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INTERNATIONAL TRADE EFFECTS OF VALUE ADDED TAXATION

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ABSTRACT

The actual value added tax systems used in many countries differ significantly from the completely general VAT that has been the focus of most economic analyses. In practice, VAT systems exempt broad classes of consumer goods and services. This has important implications for the effect of the VAT on international trade.

A value added tax is sometimes advocated as a way of improving a country's international competitiveness because GATT rules permit the tax to be levied on imports and rebated on exports. This leads to political support for the VAT among exporters and producers of import-competing products.

For a general VAT on all consumption, this argument is incorrect except in the very short run because exchange rates or domestic prices adjust to offset the effect of the tax on the relative prices of domestic and foreign goods. When prices or exchange rates have adjusted, a general value added tax will have no effect on imports and exports.

In practice, the value added tax frequently exempts housing and many personal services. The VAT thus raises the price of tradeables relative to nontradeables and induces a substitution of housing and services for tradeable goods. Since this implies a reduced consumption of imported goods, it also implies a decline in exports. The most likely effect of the introduction of a VAT would thus be a decline of exports.

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There is a well-understood economists' case for a value-added tax (VAT). As a consumption tax, a VAT would not impose the bias against saving that is inherent in income taxation, and could therefore help to promote capital formation and economic growth. Against this advantage must be weighed possible disadvantages resulting from higher administrative costs and greater difficulty in providing an acceptable degree of progressivity to the overall tax-and-transfer structure, as well as the possible political costs (or benefits, depending on one's point of view) of a tax that is relatively invisible and thus easy to raise.

Among many businessmen, however, the case for a VAT is often stated quite differently. They view such a tax as an aid to international competitiveness, since VATs are levied on imports but rebated on exports. The case is often stated as follows: an income tax is paid by producers of exports, but not by foreign producers of the goods we import, while a VAT is paid on imports but not on exports. Surely, say the proponents of this view, this means that countries that have a VAT have an advantage in international competition over countries that rely on income taxation.

In fact, this argument is wrong. A VAT is not, contrary to popular belief, anything like a tariff-cum-export subsidy. Indeed, a VAT is no more an inherently pro-competitive trade policy than a universal sales tax, to which an "idealized" VAT, levied equally on all consumption, is in fact equivalent. The point that VATs do not inherently affect international trade flows has been well

recognized in the international tax literature.¹ This point is also familiar to tax policy practitioners; McClure (1987), to take a recent example, dismisses the competitive argument for a VAT as evident nonsense. Yet the belief that VATs are important determinants of international competitiveness persists among laymen.

In large part the belief that VATs are trade distorting policies reflects a failure on the part of non-economists to understand the basic economic arguments. There is also another factor, however: in reality VATs will not be neutral in their effect on trade, for at least two reasons. First, VATs are a substitute for other taxes, especially income taxes, which do affect trade. Second, in practice a VAT will not be neutral; concern over distributional issues, as well as administrative difficulties, inevitably leads to a tax whose rate varies substantially across industries.

To acknowledge that in practice a VAT will indeed affect trade flows is not the same as saying that the lay view is right. In fact, the widespread view that a VAT enhances the international competitiveness (in some sense) of the country that adopts it may well be the reverse of the truth. To the extent that a VAT taxes traded goods more heavily than nontraded, which is normally the case, a VAT in practice probably tends to reduce rather than

¹ An early treatment is Shibata (1967). For a modern and especially neat statement of the point, see Grossman (1980); for a brief statement, see Dixit (1985).

increase the size of a country's traded goods sector. Against this may be set the favorable impact on saving and hence on a country's trade balance in the short run of substituting a consumption tax for taxes, like the income tax, that distort intertemporal consumption choices.

The purpose of this paper is to lay out a simple analytical approach for thinking about the effects of a VAT on international trade. The paper begins by laying out a simple three-good, two-period model that has the minimal elements necessary to discuss the international trade effects of a VAT. The first section describes the model, and shows how equilibrium is determined in the absence of taxation. The second section introduces a VAT, and demonstrates in the context of our model the well-known fundamental point that an idealized VAT that is levied on all production is nondistortionary, in particular having no effect on the allocation of resources between tradeable and nontradeable sectors. We can also show that such an idealized VAT would leave nominal factor prices measured in foreign currency unchanged; this argues, in effect, that even in the short run under fixed exchange rates a VAT should not be expected to have any effect on trade.

We show next that the absence of distortionary effects from a VAT depends on precisely the feature that is often alleged to constitute an unfair trade advantage, namely the rebate of value-added taxes on exports. In the absence of an export rebate, a VAT would act like an export tax -- which in general equilibrium is equivalent to an import tariff. Thus the export rebate is

necessary if a VAT is not to be protectionist.

The remainder of the paper is devoted to reasons why in practice the introduction of a VAT may not be neutral in its trade effects. First, a VAT may substitute for an income tax; since an income tax is not neutral in its effects, the substitution will have allocative effects, tending other things equal to improve the trade balance in the short run. Second, and offsetting this effect in the short run and persisting in the long run, a VAT in practice will tend to be levied more heavily on traded than on nontraded output, and will therefore tend to shift resources out of the traded goods sectors.

On balance, the substitution of value-added taxation for income taxation is likely to have an uncertain short-run effect on a nation's net exports but is likely to reduce net exports in the longer term. This does not constitute an argument either for or against introducing a VAT; indeed, even if the effect on competitiveness were unambiguous, it is by no means clear what policy moral ought to be drawn. The point of this analysis is more modest; we want to show that the common belief that a VAT is a kind of disguised protectionist policy is based on a misunderstanding.

1. A Basic Model

The analysis of the international impact of a VAT has several strands. These strands dictate the necessary content of our model. First, a VAT is often alleged to favor traded goods production over nontraded goods in general; thus we need to have a model in which some goods are nontraded. Second, the apparent differential taxation of exports and imports resulting from export rebates has been praised and attacked; thus we need to make the distinction between importables and exportables. Finally, a consumption tax like a VAT differs from an income tax in its effect on the choice between consumption and saving; thus we need to have a model that allows intertemporal tradeoffs. Putting these together, in order to discuss the international economics of a VAT we need at minimum a model with three goods (exports, imports, and nontraded) and with two periods (present and future). At times it will be helpful to consider more collapsed models, aggregating the two tradeable sectors or eliminating the time dimension; however, a three-good, two-period model will be our base in this paper.

Consider, then, a country that produces and consumes three goods: an exported good X, an imported good M, and a nontraded good N. The economy lasts for two periods, 1 and 2. The country will be assumed to be small on both world goods markets and world financial markets, in the sense that it can trade X for M at a fixed relative price in each period and can borrow or lend at a fixed real interest rate in terms of traded goods.

The technology of production is assumed to be standard

neoclassical, with perfect competition prevailing. In the first period the economy's production possibilities may be summarized by a tradeoff among the outputs of the three goods:

$$(1) \quad T^1(Q_X^1, Q_M^1, Q_N^1) = 0$$

Some first-period production may be used to form capital, which expands production possibilities in the second period. It is unnecessary to define a capital aggregate; we can simply define K_I , $I = X, M, N$ as the quantity of each good set aside to enhance second-period production. The second-period transformation function may thus be written

$$(2) \quad T^2(Q_X^2, Q_M^2, Q_N^2, K_X, K_M, K_N) = 0$$

Turning next to the demand side, we ignore issues of income distribution and treat the economy in terms of the income and tastes of a representative individual. Preferences of this representative individual may be written in terms of a welfare function,

$$(3) \quad W = U(C_X^1, C_M^1, C_N^1) + \delta U(C_X^2, C_M^2, C_N^2)$$

Like the production technology, this welfare function is assumed to exhibit all the usual properties.

The country is assumed to be a price-taker on world markets. With slight loss of generality, we assume that nominal prices of X and M in foreign currency are constant:

$$(4) \quad P_I^* = \bar{P}_I^* \quad I = X, M \quad t = 1, 2$$

The loss of generality here lies not in the absence of foreign inflation, which could be introduced without any change in results, but in the assumption that our country's terms of trade are the same in both periods. This assumption could be relaxed without any significant change in our analysis, but it saves on complexity and notation.

We also assume that the country can borrow or lend freely at an interest rate r^* .

Now let us consider the equilibrium conditions of the model. In each period the consumption of nontraded goods must equal production, less that part of production which (in the first period) is set aside for investment. Thus we have

$$(5) \quad C_N^1 = Q_N^1 - K_N$$

$$(6) \quad C_N^2 = Q_N^2$$

For traded goods the constraint is much looser, since the country can both exchange goods within each period and borrow or lend across periods. The only constraint is that the present value

of traded goods production that is not invested must equal the present value of traded goods consumption:

$$(7) \quad P_X^1(Q_X^1 - K_X) + P_M^1(Q_M^1 - K_M) + (1+r^*)^{-1}[P_X^2Q_X^2 + P_M^2Q_M^2] \\ - P_X^2C_X^2 + P_M^2C_M^2 + (1+r^*)^{-1}[P_X^2C_X^2 + P_M^2C_M^2]$$

To solve the model, we must determine prices. In the absence of taxation, the prices of the traded goods are simply determined by their international prices:

$$(8) \quad P_I^1 = P_I^2 = P_I^*$$

The price of the nontraded good is determined in each period by the requirement that supply equal demand. Supply is determined by maximization of the present value of marketed production,

$$(9) \quad V = P_X^1(Q_X^1 - K_X) + P_M^1(Q_M^1 - K_M) + P_N^1(Q_N^1 - K_N) \\ + (1+r^*)^{-1}[P_X^2Q_X^2 + P_M^2Q_M^2 + P_N^2Q_N^2]$$

Demand is determined by maximization of (3) subject to the budget constraint.

Equilibrium may be usefully illustrated using Figure 1. On the axes are the nominal prices of the nontraded good in each period. The curve N_1N_1 represents points consistent with market clearing for N in period 1; it is downward sloping under the usual

assumption that excess demand for the good is decreasing in its own price and increasing in prices of substitutes. The curve N_2N_2 similarly represents points consistent with market clearing for N in period 2. We show N_1N_1 steeper than N_2N_2 , which will be the case as long as "own" effects are larger than "cross" effects. (This assumption about relative slopes may also be thought of as a stability condition, since it is necessary for convergence under most quasi-dynamic stories about price adjustment.) Equilibrium is where the curves intersect, at point E.

We now have a basic model of resource allocation in a trading economy, both across sectors and over time. We can now introduce a value-added tax, and examine its effects.

2. Effects of an Idealized Value-Added Tax

We now consider the effect of introducing a value-added tax into this economy. This tax will be "idealized," in the sense that it will be assumed to be successfully levied at a flat rate on all production for consumption. In reality, VATs do not meet this ideal, both because of legislated differences in rates and exemptions and because of the impossibility of actually taxing important parts of production. Although these departures from the ideal are of critical importance in evaluating the likely effects of an actual VAT, the idealized VAT is a useful reference point with which to begin our analysis, since such an idealized VAT is implicit in most economists' discussions of the effects of a VAT on international trade.

We suppose, then, that any firm selling a good domestically must pay taxes at a rate r on the value of the good, less any value-added taxation that the firm can demonstrate has been paid on productive inputs. Investment goods are included in this deduction, so that in effect investment is exempt from the VAT. Sales of imported goods must pay the full tax rate. Exported goods, since they are not sold domestically, are not subject to the tax; thus exporters receive a full rebate. Tax revenue is redistributed to consumers in a nondistorting fashion.

Let us define the prices of goods to domestic consumers as

$$\bar{P}_I^t \quad I = X, M, N \quad t = 1, 2.$$

The price of imported goods is simply the international price plus the tax:

$$(10) \quad \bar{P}_M^t = P_M^*(1+r) \quad t = 1, 2.$$

Since a producer of export goods must be indifferent between selling the goods domestically or on the world market, and since tax is paid on domestic but not foreign sales, the internal price of the exported good must also equal the international price plus the tax:

$$(11) \quad \bar{P}_X^t = P_X^*(1+r) \quad t = 1, 2.$$

The price of N in each period continues to be determined by market-clearing. Supply, however, now reflects the presence of the VAT: firms will maximize the value of output net of taxation,

$$(12) \quad V = (1+r)^{-1}(\bar{P}_X^1(Q_X^1 - K_X) + \bar{P}_M^1(Q_M^1 - K_M) + \bar{P}_N^1(Q_N^1 - K_N)) \\ + (1+r')^{-1}[\bar{P}_X^2 Q_X^2 + \bar{P}_M^2 Q_M^2 + \bar{P}_N^2 Q_N^2]$$

We may now assert the following: imposition of a VAT at the rate τ will raise the consumer price of the nontraded good in each period by the fraction τ , thus leaving all relative prices unchanged; as a result there will be no change in either the allocation of resources or in welfare. Figure 2 illustrates what happens: when equilibrium is illustrated in terms of a diagram with consumer prices of N on the axes, the effect of a VAT is to shift both N_1N_1 and N_2N_2 out, to N_1N_1 and N_2N_2 , respectively; the new equilibrium is at E, with the price of the nontraded good increased by a fraction τ in both periods.

To see why this must be true, we first note by inspection of (12) that if consumer prices of all goods rise exactly in proportion to the VAT, there is no effect on production incentives. So if all prices rise so as to offset the VAT, there will be no change in the allocation of resources or production.

Second, we argue that under the hypothesized solution there will be no effect on demand. The simplest way to see this is to notice that the welfare function (3) implies a set of compensated

demand functions,

$$(13) \quad C_I^t = H_I^t(p, W) \quad I = X, M, N \quad t = 1, 2$$

where p is the vector of present-value consumer prices. The functions $H(\cdot)$ are homogeneous of degree zero in p ; so if all consumer prices rise in the same proportion, while welfare is unchanged, then demand will be unchanged. But if nothing changes, nothing changes, including welfare; so when all prices rise by τ , the market for nontraded goods continues to clear in each period.

An idealized VAT, then, has no allocative effects. In particular, it is neither pro-competitive nor anti-competitive; whatever your definition of competitiveness, it has no effect at all.

Many general equilibrium results, such as the equivalence of a VAT without an export rebate to an import tariff, to which we will refer in the next section, depend on the assumption that nominal price levels do not matter. Thus their practical relevance depends either on price flexibility or on an appropriate exchange rate adjustment. The assertion that a VAT is neutral with regard to competitiveness does not, however, require even this much defense. Because consumer prices rise precisely in proportion to the tax, the net prices to producers are unchanged. The marginal revenue product of factors of production must also be unchanged. So (to step slightly outside the model), even if factor prices and/or producer prices are sticky and the exchange rate is fixed,

a VAT will still have no competitive effect.

Perhaps the surprising point is that this absence of a competitive effect occurs despite the rebate of VAT on exports, which is widely regarded as a kind of export subsidy. In fact, as we show in the next section, in the absence of an export rebate a VAT would distort allocation, definitely reduce export production, and probably shift resources on net away from traded goods sectors.

3. The Role of Border Tax Adjustments

The controversy over VATs is largely generated by the impression that the border tax adjustments -- the fact that imports are subject to the tax, while exports have the tax rebated -- constitute a policy favoring a country's traded goods sectors. It is therefore interesting to ask how a VAT would function without these adjustments.

Perhaps the simplest case would be a system with no border adjustments at all -- i.e., no VAT collected on imports, no rebate on exports. This would in effect shift the tax from a "destination" basis to an "origin" basis. The effects of such a system may be derived immediately by the following observations. First, the prices to consumers of exports and imports will clearly remain unchanged; thus the price to producers net of taxation must fall in proportion to the VAT rate. Clearly, if the price of the nontraded good also remains the same to consumers, i.e., if the price net of taxes to firms falls by the size of the tax, then

producers will have no incentive to change their output mix. At the same time, if no relative prices change, then at unchanged utility consumers will also leave their choices unchanged. But if nothing happens, nothing happens; so the VAT without border tax adjustments is neutral in the same way as a VAT with these adjustments.²

The difference in this case is, of course, that the nominal marginal product of factors of production in foreign currency falls. Thus in the case without border tax adjustments, there must either be price flexibility or (more plausibly) a currency depreciation in order for the neutrality of the VAT to hold. This in turn helps explain why in practice VATs do in fact include border adjustments.

It is also true that given the general preference among authorities for a subtraction method of administration, it would be awkward to exempt imports from the tax. Firms would be given an imputation of taxes paid on imports, as opposed to showing proof of actual payment on domestic inputs; this would raise the odd prospect of firms preferring to use imports because of the lower administrative costs. Partly for this reason, it seems likely that a country pressured into avoiding any border adjustments would end

² Hamilton and Whalley (1986) have pointed out that given the non-uniformity of tax rates across goods in practice, there is a difference between destination and origin systems. To take an extreme example, imagine a country that places a VAT on importables but not exportables. In a VAT with border tax adjustments, such a system is in effect a consumption tax on the importable, with no tax on domestic producers; without the border adjustments, it becomes a production tax, with no tax on consumers. We abstract from this issue in this paper; Hamilton and Whalley demonstrate that it is relatively unimportant quantitatively.

up without an export rebate but would still tax imports. In this case, the VAT would have a distortionary effect on the allocation of resources. Perhaps surprisingly, this effect is essentially protectionist -- a VAT without an export rebate is equivalent to an import tariff.

The difference between a VAT with and without an export rebate may be seen in the export pricing condition. Without the rebate, arbitrage will ensure that the consumer price of exportables equals the world price because the producer pays the tax whether the good is exported or sold domestically. Thus,

$$(14) \quad \bar{P}_x^t = P_x^* \quad t = 1, 2$$

Comparing this with (11) we see that the rebate-less VAT leads to a lower export price. This is not surprising, since we have in effect added an export tax to the idealized VAT described before.

The internal price of exports relative to imports is of course lower in this case -- or to reverse the point, the relative price of imports is higher. It is a general proposition, the so-called Lerner symmetry theorem, that an export tax and an import tax are equivalent in their general equilibrium effects. So an ideal VAT without an export rebate is like a protectionist policy.

We should note, however, that the equivalence between import and export taxes is one of those propositions that depends either on nominal prices not mattering or on an appropriate exchange rate adjustment. Note that the effect of a VAT without a rebate is to

lower the price to producers of the exported good, when measured in foreign currency; a tariff would of course raise the price of the imported good instead. Thus these are only equivalent, either given an exchange rate adjustment or sufficient price flexibility.

We see, then, that a VAT without an export adjustment would in effect be a protectionist measure. Will it increase or decrease "competitiveness" as measured by the size of the traded goods sector? The answer is ambiguous, but a presumption may be offered that size of the traded goods sector as a whole will decrease. To see this, it is helpful to collapse the model into a single period, ignoring the intertemporal aspect (which is in any case unimportant for this question). Equilibrium in the one-period version of the model may be analyzed using a diagram suggested by Dornbusch (1974), and shown in Figure 3. On the axes are the consumer prices of X and M, relative to the consumer price of N. The curve NN represents a locus of points for which the market for nontraded goods clears: it is downward sloping because a rise in either traded good's relative price will shift demand onto and resources out of the nontraded sector. The ray OT has a slope equal to the consumer price of imports relative to exports, which is determined by world prices and the tax system. Equilibrium occurs where this ray crosses NN, at E.

Now suppose that the rebate on exports were to be removed from a VAT. Then the ratio of import to export prices would rise by the fraction τ , corresponding to a counter-clockwise rotation of OT to OT'. Equilibrium would shift from E to E'.

Clearly the resulting rise in P_M/P_N would tend to shift resources out of the nontraded sector, while the fall in P_X/P_N would tend to shift resources into N. The overall effect on the size of N is therefore ambiguous. However, we may offer a presumption that the net effect on N is positive, and therefore that the net effect on traded goods sectors as a whole is negative.

The reason for this presumption is the probable relative importance of demand and supply adjustment in the exporting and import-competing sectors. A tariff reduces exports and imports by an equal amount. On the import side, the reduction comes about through a combined reduction in demand and increase in supply for the importable; on the export side, through a combination of increased demand and reduced supply. Initially, however, demand exceeds supply for the importable, while supply exceeds demand for the exportable. Thus more of the exportable side will tend to come from supply and less from demand than on the import side -- i.e., we would expect exportable production at world prices to fall more than import-competing production rises. Thus, the size of the tradeable sector as a whole will typically fall.

A specific example may make the point. Consider an economy that produces but does not itself consume its export good, and which consumes but does not produce its import good -- an extreme form of the general proposition that countries must have excess supply for exportables and excess demand for importables. When such an economy imposes a tariff or export tax, the export sector necessarily shrinks and, since there is no import-competing

production, the nontraded sector expands. Thus, in this extreme case, the effect of a tax on trade, such as a VAT without an export rebate, will unambiguously be to shrink the size of the traded goods sector. Adding some import-competing production and some domestic demand for exportables will remove the certainty of this outcome, but it will still be a presumption.

We see, then, that the widespread belief that the use of export rebates in a value-added tax system is questionable and perhaps an unfair protectionist device is very nearly the opposite of the truth. In fact, the export rebate is necessary if the VAT is not to have a protectionist effect, reducing the volume of trade and probably reducing the size of the tradeable sector.

4. The Idealized VAT as a Substitute for an Income Tax

The best case for arguing that a VAT enhances competitiveness is not what it does, but what it doesn't do: a VAT, unlike an income tax, does not place a tax on saving. Thus to the extent that a VAT substitutes for an income tax, it will tend to reduce the current propensity to consume. As many economists have pointed out (see in particular Frenkel and Razin 1988), to the extent that a value-added tax that substitutes for an income tax reduces current consumption, it will in turn will tend to lead to a trade surplus in the short run. A trade surplus, other things equal, tends to increase the size of the traded goods sector.

In order to demonstrate this point, we introduce an income tax

into our basic model.

We already know that an idealized VAT does not distort the economy, relative to a no-tax equilibrium. Thus, in making the comparison of a VAT and an income tax, it is sufficient to consider the effects of an income tax. So, we now examine the effects of imposing on our economy an income tax at a proportional rate π . Proceeds of this tax, like those of the VAT considered earlier, are assumed to be redistributed in a nondistorting fashion.

It is important to specify how profit income is calculated for tax purposes. The most natural assumption here is that both earnings on foreign investments and earnings on capital are treated as part of second-period income, with profits calculated as the difference between sales and factor costs plus depreciation on capital -- but since the economy only lasts two periods, the whole capital stock is depreciated. There is a potential issue over whether depreciation should be calculated at historical or replacement cost, but our assumption of constant prices on world markets allows us to ignore the issue here.

Income in the first period, then, is the value of production less taxes, plus whatever transfer the government makes:

$$(15) \quad I^1 = (1-\pi)[P_X^1 Q_X^1 + P_M^1 Q_M^1 + P_N^1 Q_N^1] + L^1$$

where L_1 is the rebate from the government.

Income in the second period is

$$(16) \quad I^2 = (1-\pi)[P_X^2 Q_X^2 + P_M^2 Q_M^2 + P_N^2 Q_N^2] \\ + (1-\pi)r^*[P_X^1 Q_X^1 - P_X^1 C_X^1 + P_M^1 Q_M^1 - P_M^1 C_M^1 + P_N^1 Q_N^1 - P_N^1 C_N^1] + L^2$$

Here the first term represents factor income, i.e., gross domestic product. The second term represents capital consumption allowances. The third term represents the income from net foreign investment. Finally, the fourth term represents the rebate from the government.

Now consider an individual's budget constraint. In the first period, the individual accumulates wealth equal to the difference between income and consumption expenditure:

$$(17) \quad W = I^1 - [P_X^1 C_X^1 + P_M^1 C_M^1 + P_N^1 C_N^1]$$

In the second period, the value of consumption equals income plus wealth:

$$(18) \quad P_X^1 C_X^1 + P_M^1 C_M^1 + P_N^1 C_N^1 = W(1+r^*) + I^2$$

From inspection of (16)-(18), it is now immediately apparent that the presence of the tax distorts the incentives of a consumer. An individual who takes the government rebates as given, faces a rate of return of $r^*(1-\pi)$ rather than r^* on deferred consumption. For a small income tax, which will have a second-order effect on

welfare, the result must be a substitution effect that induces consumers to consume more in the first period and less in the second.

To analyze the trade consequences of this disincentive to save, we turn once again to the diagrammatic analysis of nontraded goods prices. In Figure 4, the curves N_1N_1 and N_2N_2 represent market clearing for the nontraded goods market in the first and second period, respectively. Imposing an income tax shifts consumption from the second period to the first. Thus, other things equal, demand for first period N rises, shifting N_1N_1 up to $N'_1N'_1$; other things equal, demand for second period N falls, shifting N_2N_2 down to $N'_2N'_2$. Thus, the result is to shift the equilibrium from E to E' , raising P_M in the first period and lowering it in the second. The initial effect of an income tax is, therefore, to draw resources out of the traded goods sectors and into the nontraded sector, thereby reducing exports and the production of import substitutes.

In passing, it may be worth noting that in an economy such as this, which although small in world goods and financial markets does produce a nontraded good, it is not the case that changes in the saving rate affect only the balance of payments, without affecting the domestic real interest rates. It is true that the real rate of interest in terms of traded goods remains fixed at r^* by assumption. A real interest rate defined in terms of a basket of either domestic production or domestic consumption will, however, change whenever P^1_M/P^2_M changes. In particular, the rise

in p^1_w/p^2_w that results from an income tax will imply deflation of domestic prices relative to world prices from period 1 to 2, and will thus be measured as a rise in the real domestic interest rate. In this sense the income tax produces domestic crowding out as well as a shift toward trade deficit.

We have now seen that an income tax, in contrast to a VAT, does reduce the size of the traded goods sector. It is now straightforward to analyze the effect of introducing a VAT that substitutes for an income tax. The VAT has no competitive effect; the reduction in the income tax expands trade. Thus the overall effect is to shift resources into tradeable.

It is important however to note that this is true only in the first period. In the second period P_w falls, and the traded goods sector is presumably smaller. The point is that the short-term increase in net exports leads to an accumulation of overseas assets that eventually finances an excess of imports over exports.

5. Effects of a Selective VAT

We have so far considered only an idealized VAT which succeeds in taxing all consumption at the same rate. In practice, value-added taxation does not fall equally on all activities. In part, this is because of practical difficulties: nonmarketed production, ranging from do-it-yourself repairs to the services of owner-occupied housing and consumer durables, cannot be taxed. Also, social considerations, rightly or wrongly, frequently lead to exemptions for medical care, education, and various other

activities that are deemed inappropriate for taxation. As a matter of practice, many other services are frequently exempted from VATs. Among OECD countries with value-added taxes, the VAT typically applies to only about two-thirds of total consumption and often has lower rates for some products than for others.

For the purposes of this paper, the important point is that the de facto and de jure exemptions from a VAT are likely to fall primarily on nontraded rather than traded goods and services. This is necessarily true of nonmarketed production, and for one reason or another is also true of most of the marketed areas that are likely to be exempted or subject to reduced taxation.

The impact of a selective VAT is, therefore, to increase nontradeable consumption and production at the expense of tradeable. Imports and exports are both reduced by the imposition of the typical VAT.

To see this more formally, we return to our basic model. It will simplify matters at no cost if we take advantage of the assumption of an unchanged relative price of exports and imports to aggregate X and M into a composite traded good T. We represent the differential taxation of nontraded and traded goods in extreme form, by supposing that while domestic consumption of T is subject to a value-added tax at a rate τ , consumption of N is nontaxed.

Firms in this economy will maximize the present value of production after taxes,

$$\begin{aligned}
 (19) \quad V &= (1+r)^{-1} \bar{P}_T^1 (Q_T^1 - K_T) + \bar{P}_N^1 (Q_N^1 - K_N) \\
 &+ (1+r^*)^{-1} \{ (1+r)^{-1} \bar{P}_T^2 Q_T^2 + \bar{P}_N^2 Q_N^2 \} .
 \end{aligned}$$

Clearly the presence of the tax acts as a disincentive to produce traded goods.

To think about the equilibrium that results, it is helpful once again to start by collapsing the model into a single period. In Figure 5, the curve QQ represents the economy's production possibility frontier between N and T. In a one-period model, trade must be balanced, implying equality of supply and demand for T as well as N; thus consumption must lie on this production possibility frontier. The optimum consumption is shown as E, where the PPF is tangent to the highest possible indifference curve. With a selected VAT on traded goods, however, consumption is distorted, the equilibrium is at a point like E', where PP represents consumer prices and Pp the marginal rate of transformation in production. As shown, the relative price of tradeable faced by consumers is higher than that faced by firms, and the result is a smaller traded goods sector.

In the two-period model, the basic effect is the same. Figure 6 shows initial equilibrium loci at N_1N_1 and N_2N_2 , respectively. The effect of the VAT, other things equal, is to raise the demand for the nontraded good in each period. Thus, both schedules shift out. While it is possible that the net effect

could be to lower P_N in one period, ordinarily both prices will rise. Meanwhile, the net price of T to producers will remain unchanged, since producers must remain indifferent between producing for the domestic and the world market. Thus, the rise in the price of N will induce a shift of resources out of the traded goods sector.

A selective VAT that falls most heavily on traded goods, then, will tend to hurt the traded goods sectors of an economy -- the reverse of the common belief. In addition, there is the effect noted in the last section: to the extent that a VAT substitutes for an income tax, while it will in the short run encourage saving and therefore net exports, in the long run the resulting accumulation of net foreign assets will have the opposite effect on net exports.

6. Conclusions

There is a widespread belief that value-added taxation, because it is levied on imports and rebated on exports, acts as a combination of protection and export subsidy, giving the traded-goods sectors of countries with VATs an advantage over the corresponding sectors of countries that rely on income taxation. In this paper we have used a simple model to show that this view is almost completely wrong. A VAT is not a protectionist measure; indeed, the allegedly pro-competitive device of export rebates is necessary if the VAT is not to act as an export tax, which in turn is actually a protectionist measure that would reduce both imports

and exports. To the extent that a VAT does improve competitiveness, it does so in the short run by offering less bias against saving than an income tax, which, other things equal, tends to improve the trade balance -- but which is far from the common belief about why VATs are helpful in international competition. Moreover, in the longer term, the resulting accumulation of foreign investment would lead to an increase of imports in excess of exports. In practice, moreover, a VAT would almost surely fall more heavily on traded rather than nontraded goods, which would constitute a bias against both exports and imports.

References:

Dixit, A. (1985), "Tax policy in open economies" in A. Auerbach and M. Feldstein, eds., Handbook of Public Economics, Amsterdam, North-Holland.

Dornbusch, R. (1974), "Tariffs and nontraded goods", Journal of International Economics 4, 177-185.

Frenkel, J. and Razin, A. (1988): Fiscal Policies and the World Economy, Cambridge: MIT Press.

Grossman, G. (1980), "Border tax adjustments: do they distort trade?", Journal of International Economics 10, 117-128.

Hamilton, B. and Whalley, J. (1986): "Border tax adjustments in US trade", Journal of International Economics 20, 377-383.

McClure, C. (1987): The Value-added Tax: Key to Deficit Reduction?, Washington: American Enterprise Institute.

Shibata, H. (1967): "The theory of economic unions: a comparative analysis of customs unions, free trade areas, and tax unions" in C.S.Shoup, ed., Fiscal Harmonization in Common Markets, New York: Columbia University Press.

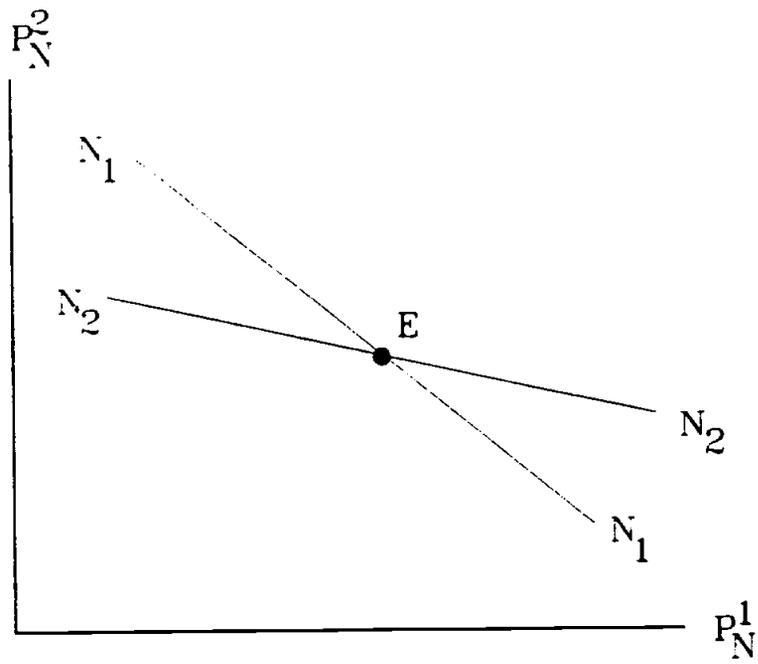


FIGURE 1

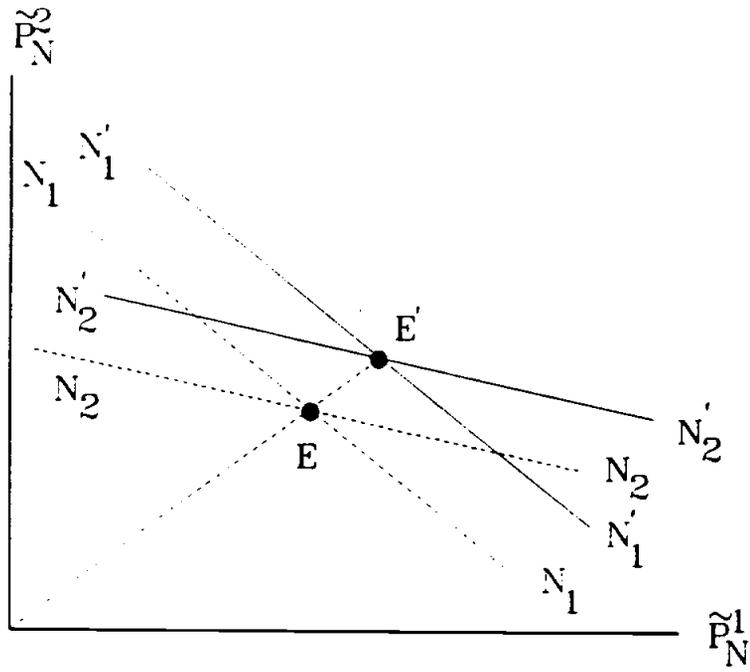


FIGURE 2

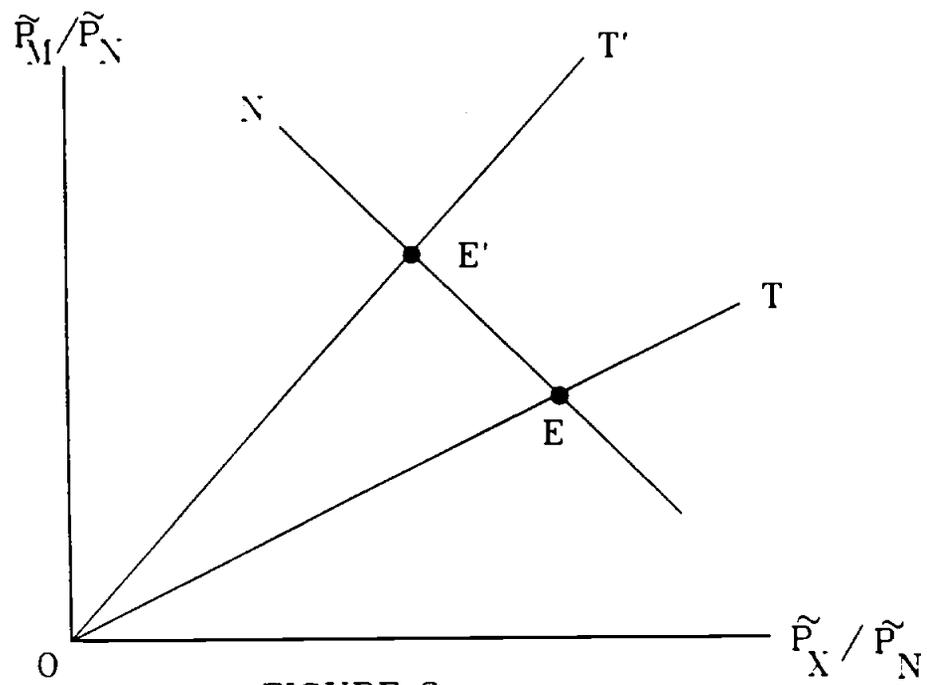


FIGURE 3

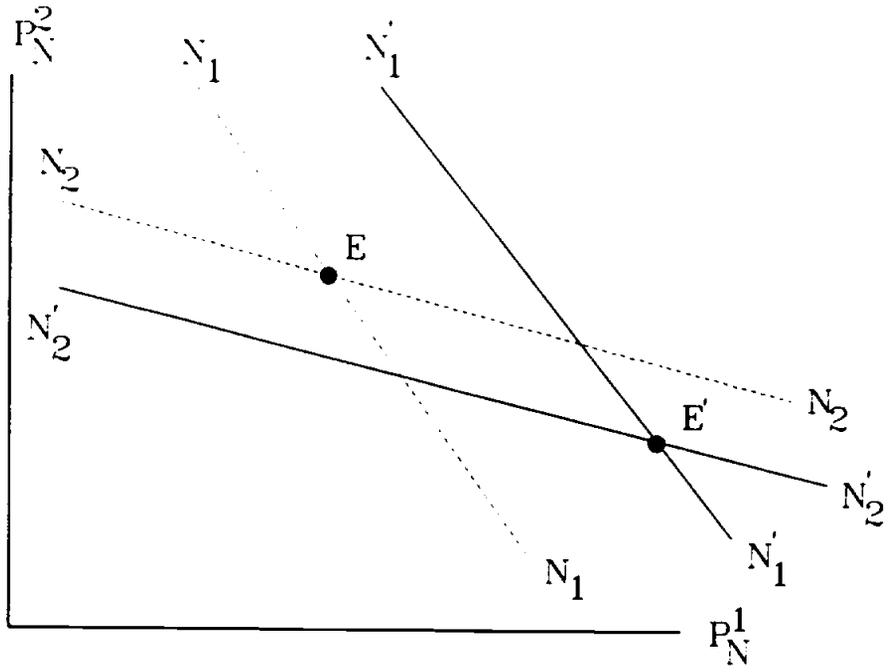


FIGURE 4

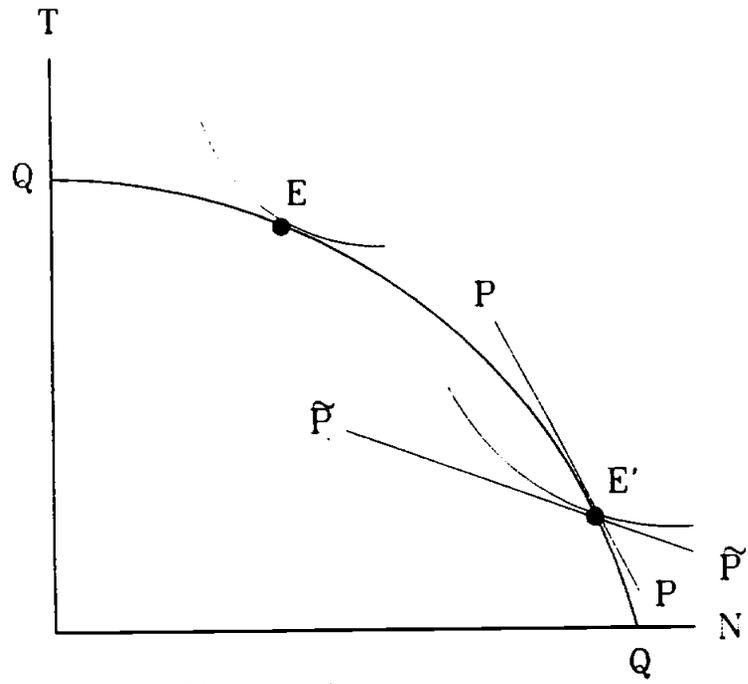


FIGURE 5

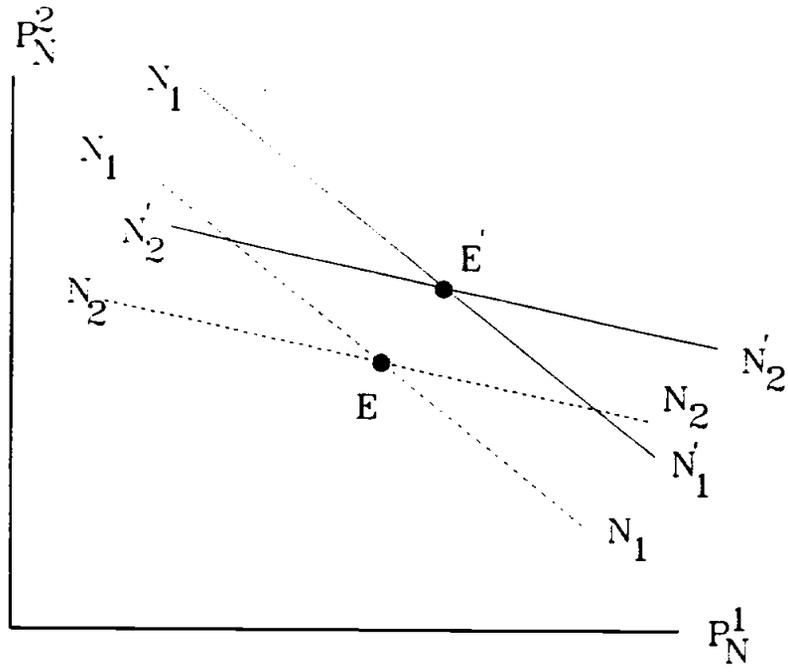


FIGURE 6