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TAX EXPORTING AND THE MARGINAL COST OF PUBLIC SPENDING *

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It is widely held that tax exporting lowers the relative price of public goods and induces inefficiently large amounts of public spending. This paper finds, to the contrary, that the ability to export taxes need not in general lower the effective cost of public spending. A simple model is developed in which a jurisdiction optimizes the mix of taxes between those on traded and non-traded goods. Once this structure is optimally set, the jurisdiction is indifferent between exported and own-source revenues, and the marginal cost of public expenditure is unaffected by the possibility of exporting. This argument is illustrated with an example in which the prohibition of taxation of traded goods results in no change in government spending.

1. Introduction

Suppose that a government – whether federal, state, or local – can influence its jurisdiction's terms of trade with the rest of the world by manipulating its tax policy. This will generally be possible whenever the producers and/or consumers in the jurisdiction are non-negligible in size relative to the market for some traded commodity, whether a good or a factor. According to the standard theory of optimal tariffs, such a government has an incentive to tax exports or imports in order to restrict trade and thereby achieve a welfare-increasing change in the terms of trade. [1] This will take the form of an increase in the price on world markets (or perhaps national or regional markets, if we are considering a smaller jurisdiction such as a state, province, local government, etc.) for goods (or factors) for which the jurisdiction is a net supplier, or of a decrease in the world price of goods (or factors) for which the jurisdiction is a net demander. Although this terms-of-trade effect is well known in the international trade literature, it is also known in the literature of public finance as *tax exporting*, that is, a shifting of the burden of taxes (or tariffs) from domestic residents to non-residents.

It is generally argued in the public finance literature that tax exporting stimulates the provision of public goods and services, by lowering their effective cost to the taxing jurisdiction. The usual view is that the additional tax burden required by additional spending is partly shifted to non-residents. Public goods would therefore appear to be cheaper from the viewpoint of the residents of the jurisdiction, or their representatives, who decide on the level of spending. [2]

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[1] For a recent treatment, see Bhagwati and Srinivasan (1983).

[2] This argument can be found, e.g., in McLure (1967), Oates (1972), Bird and Slack (1983), and Zimmerman (1983). For additional references and discussion, see Wildasin (1986a).

This conclusion can be used to justify various policy views. For example, it could be used to argue that since tax exporting results in levels of public spending that are inefficiently high, it ought to be curtailed. Alternatively, one might argue that tax exporting stimulates public spending that would otherwise be inefficiently low, and therefore it should not be limited.

Whatever its policy implications, it is somewhat surprising that the underlying proposition that tax exporting stimulates public expenditure has received relatively little critical scrutiny. Perhaps this is because the proposition appears to be so obvious. Appearances can be deceptive, however. In reality, this proposition is not obvious at all, and, under quite non-pathological conditions, it can be false.

The present paper analyzes this issue in the following way. Sections 2 and 3 begin by characterizing optimal tax policy, conditional on a given level of public expenditure, in a simple model of a jurisdiction that is able to affect its terms of trade. The essential feature of this model is that the jurisdiction has at least one non-exportable tax – exemplified here by a tax on labor. Next we examine the benefit–cost criterion for public expenditure. The conclusion, derived from a simple application of the envelope theorem, is that incremental revenue could be raised either from exported or non-exported taxes without affecting the evaluation of public spending. In this sense, tax exporting does not affect the marginal cost of public funds.

This does not imply that tax exporting is completely irrelevant for the evaluation of public expenditure. It still creates income effects, and affects the degree of reliance on distortionary non-exported taxes. However, if one abstracts from income effects and from distortionary non-exported taxes, a prohibition of tax exporting would have no effect at all on a jurisdiction's optimal level of public good provision. This is demonstrated in section 4. Section 5 contains a few summary remarks.

2. The model

The simplest possible model which can be used to present the argument is one in which a given jurisdiction is inhabited by a single representative household. This household's utility is a function of a vector $x = (x_1, \ldots, x_n)$ of goods, labor l, and a public good z. The household faces a vector of (tax-inclusive) prices $p = (p_1, \ldots, p_n) = (p_1, \ldots, p_{n-1}, 1)$ for goods, where good 1 is an exported good, good n is a numeraire traded good, and other goods may be traded or not. Labor is non-traded. The gross wage is w, and the net wage is $w - \tau$, reflecting a per unit tax τ on labor. The consumer maximizes utility, conditional on public policy, by choosing (x, l) subject to the budget constraint

$$px = (w - \tau)l. \tag{1}$$

This generates an indirect utility function $v(p, w - \tau, z)$ and demand and supply functions $x(\cdot)$ and $l(\cdot)$ with the same arguments.

The government taxes the output of the exported good as well as labor, so the government budget constraint is

$$t_1 y_1 + \tau l = \Gamma(z), \tag{2}$$

where t_1 is the per unit tax on the export, y_1 is domestic production of good 1, and $\Gamma(z)$ is a convex cost function for z. [3]

[3] Of course, one can export a tax on an *imported* commodity or factor as well as an exported one. This paper assumes that taxes are exported through taxation of an exported good, just for the sake of concreteness. The analysis applies equally to the case of taxation of imported goods.

We assume that the domestic production technology exhibits constant returns to scale, and is linear in goods 1, n, and any non-traded goods. The prices of all other traded goods are taken as given by the jurisdiction. Thus, the producer prices ($[p_1 - t_1, p_2, \ldots, p_{n-1}, 1]$, w) are taken as fixed. It immediately follows that an increase in t_1 increases p_1 unit for unit, and an increase in τ leaves w unaffected. By the constant returns assumption, there are no profits from domestic firms. Also, domestic ownership of foreign firms is assumed absent for simplicity.

For any traded good, net exports equal domestic production less consumption in equilibrium. In particular, for good 1,

$$x_1(\cdot) + C_1(p_1) = y_1, \tag{3}$$

where C_1 is net demand for good 1 by agents outside the locality. [4] This demand is assumed to depend only on traded goods prices (thus, C_1 is independent of z, so there is no benefit spillover from the locality), all of which are fixed by assumption except p_1. C_1' is assumed to be finite, so that the jurisdiction can influence the terms of trade for this commodity.

3. Tax and expenditure policy

We now substitute from (3) into (2) to eliminate y_1. The government budget constraint (2) then yields one equation in (t_1, τ, z). We will consider first the optimizing choice of (t_1, τ) conditional on $z = z_0$, exogenously fixed, and then discuss the choice of z itself.

For the optimal tax problem, the objective is to choose t_1 and τ to maximize v subject to (2). The first-order conditions for t_1 and τ are

$$v_1 + \lambda\left[y_1 + t_1\left(\frac{\partial x_1}{\partial p_1} + C_1'\right) + \tau\frac{\partial l}{\partial p_1}\right] = 0, \tag{4a}$$

$$-v_w + \lambda\left[l - t_1\frac{\partial x_1}{\partial w} - \tau\frac{\partial l}{\partial w}\right] = 0, \tag{4b}$$

where $v_1 = \partial v/\partial p_1$, $v_w = \partial v/\partial w$, $C_1' = \mathrm{d}C_1/\mathrm{d}p_1$, and λ is a Lagrange multiplier for (2). By Roy's formula, this implies (after rearrangement) that [5]

$$x_1\Big/\left[y_1 + t_1\left(\frac{\partial x_1}{\partial p_1} + C_1'\right) + \tau\frac{\partial l}{\partial p_1}\right] = l\Big/\left[l - t_1\frac{\partial x_1}{\partial w} - \tau\frac{\partial l}{\partial w}\right]. \tag{5}$$

Suppose now that the jurisdiction's tax structure has been optimized, according to the implicit characterization (5). We wish to see whether the possibility of tax exporting affects the evaluation of public expenditure at the margin. The fact that some revenues are raised from a tax on exports means that the consumer has a different consumption bundle of traded and non-traded goods and factors, so in this sense the evaluation of public expenditure is certainly affected by the fact that

[4] One can verify that market clearing for each traded and non-traded good, the government and household budget constraints, and the zero-profit condition imply trade balance for the locality.

[5] It is conceivable that the optimal tax structure satisfying (5) might require $\tau < 0$. This would be true if the locality's revenue requirement were relatively small, and if there were a good opportunity to export taxes. It is assumed either that $\tau > 0$ at an optimum, or that there is no institutional obstacle to $\tau < 0$.

$t_1 \neq 0$. But our concern is more specific than that. The question is rather whether the ability to raise t_1 further, and export some *incremental* taxes, impinges on the expenditure choice.

To answer this question, observe that an incremental change in z, starting from any z_0, changes welfare according to

$$\frac{dv}{dz} = v_z + v_1 \frac{dt_1}{dz} - v_w \frac{d\tau}{dz}, \tag{6}$$

where dt_1/dz and $d\tau/dz$ are whatever changes in tax rates accompany the change in z. Equivalently, dividing by the marginal utility of income v_I, we have

$$v_I^{-1} \frac{dv}{dz} = MRS - x_1 \frac{dt_1}{dz} - \frac{l\, d\tau}{dz} \tag{7}$$

as the change in real income resulting from a change in z.

Now to pose the problem sharply, consider the evaluation of (7) under two assumptions: first, that t_1 is held constant at the value satisfying (4) or (5), conditional on z_0, and second, that t_1 and τ simultaneously and optimally adjust to the change in z. In the first case, we are not allowing any additional taxation of the exported good at the margin, while in the second case this restriction is not imposed.

In either case, dt_1/dz and $d\tau/dz$ must satisfy

$$\left[y_1 + t_1 \left(\frac{\partial x_1}{\partial p_1} + C_1' \right) + \tau \frac{\partial l}{\partial p_1} \right] \frac{dt_1}{dz} + \left[l - t_1 \frac{\partial x_1}{\partial w} - \tau \frac{\partial l}{\partial w} \right] \frac{d\tau}{dz} = \Gamma' - t_1 \frac{\partial x_1}{\partial z} - \tau \frac{\partial l}{\partial z}, \tag{8}$$

by (2), where, of course, $dt_1/dz = 0$ in our first case. But by (4a), the first bracketed expression in (8) is equal to $-v_1/\lambda$, and by (4b) the second is equal to v_w/λ. Dividing by the marginal utility of income, we find that

$$x_1 \frac{dt_1}{dz} + l \frac{d\tau}{dz} = \frac{\lambda}{v_I} \left(\Gamma' - t_1 \frac{\partial x_1}{\partial z} - \tau \frac{\partial l}{\partial z} \right). \tag{9}$$

Finally, substituting into (7), we have

$$v_1^{-1} \frac{dv}{dz} = MRS - \frac{\lambda}{v_I} \left(\Gamma' - t_1 \frac{\partial x_1}{\partial z} - \tau \frac{\partial l}{\partial z} \right). \tag{10}$$

What is important about (10) is that it holds *both* in the case where t_1 is frozen at its initial value, *and* in the case where it can vary optimally. In either case, the cost–benefit criterion is precisely the same. Hence, the possibility of tax exporting is irrelevant to the public expenditure decision, at the margin.

4. The effect of a prohibition on exported taxes

To make the point of the argument in a more emphatic way, let us specialize the model in two respects. First, assume that the utility function is linear in the numeraire good and additively separable in good 1 and in the public good. Hence,

$$u(x, l, z) = \xi(x_1) + \phi(x_2, \ldots, x_n, l) + x_n + \chi(z), \tag{11}$$

where ξ and χ are strictly concave and ϕ is strictly quasi-concave. Second, assume that labor supply l is inelastic. Note that neither of these assumptions would appear to invalidate the usual intuitive argument that tax exporting stimulates the level of public good provision, since this intuition merely requires that the demand for public goods not be completely inelastic and says nothing about the elasticity of demand or supply of non-traded goods.

Nonetheless, we can establish the following result.

Proposition 1. Let z^* be the level of public good chosen when the government is free to select the tax rates on traded and non-traded goods optimally [i.e., according to (4) or (5)]. Let z' be the level of public good selected when taxation of traded goods is prohibited and all revenue must be raised from taxation of a non-traded factor. Then, given the preference structure (11) and given that the taxed factor is inelastically supplied, $z^* = z'$.

Proof. We know from (11) that the domestic demand for good 1, x_1, satisfies

$$\frac{\partial u/\partial x_1}{\partial u/\partial x_n} = \xi'(x_1) = p_1, \tag{12}$$

and hence the demand function x_1 depends only on p_1. In particular, $\partial x_1/\partial w = \partial x_1/\partial z = 0$. Also, the preference structure (11) implies that

$$MRS = \chi'(z), \tag{13}$$

which depends only on z. The fixed labor supply assumption implies that $\partial l/\partial w = \partial l/\partial p_1 = \partial l/\partial z = 0$.

When the tax structure is freely optimized, t_1 and τ are chosen to satisfy (4) and (5). Using Roy's identity and the above results on the demand and supply functions for x_1 and l in (4) establishes that $\lambda = 1$, the marginal utility of income. Hence, the fact that z^* satisfies (10), implies, using (13), $\lambda = 1$, etc., that

$$\chi'(z^*) = \Gamma'(z^*), \tag{14}$$

i.e., the marginal rate of substitution is equated to marginal cost. Concavity of χ and convexity of Γ make z^* the *unique* solution to (14).

Now suppose that the government is constrained to set $t_1 = 0$. It can then choose just (τ, z) to maximize v subject to (2). It is a straightforward exercise to show that the level of z solving this problem, z', is the solution to

$$\chi'(z') = \Gamma'(z'). \tag{15}$$

Comparing (14) and (15) proves the result. □

5. Conclusions

Proposition 1 shows that it is perfectly possible to have a non-pathological economy in which the prohibition of exported taxes (e.g., because of a tax treaty, constitutional constraints or directives from higher level governments) leads to absolutely no change in the level of public good provision. Some reflection shows that the key to Proposition 1 is (a) an absence of income effects in the demand

for the public good, (b) an absence of cross-effects on the domestic demand for the taxed traded good, and (c) an absence of distortions in the taxation of the domestic non-traded good. None of these features is an essential part of the usual intuitive argument for the stimulative effects of tax exporting. Since the proposition contradicts the intuitive argument, the intuition must be essentially wrong.

The proper intuition seems to be that when the tax structure is optimized, it makes no difference whether an incremental dollar of taxes is raised from taxation of traded or non-traded goods. This intuition is elaborated in Wildasin (1986b), which also discusses some of the implications for empirical work and for normative issues. To see one obvious implication, note that when the jurisdiction has access to a non-distortionary tax on a non-traded good (more specifically, if taxation of such a good affects neither its equilibrium quantity not the terms of trade), the marginal cost of public expenditure will always be one dollar. This is true *irrespective* of how much of the burden of an incremental dollar of revenue from taxation of a traded commodity falls on non-residents. Thus, in order to see how tax exporting can affect public spending, it is essential to analyze the distortions caused by taxation of *non-traded* goals.

References

Bhagwati, J.N. and T.N. Srinivasan, 1983, Lectures on international trade (MIT Press, Cambridge, MA).

Bird, R. and E. Slack, 1983, Urban public finance in Canada (Butterworth's, Toronto).

McLure, C.E., Jr., 1967, The interstate exporting of state and local taxes: Estimates for 1962, National Tax Journal 20, 49–77.

Oates, W.E., 1972, Fiscal federalism (Harcourt Brace Jovanovich, New York).

Wildasin, D.E., 1986a, Urban public finance (Harwood Academic Publishers, New York).

Wildasin, D.E., 1986b, The demand for public goods in the presence of tax exporting, Unpublished manuscript.

Zimmerman, D., 1983, Resource misallocation from interstate tax exportation: Estimates of excess spending and welfare loss in a median voter framework, National Tax Journal 36, 183–202.