exodus of manufacturing operations from Canada. . . . U.S. parents (however) might want to raise the price they charge to their Canadian subsidiaries on intercompany transfers of goods or services." (p. B9)

Partly as a result of U.S. tax reform, the Canadian government announced its own tax reform package on June 18, 1987. The statutory CIT rate is to be reduced from 46 percent to 38 percent (34 percent by 1990 on manufacturing profits). Some exemptions such as capital cost allowances are to be reduced and certain tax credits such as the investment tax credit eliminated. The federal government justified these measures on the grounds that statutory rate reductions were necessary to keep the Canadian fiscal system competitive with its major trading partners, especially the U.S. "Without tax rate cuts, income-earning activity in Canada could be diverted elsewhere and corporations . . . could arrange their activities in such a way as to earn more income taxable abroad and less in Canada. The tax rate cuts . . . are designed to avoid these undesirable effects." (*Income Tax Reform*, p. 99)

The purpose of this chapter is to analyze the net effects of these corporate income tax and tariff rate changes on U.S.-controlled manufacturing firms in Canada. We restrict our analysis to a first-order approximation to the net impact, taking a partial-equilibrium approach so that second-round exchange rate and income effects are ignored. We concentrate only on the impacts of reform on manufacturing intrafirm trade and investment flows between the two countries.[4] In the first section of the chapter we explain the impacts of corporate income taxes on international capital flows and relate this to current U.S. and Canadian taxation of U.S.-owned subsidiaries in Canada. In the second section we develop a partial-equilibrium theory of a horizontally-integrated multinational (MNE) and predict the impact of tax and tariff changes on capital, intrafirm trade and financial flows within the MNE. The fourth section uses data for the period 1978–81 to estimate effective marginal CIT rates on capital flows and effective average CIT rates on book profits for the U.S. manufacturing parents and their Canadian subsidiaries. We then reestimate these effective marginal and average rates under the following scenarios: U.S. reform only, Canadian reform only, and U.S. plus Canadian tax reform. Based on the theories presented in the second and third sections, the marginal and average tax rates are then used to predict the impact of Canadian and U.S. tax and tariff reform on capital, trade, and financial flows of U.S.-controlled manufacturing subsidiaries in Canada. The fifth section sums up.

The chapter concludes that U.S. tax reform should generate an investment boom in Canadian manufacturing; however, both effective marginal and average corporate income tax rates rise so sharply under the Canadian tax proposals that an overall net decline in new investment by U.S.-controlled subsidiaries in the Canadian manufacturing sector of between 16 and 28 percent is predicted. Since tax reform should increase financial outflows and imports while the reduction in Canadian tariffs should reduce the incentive to underinvoice, the net impact is likely to worsen the Canadian balance of payments in this sector.

THE IMPACTS OF CORPORATE INCOME TAXES ON INTERNATIONAL CAPITAL FLOWS

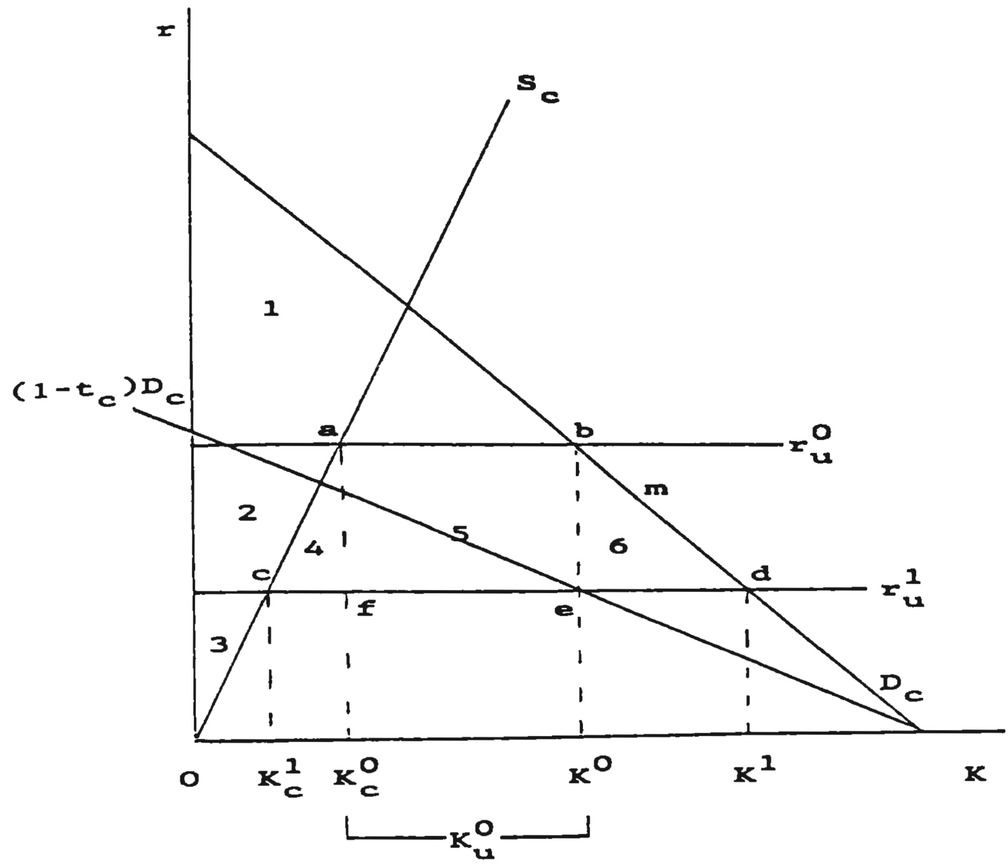
Current Rules on the International Taxation of Capital Income

Taxation of multinational capital income by either the home or host country has complicated effects that spill over internationally. These spillovers occur because taxation of MNEs affects not only the international allocation of capital, but also the distribution of gains from foreign investment between home and host countries, the returns to residents and nonresidents in the host country, and the treatment in the home country of local residents with foreign-source income relative to those with domestic income. As a result of these international complications, the OECD has a Model Tax Treaty Convention on Income and Capital which countries are urged to follow in taxing MNE income.

Under the OECD Convention the host country has the primary right to tax business income earned within its borders. The MNEs tax base is allocated internationally according to the concept of a permanent establishment, with affiliates treated as separate legal entities and income apportioned between them assuming intrafirm transactions take place at arm's length prices. The home country has the right to tax remitted income, with the host country having the prior right to levy a withholding tax. Since the host is considered to have the primary right to tax, the home country is expected to modify its rules to take account of host taxation. Usually the home country defers taxation of foreign retained earnings and taxes only repatriated profits, giving a foreign tax credit for the CIT and withholding taxes paid in the host country.

With respect to U.S.-controlled manufacturing affiliates in Canada, both the Canadian and U.S. governments basically follow the OECD convention. In Canada foreign-controlled permanent establishments are taxed at a federal plus provincial statutory CIT rate with most tax deductions and credits available to domestic firms also available to foreign establishments. Manufacturing and processing firms benefit from a reduced CIT rate. Foreign-owned branches pay an additional 25 percent of taxable income, from which the CIT is deductible, as a branch tax. Withholding taxes on remittances (except interest payments) are levied when these funds are repatriated. In the United States, the CIT applies to domestic income of U.S. MNEs plus accrued foreign branch profits plus head-office fees and interest payments remitted from foreign affiliates. Remitted dividends are grossed up by the amount of foreign CIT

Figure 9.1
The Impacts of U.S. and Canadian Corporate Income Taxes on Capital Flows



and also brought into taxable income. Foreign tax credits are provided for withholding taxes on remitted interest, head office payments and dividends, foreign branch taxes, and foreign CITs on dividends. The credit on dividends for the foreign CIT plus withholding tax is limited to the U.S. tax due on these profits.

A Simple Model of U.S.-Canada Capital Flows

We can explain the impacts of these U.S. and Canadian taxes using a simple model of capital flows between the two countries. We assume the net return to capital is determined in the U.S. market so that Canada treats the net return as given. Assume initially that neither country taxes domestic profits. Figure 9.1 shows the Canadian demand for capital curve, D_C the Canadian supply of savings curve, S_C, and the supply of U.S. capital curve, S_U, which is horizontal at the going U.S. net return to capital, r^0_U. Equilibrium occurs at point b with total investment in Canadian manufacturing of K^0, consisting of K^0_C in resident-controlled capital and $K^0 - K^0_C = K^0_U$ (the distance ab) in U.S.-controlled foreign direct investment (FDI). National income is measured by labor income equal to area 1 plus resident capital surplus (the excess over the opportunity cost of capital) of area 2 + 3, for a total Canadian welfare level of area 1 + 2 + 3.

We examine several possible tax cases organized under three headings according to whether the Canadian government does not tax U.S.-controlled capital income, taxes it at the same rate as in the U.S. or taxes it at a higher rate. In each case we compare exemption of foreign-source income by the U.S. with taxation of foreign income accompanied by a foreign tax credit up to the U.S. tax. We examine the impacts of the Canadian government levying either a nondiscriminatory CIT or a separate withholding tax on FDI income.

Canada Does Not Tax Capital Income

The U.S. Exempts Foreign-Source Income. Assume that the U.S. decides to tax domestic capital income at rate t_U, leaving an after-tax return of r_U^0 to local investors, but exempts all foreign affiliate profits from tax. Since the net return to capital invested in the U.S. falls, foreign direct investment in Canada expands to the distance cd, equal to $K^1 - K_C^1$ in Figure 9.1. National welfare rises by area 4 + 5 + 6 since the decline in the opportunity cost of capital causes producer surplus to fall by area 2 and labour income to rise by area 2 + 4 + 5 + 6. Areas 4 + 6 represent the traditional specialization and exchange gains that accompany increased trade while area 5 is a revenue transfer from foreign capitalists to Canadian labour because the opportunity cost of capital has fallen.

The U.S. Taxes Foreign-Source Income and Provides a Foreign Tax Credit. If the U.S. government taxes both domestic and foreign-earned returns to capital at the same rate t_U, the analysis is quite different. The U.S. tax on foreign-source income acts like a tariff, raising the cost of U.S. investments in Canada. Now all U.S. capital wherever invested is taxed at the same rate, ensuring capital export neutrality. In Figure 9.1 the price of foreign capital in Canada shifts back to r_U^0 and K_U returns to its initial level K_U^0 (the distance ab). Canadian welfare returns to area 1 + 2 + 3 as Canada loses area 4 + 5 + 6. The only difference compared to the zero-tax case is that area 5 goes to the U.S. government instead of the foreign investor.

Canada Taxes Capital Income at the U.S. Rate.

The U.S. Exempts Foreign-Source Income. (a) Assume that all capital in Canada is taxed at rate $t_C = t_U$ and that the U.S. exempts foreign source income from taxation. Before the Canadian tax the economy is importing cd of foreign capital at price r_U^0. The Canadian tax causes the demand for capital curve in Figure 9.1 to rotate downward to $(1 - t_C) D_C$. Assume t_C initially equals t_U so that the new demand curve must pass through point e directly below point b. Thus total capital investment falls from K^1 to K^0, resident investment is unchanged while FDI contracts to $K^0 - K_C^1$. Total Canadian tax revenue equals area 2 + 4 + 5. Since labor income falls by area 2 + 4 + 5 + 6 while resident capital surplus is unaffected, national welfare falls by area 6, the deadweight loss (DWL) in exchange, the net loss due to the lower capital/labor ratio.[5]

(b) If the Canadian government places a discriminatory tax on nonresident capital income the results are slightly different. A discriminatory tax such as the withholding tax acts as a tariff, raising the price of imported capital. Since the tax does not apply to resident capital, its net return rises by the tax. In Figure 9.1, a withholding tax at rate $w = t_U$ causes the price of capital to rise to point b, K_U to shrink to $K^0 - K_C^0$, generating area 5 in tax revenue. The welfare loss to Canada is identical to a tariff loss; i.e., area 4 (the DWL in specialization) + 6 (the DWL in exchange). Note that the discriminatory withholding tax causes a larger welfare loss than a nondiscriminatory CIT.

The U.S. Taxes Foreign-Source Income and Provides a Foreign Tax Credit

(a) Assume that Canada levies a CIT and the U.S. government also taxes MNE income earned in Canada on an accrual basis (i.e. the foreign affiliate is a branch). We assume the U.S. credits Canadian taxes on MNE profits up to the level of the U.S. tax. With only the U.S. tax in place, the initial position is represented by the distance ab in Figure 9.1 and U.S. tax revenue by area 5. Imposing the Canadian CIT at rate $t_C = t_U$ generates a new equilibrium at point e. Total capital investment is unchanged at K^0, resident investment falls to K_C^1 while FDI expands to $K^0 - K_C^1$. The total Canadian tax, equal to area 2 + 4 + 5, has two effects. First, the tax generates a revenue transfer equal to area 5 from the U.S. to the Canadian government, because the U.S. government credits the Canadian tax. Secondly, the nondiscriminatory CIT tax lowers the net return to Canadian savers to r_U^0, causing a fall in resident capital equal to $K_C^0 - K_C^1$ and an equal-sized inflow of U.S. capital. Since the opportunity cost of U.S. capital is r_U^0 while the opportunity cost of resident capital is the area under the S_C curve, a specialization gain is generated equal to area 4. The Canadian CIT, if credited in the U.S., causes national welfare to increase by area 4 + 5. Thus, if the U.S. exempts foreign-source income from taxation, the Canadian CIT causes a fall in national welfare equal to area 6; whereas U.S. taxation with a foreign tax credit implies that the Canadian CIT raises welfare by area 4 + 5.

(b) If the Canadian government places a discriminatory tax on nonresident capital and the U.S. taxes foreign-source income but credits the Canadian tax, the gains are not as large. The new equilibrium is at point b, with Canadian revenue of area 5 and foreign capital of $K^0 - K_C^0$. The welfare gain to Canada is simply the revenue transfer area 5. Thus the withholding tax, if the U.S. exempts foreign income, lowers Canadian welfare by area 4 + 6; whereas if the U.S. taxes and credits, Canadian welfare rises by area 5.

Note that, if Canada does tax capital income, a nondiscriminatory tax like the CIT is preferred to an equivalent discriminatory tax such as the withholding tax because the CIT generates a larger welfare gain than the withholding tax. From Figure 9.1 we also see that, if the U.S. provides a credit up to the U.S. tax rate, it is in Canada's interest to set its rate at the U.S. rate. Any rate lower than that reduces the Canadian welfare gain.

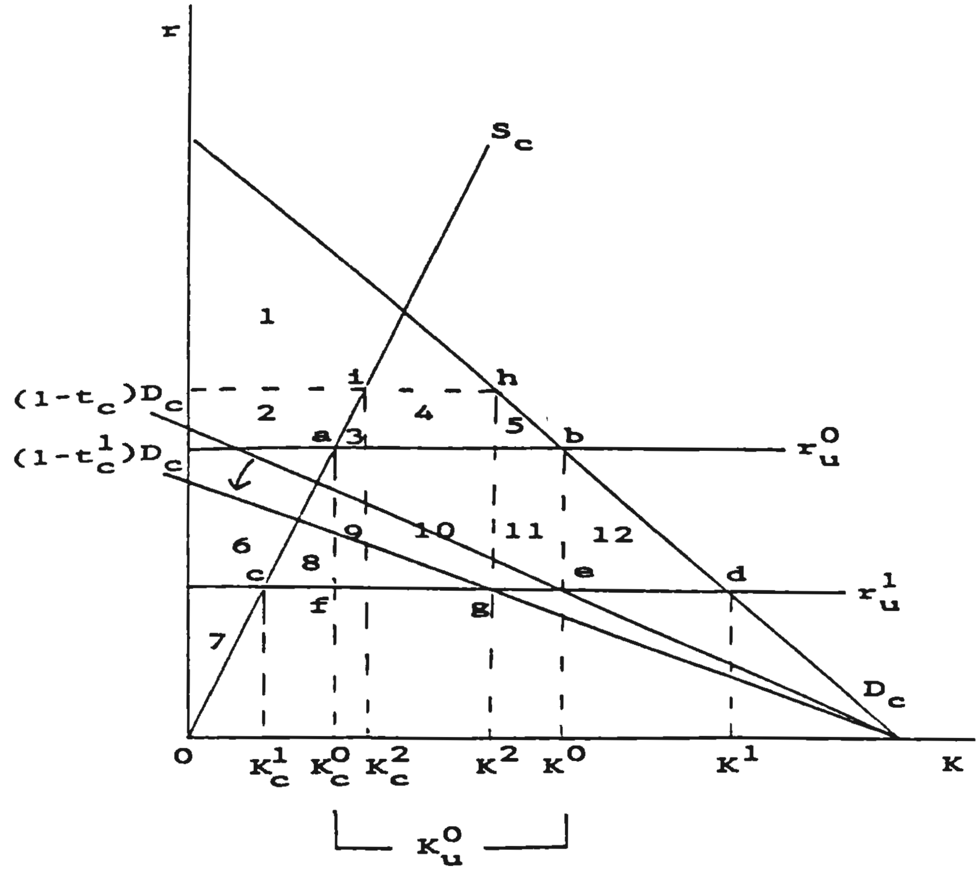
Canada Taxes Capital Income at a Rate Higher Than the U.S. Rate

The U.S. Exempts Foreign-Source Income. This analysis is similar to that in B.1, except the losses are larger.

The U.S. Taxes Foreign-Source Income and Provides a Foreign Tax Credit. (a) Assume that the Canadian government levies a nondiscriminatory CIT at a rate higher than in the U.S. so that a deficit of foreign tax credits occurs. This is represented in Figure 9.2, which is based on Figure 9.1. A Canadian CIT at the same rate as in the U.S. generates a welfare gain equal to area 4 + 5 in Figure 9.1 and area 8 + 9 + 10 + 11 in Figure 9.2. If the Canadian tax rate rises, the demand curve rotates again to $(1 - t_C^1)\, D_C$ and total investment is determined by point g with the gross price of capital represented by point h. Capital flows shrink to K^2, with unchanged resident investment and a smaller amount of foreign capital inflows, $K^2 - K_C^1$. The new tax revenue is area 2 + 3 + 4 + 6 + 8 + 9 + 10 compared to the earlier revenue of area 6 + 8 + 9 + 10 + 11, for a net change of area 2 + 3 + 4 − 11. Since labour income falls by area 2 + 3 + 4 + 5 while resident capital surplus is unchanged, the net impact is a loss of area 5 + 11. Area 5 is the DWL in exchange caused by the fall in investment, while area 11 is the foregone revenue transfer on foreign capital. Thus, raising the Canadian CIT rate above the creditable level in the U.S. causes an outflow of FDI, generating a DWL in exchange and a smaller revenue transfer that lowers Canadian welfare.

(b) If the Canadian tax is discriminatory, the welfare losses are larger. Suppose the only Canadian tax is a withholding tax on foreign capital

Figure 9.2
The Effects of Setting the Canadian Tax Rate Above the U.S. CIT Rate



levied at a rate greater than t_U. The tax acts like an import tariff, raising the price of capital to point h, and lowering FDI to $K^2 - K_C^2$ (the distance ih). Compared to a withholding tax equal to t_U, the higher tax causes tax revenue to change by area 4 + 10 minus area 9 + 10 + 11 for a net change of area 4 − 9 − 11. Since labour income falls by area 2 + 3 + 4 + 5 and resident capital surplus rises by area 2, the net change in Canadian welfare is a loss of area 3 + 9 + 5 + 11. Area 3 represents the specialization DWL, area 5 the exchange DWL, while area 9 + 1 is the foregone revenue transfer. Note that the losses, as before, are larger under a discriminatory tax.

Implications for Current U.S. and Canadian Taxation of Capital Income

In practice, the U.S. and Canadian tax structures fall somewhere in the middle of the above cases. Canada levies both a nondiscriminatory CIT and a discriminatory withholding tax. However, since the current withholding tax on dividends is low (10–15 percent) and levied only on remitted profits net of the CIT, the effective rate is even lower (6–9 percent on dividends), compared to a statutory CIT rate on all manufacturing profits of 40 percent. Thus, in general, Canadian taxes on nonresident capital income can be considered as nondiscriminatory. Since the United States taxes branch profits as accrued and provides a full foreign tax credit up to the U.S. tax rate, we consider cases (B)(2)(a) and (C)(2)(a) as appropriate for branches depending on whether the Canadian tax rate is higher, lower, or equal to the U.S. rate. The implicit policy implication for Canadian taxation of U.S. branches is that the Canadian government should keep Canadian taxation of American branches is that the Canadian government should keep Canadian taxation of American branches at rates creditable in the U.S. in order to generate welfare gains for Canada.[6]

The implications for U.S. subsidiaries in Canada are not straightforward since the U.S. defers taxation of subsidiary income until it is remitted. There is a large literature on the economic effects of tax deferral,[7] with the standard view being that tax deferral lowers the effective tax rate on foreign subsidiary earnings, encouraging capital outflows from the home country. The effective tax on the subsidiary is measured as a weighted average of the tax rate on dividends and that on retained earnings, determined by the dividend remittance ratio α where $0 \leq a \leq 1$. In our case the effective rate of tax on foreign source income, t^E, would be a weighted average of the Canadian CIT (on retained earnings) and either of two rates on dividends depending on whether Canada has a surplus or deficit of foreign tax credits:

$$t^E = (1 - \alpha)\, t_C + \alpha\, t_U \qquad \text{deficit of tax credits} \qquad \text{(1a)}$$

$$t^E = t_C + \alpha\, w_D\, (1 - t_C) \qquad \text{surplus of tax credits} \qquad \text{(1b)}$$

If $\alpha = 0$ (complete deferral), $t^E = t_C$ so that foreign-controlled capital income is taxed at the host rate (ensuring capital import neutrality). This corresponds to cases (B)(1)(a) and (C)(1)(a) where the U.S. exempts foreign-source income from taxation so that Canadian taxation causes deadweight losses that rise with the tax rate. If $\alpha = 1$ (no deferral, the branch case), $t^E = t_U$ in the deficit of credits case so all U.S. capital wherever invested is taxed at the home rate (and capital export neutrality prevails). This corresponds to our earlier branch cases (B)(2)(a) and (C)(2)(a) where the optimal Canadian tax should be set at the creditable U.S. rate and Canadian welfare is increased by the tax. In the intermediate cases t^E lies somewhere between capital export and import neutrality, with part of the Canadian tax creditable in the U.S. so that Canadian welfare could either rise or fall. The economic rationale for the standard view can be explained as follows.

Due to the U.S. tax treatment of subsidiaries, American MNEs have an incentive to defer repatriation of profits from their subsidiaries in order to avoid the extra tax payable upon remittance. This incentive exists in both the surplus and deficit of foreign tax credit cases as long as the host country levies a withholding tax on dividend repatriations. As a result, deferral may induce larger U.S.-controlled capital inflows into Canada compared to the branch case. In Figure 9.1, exemption of foreign-source income from U.S. taxation generates an initial equilibrium in the Canadian capital market at point d (the net return to capital under exemption is r_U^1) with U.S. investment equal to the distance cd. Full U.S. taxation and crediting moves the Canadian equilibrium to point b (the net return is r_U^0) with FDI equal to the distance ab. If $0 < \alpha < 1$, the net return lies between these two extremes at a point like m with an intermediate amount of foreign investment. The policy implication from this is that a Canadian CIT that lowers the net return to investments in Canada below $\alpha\ r_U$ may generate fewer capital inflows, a fall in total investment and welfare losses. However, taxes that are creditable in the U.S. may not affect total investment, but raise welfare via capital inflows.

The alternative view gaining recognition among economists is that tax deferral is equivalent to tax exemption by the U.S.; i.e., the additional withholding taxes and/or U.S. taxes due upon repatriation can be ignored so that the effective tax on foreign-source income is the host tax rate. Thus the allocation of capital flows between the home and host countries depends only on a comparison between their domestic CIT rates. Two quite different arguments have been put forward, both supporting this new view of deferral. The first argument is an old one, best put by Carl Shoup (1969): "Since a delayed tax is a reduced tax . . . if the delay lasts for, say, fifty years or more, the present value of the tax is reduced close to zero at usual rates of discount" (pp. 636–7). That is, if dividends are deferred long enough, tax deferral by the home country is equivalent to exempting foreign-source income from tax since the net present value (NPV) of the extra tax is zero.

The second argument is the exact reverse of Shoup's point but has the same policy conclusion (see Hartman, 1985; also Warren, 1986). Hartman argues that mature subsidiaries that finance their growth with retained earnings decide whether to reinvest or repatriate their profits by comparing the net return to local reinvestment vis-à-vis the net return from remitting the profits to the home country for reinvestment at home. As long as foreign-source earnings are eventually remitted to the parent company, the MNE cannot avoid the extra tax due upon repatriation. And, if the funds are reinvested in the host country and grow at the average after-tax host rate of return, the NPV of the extra tax payment due on repatriation is unchanged (see Warren). Because all foreign earnings must at some time bear the extra tax, it can be treated as a fixed cost and ignored; the timing of the extra tax payment is irrelevant. The only question for the MNE is which location produces the highest return net of the local CITs, t_C and t_U. Thus in the new view of deferral, the effective tax on foreign-source income is the host CIT, whether the NPV of the deferred tax is zero (as in Shoup) or constant (as in Hartman/Warren).[8] The policy implication is that deferral is equivalent to tax exemption; i.e., cases (B)(1)(a) and (C)(1)(a) apply so the Canadian CIT, whether it is above or below the U.S. level, generates a welfare loss.

A PARTIAL-EQUILIBRIUM ANALYSIS OF INTRAFIRM TRADE AND CAPITAL FLOWS

In this section we develop a simple model of a two-firm manufacturing MNE consisting of a U.S. parent and a Canadian subsidiary engaged in horizontal intrafirm trade. This model is used to predict how MNE capital, intrafirm trade and financial flows react to changes in CIT and tariff rates.

A Model of MNE Capital, Intrafirm Trade and Financial Flows

Each firm produces output, Q_I, for sale in the local market, Y_I, or for export, X, where $I = U, C$. We assume, in accordance with the data, that the Canadian subsidiary is the importer, and that a tariff at rate τ is levied on imports. Intrafirm imports are priced at a transfer price p for a total trade value of pX. The parent therefore sells $Y_U = Q_U - X$ for a total revenue of R_U; while the subsidiary sells $Y_C = Q_C + X$ for sales revenue of R_C. Each firm incurs only capital costs; we ignore labour costs.

Each firm owns $P_{KI}K_I$ in capital which depreciates at a uniform rate d.[9] The opportunity cost of capital is its real return plus the depreciation rate. The real return is assumed given to the firm and equals r_U, the U.S. real return to capital, with arbitrage between countries ensuring $r = r_C = r_U$. Note that although real returns are equal, nominal returns may differ ($i_U \gtreqless i_C$) as well as inflation rates ($\Phi_U \gtreqless \Phi_C$). Thus the cost of capital is $(r + d)\, P_{KI}K_I$ to each firm in the absence of taxation. Corporate income taxes complicate matters in three ways. First, interest costs are tax-deductible so that the true opportunity cost is reduced by the CIT rate times the leverage ratio, L_I (the ratio of long-term liabilities to long-term liabilities plus equity); i.e., the new opportunity cost is $(r + d - t_I L_I i_I)\, P_{KI}K_I$.[10] Second, both countries currently offer an investment tax credit so that some fraction, β_I, of investment expenditures is creditable against the CIT. This reduces the opportunity cost of capital to $(r + d - t_I L_I i_I)(1 - \beta_I)\, P_{KI}K_I$. Lastly, both countries offer capital cost allowances that provide accelerated depreciation over and above economic depreciation rates as a tax deduction. If the net present value of these allowances is Z_I the true opportunity cost is reduced by the CIT times Z_I. Since U.S. tax law employs a half-year convention that treats all purchases within a year as if they occurred at midyear (see Fazzari, 1987), the final opportunity cost of capital to the U.S. parent is:

$$C_{KU} = (r + d - t_U L_U i_U)(1 - \beta_U - t_U Z_U (1 - .5\,\beta_U))\, P_{KU} K_U \tag{2a}$$

In Canada, the investment tax credit must be deducted from the capital base used to calculate the capital consumption allowance, so the effective cost of capital to the Canadian subsidiary is:

$$C_{KC} = (r + d - t_C L_C I_C)(1 - \beta_C)(1 - t_C Z_C)\, P_{KC} K_C \tag{2b}$$

We assume the exchange rate between the two countries is e and that all variables are measured in the home currency. The net profit function of each firm is calculated by determining taxable income; i.e., economic profit minus tax-deductible expenses. Taxable income times the CIT rate yields the initial tax, from which tax credits are subtracted to determine the total tax payable. Economic profit minus actual taxes yields the net profit of the firm, π_I. The net profit function for the Canadian subsidiary is:

$$\pi_C = [\,(1 - t_C)\{R_C - (1/e)(1 + c)\,pX - H\} - C_{KC} = W_H H - (1 + W_D)\,D] \tag{3}$$

assuming the subsidiary is charged for head office services and these charges, H, are tax deductible in the host country. The subsidiary remits H, after paying a withholding tax at rate w_H, plus dividends, D, net of a withholding tax at rate w_D, to the parent company.

The after-tax profit function of the U.S. parent is calculated as the CIT times taxable income, minus tax credits. Taxable income equals domestic economic profits plus remittances from the subsidiary (after grossing up the dividends by the host CIT) minus other tax-deductible expenses. The foreign CIT and withholding tax are creditable up to the level of the home CIT. The profit function of the U.S. parent can therefore be written as:

$$\begin{aligned}\pi_U = {} & (1 - t_U)(R_U + \mathrm{p}X) - C_{KU} + \mathrm{e}\,[1 - (t_U - w_H)]\,H \\ & + e\,[1 - \{\,(t_U - (t_C + W_D(1 - t_C))\,/(1 - t_C)\,\}]\,D\end{aligned} \tag{4}$$

where the term in $\{\cdot\}$ brackets must be either zero (if the subsidiary has a surplus of foreign tax credits) or positive (in the deficit of credits case).

Let us rewrite the $\{\cdot\}$ term as $f = 0$ for the surplus case and $f > 0$ for the deficit case. In the surplus case π_U therefore equals:

$$\pi_U = (1 - t_U)(R_U + pX) - C_{KU} + e[1 - (t_U - W_H)]H + eD \tag{4a}$$

since $f = 0$; and in the deficit case,

$$\pi_U = (1 - t_U)(R_U + pX) - C_{KU} + e[1 - (t_U - W_H)]H + e[1 - f/(1 - t_C)]D \tag{4b}$$

The objective function of the MNE is to maximize global net profits:

$$\begin{array}{ll} \text{Max}\ \pi = (\pi_C + \pi_U) & \text{subject to the constraints that:} \\ \Sigma Q_I = \Sigma Y_I & \text{(all output is sold)} \\ r_C = r_U = r & \text{(capital arbitrage assumption)} \end{array} \tag{5}$$

where the decision variables for the MNE are K_C, K_U and X and the financial variables are H, D and p. We assume D is affected by H and p since dividends are a residual item.[11] Substituting (2a, 2b, 3, 4a or 4b) into (5), we differentiate (5) with respect to K_C, K_U and X.

The first order condition for an optimal allocation of K_C is;

$$e(1 - t_C)MRP_{KC} - e(r + d - t_C L_C i_C)(1 - \beta_C)(1 - t_C Z_C)P_{KC} = 0$$

or, rearranging:

$$MRP_{KC}/P_{KC} = [(r + d - t_C L_C i_C)(1 - \beta_C)(1 - t_C Z_C)]/(1 - t_c) \tag{6}$$

Similarly, the optimal allocation of K_U is determined by:

$$MRP_{KU}/P_{KU} = [(r + d - t_U L_U i_U)(1 - \beta_U - t_U Z_U(1 - .5\,\beta_U))]/(1 - t_U) \tag{7}$$

Lastly, the optimal allocation of intrafirm trade, X, depends on:

$$e(1 - t_C)MR_C - (1 - t_U)MR_U + [t_C - (t_U + \tau(1 - t_C)]p = 0$$

or, rearranging:

$$(1 - t_C)[e\,MR_C - (1 + \tau)p] = (1 - t_U)[MR_U - p] \tag{8}$$

Equation (8) is well-known from international trade and horizontally-integrated MNE models (see Eden, 1985; Horst, 1973). The MNE should balance the marginal revenue from intrafirm imports (the left-hand side of (8)) to the marginal cost of exports (the right-hand side of (8)) in order to maximize overall profits. The Canadian marginal revenue from imports equals the marginal revenue from domestic sales, $e\ MR_C$, net of importing costs, $(1 + \tau)\ p$, in after-tax terms. The U.S. marginal cost of exports equals the foregone marginal revenue in domestic sales, MR_U, minus earnings from exports, p, after tax.

The left-hand side of equations (6,7) is the marginal revenue product of capital divided by its price. The right-hand side is the tax-adjusted cost of capital per dollar of investment spending; i.e. the gross cost of capital per dollar of capital expenditures. Note that capital arbitrage ensures that the net return, r, is equalized between countries. Since we have assumed similar types of capital (machinery and equipment) in the two firms, we assume identical depreciation rates so that the net cost of capital, $c_N = r + d$, per dollar of investment spending is the same in both firms. However, the gross costs of capital in (6, 7) are unlikely to be equalized since tax rates, leverage ratios, nominal interest rates, tax deductions and credits generally differ between countries.

Equations (6,7) also show that capital flows are affected by the effective marginal tax rates on capital. We can derive the effective rate as follows. Let c_{GI} be the gross cost of capital, the right-hand side of equation (6) or (7). Then the effective marginal tax rate,t_I^M is

$$t_I^M = (C_{GI} - C_N) / C_{GI}\ ] \tag{9}$$

For example, in the simplest case, assume $\beta_I = Z_I = L_I = 0$. Then $C_{GI} = (r + d)/(1 - t_I)$ so that $t_I^M = t_I$; the effective marginal tax rate is simply the CIT rate. Since we assume the net costs of capital are equal in the two firms, if the CIT rate in Canada is twice as high as in the U.S., this implies that the gross cost of capital in Canada is also twice as high.

Note also that the effective mariginal tax rate, which influences gross fixed capital formation by the subsidiary, is independent of the withholding tax on dividends or the extra CIT tax due in the home country on repatriation. Thus the early view that a weighted average of the rates on dividends and retained earnings determines subsidiary investments is not valid. Hartman (1985) is right: capital flows are affected by effective marginal CIT rates in each country; the extra taxes due upon repatriation are ignored.

The optimal financial decisions for the MNE are found by differentiating (5) with respect to p, D and H, using the envelope theorem to eliminate terms.[12] We assume either or both governments impose constraints on the size of p, H and D so that the optimal variables may have to set at these upper or lower government-imposed limits rather than the profit-maximizing ones. The optimal level of D depends on whether a surplus or deficit of tax credits applies to dividends. In the deficit case,

$f > 0$, the optimal size of dividends is determined by substituting (4a) into (5):

$$d\pi/dD = e\,[\,t_c - t_u\,]/\,(1 - t_c) < 0 \qquad \text{(since } t_u > t_c\text{)} \tag{10a}$$

In the surplus case, $f = 0$, substituting (4b) into (5):

$$d\pi/dD = -\,ew_D < 0 \tag{10b}$$

Therefore in both deficit and surplus of credits cases, the MNE maximizes profits by setting dividends at their lowest possible level. Note that in this financial decision, the important tax variables are the statutory CIT and dividend withholding tax rates. The effective marginal tax rates on capital flows are irrelevant because the MNE is assumed to maximize after-tax global profits with respect to the real variables; dividends are treated as a residual payment out of after-tax subsidiary profits.

The results in (10a, b) imply that Hartman (1985) is mistaken; i.e. the additional taxes do affect remittance decisions. However, if the extra taxes are unavoidable through financial manoeuvers, they become a fixed cost for the MNE, one that must be paid in any case. This also applies to head office charges. The optimal amount of head office charges is determined by:

$$d\pi/dH = e\,(t_C - t_U) + (\delta\pi/\delta D)\,(\delta D/\delta H) \gtrless 0$$

Since $D = \alpha\,\pi_C$, it follows that $\delta D/\delta H = \alpha\,\delta\pi_C/\delta H$. Substituting this into $\delta\pi/\delta H$:

$$d\pi/dH = e\,(t_C - t_U) + (\delta\pi/\delta D)\,[\,e\,\alpha\,\{\,-\,(1 - t_C) - W_H\,\}\,] \tag{11}$$

Equation (11) shows that H has two effects on MNE profits. First, if t_C exceeds (is less than) t_U, head office charges should be raised (lowered) since they are tax-deductible in Canada and taxable income in the U.S.[13] Second, higher charges reduce after-tax subsidiary profits and thus indirectly reduce dividends. Since $\delta\pi/\delta D < 0$ and the term in $\{\cdot\}$ is negative, the impact of higher charges, via dividends, on MNE profits is positive. (This point is also made by Mutti, 1981.) Thus the dividend effect tends to raise the optimal H if $t_C > t_U$; and to reduce it if t_U is higher. Note, of course, that if $\alpha = 0$ (no dividends are remitted), this second effect disappears.

The optimal transfer price on intrafirm trade is determined by:

$$d\pi/dp = [\,t_C - (t_u + \tau\,(1 - t_C)\,]\,X + (\delta\pi/\delta D)(\delta D/\delta p) \gtrless 0$$

which, following the same procedure as in (11) yields:

$$d\pi/dp = [\ t_C - (t_U + \tau(1 - t_C)\ ]\ X + (\delta\pi/\delta D)\ [\ \alpha\ \{ -(1 - t_C)(1 + \tau)\ X\ \}] \quad \textbf{(12)}$$

Again, since $\delta\pi/\delta D < 0$ and the term in $\{\cdot\}$ is negative, the impact of the transfer price, via dividends, on global profits is positive. The first term in (12), however, may be either positive or negative, depending on the tax and tariff costs; e.g. higher CITs in the host country tend to encourage overinvoicing whereas tariffs encourage underinvoicing.

Implications for Current U.S. and Canadian Tax and Tariff Rules

The three first order conditions (6,7,8) show the profit-maximizing levels of capital and trade flows within a manufacturing MNE. They show that capital flows depend on effective marginal CIT rates in each country and are independent of the extra taxes due upon dividend repatriation. A higher statutory CIT rate raises the gross cost of capital in that country, lowering the optimal gross fixed capital formation by the firm.[14] This has second-round impacts on output, sales, and trade flows by the two firms. In general, we expect a higher tax rate to discourage output and exports (encourage imports).

Intrafirm trade flows depend on CIT and tariff rates and the transfer pricing policy of the MNE. In our model the MNE maximizes global economic profits net of tax so that statutory tax and tariff rates affect trade flows. With a statutory CIT rate of 46 pecent in the U.S. and 40 percent in Canada; and a average tariff rate of 5 percent, the MNE should set a low transfer price to shift profits to the Canadian subsidiary, according to (12).[15] Thus, in (8) the subsidiary shows a marginal profit on intrafirm trade ($MR_C > (1 + \tau)\ p$), while the parent records a equal marginal loss ($MR_U > p$). Raising t_C lowers the marginal profit of the subsidiary, generating an overall marginal loss on X to the MNE. The MNE, as a result, contracts trade. This has second-round impacts on output, sales, and capital flows. A rise in t_U or τ has the opposite effects.

However, managers of large MNEs do not measure economic profits; their balance sheets record book profits, before and after tax. Therefore managers may be affected by the effective tax rates on book profits, not economic profits. If managers try to maximize book profits net of taxes, the appropriate tax rate for decision purposes is the effective average CIT rate on book profits; i.e., total taxes paid by the firm divided by book profits of the firm. These tax rates are available from each country's income tax statistics. In the next section we calculate effective marginal and average tax rates on U.S. manufacturing parents and their Canadian subsidiaries.

CALCULATING EFFECTIVE MARGINAL AND AVERAGE CORPORATE INCOME TAX RATES

As we saw in the third section, international capital flows within the MNE depend on effective marginal tax rates on capital; whereas financial and trade flows depend on effective average tax rates on book profits. In this section we calculate effective marginal and average rates on U.S. parents and their Canadian affiliates in the manufacturing sector. The rates are calculated for the prereform period, with U.S. reform only, Canadian reform only and joint tax reform. These rates are then used to predict changes in intrafirm capital, trade, and financial flows within the manufacturing sector.

Calculating Effective Marginal Corporate Income Tax Rates

Pre-Reform. Table 9.1 shows the initial values of the variables used to calculate the effective marginal and average CIT taxes in the prereform period. How these variables were obtained is explained in the Data Appendix to this paper.

The gross cost of capital, before reform, in Canada is based on (6), reproduced in a slightly different fashion below:

$$C_{GC} = [\,(1 - \beta_C)\,(1 - t_C Z_C) \,/\, (1 - t_C)\,]\,[\,r + d - tL_C i_C] \qquad \textbf{(13)}$$

The first square-bracketed term in (13) is the gross-up factor; the second is the effective opportunity cost of capital. In the simplest case where $\beta_C = Z_C = 0$, the gross-up factor is $1/(1 - t_C) = 1.7203$. Since the second term equals .1825, $C_{GC} = .3139$ in this case. Using (9) to find the effective marginal CIT rates yields $t_C^M = .3816$, since $C_N = r + d = .1941$. Thus, in the absence of the investment tax credit and the capital consumption allowance, the effective marginal rate on Canadian gross fixed capital formation (GFCF) is 38.16 percent. To calculate the effective marginal rate on new investment or net fixed capital formation (NFCF) we must measure $(r_{GI} - r_N) \,/\, r_{GI}$, or alternatively, measure:

$$T_I^M = (\,C_{GI} - C_{NI})\,/\,(C_{GI} - d\,) \qquad \textbf{(14)}$$

where T_I^M is the effective marginal rate on new investments only. Thus $T_C^M = .5908$ when $\beta_C = Z_C = 0$. The impact of tax deductions and tax credits is to reduce the effective marginal rate on net and replacement investment. Given the actual 1981 values of β_C and Z_C we find the effective marginal CIT rate on GFCF by U.S.-controlled manufacturing

Table 9.1
Effective Corporate Tax Rates on U.S. Manufacturing MNE Parents and Their Canadian Subsidiaries

Variable	Pre-Reform	U.S. Reform r_U fixed	U.S. Reform r_U varies	Canadian Reform	Canadian/U.S. Reform
$r_U = r_C$	.0830	.0830	.0719	.0830	.0719
d	.1111	.1111	.1111	.1111	.1111
$C_{NU} = C_{NC}$	.1941	.1941	.1830	.1941	.1830
Φ_U	.0395	.0395	.0346	.0395	.0346
Φ_C	.0440	.0440	.0440	.0440	.0440
i_U	.1225	.1225	.1066	.1225	.1066
i_C	.1313	.1313	.1187	.1313	.1187
L_U	.3588	.3588	.3588	.3588	.3588
L_C	.2899	.2899	.2899	.2899	.2899
β_U	.0889	0	0	.0889	0
β_C	.0635	.0635	.0635	0	0
Z_U	.8538	.8513	.8673	.8538	.8673
Z_C	.9221	.9221	.9289	.6248	.6378
C_{GU}	.1731	.1936	.1823	.1731	.1823
C_{GC}	.1805	.1805	.1687	.2223	.2075
r_{GU}	.0620	.0825	.0711	.0620	.0711
r_{GC}	.0694	.0694	.0576	.1112	.0964
t_U	.4946	.3823	.3823	.4946	.3823
t_C	.4187	.4187	.4187	.3487	.3487

subsidiaries in the prereform period was $t_{CM} = -.0756$; while on NFCF the effective rate was $T_C^M = -.1966$ (i.e., Canadaian-subsidized investment in the manufacturing sector).

In the United States, the gross cost of capital is, based on (7):

$$C_{GU} = [(1 - \beta_U - t_U Z_U (1 - .5\,\beta_U)) / (1 - t_U)\,]\,[\,r + d - t_U L_U i_U\,] \qquad (15)$$

where the first square bracket is the gross-up factor and the second, the opportunity cost of capital. Assuming $\beta_U = Z_U = 0$ leaves a simple

Table 9.1 *(Continued)*

Variable	Pre-Reform	U.S. Reform r_U fixed	U.S. Reform r_U varies	Canadian Reform	Canadian/U.S. Reform
t_U^M	-.1213	-.0025	-.0043	-.1213	-.0043
t_C^M	-.0756	-.0756	-.0847	+.1269	+.1180
T_U^M	-.3386	-.0059	-.0111	-.3386	-.0111
T_C^M	-.1966	-.1966	-.2480	+.2537	+.2540
t_U^A	.4172	.3550	.3757	.4172	.3757
t_C^A	.2772	.2772	.2989	.3223	.3335
t_C^D	.3495	.3495	.3690	.3901	.4002

Source: Data Appendix and author's calculations (note: all numbers calculated to seven digits and rounded to four digits in the table)

Key to Variables:

r = real rate of interest

d = economic rate of depreciation

c_N = net cost of capital; equals r + d

Φ = inflation rate

i = nominal rate of interest; $i_U = r + \Phi$ in U.S., see Data Appendix for Canada

L = leverage ratio; equals long-term debt to long-term debt plus equity

β = investment tax credit

Z = net present value of one dollar's worth of capital consumption allowance

c_G = gross cost of capital

r_G = gross rate of return

t = statutory corporate income tax rate

t^M = effective marginal rate of corporate income tax on gross capital formation

T^M = effective marginal rate of CIT on net fixed capital formation

t^A = effective average CIT rate on book profits

t^D = effective average Canadian tax rate on remitted dividends gross-up factor of $1/(1 - t_U) = 1.9786$. Since the opportunity cost equals .1724 the gross cost of capital, in the absence of the capital cost allowance and the investment tax credit, is .3411. Given a net cost of capital of .1941, this implies an effective tax rate of .4308 on GFCF in manufacturing. In terms of new investment only, we can use (14) to find $T_U^M =$ .6390. The impact of tax deductions and credits is to turn these tax rates into subsidies. With the prereform values for β_U and Z_U, we find $t_U^M =$ $-.1213$ and $T_U^M = -.3386$. Since the respective Canadian rates are t_C^M $= -.0756$ and $T_C^M = -.1966$. The U.S. rates are more generous, even though the statutory U.S. CIT rate is substantially higher (.4946 compared to .4187). This is due to the higher U.S. investment tax credit and lower opportunity cost of capital, which is partly offset by the higher Canadian capital cost allowance.

(B) Tax Reform in the United States. The U.S. Congress (1986) made the following changes to the CIT: (1) the statutory federal CIT rate was cut to 34 percent; (2) the investment tax credit was repealed and (3) and the capital cost allowance was changed from a 150 percent to a 200 percent declining balance on basically-unchanged asset lives. Following Fazzari (1987), we assume initially that real and nominal interest rates are unaffected by the tax law changes. The impact of U.S. reform is to slightly lower Z_U from .8538 to .8513, eliminate B_U and reduce t_U to .3823 (combined federal/state). As a result C_{GU} rises from .1731 to .1936; causing the effective marginal tax rate on all investment to rise from $t_U^M = -.1213$ to $-.0025$ (i.e., the subsidy becomes smaller). The effective tax cost of NFCF rises from $T_U^M = -.3386$ to $-.0059$. We can translate these tax changes into predicted changes in gross fixed capital formation, GFCF, using the formula:

$$\% \text{ change in GFCG}_I = 100 \left[\left(C_{GI}^{O} / C_{GI}^{N}\right)^{G} - 1 \right] \tag{16}$$

where zero refers to the original gross cost of capital, N refers to the new cost and S is the elasticity of substitution. Following Fazzari, we assume S equals either 1 (Cobb-Douglas) or .55. The formula for the predicted change in net fixed capital formation, NFCF, is similarly defined as:

$$\% \text{ change in NFCF}_I = 100 \left[\left(r_{GI}^{O} / r_{GI}^{N}\right)^{S} - 1 \right] \tag{17}$$

These predicted investment changes are shown in Table 9.2. U.S. tax reform, assuming interest rates are unaffected, causes GFCF_U to fall by 10.59 percent and NFCF_U by 24.85 percent in the Cobb-Douglas case. With a lower elasticity of substitution, these changes are reduced.

U.S. tax reform, however, is expected to cause real and nominal interest rates to fall. Using the percentage point changes outlined in Faz-

Table 9.2
Predicted Percentage Changes in Gross and Net Fixed Capital Formation in Manufacturing Due to Tax Reform

% Change in Capital Formation.	Pre-Reform	U.S. Reform r fixed	U.S. Reform r varies	Canadian Reform	Canadian/U.S. Reform
	(assuming elasticity of substitution S = 1)				
$GFCF_U$	0 %	-10.59 %	-5.02 %	0 %	-5.02 %
$NFCF_U$	0	-24.85	-12.85	0	-12.85
$GFCF_C$	0	0	+6.95	-18.83	-13.04
$NFCF_C$	0	0	+20.34	-37.63	-28.07
	(assuming elasticity of substitution S = .55)				
$GFCF_U$	0	-5.97	-2.79	0	-2.79
$NFCF_U$	0	-14.54	-7.29	0	-7.29
$GFCF_C$	0	0	+3.76	-10.84	-7.40
$NFCF_C$	0	0	+10.72	-22.87	-16.57

Source: Data Appendix and author's calculations based on Table .1 results

zari, we find r drops to .0719, implying $i_U = .1066$ and $i_C = .1187$. As a result, Z_U rises, reducing the gross and net costs of capital. The new effective marginal tax rates are $t_U^M = -.0043$ and $T_U^M = -.0111$, and the decline in the U.S. capital stock is smaller (see Tables 9.1 and 9.2). In Canada, the lower real interest rate reduces the opportunity cost of capital, raises Z_C from .9221 to .9289 and lowers the gross cost of capital to .1687. As a result, the effective marginal subsidy to capital rises, inducing a total capital expansion in Canada of between 3.76 and 6.95 percent, depending on the elasticity of substitution. The change in $NFCF_c$ is even larger: 10.72 to 20.34 percent. Thus U.S. tax reform, instead of causing an exodus of capital from Canada to the United States as predicted in the newspapers, should cause a substantial investment boom! This confusion results from relying on changes in statutory tax rates rather than changes in effective marginal CIT rates to predict capital flows.

Tax Reform in Canada. On June 18, 1987, the Canadian government announced major changes to the corporate income tax structure to be phased in over the 1988–91 period. The federal statutory rate falls from 46 to 38 percent, with the CIT on the manufacturing sector falling from 40 to 33 percent. The investment tax credit is phased out, while capital consumption allowances become less generous since the two-year write-off for machinery and equipment is reduced to a 25 percent declining balance rate, both subject to the half-year rule (see Canada, 1987).

The impact of these tax changes is shown in Table 9.1. In the absence of U.S. reform, Canadian reform eliminates β_c, substantially reduces Z_c from .9221 to .6248 while reducing the statutory rate to .3487 (assuming provincial rates do not change). The net impact is to raise the gross cost of capital from .1805 to .2223. This causes the effective marginal tax rate on all Canadian capital to shift from a *subsidy* of 7.56 percent to a *tax* of 12.69 percent; a major increase. The change in the marginal rate on new investment is even larger (−.1966 to +.2537). As a result, the desired total capital stock falls between 10.84 and 18.83 percent, depending on the size of S, with the decline in NFCF even more pronounced. Thus, while U.S. tax reform is widely perceived to have increased effective tax rates on capital income, it is Canadian tax reform that has the most punitive effects. Note, however, that U.S. tax reform has already occurred, whereas the Canadian package is not yet law—and perhaps is unlikely to be, given its probable impacts on investment.

Canadian and U.S. Tax Reform. When we examine the combined effects of Canadian and U.S. tax reform, we see that the drop in U.S. interest rates moderates the negative impact of Canadian reform on Canadian manufacturing investment. The net impact is an effective marginal tax of 11.80 percent in Canada and a subsidy of 0.43 percent in the U.S. on GFCF; and a tax of 25.40 percent in Canada and subsidy of 8.03 percent in the U.S. on NFCF. The gap between effective marginal rates has therefore widened compared to pre-reform levels and we expect manufacturing MNEs to shift investments from Canada to the U.S. as a result. Based on our analysis in sections II and III we therefore predict a minor drop in domestic investment in the U.S., largely offset by an inflow of capital from Canada. The decline in FDI in Canada could be substantial.

Calculating Effective Average Corporate Income Tax Rates

Pre-Reform. While marginal tax rates affect long-run investment flows; short-run financial decisions and intrafirm trade flows depend on average tax rates and customs duties. If managers consider maximizing book profits net of taxes paid as their objective, it is the effective CIT rate on book profits that influences their decisions. In this section, we develop a new method that calculates effective average tax rates on book profits. This method is simple and omits most of the minor tax deductions and credits in actual tax legislation, concentrating solely on the capital consumption allowance and the investment tax credit. Let us define taxes paid in the following manner:

$$\text{TAXES} = t_I\,[\,\Gamma - (\text{CCA} - \text{DEP})\,] - \beta_I P_{KI} K_I\,[\,(1 - L_I t_I)\,i_I - \Phi_I + d\,] \tag{18}$$

where Γ is book profit, CCA is the capital consumption allowance and DEP is book depreciation. The effective average tax rate on book profits, t_I^A, is therefore t_I^A = TAXES / Γ or:

$$t_I^A = t_I\,[\,1 - (\text{CCA} - \text{DEP})\,/\,\Gamma\,] - \beta_I\,[\,P_{KI} K_I\,\{(1 - L_I t_I)\,i_I - \Phi_I + \text{d}\}\,/\,\Gamma\,] \tag{19}$$

The data for calculating (19) are given in the Data Appendix. Since $t_U = .4946$, $\beta_U = .0889$, (CCA − DEP) / Γ = .0127 and capital expenditures relative to book profits (the second square-bracketed term) equal .7996; we find $t_U^A = .4172$ in the pre-reform period. For Canada, $t_C = .4187$, $\beta_C = .0635$, (CCA − DEP) / Γ = .2205 and the second square bracket = .7742. This implies an effective CIT rate on book profits of $t_C^A = .2772$ in the pre-reform period.

Since the U.S. average tax rate is substantially higher than the Canadian average rate due to the larger tax deductions available in Canada, MNEs in the manufacturing sector have an incentive to underinvoice their exports to Canada to avoid the extra U.S. tax on book profits. The Canadian tariff tends to reinforce this result (see (12)). MNEs also have an incentive to minimize head office charges (see (11)). On the other hand, dividend repatriation decisions are affected by the extra tax due upon repatriation. Given $W_D = .10$, the effective Canadian tax on dividends, t_{CD}, is:

$$t_C^D = t_C^A + W_D\,(1 - t_C^A) = .2772 + .1\,(1 - .2772) = .3495 \tag{20}$$

compared to a U.S. average rate on domestic book profits of .4172. The Canadian subsidiary therefore has a deficit of tax credits and its parent would have to pay extra taxes on remitted profits.[16] The MNE would therefore have a reason to defer repatriating dividends (subject to the Hartman/Warren proviso that fixed costs cannot be avoided by postponing the remittance).

Tax Reform in Canada and the United States. Tax reform has four effects on the calculation of the effective average CIT rate: the statutory tax rate changes, capital consumption allowances change, the investment tax credit disappears and, in the case of U.S. tax reform, the real and nominal interest rates change. Taking each of these effects into account generates the average tax rates shown in Table 9.1. U.S. reform, holding r_U constant initially, lowers the average tax rate from 41.72 percent to 35.50 percent. With the drop in r_U, the effective rate rises slightly to 37.57 percent because the value of the CCA and the interest rate deduction decrease as the nominal interest rate declines. (Note that the Canadian average CIT rate also rises for this reason.)

Canadian tax reform raises the effective average tax rate on book profits in manufacturing from 27.72 to 32.23 percent. Combined with U.S. reform, t_C^A rises to 33.35 percent. Effective Canadian and U.S. rates post-reform would be quite close: 33.35 percent in Canada and 37.57 percent in the U.S., although U.S. rates are still higher. The narrowing of the spread in tax rates should lessen the incentive to minimize charges and underinvoice imports. Also, the fall in tariff rates should have the same impact on transfer pricing. The net impact may be larger outflows on the current account of Canada's balance of payments, both in the goods and services accounts. Coupled with a 10 percent withholding tax, the effective Canadian tax rate on dividends increases to 40.02 percent, giving the Canadian subsidiary a surplus of tax credits! Thus no extra U.S. taxes would be due on repatriated dividends; the binding rate in (10) becomes the withholding tax. The interesting conclusion is that, in the absence of Canadian tax reform, this redirection of incentives would not have occurred; i.e., the Canadian average rate on dividends would have remained below the U.S. rate (36.90 percent), leaving a continuing deficit of tax credits.

CONCLUSIONS

The purpose of this chapter was to explore the probable impacts of tax and tariff reform on U.S.-controlled foreign direct investment in the Canadian manufacturing sector. We outlined a simple model of international capital flows and showed how tax changes could affect capital movements and the welfare level in the host country. We developed a model to predict the impact of tax and tariff changes on a horizontally-integrated manufacturing MNE. These models predicted that effective marginal CIT rates determine capital flows within the MNE, while effective average rates on book profits affect financial and intrafirm trade flows. We estimated effective marginal and average CIT rates for U.S. manufacturing MNEs and their Canadian subsidiaries in the pre-reform period, and then reestimated these rates based on the U.S. tax reform, Canadian reform, and joint reform programs.

Our results showed that, in the pre-reform period, both Canada and the United States were subsidizing investments in machinery and equipment in the manufacturing sector, with the U.S. effective marginal subsidy being larger than the Canadian. The impact of U.S. tax reform was to substantially reduce the U.S. subsidy, causing a decline in the optimal U.S. capital stock in manufacturing. The subsequent fall in U.S. interest rates moderated this effect, but increased the effective Canadian subsidy, encouraging an investment boom in Canada. The impact of Canadian tax reform, however, was to offset this positive external effect, with the marginal effective CIT rate turning from a subsidy to a tax. This could generate substantial long-run capital outflows.

The situation with respect to the effective average tax rate on manufacturing book profits was different. In the pre-reform period, the U.S. rate was much higher than the Canadian one, discouraging remittances to U.S. parents and encouraging underinvoicing of imports from the U.S. The impact of U.S. tax reform was to marginally lessen the U.S. average tax rate with probable minimal effects on financial and trade flows within manufacturing MNEs. However, the Canadian reform proposals would substantially raise the Canadian effective average tax rate on book profits, leaving it slightly below the U.S. level. The incentive to underinvoice and to avoid remittances would be therefore somewhat reduced. When the withholding tax on dividends was added, Canada moved from a deficit of foreign tax credits to a surplus. Coupled with the U.S. tax change from an overall to a per-country limitation on foreign tax credits, the Canadian proposals could significantly affect financial and intrafirm trade flows within manufacturing MNEs.

Given the importance of the manufacturing sector to the Canadian economy, and the vital role of U.S.-controlled subsidiaries in that sector, the effects of tax and tariff reform outlined above imply major changes in Canadian capital, financial, and trade flows over the next few years. With the predicted strong, negative impact on investment of the Canadian tax proposals, it is likely that the reforms may undergo major revisions before becoming law. Even if the Canadian proposals do not become law, the effects of U.S. tax reform will be substantial. Coupled with falling tariff rates, a possible Canada-U.S. free trade deal and/or increasing U.S. protectionism, the Canadian manufacturing sector must be as flexible as possible in order to successfully weather the government-induced changes ahead.

Lastly, note that since Canadian tax rates in the manufacturing are substantially below those in other sectors, Canadian tax reform could push the Canadian average CIT rate well above the U.S. rate in these sectors. The incentives that we have shown exist for U.S.-controlled manufacturing subsidiaries in Canada to shift profits, financial flows, and trade flows to the U.S. could therefore be much stronger in other sectors of the Canadian economy.

NOTES

Helpful comments were received from Carl S. Shoup, Michael Daly, Jack Jung, Barry Mersereau, and participants at a University of Waterloo economics department seminar, where an early version of this chapter was presented.

1. The data are from Canada, *Foreign-owned Subsidiaries* (1984), Tables 2a and 2b (excluding other non-manufacturing); Canada, *Domestic and Foreign Control* (1985), Table 4; and Canada, *Canadian Imports* (1981), Table 2.
2. See U.S. Congress (1986) for details. Analyses of U.S. tax reform can be found in Auerbach (1987), Fazzari (1987), and Warren (1987). All three expect the effective tax on capital income to rise, reducing the long-run capital stock.
3. *The Wall Street Journal* (Aug. 19, 1986), for example, concluded that for many MNEs, U.S. tax reform could create a tax shelter at home because it would be cheaper to manufacture products in the U.S. than in many other developed countries. The *Journal* predicted that tax reform would create jobs in U.S. manufacturing and that some high-tax countries, such as Canada, would be forced to bring their taxes in line with the new U.S. tax system.
4. In later work, we intend to extend this analysis to other sectors, such as mining and services, and to examine the 20 manufacturing industries individually.
5. Asuming Canada is a price taker in the international capital market implies that 100 percent of the burden of foreign (and domestic) taxation falls on Canada. If Canada has monopoly/monopsony power in either international capital or product markets, the optimal Canadian tax may not only be positive, but possibly lie above U.S. levels. See Burgess (1985a), Eden (1988, 1987).
6. See Thirsk (1986) for an estimate of the welfare impact of raising Canadian taxes on capital income. In certain cases, he shows that raising the tax rate increases welfare. See also the analysis in Mintz (1987).
7. The earliest writers on deferral were Richman (1963) and Shoup (1969). For good "traditional" analyses of deferral and its impacts, see Arnold (1986), Brean (1984), and Horst (1977). For the new approach to deferral, see Hartman (1985). Both approaches are discussed in Eden (1988).
8. In fact, there is no conflict in these positions. The net present value of a constant dollar amount, A, does approach zero as the time period, n, rises: i.e., NPV $= A / [1 + (1 - t)\, i]^{N} \rightarrow 0$ as $N \rightarrow$ infinity. However, if A rises yearly by the net return to investments, $(1 - t)$ i, the NPV of A is constant.
9. The cost of capital formula derived in this section and used in section IV is outlined in Daly and Jung (1987) and Fazzari (1987). The gross cost varies across industries, types of capital (e.g. machinery, buildings, inventories) and funding of capital (e.g. equity, debt).
10. Setting $L_i = 0$ implies that all capital is equity capital; if $L_i = 1$, all capital is debt funded.
11. For example, higher head office charges reduce dividends by $\alpha\,(1 - t_C)$ times the change in H. A higher transfer price, for a given X, reduces profits by the change in p times $\alpha\,(1 - t_C)\,X$.
12. For example, differentiating (5) with respect to p yields:

$d\pi/dp = \Sigma\ (\delta\pi/\delta K_I)\ (\delta K_I/\delta p)\ +\ (\delta\pi/\delta X)/(\delta X/\delta p)\ +\ (\delta\pi/\delta D)(\delta D/\delta p) +\ \delta\pi/\delta p$

However, since the MNE simultaneously optimises over K_1 and X, $\delta\pi/\delta K_I = \delta\pi/\delta X = 0$, leaving only the impact of p on dividends (we assume $\delta\pi/\delta D = 0$) and $\delta\pi/\delta p$. A similar procedure holds for H and D.

13. Note that the withholding tax, w_H, has no effect on the optimal amount of H. This is because w_H is so low relative to t_U that the tax is always fully deductible in the U.S. The net cost of H to the Canadian subsidiary is $e\ (1 - t_C + w_H)\ H$ and the U.S. parent is $e\ (-1 + t_U - w_H)\ H$ for a total net cost of $e\ (t_U - t_C)\ H$ to the MNE. Note that in the Canadian case with $t_C = .4$ and $w_h = .15$, the Canadian government bears 25 percent of the burden of H in foregone taxes. The U.S. government, on the other hand, receives $t_U - w_H = .46 - .15$, or 31 percent of the return from H to the U.S. parent.

14. By totally differentiating (6, 7, 8) with respect to the various government policy and financial variables, t_I, τ, α, β_I, Z_I, and using Cramer's Rule, we could find the comparative static effects of these variables on K_I and X. Since this has been largely done elsewhere (Eden, 1985) and would substantially lengthen the paper, we omit this analysis. Simple inspection of the effects of a change in each variable on (6, 7, 8) yields much the same results. For example, a rise in t_C raises the numerator and lowers the denominator in (6), raising the gross cost of capital to the subsidiary and causing a fall in the optimal stock of K_C and an outflow of foreign investment.

15. The effective return to the MNE of a high transfer price is $t_C = .4$ while the effective cost is $t_U + \tau\ (1 - t_C) = .46 + .05\ (.6) = .503$. Since the cost exceeds the return, the MNE sets a low price, both to avoid the tariff and the higher U.S. CIT. This is dampened by the positive effect of p on π via D.

16. This may have had little effect in the last few years, because U.S. MNEs could elect either the overall or per-country limitation on the foreign tax credit. A deficit of tax credits could be applied against a surplus elsewhere under the overall limitation, thus offsetting the negative impact on the Canadian subsidiary of the credit deficit. The new U.S. tax law, however, forces MNEs to use the per-country limitation. This increases the extra tax payable by the parent, because pooling of credits is eliminated. See Batten and Ott (1985, p. 12) for an example.

APPENDIX

We make the following assumptions concerning the data:

1. The capital stock in both firms consists wholly of machinery and equipment with an economic life of 18 years (Daly and Jung, 1987). The economic depreciation rate is $d + (2/N)\ (K_T + K_{T-1})/2$, where N is the service life of the asset and K_T is the capital stock in period T; i.e., the depreciation rate is $2/N$ times the average capital stock. (See Statistics Canada, *Fixed Capital Flows and Stocks 1936–83*.) Assuming $N + 18$ implies $d + .11111$.

2. International capital mobility ensures $r_U = r_c = r = .083$ in the pre-reform period. The expected inflation rate in Canada is .044 and in the U.S. is .0395. Thus the nominal interest rate is .1225 in the U.S. After U.S. tax reform, the U.S. real rate falls to .0719 and the inflation rate to .0346 (based on data in Fazzari, 1987) so the nominal U.S. rate becomes .1066. Using Daly and Jung's

fixed-r^* assumption and their equations (6,7) implies a nominal Canadian interest rate of .1313 initially, and a rate after U.S. reform of .1187.

2a. The 1985 statutory CIT, federal plus provincial, on manufacturing profits is .4187 in Canada; i.e. the federal rate is .40 minus an abatement of .10 for the provinces plus a provincial-average rate of .1187. The investment tax credit in Canada is .0635 (Daly and Jung). We assume the provincial tax rate is constant.

The following statistics were calculated from several sources. In all cases the Canadian data are of foreign-controlled manufacturing subsidiaries in Canada with assets of at least $10 million Canadian. The U.S. data are for U.S. manufacturing firms with assets of $250 million U.S. or more. (Since these U.S. firms receive approximately 95 percent of all foreign tax credits, this sample includes almost all U.S. MNEs. See U.S. *Statistics of Income, 1977–81.*)

3. The leverage ratio for Canadian subsidiaries was based on the 1978–81 average ratio of long-term liabilities to long-term liabilities plus equity, calculated from *CALURA (Part I - Corporations,* 1979 and 1981). The leverage ratio for the U.S. parents was similarly calculated as the 1978–81 average, from *1977–81 Statistics of Income*. The ratios are L_c = .2899 and L_u + .3588. We assume, in both cases, that L is constant throughout the analysis, although we would expect tax reform to alter debt-equity ratios.

4. We model the combined effect of U.S. federal and state CITs, because capital flows are affected by both income taxes. The U.S. statutory CIT rate equals the federal CIT rate plus an average state CIT, net of the federal rate, because state taxes are deductible against the federal CIT. The pre-reform 1985 federal rate is .46. The average statutory state CIT rate was calculated by the following method. Total 1979 state income taxes were 13.94 percent of total federal income taxes paid by all manufacturing firms (from *U.S. Quarterly Financial Report*, 1979). Since both taxes were calculated on the same base and the federal rate was .46, the state rate was .0641, implying a net state rate of .0641 (1 − .46) = .0346. Thus the statutory combined federal/state pre-reform CIT rate is .4946. We assume the state rate remains constant at .0641.

5. The U.S. investment tax credit is calculated as .0889, based on the 1978-81 average of the ratios of investment tax credits to cost of property used for the tax credit (see *Statistics of Income*). The simple 10 percent rate was not used since the U.S. income tax regulations place limits on the amount of investment tax credits that can be claimed by different firms.

6. The net present value of capital consumption allowances, Z, was calculated using the formula for *N* years of service life (see Fazzari, 1987):

$$Z_I = \Sigma\,(CCA_I\,/\,(1 + (1 - t_I)i_I)^N) \tag{A.1}$$

In the pre-reform case, Canada allowed machinery to be written off on a two-year straight line method, subject to the half-year rule (see *Income Tax Reform*, 1987). Given the initial values for t_c and i_c above, Z_c = .9221. The pre-reform Z_u was calculated assuming a 150 percent declining balance method with a five-year tax service life, where the corporation could switch to straight-line depreciation to maximize the deduction. Substituting values for t_u and i_u, we find Z_u = .8538.

7. A four-year average, 1978–81, of capital consumption allowances to before-tax book profits for Canadian manufacturing (.5450) was calculated from *Cor-*

porate Taxation Statistics 1979, 1981. This publication was also used to calculate the average ratios of CCA minus book depreciation to book profits (.2205), and recorded capital expenditures to book profits (.7742).

8. U.S. domestic book profits are not explicitly recorded in *Statistics of Income*. They were inferred for manufacturing firms with $250 million or more in assets in the following manner. The U.S. levies a 15 percent additional tax on tax preferences (such as CCA in excess of book depreciation) over $10,000. Tax preferences were estimated as the additional tax divided by .15 plus $10,000. Constructive taxable income from foreign corporations was subtracted from net income (less deficit) and then the tax preferences were added to estimate book domestic profits before CIT. Ratios similar to those in item 7 were then calculated for U.S. MNEs: .0127 for (CCA - DEP) divided by book profits; .5606 for CCA to book profits and .7996 for capital expenditures to book profits.

REFERENCES

Arnold, Brian J. *The Taxation of Controlled Foreign Corporations: An International Comparison*. Toronto: Canadian Tax Foundation, 1986.

Auerbach, Alan J. "The Tax Reform Act of 1986 and the Cost of Capital." *Economic Perspectives I.1*, Summer, 1987.

Batten, Dallas S. and Ott, Mack. "The President's Proposed Corporate Tax Reforms: A Move Toward Tax Neutrality." *The Federal Reserve Bank of St. Louis Review* 67.3, Aug/Sept. 1985.

Brean, Donald J. S. *International Issues in Taxation: The Canadian Perspective*. Toronto: Canadian Tax Foundation, 1984.

Burgess, David F. "On the Relevance of Export Demand Conditions for Capital Income Taxation in Open Economies." Ottawa: Economic Council of Canada Discussion Paper, 1985a.

———. "The Impact of Trade Liberalization on Foreign Direct Investment Flows." In *Canada-U.S. Free Trade*, Whalley, John, research coordinator, Toronto: University of Toronto Press, 1985b.

Canada, Department of Regional Economic Expansion. *Foreign-Owned Subsidiaries in Canada 1973–1979, 1979–1981*. Ottawa: Government of Canada, 1983, 1984.

———. Department of Finance. *Income Tax Reform, June 18, 1987*. Ottawa: Supply and Services Canada, 1987.

———. Statistics Canada. *Canadian Imports by Domestic and Foreign-Controlled Enterprises 1978*. Ottawa: Supply and Services Canada, 1981.

———. *Corporate Taxation Statistics 1979, 1981*. Ottawa: Government of Canada, 1983.

———. *Corporations and Labour Unions Returns Act: Part I Corporations 1978–81*, Ottawa: Supply and Services Canada, 1983.

———. *Domestic and Foreign Control of Manufacturing, Mining and Logging Establishments in Canada 1981*. Ottawa: Supply and Services Canada, 1985.

Daly, Michael J. and Jung, Jack. "The Taxation of Corporate Investment Income in Canada: an Analysis of Marginal Effective Tax Rates." *The Canadian Journal of Economics* XX.3, Aug. 1987.

Eden, Lorraine. "Equity and Neutrality in the International Taxation of Capital." *Osgoode Hall Law Journal* 26(2), forthcoming 1988.

———. "Pitfalls in the Taxation of Foreign Capital." Presented at the Canadian Economic Theory Meetings, University of Montreal, May, 1987.

———. "The Microeconomics of Transfer Pricing". In *Multinationals and Transfer Pricing*, Rugman, Alan, and Eden, Lorraine, editors, London: Croom Helm and St. Martins Press, 1985.

Fazzari, Steven M. "Tax Reform and Investment: How Big an Impact?." *Federal Reserve Bank of St. Louis Review 69.1*, Jan. 1987.

"For Business, Tax Bill Offsets Rate Cut with Loss of Deductions." *The Wall Street Journal*, Aug. 19, 1986.

Hartman, David. "Tax Policy and Foreign Direct Investment." *Journal of Public Economics* 26, 1985, 107–21.

Horst, Thomas. "American Taxation of Multinational Firms." *American Economic Review* 67.3, 1977, 376–89.

———. "The Simple Analytics of Multinational Firm Behaviour." In *International Trade and Money*, Connolly, Michael B., and Swoboda, Alexander K., editors, London: George Allen and Unwin, 1973.

Little, Bruce. "U.S. Tax Reforms Create Problems for Wilson." *The Globe and Mail*, Nov. 11, 1986.

Lush, Patricia. "Going, Going, Gone." *Report on Business Magazine*. Toronto: Globe and Mail Publishers, January 1987.

Mintz, Jack M. *Corporate Tax Design in an International Setting*. Ottawa: Department of Finance, forthcoming, 1987.

Mutti, John. "Tax Incentives and the Repatriation Decisions of U.S. Multinational Corporations." *National Tax Journal* XXXIV, 1981, 241–8.

Richman, P. B. *Taxation of Foreign Investment Income*. Baltimore: Johns Hopkins Press, 1963.

Rugman, Alan M. *Trade Liberalization and International Investment*. Ottawa: Economic Council of Canada, forthcoming 1987.

Shoup, Carl S. *Public Finance*. Chicago: Aldine Publishing Company, 1969.

Thirsk, Wayne R. "The Marginal Welfare Cost of Corporate Taxation in Canada." *Public Finance / Finances Publiques* XXXXI.1, 1986.

U.S. Congress, Staff of the Joint Committee on Taxation. *Tax Reform Act of 1986*. Washington: U.S. Government Printing Office, 1986.

U.S. Federal Trade Commission. *Quarterly Financial Report for Manufacturing, Mining and Trade Corporations 1978–79*. Washington: U.S. Government Printing Office, 1979.

U.S. Internal Revenue Service. *Statistics of Income: 1977–81 Corporation Income Tax Returns*. Washington: U.S. Government Printing Office, 1977–81.

Warren, Alvin C., Jr. "Taxing Corporate Income in the U.S. Twenty Years after the Carter Commission Report: Integration or Disintegration?". In *The Royal Commission on Taxation: Twenty Years Later*, Osgoode Hall Law School Annual Lecture Series, Brooks, Neil, editor, Toronto, forthcoming, 1987a.

———. "The Timing of Taxes." *National Tax Journal* XXXIX.4, 1986.

CANADIAN-AMERICAN ECONOMIC RELATIONS

Conflict and Cooperation on a Continental Scale

EDITED BY David L. McKee

PRAEGER

New York
Westport, Connecticut
London