Guy V.G. Stevens
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The Value-Added Tax and the Trade Balance

I. Introduction and Summary

The short-run, necessarily partial equilibrium effect of the imposition of a value-added tax (VAT) on the trade balance depends almost entirely on the impact of the taxes being replaced. Assuming that a VAT is introduced as part of a revenue-neutral package, it can be shown that the VAT, itself, is unlikely to affect the variables determining U.S. trade.[1] Of these variables, the primary ones to look at in assessing this short-run effect are the price ratios entering U.S. import and export functions.[2]

As far as exports are concerned, the relevant variable is the ratio of export prices to some measure of the dollar value of foreign prices; since value-added taxes would be rebated on exports, such a tax, taken alone, would not affect the ratio and, consequently, the level of real exports. On the other hand, the VAT is added onto import prices. However, it is typically applied to the same degree on imports as on

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1. Whether a particular package is revenue neutral may, of course, be subject to differences of opinion; it turns out, however, that the revenue-neutrality of a given package does not affect the qualitative conclusions of this note and probably affects the quantitative conclusions only marginally.

2. By specifying a partial equilibrium effect analysts have excluded from consideration potential short-run effects on GNP. In section III, below, I note recent studies that focus on possible increases in the savings rate (independent of the effect on GNP) -- an effect that could arguably have some impact in the short run. If it were to operate in the short run, an increased savings rate, by reducing the need for net capital inflows and causing a depreciation in the exchange rate, would probably affect the trade balance in the same direction as the price effect discussed above and in section II. In such a case, the quantitative effect attributable to the increased savings rate should be added to the price effect.

domestic products, so that the ratio between after-tax import prices and various measures of domestic prices should not change. Thus, for real imports, as well as real exports, the imposition of a VAT, taken alone, should have no effect.

Going to nominal flows, since the VAT is imposed at the retail level, the price of imports paid to foreign sellers should not change. As argued above, the price of exports would also not change, so nominal exports, imports, and the trade balance would, therefore, remain constant.

The conclusion of the above analysis is that the imposition of a value-added tax, by itself, has no partial equilibrium effect on the trade balance.[3]

Most policy proposals, however, have involved the substitution of a VAT for a bundle of other taxes, usually emphasizing the reduction of the corporate income tax in a revenue-neutral package. Since the VAT by itself has a neutral short-run effect on the trade balance, the overall partial equilibrium effect of such proposals depends on the impact on prices of the taxes being reduced. In section II, I concentrate on the reduction of the corporate income tax (CIT) as the adjunct to the increase in the VAT. The conclusion is that a revenue-neutral reduction of the corporate income tax will tend to improve the trade balance in the short run; however, a best guess, developed in Table 1, is that the

3. The same conclusion is reached in recent studies such as, Martin Feldstein and Paul Krugman, "International Trade Effects of Value-Added Taxation," in Assaf Razin and Joel Slemrod, eds., Taxation in the Global Economy (Chicago, 1990). A similar view is reached in the detailed report written by the Staff of the Joint Committee on Taxation, Factors Affecting the International Competitiveness of the United States, prepared for House Ways and Means Committee Hearings, June 4-6, June 18-20, and July 16-18, 1991, 102 Cong. 1 Sess. (GPO, May 30, 1991), pp. 302-306.

magnitude will probably be small -- less than $6 billion -- and that virtually all of the improvement will be attributable to a reduction in imports.

Section III reviews the evidence from recent studies of the European experience and from simulations with computable general equilibrium models. None of these sources suggests a large impact of a shift to a VAT system on the trade balance, but some identify and analyze new channels for the impact of a VAT on the economy. In addition to the short-run price effects analyzed above and in section II, these studies analyze the intermediate- to long-run effects of the increased savings rate possibly associated with a VAT-CIT package. It turns out that the effect through this channel is likely to reinforce the improvement in the trade balance in the short to intermediate run, as increased savings are partially translated into lower net capital inflows and an exchange rate depreciation; however, in the long run, although the current account may remain constant or even improve, the trade balance will deteriorate as interest and profit remittances increase and the exchange rate appreciates.

II. The Short-Run Impact of a VAT-CIT Package on the Trade Balance

Three empirical factors combine to determine the short-run, partial equilibrium effect of a CIT-VAT package on the trade balance: (1) the necessary reduction of the CIT, given the stipulated increase in the VAT, that leaves government revenues unchanged; (2) the degree to which the above reduction in the CIT leads to lower prices -- the shifting of the corporate income tax; (3) the elasticity of imports and exports given the price change. Probably the greatest controversy surrounds the second

factor, the degree of shifting of the corporate income tax, but at present there would probably be some differences in opinion regarding the magnitude of all three factors.[4]

A study, by Dresch, Lin and Stout,[5] provides a framework for empirically assessing the impact of a VAT-CIT package on the trade balance. The study is avowedly a partial equilibrium analysis, limiting itself to the impact of price changes, and, thus, unable to account for the interaction of the tax package with GNP, savings, and investment.

The Dresch, Lin and Stout book (hereafter DLS) analyzes the partial effects of alternative VAT-CIT packages within the framework of a 100-industry input-output table. Alternative shifting parameters are assumed and are combined with alternative percentage reductions of the corporate income tax. For each case the level of the across-the-board VAT is calculated that leaves total tax revenues unchanged; associated with this level are the price changes implied for each industry and the implied change in the aggregate import and export price indices. Given these price changes, alternative elasticities of imports and exports are used to calculate the final effect on the trade balance.

The attached table, their Table 6.1, illustrates the authors' calculations. Consider the third row from the bottom, a realistic case assuming the total replacement of the corporate income tax by a value-added tax and a 20 percent shifting of the corporate income tax. The second column shows that the calculation with the input-output table

4. For the flavor of the discussion on the shifting of the corporate income tax, see John G. Cragg, Arnold C. Harberger and Peter Mieszkowski, "Empirical Evidence on the Incidence of the Corporate Income Tax," Journal of Political Economy, (December 1967), pp. 811-822.

5. Stephen P. Dresch, An-Ioh Lin, and David K. Stout, Substituting a Value-Added Tax for the Corporate Income Tax (NBER & Ballinger, 1977).

Table 6-1. Hypothetical Changes in U.S. Trade Balance, 1969 (dollars in billions)

CIT Shifting Parameter (α)	Export Price Reduction $\left(-\frac{\Delta P_x}{P_x}\right)$	Import Competing Price Reduction $\left(-\frac{\Delta P_d}{P_d}\right)$	Assuming Houthakker-Magee Elasticities ($\epsilon_x = -1.24$; $\epsilon_x = -0.88$)				Assuming Higher Elasticities ($\epsilon_x = -2.00$; $\epsilon_m = -1.00$)			
			Increase in Exports (ΔV_x)	Export-Induced Imports ($\Delta V_{m'}$)	Reduction in Imports ($-\Delta V_m$)	Change in Trade Balance (ΔV)	Increase in Exports (ΔV_x)	Export-Induced Imports ($\Delta V_{m'}$)	Reduction in Imports ($-\Delta V_m$)	Change in Trade Balance (ΔV)
CIT Reduction of 25 Percent										
0.2	0.29%	0.31%	$.030	$.007	$0.121	$0.144	$0.126	$.011	$0.137	$0.252
0.6	1.06	1.14	.111	.025	0.443	0.529	0.461	.041	0.504	0.924
1.0	2.26	2.39	.236	.053	0.930	1.113	0.983	.086	1.056	1.953
CIT Reduction of 50 Percent										
0.2	0.56	0.61	.058	.013	0.237	0.282	0.244	.022	0.270	0.492
0.6	1.91	2.06	.199	.045	0.801	0.955	0.831	.073	0.911	1.669
1.0	3.66	3.92	.382	.085	1.525	1.822	1.592	.137	1.733	3.188
CIT Reduction of 75 Percent										
0.2	0.82	0.89	.086	.020	0.346	0.412	0.357	.032	0.393	0.718
0.6	2.62	2.83	.274	.062	1.101	1.313	1.140	.099	1.251	2.292
1.0	4.63	5.00	.483	.107	1.945	2.321	2.014	.171	2.210	4.053
CIT Reduction of 100 Percent										
0.2	1.07	1.16	.112	.026	0.451	0.537	0.465	.041	0.513	0.937
0.6	3.21	3.48	.335	.075	1.354	1.614	1.396	.121	1.538	2.813
1.0	5.35	5.81	.559	.122	2.260	2.697	2.327	.196	2.568	4.699

indicates a reduction of the aggregate export-price index by 1.07 percent; similarly, domestic or import competing prices fall by slightly more, 1.16 percent. These price changes are of course only the first round or impact effects of the imposition of the tax package.

The rest of the entries in the line develop two alternative estimates of the impact on the 1969 trade balance, depending on assumptions about import and export elasticities. Columns four through seven develop the estimate assuming the Houthakker-Magee elasticities; the entries are in billions of 1969 dollars. Exports increase by $112 million, because of the reduction in export prices due to the partial shifting of the CIT. Because of these increased exports, however, the authors estimate that imported inputs to U.S. industry increases by $26 million.[6] Finally, final imports for consumption are reduced by $451 million. The total improvement in the trade balance found in column seven is $537 million. In percentage terms, exports for this case increase by 0.26 percent and total imports by 0.94 percent. In terms of 1991 prices and levels of trade, the export effect would be $1.1 billion and the import savings $4.6 billion -- with a net improvement to the trade balance of $5.7 billion.

Columns eight through eleven of the table develop estimates for a case with substantially higher elasticities. The major change is a quadrupling of the increase in exports, caused by the considerably higher export elasticity.

6. One may be skeptical of the methodology used to make this calculation, but in any case the estimate is always small relative to the other effects. In making alternative estimates below, I ignore this effect.

Suppose one recalculates the trade effects using more current estimates of the elasticities and contemporary values for exports and imports. Rather than assume a single elasticity for overall exports and imports, a slightly more sophisticated approach takes account of the major export and import categories and the fact that the full effect of price changes is not felt instantaneously. On the import side, because of the large differences in price (and income) elasticities, the accounts are divided, at a minimum, into oil and non-oil imports. International Finance Division estimates now show very low price elasticities for petroleum imports of 0.062 and 0.119 in the first two years after a price change; for non-oil imports the corresponding figures are a much higher 1.02 and 1.24. On the export side, the price elasticity for agricultural exports is estimated at 0.35 for the first year, rising to 1.30 in the second and subsequent years; for non-agricultural exports the favored elasticities are 0.39 and 0.82.

The consensus of the staff favors a small percentage shift of the corporate income tax, so the estimates that follow continue to assume the 20 percent shift used in the previous calculation. Finally, estimated 1991 values are used for trade flows: total imports of $489 billion (oil, $51 billion), and total exports of $418 billion (non-agricultural, $378 billion).

Using the Dresch, Lin and Stout methodology, if the corporate income tax were replaced completely at the beginning of 1991 (the 100 percent reduction line), we estimate that the trade balance would have improved by approximately $2.5 billion in the first year and $5.8 billion in the second (this latter very close to the calculation, above, using the Houthakker-Magee elasticities). Given a 1991 trade deficit of

approximately $70 billion, this represents an improvement of 3.5 percent and 8.3 percent, respectively.

The details are presented in Table 1. It is interesting to note that the impact on the value of exports is negative, especially in the first year; this is the result of the low first-year price elasticity for both categories of exports. It bears reemphasis that the above calculations are price effects only; longer run impacts on income, savings, and growth are ignored. As the results cited in the next section indicate, these longer run effects are likely eventually to reverse the short-run price effects.

III. Evidence from More Recent Studies

A number of recent studies have examined the impact of value-added taxes in other countries, particularly European countries.[7] Other types of studies have examined both the short-run and long-run effects of moving to a VAT within the context of a general equilibrium model.[8] Where relevant, none of them has argued that the shift to a VAT would have a substantial impact on the trade balance.

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7. See Henry J. Aaron, ed., **The Value-Added Tax: Lessons from Europe** (Brookings, 1981) and Henry J. Aaron, ed., **VAT: Experiences of some European Countries** (Deventer, Netherlands: Kluwer Law and Taxation Publishers, 1982).

8. C.L. Ballard, John K. Scholz, and John B. Shoven, "The VAT: A General Equilibrium Look at Its Efficiency and Incidence," in Martin Feldstein, ed., **The Effects of Taxation on Capital Accumulation** (NBER, 1987). Lawrence H. Goulder, John B. Shoven, and John Whalley, "Domestic Tax Policy and the Foreign Sector: The Importance of Alternative Foreign Sector Formulations to Results from a General Equilibrium Tax Analysis Model," in Martin Feldstein, ed., **Behavioral Simulation Methods in Tax Policy Analysis** (NBER, 1983). Lawrence H. Goulder and Barry Eichengreen, "Savings Promotion, Investment Promotion, and International Competitiveness," in Robert C. Feenstra, ed., **Trade Policies for International Competitiveness** (NBER & Chicago, 1989).

Table 1

Estimated Impact of VAT-CIT Package
Using Division Elasticities

Amounts in billions of 1991 dollars

Trade Category	1st Year	2nd Year
Exports		
Agricultural	-0.28	+0.13
Non-Agricultural	-2.47	-0.73
Total Exports	-2.75	-0.60
Imports		
Oil	-0.037	-0.071
Non-Oil	-5.16	-6.28
Total Imports	-5.20	-6.35
Trade Balance	+2.45	+5.75

The European Experience with a VAT

In the two books edited by Henry Aaron cited in footnote 7, virtually no mention is made of any effect of European value-added taxes on the trade balance; in fact, Aaron states in his introduction that, except for the rather unique case of Italy, "there is no evidence that it [the adoption of the VAT] had any material impact on the balance of trade."[9] Italy was considered to be a special case because the VAT affected import prices much more that domestic prices (contrary to the usual assumption), the result of a much lower incidence of tax evasion on imports than on domestic transactions as whole.[10] It should be pointed out, however, that Aaron notes that in Europe there seemed to be only minor effects of the introduction of a VAT on the domestic price level; this may have been because the taxes for which the VAT substituted were incorporated almost completely into both domestic and import prices. Given this evidence, it is arguable that the European experience with the VAT is of no predictive relevance for the United States.

Macroeconomic and General Equilibrium Treatments

Some journalistic approaches to the question have focused on the implications of the GNP identity (interpreted more accurately in its ex ante form as a goods market equilibrium condition):

$$Y - C - Tax = I + (G - Tax) + (X - M).$$

Suppose one institutes a VAT in conjunction with a revenue-neutral reduction of the corporate income tax. Taxes, by assumption, remain constant. Since it is generally agreed that the net effect on

9. Henry J. Aaron, "Introduction and Summary," in Henry J. Aaron, ed., **The Value-Added Tax: Lessons from Europe** (Brookings, 1981), p. 13.
10. Antonio Pedone, "Italy," in Henry J. Aaron, ed., **VAT: Experiences of some European Countries** (Deventer, Netherlands: Kluwer Law and Taxation Publishers, 1982), p. 216.

consumption will be negative, private savings on the left hand side of the equation will rise. In equilibrium, the uses of these savings, on the right, must also increase. By assumption, the government budget deficit, G - Tax, will remain constant, so the increase must come in private investment (I) or the trade balance (X - M). Most followers of this approach make the further assumption that private investment is unchanged, or at least increases less than savings; in such a case the conclusion must be that the trade balance increases. Of course, without further analysis one must admit the possibility that private investment would increase by more than the increase in private savings -- thus decreasing the trade balance. As will be seen below, more detailed general equilibrium models provide reasons for believing that in the long run this latter possibility will predominate.

The above approach, with its implicit reliance on the requirements for equilibrium in the goods markets and its conjectures about the equilibrium impact of the VAT on consumption and private investment, is a rudimentary attempt at a general equilibrium analysis. John Shoven, Lawrence Goulder, Barry Eichengreen and their associates have carried out this analysis in a more rigorous fashion, simulating the introduction of a VAT and similar tax packages in computable general equilibrium models (with parameters chosen by other than econometric means).

The most realistic model and simulations are presented in a paper by Goulder and Eichengreen, although their simulations assume that the personal income tax rate is reduced to offset the increase in the VAT. [11]

11. See footnote 8 for the reference. Goulder and Eichengreen do not explicitly simulate the imposition of a value-added tax; rather they impose a comsumption tax balanced by a revenue neutral reduction of the personal income tax. Goulder believes that the qualitative results of this experiment will be the same as those for the imposition of a VAT.

The simulations indicate that the qualitative result observed in the preceding section continues to hold: the VAT package improves the trade balance in the short run. However, Goulder and Eichengreen show also that in the long run the positive effect on the trade balance can be reversed. Both of these results are driven primarily not by the tax shifting posited in previous sections, but by the increased savings and capital accumulation induced by the package. In the short to intermediate run, the increased savings lead to increased capital outflows which temporarily cause an exchange rate depreciation and trade balance improvement. However, in the long run, the increased capital outflows eventually result in a net service inflow as interest and profits are repatriated; because the current account is constrained to be zero in the long run, with a higher service inflow, the trade balance must be in deficit.[12]

Probably one should not pay much attention to the values that come out of these simulations, since the tax package is significantly different from the one assumed earlier and the magnitude (but not the sign) of the impact is very dependent on the degree of capital mobility assumed. However, it is comforting to note that even in the polar case of very high capital mobility, the imposition of the package leads to a short-run effect that is not far from that calculated above in section II: an improvement of $4.9 billion in the nominal trade balance (1991

12. It seems at least possible that a package that included a reduction of the corporate income tax could show a trade balance deterioration in the intermediate run, contrary to the results of the simulation described above. A reduction in the corporate income tax would tend to shift upward the marginal rate of return for investment in the United States, favoring investment in the United States over investment abroad. It is at least conceivable that this effect would more than offset the increased savings rate identified above, causing a net capital inflow and an exchange rate appreciation.

prices) in the first year. Ultimately, in the long-run steady state, the trade balance shows a net decline of $7.3 billion.