IMF WORKING PAPER

WP/94/50

INTERNATIONAL MONETARY FUND

Research Department

The Trade and Welfare Consequences of U.S. Export-Enhancing Tax Provisions

Prepared by Donald Rousslang and Stephen Tokarick 1/

Authorized for Distribution by Peter B. Clark

May 1994

Abstract

The U.S. tax code contains two provisions that encourage exports by reducing the U.S. corporate income tax on export profits. An applied general equilibrium model of the U.S. economy is used to estimate the trade and welfare consequences of eliminating both tax provisions. We find that the provisions ameliorate the trade-discouraging effects of U.S. tariffs, but they also adversely affect the U.S. terms of trade to such an extent that eliminating them is likely to improve U.S. domestic welfare. While it is possible to find a "equivalent" tariff rate that replicates the effects on trade flows of removing the tax provisions, the welfare effects of a tariff differ importantly because a tariff interacts differently than the tax provisions with other distortions in the model.

JEL Classification numbers:
C68, F13

1/ Don Rousslang is an economist with the U.S. Department of the Treasury and Stephen Tokarick is an economist with the Research Department of the International Monetary Fund. The views expressed in this paper are those of the authors and do not reflect the views of the U.S. Department of the Treasury or the International Monetary Fund. The authors would like to thank Peter Clark, Harry Grubert, and Christopher Towe for helpful comments.

Contents

List of Tables

Summary

This paper uses an applied general equilibrium model of the U.S. economy to quantify the effects of two provisions in the U.S. tax code that provide tax breaks for corporate export profits: the Foreign Sales Corporation (FSC) program and the rules for allocating the export profits of U.S. multinational corporations between domestic and foreign source income. The model provides estimates of the effects of these two provisions on trade flows, production, real wages, consumption, and aggregate welfare. It shows that the welfare effects depend importantly on the degree to which the United States is able to influence its terms of trade. In the absence of terms-of-trade effects, these tax provisions improve U.S. welfare because they offset other distortions in the economy, namely the distortionary effects of import tariffs. With terms-of-trade effects, however, the tax breaks have an adverse effect on welfare because they worsen the terms of trade.

The paper also shows that export tax breaks are a more efficient way of reducing the anti-trade bias imposed by tariffs than a direct reduction in U.S. tariffs. Specifically, eliminating the tax breaks, while at the same time reducing the import tariff to keep the volume of U.S. exports and imports unchanged, reduces domestic economic welfare. This result occurs because the tax breaks interact differently with other distortions in the economy than changes in tariffs. Removing the tax breaks on export profits exacerbates the effects of existing distortions to a greater extent than an "equivalent" change in import tariffs, when equivalent is defined as a tariff change that leaves trade volume unaffected.

I. Introduction

The U.S. tax code contains two provisions that encourage exports. One provision, the "sales source rules," determines how profits from U.S. exports are divided between domestic and foreign source income for the purpose of calculating the U.S. income tax liability of multinational corporations. The other provision governs the taxation of income earned from exports that are sold through Foreign Sales Corporations (FSCs). Both provisions give preferential tax treatment to corporate profits earned from exports. In this paper we examine the trade and welfare consequences of these two provisions using an applied general equilibrium model.

The model incorporates two important advances over other static general equilibrium trade models. First, it accounts for the role of domestic labor market distortions in determining the welfare consequences of commercial policies. This role is ignored by most general equilibrium trade models, because most fail to incorporate either leisure or domestic taxes. 1/ Second, the model does not constrain all goods to be net substitutes for each other in demand. Most general equilibrium models impose this constraint, because they use a functional form (such as Cobb-Douglas, CES, or Stone-Geary) that requires all goods to be net substitutes, despite empirical evidence that leisure is a net complement for an important part of total consumption. 2/ We have shown elsewhere (Rousslang and Tokarick, (forthcoming)) that either failing can lead to serious errors in the estimates for the welfare consequences of commercial policies.

The next section describes the export-enhancing tax provisions in greater detail. Section three describes the model. Section four discusses the application of the model and section five contains the results of our experiments. Section six contains the conclusions.

II. The Sales Source Rules and the Foreign Sales Corporation Provisions

The sales source rules allow a U.S. multinational corporation to treat part of the profit from the production of U.S. exports as though it were

---

1/ See, for example, the models used by Broadway and Treddenick (1978), Harris (1984), Whalley (1985), Hamilton and Whalley (1985), Deardorff and Stern (1986), Clarete and Roumasset (1987, 1990), Clarete and Whalley (1988), Markusen and Wigle (1989), Tarr (1989), and de Melo, Stanton and Tarr (1989), among others. Bizer and Stuart (1989) use a model that contains both leisure and domestic taxes, but they do not mention explicitly the effect of the labor market distortion.

2/ All of the studies cited in note 1 are subject to this criticism. For evidence on net complementarity between leisure and other goods, see Abbot and Ashenfelter (1976).

foreign source income. 1/ Such treatment does not attract additional foreign income tax, but it allows the corporation to reduce the U.S. tax on its export profits. The tax saving arises as follows. In general, a U.S. multinational corporation is subject to U.S. federal tax on all of its income, whether the income is earned at home or abroad. 2/ It receives a credit (as opposed to a deduction) for income taxes paid to foreign governments, but the credit is limited to the U.S. tax liability on the foreign source income. Thus, if the foreign tax rate exceeds the U.S. tax rate, the corporation will pay more in foreign taxes than it can credit against the U.S. tax liability on its foreign earnings. The sales source rules allow the corporation to credit some of the foreign tax payments against the U.S. tax on profits earned from domestic export production.

As an example, suppose a U.S. corporation has a single branch abroad that faces a foreign income tax rate of 38.5 percent, which is ten percent higher than the U.S. corporate income tax rate of 35 percent. For this corporation, the foreign tax credit will eliminate the incipient U.S. tax liability on the branch's earnings and, for each $100 of such earnings, the corporation will pay $3.50 in foreign taxes that it cannot credit against the U.S. tax liability. The corporation is said to have "excess" foreign tax credits and, for each dollar of U.S. export profits that it can treat as foreign source income, it will save $.35 in tax payments, until it has exhausted the excess foreign tax. 3/ The tax saving arises, because the reallocation of U.S. export profits does not involve any change in the branch's earnings, in the income reported to the foreign host country, or in the global income of the corporation: it is merely an accounting change made on the books of the U.S. parent that allows the corporation to claim an additional $.35 in foreign tax credits against the U.S. tax liability for each dollar of the U.S. export profits that it treats as foreign source income.

The sales source rules allow a corporation to treat up to 50 percent of U.S. export profits as foreign source income, so the tax saving amounts to $.175 for each dollar of the export profits until the excess foreign tax credits are absorbed. In the above example, the tax saving can be realized on $20 of export profits for each $100 of income earned by the foreign branch. (With $20 dollars of export profits, the U.S. parent can allocate $10 to foreign source income, which would allow it to can claim up to $3.50

1/ The sales source rules are found in section 862(a)(6) and sections 863(b)(2) and (3) of the Internal Revenue Code. Detailed explanations of the operation of the rules can be found in U.S. Department of Treasury (1993b) and Hufbauer and Hammond-Tooke (1988).

2/ Income earned abroad by foreign subsidiaries generally is not subject to U.S. tax until it is returned to the United States.

3/ If the affiliate is a subsidiary (rather than a branch), the foreign income (net of foreign income tax) must be remitted to the U.S. parent before the foreign tax credits are available.

in additional foreign tax credits. This is exactly the amount of excess foreign tax credits that would be generated by $100 of branch earnings.)

The tax saving is limited either by the amount of the corporation's exports or by the amount of its excess foreign tax credits. If the corporation earns more than enough export profits to absorb all of its excess foreign tax credits the rules provide it with a tax saving, but no incentive to expand exports, because its profits from the last units of export sales do not benefit from the tax break. If the corporation has insufficient export profits to absorb all of its excess foreign tax credits, the rules provide it with an incentive to expand exports, because they would reduce the effective rate of tax on its profits from additional exports. If the corporation has no foreign operations, or if it pays foreign income taxes at rates insufficient to generate excess foreign tax credits, it receives neither a tax saving nor an export incentive from the rules.

The Foreign Sales Corporation legislation was enacted as part of the Tax Reform Act of 1984. The program was designed to replace the Domestic International Sales Corporation (DISC) program, after complaints by U.S. trading partners that DISCs provided an export subsidy and were illegal under the General Agreement on Tariffs and Trade. The FSC program provides very nearly the same export incentive as the former DISC program. 1/ The FSC legislation exempts up to 30 percent of eligible export profits from U.S. income tax, but in the great majority of cases the exemption is limited to 15 percent. Thus, the tax saving is typically about $.05 for each dollar of export profits. To be eligible for the exemption, exports must be sold through a FSC, but the requirement usually can be met at little cost to the exporter.

If exports are sold through a FSC, only 25 percent of the export profits can be treated as foreign source income under the sales source rules. Hence, a corporation with excess foreign tax credits often will realize a greater tax saving by foregoing the FSC benefit in order to absorb more of its foreign tax credits. The sales source rules provide a substantially greater export incentive than the DISC or FSC programs, because most U.S. exports come from corporations that have excess foreign tax credits. Despite their potential effects on trade flows, the source rules have received virtually no attention in the trade literature.

III. The Model

The basic model uses standard applied general equilibrium modeling techniques and has been presented in an earlier paper (Rousslang and Tokarick (forthcoming)), so it is only summarized here. However, the

---

1/ A complete descriptions of the DISC program is provided in U.S. Department of Treasury (1988). The FSC program is described in U.S. Treasury (1993a).

changes that were made in the model in order to examine the effects of the export-enhancing tax provisions are described in detail.

The model contains four goods: an imported good (denoted M); a domestically produced traded good (T) consisting of output from agriculture, mining and manufacturing; a nontraded good (N) consisting mainly of construction and services; and leisure (LE). The imported good is an imperfect substitute in demand for the domestically produced traded good. Some of the traded good is consumed at home and the remainder is exported. Leisure and the nontraded good are net (Hicksian) complements for each other in demand; all other pairs of goods are net substitutes. 1/

Two factors of production, capital and labor, are combined to produce the traded good and the nontraded good. Both factors are fully mobile between the two industries; however, neither factor is internationally mobile. 2/ Production of the traded good is more labor intensive than production of the nontraded good. 3/ Taxes consist of an import tariff, a general sales tax, taxes on labor and capital income, and factor taxes on labor and capital. There is a single household and the government returns all tax revenues to the representative consumer in lump-sum fashion. 4/

1. Production and Factor Markets

Production of traded and nontraded goods is modeled using constant elasticity of substitution (CES) production functions. We assume that production takes place under conditions of perfect competition and the elasticity of substitution between capital and labor is constant. Factor and income tax rates are the same for labor in both sectors, so by eliminating differences in after-tax wages, labor mobility also eliminates differences in before-tax wages. The rate of return to capital gross of tax differs between the sectors, however, owing to the tax breaks on corporate profits earned from exports of the traded good.

The capital endowment is fixed. The total time available for work or leisure is also fixed, but the amount of time spend working is determined

---

1/ This substitution pattern is suggested by the empirical evidence (see Abbot and Ashenfelter, 1976).

2/ Assumptions of international capital mobility and sector specific capital can easily be incorporated into the model. The pattern of capital mobility was chosen on the basis of empirical findings by Reitzes and Rousslang (1988).

3/ The labor output ratios in the traded and nontraded goods industries were .64 and .59, respectively, in 1987 (see the data appendix to Rousslang and Tokarick, 1994).

4/ Although this is the standard assumption in theoretical trade models, it is unrealistic. For our experiments however, the change in government revenue is small, so the potential changes in government revenue and expenditure would not affect our results.

endogenously since the consumer derives utility from the consumption of leisure. Total time available must equal time spent working plus leisure, or

$$LS = TIME - LE, \tag{1}$$

where TIME is the endowment of time available for work or leisure, LS is the amount of time spent working, and LE is leisure (defined as time spent not working).

2. Consumer Demand

We allow the imported good and the domestically produced traded good to be imperfect substitutes for each other in demand owing to the level of aggregation in the model, but this approach is also appealing for more disaggregated models, as two-way trade is often observed in the disaggregate commodity categories. The imported good (M) and home consumption of the traded good (C_T) are combined to form a composite commodity (Q) using a constant elasticity of substitution aggregation function

$$Q = AC[\delta M^{-\rho} + (1 - \delta)C_T^{-\rho}]^{-1/\rho}, \tag{2}$$

where AC and δ are constants, and $\rho = (1 - \sigma)/\sigma$, where σ is the elasticity of substitution in demand between M and C_T. 1/ The consumer chooses the combination of M and C_T that minimizes the total expenditure necessary to achieve a given level of utility. Total consumer expenditure on Q is given as

$$p_Q Q = pc_T C_T + p_M M, \tag{3}$$

where p_Q, pc_T and p_M are the gross-of-tax domestic consumer prices of Q, C_T and M.

The Almost Ideal Demand System (AIDS) described in Deaton and Muellbauer (1980) is used to model consumer demand for Q, N, and LE. The structure of the AIDS allows Hicksian complementarity between leisure and the nontraded good, which would be ruled out by the popular separable utility functions that, owing to their tractability, are often used in applied general equilibrium models.

3. The Foreign Sector

The world price of imports (pf_M) and the price paid by the consumer (p_M) are related by the equation

---

1/ Functional forms other than CES could be used for the aggregation function. A CES function is convenient because econometric estimates of the elasticities of substitution are readily available.

$$p_M = (1 + t_S)(1 + t_M)pf_M, \quad (4)$$

where t_S is the rate of domestic sales tax and t_M is the tariff rate. Exports (EX) are the excess of production of the domestic traded good (X_T) over home consumption, or

$$EX = X_T - C_T. \quad (5)$$

The price received for exports of the traded good (pf_T) is related to pc_T by the equation

$$pc_T = (1 + t_S)(1 + s)pf_T, \quad (6)$$

where *s* is the ad-valorem rate of the before-tax benefit of the tax break for exports. The domestic producer's price of T (p_T) is given as

$$p_T = (1 + s)pf_T. \quad (7)$$

The balance of payments constraint requires that

$$pf_M M - pf_T EX = B, \quad (8)$$

where B denotes the amount of net foreign borrowing. 1/

The U.S. terms of trade are defined as the ratio pf_T/pf_M. Because pf_M is chosen as the numeraire, removing the tax breaks for export profits affects the terms of trade by changing pf_T. Export supply is the excess of domestic production over domestic consumption, as in equation (5). The demand for U.S exports is specified as

$$EX = EX_0(pf_T)^{\gamma}, \quad (9)$$

where EX_0 is the initial value of exports and γ is the elasticity of foreign demand for exports. For the version of the model with fixed terms of trade, the value of γ is infinite.

4. Taxes

Taxes are modeled after the treatment in Ballard, Fullerton, Shoven and Whalley (1985). Revenue from the factor taxes on labor (TL) is given as

$$TL = t_L wLS, \quad (10)$$

1/ In a static model, the presence of net foreign borrowing is an anomaly: It does not increase domestic income, but it is available for domestic purchases, so we included it in the expenditure function. This is also the procedure used by Tarr (1988) and de Melo, Stanton and Tarr (1989).

where t_L is the average rate of tax on labor use (primarily employer contributions to Social Security) and w is the wage rate net of factor taxes. Revenue from the factor taxes on capital (TK) is given as

$$TK = (t_K - etb)r_T K_T + t_K r_N K_N, \tag{11}$$

where t_K is the ad-valorem tax rate applied to capital (primarily property and corporate income taxes), etb represents the reduction in the rate of factor tax on capital attributable to the tax breaks for corporate export profits, r_i is the rental rate on capital in sector i net of factor taxes, and K_i is capital employed in sector i. Because of our assumption of capital mobility across sectors, the net-of-tax return to capital is equalized.

Revenue from the domestic sales tax (TS) is given by

$$TS = t_S[p_T C_T + pf_M(1 + t_M)M]. \tag{12}$$

Revenue from the import tariff is given by

$$TM = t_M pf_M M. \tag{13}$$

Finally, income taxes consist of a lump-sum tax and taxes on labor and capital income, and have the following form

$$TY = AT + t_{YL} wLS + t_{YK}(r_N K_N + r_T K_T), \tag{14}$$

where TY is income tax revenue, AT is a constant intercept term (a lump-sum tax or subsidy), t_{YL} is the marginal tax rate on labor income and t_{YK} is the marginal tax rate on capital income. 1/ Total government revenue is the sum of the revenues from equations (10) through (14), or

$$GR = TL + TK + TS + TM + TY. \tag{15}$$

5. Aggregate Income

Total money income (Y) available for spending on goods other than leisure is the sum of after-tax factor incomes, government revenue, and borrowing, or

$$Y = wnLS + rn_N K_N + rn_T K_T - AT + GR + B, \tag{16}$$

where $wn = w(1 - t_{YL})$ is the wage net of all taxes, and $rn_i = r_i(1 - t_{YK})$ is the rental rate on capital in sector i net of all taxes. Full income (YF) includes the value of leisure and can be written

---

1/ The intercept term AT is the amount of income taxes paid when income is zero. In this case, the representative consumer would receive an income transfer (negative tax) from the government.

$$YF = Y + wn(TIME - LS). \quad (17)$$

IV. Applying the Model

1. The parameters

The values for the endogenous variables in the base year, along with the parameters used in the domestic production and demand functions in the model are presented in Appendix I. (The model is calibrated to reproduce values for the U.S. economy in 1987.) In addition to these, we need the change in the tax rate applied to capital in the traded goods sector that would result from removing the export-enhancing tax provisions (etb), the rate of benefit from the export tax break (s), and the elasticity of foreign demand for U.S. exports (γ).

Without the tax breaks for export profits, the rate of factor tax is the same in both sectors. Thus, etb is calculated as the value that causes revenue from factor taxes on capital (TK, given in equation 11), to rise by the estimated revenue cost of the tax breaks when t_K is held constant. The revenue cost for the tax breaks in 1987 is estimated to be $2.6 billion, 1/ whereas TK in 1987 was $230.3 billion, the gross-of-tax return on capital in the nontraded sector was $1,046.0 billion and the gross-of-tax return in the traded sector was $718.3 billion. The return to capital in the nontraded sector net of factor taxes ($r_N K_N$) is obtained by dividing the gross-of-tax returns by $(1 + t_K)$, and the return to capital in the traded sector net of factor taxes is obtained by dividing the gross-of-tax return by $(1 + t_K - etb)$. The value for t_K in 1987 was .15. Combining these figures with equation (11) yields a value for etb of about .005.

The tax breaks on export profits provide a net-of-tax benefit equal to the revenue cost of the tax breaks. To obtain the gross-of-tax benefit, we divide the revenue cost by $(1 - t_K)$. Hence, to obtain the rate of benefit per dollar of exports (s), we divide the revenue cost by $EX(1 - t_K)$. The value of EX in 1987 was $250.3 billion. Combining this value with the above-mentioned values for t_K and the revenue cost for the tax breaks yields a value for s of 1.2 percent. For purposes of comparison, the trade-weighted average tariff rate in 1987 was about 3.7 percent (tariff revenue of $15.1 billion divided by merchandise imports of $409.8 billion).

We use a value of -3.0 for γ in the base case, which is close to the value used by Mutti and Grubert (1984). Results were also computed for

---

1/ The revenue cost of the FSC program was estimated to be $770 million and that for the sales source rules was estimated to be $1,845 million for fiscal year 1987 (see Executive Office of the President, 1989).

other values of γ, however, because empirical estimates for this parameter are subject to substantial margins of error. 1/

2. The experiments

We perform three experiments and use both the fixed and variable terms-of-trade versions of the model for each of them. In experiment 1, we eliminate the tax breaks for corporate export profits and examine the effects on U.S. exports, imports, employment, wages, output of the traded good, output of the nontraded good, consumption, and economic welfare.

According to the symmetry theorem of Lerner (1936), an import tariff is "symmetrical" to an export tax in its effects on relative prices. This symmetry arises because in a model with two goods--an exportable and an importable--an export tax rate can be found that replicates the effect of an import tariff on relative prices. In our model, the export-enhancing tax breaks increase exports, thus, the effects of removing the tax breaks are symmetrical to the effects of imposing an export tax or increasing the tariff on imports. In experiment 2, we calculate the change in the U.S. import tariff that would produce the same effect on the volume of exports as removing the tax breaks on export profits and note the effects on consumer welfare. In this experiment, we therefore calculate a "tariff equivalent" of the tax breaks on export profits.

In experiment 3, we eliminate the tax breaks and simultaneously adjust the import tariff in order to keep exports and imports constant at their base year values. The purpose of this experiment is to compare the effects of the tax breaks with those of an equivalent tariff reduction, where the equivalent tariff reduction is defined as the reduction that would have the same effect on the volume of trade and on the terms of trade as the tax breaks for export profits. In particular, we are interested in determining whether the tax breaks might be more efficient than a tariff reduction as a means of reducing the anti-trade bias of U.S. tariffs. By applying the symmetry theorem of Lerner (1936), we expect the tax breaks to have similar effects on relative prices and welfare as an equivalent tariff reduction. The welfare effects of the two measures differ importantly, however, depending on how each interacts with other distortions in the model.

Because all tax revenue is returned to the consumer in lump-sum fashion in the model, both experiments are balanced budget experiments (the fiscal budget balance remains unchanged) and they are also equivalent to differential incidence experiments (in which a lump-sum tax is varied to keep real government revenue unchanged). Hence, the results of the experiments do not confound the effects of eliminating the export tax breaks (with or without the accompanying tariff reduction) with the effects of a

---

1/ See, for example, the surveys by Goldstein and Khan (1985) and by Stern, Francis and Schumacher (1976).

change in the fiscal budget balance, or with the effects of an overall reduction in taxes.

V. The Results

1. Results of experiment 1

a. Fixed terms of trade

The results of experiment 1 are shown in Table 1. Removing the tax breaks for export profits reduces the volume of exports and imports. As the tax breaks apply directly to exports, removal of the tax breaks reduces exports, while import volume must fall to satisfy the balance-of-payments constraint. 1/ The tax breaks provide an incentive to employ capital in the traded sector, therefore, removal of these tax breaks encourages a reallocation of capital to the nontraded sector as the tax rate on capital in the traded sector rises. As a consequence of this shift in the allocation of resources, output of the traded good falls and output of the nontraded good rises.

With the terms of trade unchanged, removing the tax breaks on export profits reduces welfare because the tax breaks act to offset the trade-inhibiting effect of the import tariff to some degree. Initially, the import tariff discourages exports because it lowers the relative price of exportables. As a result of the symmetry theorem of Lerner (1936), a tax on imports (a tariff) is symmetrical in its effects to a tax on exports, therefore the import tariff "taxes" the exportable sector by drawing resources away from the production of exportables and encouraging the production of importables. The tax breaks on export profits encourage factors, namely capital, to move into the production of exportables, so these tax breaks offset to some degree the bias against exports introduced

---

1/ As mentioned earlier, the model is calibrated to a trade deficit in 1987 and we assume that this deficit remains constant in all the simulations. The imposition of a balance-of-payments constraint clarifies the welfare effects of the policy change as it imposes a borrowing constraint on the economy. If the balance of payments were allowed to change, the removal of the export tax breaks would produce a larger trade deficit. As long as the economy could borrow from abroad, the removal of the tax breaks would likely increase welfare further, an effect that would obscure the welfare effects of the tax breaks. This result would also be misleading because it would ignore the fact that the deficit would have to be repaid in the future. Thus, the welfare effects from removing the tax breaks would likely be biased without the inclusion of an external borrowing constraint.

by the import tariff. Therefore, when these tax breaks are removed, welfare falls. 1/

Removing the tax breaks on export profits produces additional welfare effects through interactions with the distortion in the labor market introduced by the tax on labor income. Elimination of the tax breaks on export profits causes output of the traded sector to contract and this reduces the demand for labor, as production of the traded good is labor intensive. 2/ Given the presence of the tax on labor income, the reduction in hours worked exacerbates the welfare cost of the tax on labor income and contributes to a larger reduction in welfare. This interaction among distortions produces a second-best welfare effect.

b. Variable Terms of Trade

When the terms of trade are endogenous, removal of the tax breaks reduces the volume of both exports and imports as in the fixed terms-of-trade case, however, overall welfare rises as shown in Table 1. This result occurs because removal of the tax breaks results in an improvement in the terms of trade. In this case, we assume that the United States is large enough in the export market to influence the world price of its exports by how much it sells to the rest of the world. Given that the United States can influence its terms of trade, there exists an optimal amount of trade restriction, the point where the terms of trade gain from restricting trade just balances the distortionary cost of the restriction at the margin. 3/ Thus, removing the tax breaks on export profits improves the terms of trade by reducing the volume of exports.

With terms of trade effects, the price elasticity of demand for U.S. exports (γ) is less than infinity and removing the tax breaks reduces the volume of both exports (and hence imports) by a smaller amount than when the terms of trade are held fixed ($\gamma = -\infty$). For a value of γ of -3.0, removing the tax breaks on export profits results in an improvement in consumer welfare. This result occurs because removing the tax breaks reduces the volume of exports (restricts trade), as would an increase in the import tariff, and generates an improvement in the terms of trade. Alternatively, given the ability to influence the terms of trade, the existence of U.S. tariffs supply such large terms-of-trade gains that effectively offsetting the tariffs with the tax breaks for export profits reduces domestic welfare.

1/ This result can also be explained by applying the theory of second best. For a survey, see Lipsey and Lancaster (1957).

2/ See the data appendix for details. The reduction in labor demand is a result of the Stolper-Samuelson theorem (1941).

3/ This is the rationale for the optimal tariff arguments in the trade theory literature. For a discussion, see Bickerdike (1906) and Johnson (1953). For a survey of the literature, see Subramanian et al. (1993).

Table 1: Effects of Eliminating the Export-Enhancing Tax Provisions

(Percentage change from the base values unless otherwise specified)

	Terms of Trade:	
	Fixed	Variable
Export volume	-4.67	-2.43
Import volume	-2.85	-0.99
Terms of trade	0.00	0.83
Hours worked	-0.17	-0.11
Real wage 1/	-0.01	0.02
Real output of the traded good	-0.47	-0.31
Real output of the nontraded good	0.18	0.13
Consumption of the domestic traded good	0.15	0.00
Consumption of the nontraded good	0.18	0.13
Consumption of leisure	0.37	0.24
Economic welfare:		
In billions of 1987 dollars 2/	-2.58	0.66
Percent of Full Income 3/	-0.05	0.01

1/ The nominal wage is deflated by an index of consumer prices.
2/ We measure the change in welfare by the Hicksian equivalent variation. The equivalent variation is defined as: $EV = E(P^o, U^1) - E(P^o, U^o)$, where $E(P, U)$ is the expenditure function, P^o is the vector of initial prices, U^o is utility in the base year, and U^1 is the utility level after the policy change.
3/ We express the equivalent variation as a percent of full income (YF) in 1987 dollars.

Because terms-of-trade effects turn out to be so crucial to the welfare estimates, and because estimates of the elasticity of foreign demand for U.S. exports are subject to wide ranges of error, we repeated the first experiment using different values for this elasticity. In our model, we find that an important value for this elasticity is -4.5 because this is the elasticity value that just balances the terms-of-trade improvement from removing the tax breaks against the detrimental effect of reducing exports. The export tax breaks distort the allocation of capital and therefore lower welfare, however, they also improve welfare to the extent that they offset the bias against exports introduced by the import tariff. In addition to these effects, removing the export tax breaks improves the terms of trade by restricting exports, which is similar to the effect of an increase in the import tariff on exports. Thus, the net result of removing the tax breaks depends on the presence of other distortions and the price elasticity of demand for exports. The consensus appears to be that γ is less elastic than our critical value of -4.5 1/ so the tax breaks probably reduce domestic welfare. 2/

In the model, if the price elasticity of demand for exports were greater than -4.5 in absolute value, tariffs would impose a welfare cost, but the export tax breaks generate a welfare gain by offsetting the bias against exports introduced by these tariffs, despite the distortion in the domestic distribution of capital. For a price elasticity of demand less than -4.5 in absolute value, a tariff improves the terms of trade and welfare rises. The tax breaks on export profits offset some of this welfare gain by depressing the terms of trade and distorting the allocation of capital across sectors.

1/ See Goldstein and Khan (1985).

2/ In an earlier analysis of the welfare consequences of DISCs (the precursors to FSCs), Mutti and Grubert (1984) came to a similar conclusion. They found that the DISCs caused a domestic welfare loss by adversely affecting the U.S. terms-of-trade. Our analysis of the likely effect on global welfare is very different from theirs, however. They argued that the DISC program probably lowered global welfare slightly by attracting capital to the United States from countries where, on average, the tax rates and hence the pre-tax rates of return were likely to be higher than in the United States. In assessing the global welfare consequences, they ignored the role of the DISC in reducing the domestic misallocation of capital induced by U.S. tariffs.

In contrast, we ignore the effect of the export-enhancing tax provisions on global investment flows, but account for their role in reducing the tariff-induced misallocation of resources within the United States. We argue that the provisions provide a global efficiency gain that should outweigh the gain that the United States would realize in the absence of terms-of-trade effects, because commercial policies abroad, like those of the United States, probably exhibit an anti-trade bias.

3. Results of experiment 2

This experiment calculates the "tariff equivalents" of the tax breaks on export profits. As mentioned above, there exists a symmetry between an export tax and an import tariff. Given that removal of the export-enhancing tax provisions produces effects similar to an export tax, there exists a tariff rate that induces effects symmetrical to the removal of the tax breaks on export profits. For both the fixed and variable terms of trade versions, the model calculates the tariff rate that produces the same effect on the volume of exports as removal of the tax breaks on export profits. In both cases, the export-enhancing tax provisions remain in place. The results are shown in Table 2.

a. Fixed terms of trade

In the case where the terms of trade are fixed, a tariff increase of 36.4 percent (from 3.6 percent to 5.0 percent) would reduce the volume of exports and imports by the same amount as the elimination of the tax breaks on export profits. The welfare effects, however, differ because the change in the tax rate on capital in the export sector interacts differently with the other distortions in the model than a change in the import tariff. The tariff increase reduces welfare by a smaller amount than the elimination of the export-enhancing tax provisions for a number of reasons. First, the tariff increase results in a smaller increase in the consumption of leisure, or equivalently, a smaller decline in the amount of time spent working. For the given marginal tax rate on labor income, a reduction in hours worked exacerbates the welfare cost of the labor-income tax. Since the reduction in hours worked is smaller from a tariff increase, the overall welfare loss is smaller compared to the welfare loss from removing the export-enhancing tax provisions.

The effect of an increase in the import tariff on consumption and output of the domestic traded good differs importantly from the effect of removing the export-enhancing tax provisions. The tariff increase results in a larger increase in consumption of the domestic traded good, compared to the elimination of the tax breaks on export profits. The reason is that a tariff increase raises the price of imports. This rise in the price of imports increases the demand for the domestic traded good, as imports and the traded are (imperfect) substitutes in demand. Since consumption of the traded good is subject to an excise tax, the increase in consumption that results from the tariff increase offsets some of the welfare loss from this excise tax, an effect which is not present in experiment 1. In addition, the increase in the import tariff reduces output of the traded good by less than the elimination of the export-enhancing tax provisions. This result occurs because the reduction in the volume of exports that occurs in both experiments 1 and 2 is identical by construction and the tariff increase results in a much larger increase in domestic consumption of the traded good. Therefore, an increase in the import tariff reduces output of the traded good by a smaller amount.

b. Variable terms of trade

With terms-of-trade effects, a tariff increase that has the same effect on the volume of exports as the removal of the export-enhancing tax breaks produces a welfare gain of US$1.33 billion, as shown in Table 2. As in the fixed terms of trade case, a tariff increase raises the price of imports and increases the demand for the traded good. This increase in domestic demand will reduce exports and improve the terms of trade. In this experiment, the terms of trade improvement that results from the tariff increase outweighs the distortionary cost of the tariff, so overall welfare rises.

The welfare gain that results from the tariff increase is slightly more than twice the gain that results from removal of the export-enhancing tax breaks (see Table 1). By construction, the results of experiments 1 and 2 have identical effects on the volume of exports and imports, and on the terms of trade. Therefore, the differences in the welfare effects of the two experiments result from the ways in which the two policy changes interact with other distortions in the economy. First, the tariff increase causes a much larger increase in the consumption of the traded good than the elimination of the export-enhancing tax provisions. This effect has implications for the welfare cost calculations because consumption of the traded good is subject to an excise tax that discourages consumption. Since a rise in the import tariff increases domestic consumption of the traded good, the higher tariff offsets some of the distortionary effects of the excise tax, and thus, leads to larger welfare gain, along with an improvement in the terms of trade. Second, the tax on labor income distorts the consumer's allocation of time between work and leisure. The rise in the import tariff exacerbates the distortionary effect of the tax on labor income because the higher tariff reduces the amount of time spent working and increases the consumption of leisure. The elimination of the export-enhancing tax provisions, however, results in a larger reduction in time spent working and a larger increase in the consumption of leisure, an effect that exacerbates the distortionary effect of the labor tax and contributes to a smaller welfare gain, compared to an increase in the import tariff.

Overall, the results of the two experiments exhibit a certain "symmetry" between the elimination of the export-enhancing tax provisions and an increase in the import tariff in their effects on trade flows. There is, however, an important difference between the two experiments. The elimination of the export-enhancing tax provisions *worsens* the distortionary effect of the import tariff, absent any terms-of-trade effects, because the tax breaks provide an incentive for export expansion and this effect offsets the bias against exports introduced by the tariff. An increase in the import tariff, however, *offsets* the distortionary impact of the export-enhancing tax provisions, absent any terms-of-trade effects, because an increase in the tariff reduces exports. Thus, there exists an important difference between these two experiments.

Table 2: Tariff Equivalents of the Export-Enhancing Tax Provisions

(Percentage change from the base values unless otherwise specified)

	Terms of Trade:	
	Fixed	Variable
Export volume	-4.67	-2.43
Import volume	-2.85	-0.99
Terms of trade	0.00	0.82
Hours worked	-0.12	-0.06
Real wage 1/	-0.04	-0.01
Real output of the traded good	-0.32	-0.17
Real output of the nontraded good	0.12	0.07
Consumption of the domestic traded good	0.32	0.17
Consumption of the nontraded good	0.12	0.07
Consumption of leisure	0.26	0.13
Economic welfare:		
In billions of 1987 dollars 2/	-1.91	1.33
Percent of Full Income 3/	-0.04	0.02
Ad-valorem import tariff (in percent)	5.0	5.0
Percent change	+36.4	+36.4

1/ The nominal wage is deflated by an index of consumer prices.
2/ We measure the change in welfare by the Hicksian equivalent variation. The equivalent variation is defined as: $EV = E(P^o, U^1) - E(P^o, U^o)$, where $E(P, U)$ is the expenditure function, P^o is the vector of initial prices, U^o is utility in the base year, and U^1 is the utility level after the policy change.
3/ We express the equivalent variation as a percent of full income (YF) in 1987 dollars.

3. Results of experiment 3

In experiment 3, the export-enhancing tax breaks are eliminated and the import tariff is altered in such a way that the volume of exports and imports remains constant. This experiment is actually a combination of experiments 1 and 2 in that it demonstrates the net welfare effect of removing the tax breaks on export profits and adjusting the import tariff to leave the volume of trade unaffected. The results of this experiment indicate that the tax breaks have the same effect on trade as reducing the import tariff by 36 percent, as shown in Table 3. 1/ This result is expected because, as shown above, the pre-tax ad valorem rate of benefit provided by the tax breaks (1.2 percent) is approximately one-third as high as the overall average U.S. ad valorem tariff rate (3.7 percent). The complete results of this experiment are shown in Table 3.

The results from this experiment demonstrate that while removal of the tax breaks coupled with an increase in the import tariff exhibit a certain "symmetry" in their effects on trade flows, each of these policy changes produces important differences in the welfare results because the tax breaks and the import tariff interact differently with other distortions present in the economy. The results show that domestic welfare would be lower if the tax breaks on export profits were eliminated and the import tariff reduced. In this experiment, the incentives to expand trade volume are neutral (the trade-inhibiting effects of eliminating the tax breaks on export profits offset the trade-expanding effects of a reduction in the import tariff), thus, the main effects on welfare come from interactions of changes in trade policy with other distortions present in the model: the distortion that domestic labor taxes impose by discouraging work effort and the distortion that the domestic sales tax imposes by discouraging consumption of the traded good.

To examine these second-best effects and, at the same time, to avoid unnecessary complexity, we consider the case in which the terms of trade are fixed (the foreign demand for the domestic traded good is perfectly elastic). In this case, when the export-enhancing tax breaks are eliminated the domestic producer's price of the domestic traded good (p_T) and the domestic consumer's price of this good (pc_T) both decline relative to the foreign price of imports (pf_M, which we have chosen as the numeraire). The tariff (and hence the consumer's price of imports, p_M) is reduced sufficiently to keep the volume of imports and exports at their initial levels, however, so any change in domestic production of the traded good must be matched by an equal change in the domestic consumption of this good.

1/ Two additional experiments were performed: removal of the tax breaks coupled with a change in the import tariff that would leave welfare, rather than trade flows unchanged. In the case where the terms of trade are fixed, the tariff rate would have to fall to 1.9 percent to leave welfare unchanged. With endogenous terms-of-trade effects, the tariff rate would have to fall to 3.0 percent.

Table 3: Effects of Eliminating the Export-Enhancing Tax Provisions and a Tariff Reduction

(Percentage change from the base values unless otherwise specified)

	Terms of Trade:	
	Fixed	Variable
Export volume	0.00	0.00
Import volume	0.00	0.00
Terms of trade	0.00	0.00
Hours worked	-0.05	-0.05
Real wage 1/	0.03	0.03
Real output of the traded good	-0.15	-0.15
Real output of the nontraded good	0.06	0.06
Consumption of the domestic traded good	-0.17	-0.17
Consumption of the nontraded good	0.06	0.06
Consumption of leisure	0.11	0.11
Economic welfare:		
In billions of 1987 dollars	-0.68	-0.68
Percent of Full Income	-0.01	-0.01
Ad-valorem import tariff (in percent)	2.4	2.4
Percent change	-36.0	-36.0

1/ The nominal wage is deflated by an index of consumer prices.
2/ We measure the change in welfare by the Hicksian equivalent variation. The equivalent variation is defined as: $EV = E(P^o, U^1) - E(P^o, U^o)$, where $E(P, U)$ is the expenditure function, P^o is the vector of initial prices, U^o is utility in the base year, and U^1 is the utility level after the policy change.
3/ We express the equivalent variation as a percent of full income (YF) in 1987 dollars.

The consumer's price of the composite good (p_Q) declines as a result of the declines in pc_T and in the tariff (see equations 3 and 4). The decline in p_Q causes the demand curve for the nontraded good to shift inward, which reduces its price. As a result, the producer's price of the nontraded good falls by less than the fall in p_T, so resources shift away from production of the traded good toward production of the nontraded good. It is this shift in domestic production away from the traded good that tends to exacerbate the effects of the distortions imposed by the domestic labor taxes and the domestic sales tax.

Consider first the effect of the production shift on the domestic labor market. Because the traded good is relatively labor intensive, the production shift causes the labor demand curve to shift inward. At the same time, the decline in p_Q causes the leisure demand curve to shift inward, whereas the decline in the consumer's price of the nontraded good causes this curve to shift outward. 1/ Shifts in the leisure demand curve imply opposite shifts in the labor supply curve, so the net shift in labor supply curve is ambiguous. The results of this experiment reveal that the amount of time spent working actually declined, so the net shift in the labor supply curve combined with the inward shift in the labor demand curve reduced work effort and thereby exacerbated the distortion imposed by the domestic labor taxes.

Next, consider the effect on sales that are subject to the domestic sales tax, that is, domestic sales of the traded goods. Recall that in this experiment a fall in production of the domestic traded good must be matched by an equal fall in the domestic consumption of this good, whereas domestic consumption of imports does not change. Hence, total domestic sales of the traded good declines, which exacerbates the distortion imposed by the domestic sales tax.

VI. Summary and Conclusions

In this paper we described two provisions in the U.S. tax code that provide tax breaks for corporate export profits (the FSC program and the rules for allocating export profits of U.S. multinational corporations between domestic and foreign source income) and we provided estimates of the effects of these two provisions on the U.S. economy and on domestic economic welfare. We found that the tax breaks have important effects on the volume of U.S. trade; together they cause the volume of imports and exports to expand by roughly the same amount as would reducing U.S. tariffs by one-third.

1/ Recall that leisure and the nontraded good are net complements. Because all tax revenues are redistributed to the households in lump-sum fashion, actual changes in demand are determined mainly by the compensated demand relationships. (Full income changes only to the extent that the tax changes affect economic welfare, so income effects are negligible.)

We found that the tax breaks are likely to reduce domestic welfare, even though they act to offset the distortions imposed by U.S. import tariffs, because the tax breaks worsen the U.S. terms of trade. One implication of this result is that the tax breaks probably improve global welfare, however, because the domestic terms-of-trade losses would be matched by foreign terms-of-trade gains. Thus, since commercial policies tend to lean more heavily toward import restraint than export promotion (both in the United States and abroad), the tax breaks should promote global welfare by reducing the global anti-trade bias.

Finally, we found that the export tax breaks are a more efficient way of reducing the anti-trade bias imposed by tariffs than a direct reduction in U.S. tariffs. Specifically, we found that eliminating the tax breaks while at the same time reducing tariffs to keep the volume of U.S. exports and imports unchanged reduces domestic economic welfare. (The effects on domestic welfare and global welfare are the same for this experiment, because there are no effects on the terms of trade.) This result is somewhat surprising, because it runs counter to the traditional view that the more direct way of reducing a distortion generally is also the more efficient way. This result occurs because the export tax breaks do not interact with non-trade distortions incorporated in the model (those imposed by income and sales taxes within the United States) in the same way as do tariffs. Removal of the export tax breaks exacerbates the distortionary effect of the tax on labor income and the excise tax to a greater extent than an equivalent increase in the tariff rate. Thus, the welfare results ultimately depend on complex second-best considerations.

1987 Values for the Endogenous Variables Used to Calibrate the Model and for Constants Determined by the Calibration

(Dollar amounts are in billions)

Production and employment

Endogenous variables

	i = T	i = N
X_i	$1,975.1	$2,530.1
L_i	$1,256.8	$1,484.1
K_i	$718.3	$1,046.0

Constants

	i = T	i = N
α_i	0.65	0.60
Ω_i	0.11	0.11
AX_i	1.89	1.97

Taxes and government revenue

Endogenous variables

TY	$468.5
TL	$303.3
TK	$230.3
TS	$185.5
TM	$15.1
GR	$1,199.6

t_M	0.04
t_S	0.09
t_L	0.12
t_K	0.15
AT	-$396.4

Constants

Income and consumption

Endogenous variables

Q	$2,332.1
C_T	$1,700.9
Y	$4,862.2
LE	$1,233.4
YF	$5,721.1

Constants

δ	0.37
ρ	-0.6
AC	2.03

Foreign Sector

Endogenous variables

M	$409.8
EX	$250.3

AIDS constants

		j = Q	j = N	j = LE	
G_{ij}:	i = Q	-0.220	0.093	0.127	A_0 = 8.05
	i = N	0.093	0.062	-0.155	β_0 = 1.31
	i = LE	0.127	-0.155	0.028	
	A_j:	0.360	0.480	0.159	
	β_j:	0.143	-0.144	0.001	

Prices and rates of return

Units were defined such that p_N, p_T, wg, rg_N, rg_T, pf_M, and pf_T were unity in 1987.

Source: Data for the endogenous variables are from Bureau of the Census (1990), except K_T, K_N, Q, C_T, Y, LE, YF and GR, which are determined by the parameters and other endogenous variables according to the equations in the text. The traded goods sector (T) consists of agriculture, mining and manufacturing; all other industries are in the nontraded goods sector (N).

References

Abbot, Michael, and Orley Ashenfelter, "Labour Supply, Commodity Demand and the Allocation of Time," Review of Economic Studies, 43, (1976), pp. 389-411.

Ballard, Charles L., Don Fullerton, John B. Shoven and John Whalley, A General Equilibrium Model for Tax Policy Evaluation, University of Chicago Press, (Chicago: 1985).

Bickerdike, D. F., "The Theory of Incipient Taxes," Economic Journal, vol. 16, no. 64, (1906), pp. 529-535.

Bizer, David S. and Charles Stuart, "The Public Finance of a Protective Tariff: The Case of an Oil Import Fee," American Economic Review, 77, (1987), pp. 1019-1022.

Broadway, Robin and John Treddenick, "A General Equilibrium Computation of the Effects of the Canadian Tariff Structure," Canadian Journal of Economics, 11, (1978), pp. 424-446.

Browning, Edgar K., "On the Marginal Welfare Cost of Taxation," American Economic Review, 77, (1987), pp. 11-23.

Clarete, Ramon L. and James A. Roumasset, "A Shoven-Whalley Model of a Small Open Economy: An Illustration with Philippine Tariffs," Journal of Public Economics, 32, (1987), pp. 247-261.

Clarete, Ramon L. and James A. Roumasset, "The Relative Welfare Cost of Industrial and Agricultural Policy Distortions: A Philippine Illustration," Oxford Economic Papers, 42, (1990), pp. 462-472.

Clarete, Ramon L., and John Whalley, "Interactions Between Trade Policies and Domestic Distortions in a Small Open Developing Economy," Journal of International Economics, 24, (1988), pp. 345-358.

Deardorff, Alan V. and Robert M. Stern, The Michigan Model of World Production and Trade: Theory and Applications, MIT Press (Cambridge, Massachusetts: 1986).

Deaton, Angus, and John Muellbauer, "An Almost Ideal Demand System," American Economic Review, 70, (1980), pp. 312-326.

de Melo, Jaime, Julie Stanton and David Tarr, "Revenue-Raising Taxes: General Equilibrium Evaluation of Alternative Taxation in U.S. Petroleum Industries," Journal of Policy Modeling, 11, (1989), pp. 425-449.

Executive Office of the President, Special Analyses: Budget of the United States Government, U.S. Government Printing Office (Washington, D.C.: 1989).

Goldstein, Morris and Mohsin S. Khan, "Income and Price Effects in Foreign Trade," in Ronald W. Jones and Peter B. Kenen, eds. Handbook of International Economics, Volume II, North-Holland (Amsterdam: 1985).

Hamilton, Bob, and John Whalley, "Geographically Discriminating Arrangements," Review of Economics and Statistics, 67, (1985), pp. 446-455.

Harris, Richard, "Applied General Equilibrium Analysis of Small Open Economies with Scale Economies and Imperfect Competition," American Economic Review, 74, (1984), pp. 1016-1031.

Hufbauer, Gary Clyde and Hammond-Tooke, Arthur, U.S. Export Competitiveness and the Source-of-Income Rules, Report of the Export Source Coalition, (Washington, D.C.: 1988).

Johnson, H. G., "Optimum Tariffs and Retaliation," Review of Economic Studies, vol. 21, (1953), pp. 142-153.

Lerner, Abba, "The Symmetry Between Import and Export Taxes," Economica, Vol. 3, (1936), pp. 306-313.

Lipsey, Richard, and K. Lancaster, "The General Theory of the Second Best," Review of Economic Studies, vol. 24, (1957), pp. 11-32.

Markusen, James R. and Randall M. Wigle, "Nash Equilibrium Tariffs for the United States and Canada: The Roles of Country Size, Scale Economies and Capital Mobility," Journal of Political Economy, 97, (1989), pp. 368- 386.

Mutti, John, and Harry Grubert, "The Domestic International Sales Corporation and Its Effects," in Robert E. Baldwin and Anne O. Krueger, eds. The Structure and Evolution of Recent U.S. Trade Policy, University of Chicago Press (Chicago: 1984).

Reitzes, James D., and Donald J. Rousslang, "Domestic Versus International Capital Mobility: Some Empirical Evidence," Canadian Journal of Economics, 21, (1988), pp. 312-323.

Rousslang, Donald J., and Stephen P. Tokarick, "Estimating the Welfare Cost of Tariffs: The Role of the Work-Leisure Choice," forthcoming in Oxford Economic Papers.

Stern, Robert M., Jonathan Francis and Bruce Schumacher, Price Elasticities in International Trade - An Annotated Bibliography, Macmillan (London: 1976).

Stolper, Wolfgang, and Paul Samuelson, "Protection and Real Wages," Review of Economic Studies, vol. 9, (1941), pp. 58-73.

Stuart, Charles, "Welfare Costs per Dollar of Additional Tax Revenue in the United States," American Economic Review, 74, 1984, pp. 352-62.

Subramanian, Arvind, Ali Ibrahim, and Luis Torres-Castro, "Optimal Tariffs: Theory and Practice," Working Paper 93/50, International Monetary Fund, (1993).

Tarr, David, A General Equilibrium Analysis of Quotas on U.S. Imports, U.S. Federal Trade Commission (Washington D.C.: 1988).

U.S. Bureau of the Census, Statistical Abstract of the United States: 1990, U.S. Government Printing Office (Washington D.C.: 1990).

U.S. Department of the Treasury, Report to the Congress on the Sales Source Rules, National Technical Information Service (Washington, D.C.: 1993a).

U.S. Department of the Treasury, The Operation and Effect of the Foreign Sales Corporation Legislation: July 1, 1981 to June 30, 1983, National Technical Information Service (Washington, D.C.: 1993b).

U.S. Department of the Treasury, The Operation and Effect of the Domestic International Sales Corporation Legislation: July 1, 1981 to June 30, 1983, U.S. Government Printing Office (Washington, D.C.: 1988).

Whalley, John, Trade Liberalization Among Major World Trading Areas, MIT Press (Cambridge: 1985).