

Trade taxes and international investment

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Abstract. This paper demonstrates that international investment disturbs the conventionally understood equivalence between import tariffs and export taxes. Fundamentally, remittances to foreigners introduce an additional pecuniary channel between countries so that two-good Lerner Symmetry generally will not hold. Moreover, because tariffs subsidize investors in the local import competing sector while export taxes can extract rent from foreign investors in the export sector, the pattern of international investment will influence government preferences over trade policy *instruments* as well as levels. Notably, trade tax symmetry is restored by introducing a third policy tool in the form of a direct a tax on international remittances. JEL classification: F11, F15, F21

Taxes sur le commerce international et investissement international. Ce mémoire montre que l'investissement international bouscule l'équivalence canonique présumée entre tarifs à l'importation et taxe à l'exportation. Fondamentalement, des versements aux étrangers ouvrent un canal additionnel entre pays qui fait que la Symétrie de Lerner ne tient plus. De plus, parce que les tarifs subventionnent les investisseurs dans le secteur national protégé, alors que la taxe à l'exportation peut extraire une rente des investisseurs étrangers dans le secteur d'exportation, le pattern d'investissement international va influencer les préférences du gouvernement quant à l'usage d'un instrument de politique commerciale ou un autre et quant à la vigueur avec laquelle il sera utilisé. La symétrie des taxes sur le commerce international est restaurée en introduisant un troisième instrument de politique sous la forme d'une taxe directe sur les versements internationaux.

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1. Overview

The significant and growing degree of non-trade economic integration among countries implies that the convenient modelling assumptions of national ownership and balanced goods trade carry substantial practical caveats. With goods trade now accounting for at most 60% of all current account activity and international factor payments making up well over half of the balance, it is surely remiss to continue to use conventional national ownership models to analyze international economic policy without at least a careful accounting of the inherent modelling limitations.¹ And as this paper will show, once the assumption of national ownership is relaxed, one of the longest understood tenets of trade policy – the equivalence between import tariffs and export taxes² – generally will not obtain. This trade tax asymmetry carries important practical implications, suggesting that governments should make the pattern of international ownership an explicit factor in decisions over trade policy targets and implementation.

This paper begins by identifying formally the asymmetry between import tariffs and export taxes that arises upon the introduction of cross-border ownership. Fundamentally, when one country holds claims to a share of another country's production – for instance, because of foreign direct investment, international portfolio diversification, or even temporary migration – it can run a permanent trade deficit according to its national balanced budget condition, while the investment-host country must similarly run a trade surplus to pay remittances to foreign-owned factors of production. The value of net remittances effectively constitutes the price of a third good – the net foreign ownership interest.³ To the extent that the real value of remittances depends on the choice of trade tax instrument, then, import tariffs and export taxes clearly are no longer equivalent instruments and two-good Lerner Symmetry is lost.⁴

Recognizing this trade tax asymmetry, it is then immediate that governments should have an explicit preference over the choice of trade tax instruments as well

1 In 2007 income receipts on U.S.-owned assets abroad constituted \$779 billion of the total \$2.411 trillion of U.S. current account credits, while income payments on foreign-owned assets in the U.S. and net private remittances accounted for \$698 billion of the total \$3.045 trillion in current account debits. Source: US BEA International Transaction Accounts Data Table 1, release date 17 March 2008.

2 As first established by Lerner (1936) and later formalized by McKinnon (1966), in a two-good national ownership framework any non-prohibitive ad valorem import tariff applied to the world price of the import good delivers the same equilibrium production and consumption levels, relative prices, and pattern of trade as would the equivalent ad valorem export tax applied to the local price of the export good.

3 For example, in the context of foreign direct investment, the third traded good is capital, the per unit real price of which is the local rental rate divided by the world price of the numeraire good.

4 A caveat: if the pattern of international investment is such that trade is balanced in equilibrium (e.g., if two identical countries hold claims to an equal share of each other's output), two-good Lerner Symmetry will hold. But this observation is of limited value, since a national income maximizing government would nonetheless optimally elect to impose a strictly a positive export tax or *negative* import tariff (holding any large country terms of trade effects constant). This issue is addressed in section 3.

as their levels. With international investment or cross-border factor flows, local prices affect the real value of remittances paid by the investment-host country to its foreign investors and thus the real economy. For example, when foreign-owned factors of production are paid their marginal revenue product (as in, e.g., Bhagwati and Brecher 1980 or Neary and Ruane 1988), the host-country's remittances to foreign owners depend on local prices;⁵ the same is true if international ownership is interpreted as a claim on domestic revenue. Since it is well known that a given non-prohibitive ad valorem import tariff, t , delivers a local price level that is a factor $(1 + t)$ higher than the price level induced by the same ad valorem export tax, the real value of foreign remittances – and thus national income – necessarily depends on the choice of instrument.⁶

More generally, for any level or composition of foreign ownership in the host economy and any given trade policy target, the investment host-country's government will have an explicit preference for an export tax over the equivalent ad valorem import tariff. Whereas the former can extract rents from foreign investors in the export sector, the latter subsidizes import-competing producers at the expense of local consumers. By the same logic, if restricted to a particular trade policy instrument, the government's optimal trade tax level will be lower under an import tariff regime than under an export tax policy.

The final section of this paper demonstrates that a modified form of trade tax symmetry is restored by introducing a tax on international remittances. The balance of payments approach to trade tax symmetry theorems set forth by Kaempfer and Tower (1982) establishes that a country can replace a given ad valorem tax on *all* balance of payments credits with the equivalent ad valorem tax on *all* balance of payments debits. Thus, in the context of international investment, a t % tax on the local price of a country's exports is equivalent to a t % tariff on the world price of its imports *plus* a t % tax on foreign investors' returns.⁷ Intuitively, pairing a tax on foreign remittances with a given ad valorem import tariff allows the government to capture the net industry gains to foreigners that arise under the tariff but would not be present under the same ad valorem export tax. In practice, however, this instrument pairing would require governments to adjust trade policy in tandem with investment policy – which seems unlikely – and so begs the question of whether and to what extent the current international policy structure admits potential for expropriative arbitrage across trade and investment policies.

The absence of trade tax equivalence in the presence international ownership is neither obvious nor mere technicality. Although a substantial body of the trade

5 Recall that under perfect competition and constant returns, total factor returns are homogeneous of degree one in output prices.

6 See McKinnon (1966, 592), or Dixit and Norman (1980, 240). The local price level is defined as the domestic price relative to world price for each good (i.e., with goods x and y , p_x/p_x^w and p_y/p_y^w), whereas the relative local goods price is defined as $p \equiv p_x/p_y$.

7 Bond (1990) admits a similar interpretation in a higher-order (n -commodity) model of optimal trade policy if remittances to foreign investors are interpreted as payment for imports of foreign 'capital services.'

literature has addressed the potential for simultaneous factor mobility and goods trade,⁸ none of the existing work has recognized the implied asymmetry between import tariffs and export taxes. Even the elegant and careful examination of the 'cost of protection' with factor mobility by Neary and Ruane (1988) focuses entirely on optimal *tariff* policy, although one can demonstrate easily (following the analysis outlined in section 3 of this paper) that in their framework the government would strictly prefer an export tax to an import tariff in the presence of capital inflows.

While the potential for trade tax asymmetry may surprise trade economists, a parallel caveat has been long understood in monetary economics. A series of work extending back to Meade (1955) argues that to maintain balance of payments equilibrium in a two-good monetary economy, a $t\%$ tariff can be replaced with a $t\%$ export tax only if the latter is accompanied by a $t\%$ depreciation of the currency. The monetarists' finding is consistent with this paper's results in the context of international ownership: an investment host-country will owe the same real value of foreign remittances under an export tax as it would under the equivalent ad valorem import tariff if and only if the ad valorem export tax is accompanied by a commensurate increase in the local price level. In their seminal text, Dixit and Norman (1980) point again to this link between the local price level and trade taxes, showing that in a two-good model (with balanced trade), a government can substitute for an exchange rate devaluation by instead imposing an import tariff plus the equivalent export subsidy.⁹

The critical difference between a standard international macro framework and the micro trade approach to modelling international investment is that a country's lifetime trade balance is assumed to be zero in the case of the former, but not in the latter. The macro approach to the balance of payments allows intertemporal borrowing and saving (or currency hoarding, as in Anderson and Takayama 1983) through *temporary trade imbalances*, but it nonetheless assumes that a country's lifetime gross national product (GNP) must equal its lifetime gross domestic product (GDP). Thus, in long-run equilibrium only two goods are traded, so that two-good Lerner symmetry (for real variables) holds.¹⁰

Conversely, the typical approach in the trade literature allows a country's lifetime gross domestic product to differ *permanently* from its lifetime gross national product, where the difference represents the value of international transfers or investment returns. There are a number of economically interesting and realistic scenarios that give rise to lifetime unbalanced trade under time consistent behaviour. For instance, residents of one country may own *ex ante* claims on another country's production, owing to historical circumstance such as colonialism,

8 See, for instance, Mundell (1957), Kemp (1966), Jones (1967), Brecher and Alejandro (1977), and Brecher and Findlay (1983), among many others.

9 See chapter 8, 240–2. Dixit and Norman's exchange-rate/trade-tax equivalence result no longer holds in the case of international investment, however, since trade taxes influence the real value of foreign remittances, while changes in the exchange rate do not section 3 elaborates.

10 For an elegant reconciliation of Lerner's symmetry theorem in an intertemporal model with temporary trade imbalances, see Razin and Svensson (1983).

immigration, war, or redrawn national borders (i.e., exogenous shocks to the international pattern of ownership). Alternatively, foreign investors may earn above market rents due to capital market frictions.¹¹ Allowing permanent imbalances in goods trade due to foreign investment both sets this paper apart from previous studies and also suggests a static model as the appropriate framework for analysis, since time plays no explicit role.

Finally it should be noted that this paper is not the first to identify a limitation of two-good Lerner Symmetry. Ray (1975) demonstrates that trade tax symmetry may not hold in the presence of imperfect competition in output or input markets.¹² Ray's finding reduces to the observation that if import tariffs and export taxes have asymmetric effects on the degree of monopoly distortion, factor prices need no longer be homogeneous of degree one in final goods prices, so that the allocation of resources may depend on instrument choice. Thus, this paper adds to Ray's cautionary advice to take care when comparing various forms of trade policy intervention.

The next section identifies the asymmetry between import tariffs and export taxes in the presence of international ownership. Section 3 then discusses the implications for optimal trade policy, and section 4 establishes a revised version of instrument equivalence in which both goods and foreign remittances may be taxed. Section 5 concludes.

2. Trade tax asymmetry with international investment

For the convenience of readers familiar with earlier work, this section follows the notation and expositional strategy set forth by McKinnon (1966). Consider a small¹³ Home country that produces and consumes two goods, x and y , and faces fixed world prices, p_x^w and p_y^w , measured in a single global currency. Denote the local prices p_x and p_y , and assume that Home's natural import good is x . Relative world and domestic goods prices are defined, respectively, $p^w \equiv p_x^w/p_y^w$ and $p \equiv p_x/p_y$. Government revenue is collected through trade taxes only and is redistributed to a representative consumer with non-satiated preferences.

Production depends on the local relative price only and is given by $q_i(p)$ for each good $i \in \{x, y\}$. Demand is a function of income measured in local prices

- 11 One may challenge the plausibility of permanent trade imbalances on the grounds that international investment may be viewed as 'trade' (in capital, entrepreneurship, etc.), and therefore that no country would be willing to be a lifetime net lender. Yet, as a practical matter, governments' radically different treatment of international trade and investment – in both policy and accounting methods – suggests that economic models should at the very least take care to distinguish the two.
- 12 For the extension of the result to monopsony power, see Ray (1983). For qualification of Ray's findings see Kaempfer and Tower (1982), and Eaton et al. (1983).
- 13 The small country assumption can be abandoned, but doing so complicates the analysis while providing little additional insight.

(I) and local prices, according to $d_i(p_x, p_y, I)$ for each good $i \in \{x, y\}$. Home's nominal income measured in the single world currency is defined implicitly by

$$I = p_x q_x + p_y q_y + R - \Phi, \quad (1)$$

where $R \equiv R(p_x, p_y, p_x^w, p_y^w, I)$ is trade tax revenue and Φ represents a transfer from Home to the rest of the world – that is, Home's net remittances to foreign investors – measured in the single global currency.

Home is assumed to satisfy its balanced budget constraint:

$$p_x^w M_x = p_y^w E_y - \Phi, \quad (2)$$

where $M_x \equiv d_x - q_x$ is Home's import volume of x and $E_y \equiv q_y - d_y$ is its export volume of y . Notice that Home's net payment to foreign investors, Φ , is by definition equivalent to a (permanent) trade deficit. Assume that before and after any change in trade tax policy, the economy is able to reach a stable, unique equilibrium at which (2) is satisfied.

PROPOSITION 1. *If the value of real remittances paid to foreign investors, Φ , depends on the local price level, then import tariffs and export taxes are not equivalent instruments; that is, two-good Lerner Symmetry does not obtain.*

The simplest way to demonstrate the point is by example. (See the appendix for the formal proof.) Suppose that foreign (world) investors hold an exogenous claim to a fixed share $\phi \in [0, 1]$ of Home production in each sector.¹⁴ Consider first a benchmark case in which foreign-owned production in the Home economy is sold at world prices. In scenario A:

$$\Phi_A \equiv \phi [p_x^w q_x(p) + p_y^w q_y(p)]. \quad (3)$$

Here, the value of Home's remittances to its foreign investors depends only on world prices and the local price ratio. Since a given ad valorem import tariff would deliver the same local relative price as the equivalent ad valorem export tax,¹⁵ the

14 The analysis with different shares of foreign ownership in each sector is analogous but notationally more cumbersome. The assumption that $\phi \geq 0$ (the rest of the world may hold claims on Home production, but Home does not hold claims on production overseas) implies that trade is balanced only in the absence of international investment. More generally, trade may be balanced with international investment as long as each country's remittances to foreign investors equal the return from its investments abroad (i.e., net remittances are zero). Although two-good Lerner Symmetry holds in the presence of international investment when trade is balanced, it is important to recognize that this is a razor's edge case; a marginal change in the trade tax would lead to a trade imbalance, upsetting symmetry.

15 Under an ad valorem tariff of t (applied to the world price of the imported good, x), Home's local prices are given by $p_x^s = (1 + t)p_x^w$ and $p_y^s = p_y^w$, while under an export tax of s (applied to the local price of the exported good, y), Home's local prices would be $p_x^s = p_x^w$ and $p_y^s = p_y^w/(1 + s)$. As long as $s = t$ (and neither trade tax is prohibitive), Home's relative local price will be the same: $p = (1 + t) p_x^w/p_y^w$.

production levels are independent of instrument choice. With the value of foreign-owned production indexed to fixed world prices, then, Φ_A is also independent of instrument choice.

Figure 1 illustrates. The difference between the value of Home's production measured in units of good y at the world price ($p^w q_x + q_y$) – its GDP – and its national budget constraint ($I/p_y^w \equiv p^w q_x + q_y - \Phi_A/p_y^w \equiv (1 - \phi)(p^w q_x + q_y)$) – its GNP – are the same under the tariff or the equivalent export tax.

Although two-good Lerner Symmetry holds in this benchmark scenario, the assumption that Φ is independent of the local price level carries with it the unnatural implication that foreign-owned production in the home country is exempt from export taxation and must pay the same import tariff levied on goods produced outside of the home country (an assumption that precludes tariff jumping FDI, among other things). Scenario A thus demonstrates that trade tax symmetry can be maintained by assuming that production is taxed based on ownership rather than location, but in the context of international trade policy this is tantamount to the unrealistic assumption that international investment is exempt from local trade policies.¹⁶

Scenario B adopts the more realistic assumption that foreign-owned production in the Home economy is exempt from import tariffs and faces the same export taxes as Home-owned production. The value of remittances from Home to its foreign investors is now given by¹⁷

$$\Phi_B \equiv \phi[p_x q_x(p) + p_y q_y(p)], \tag{4}$$

so that Home's nominal income is

$$I = (1 - \phi)(p_x q_x + p_y q_y) + R. \tag{5}$$

The balanced budget condition is exactly as it is in (2).

One can now conduct a thought experiment by comparing an economy with a hypothetical import tariff, t , applied to the world price of good x with the otherwise identical economy under the equivalent ad valorem export tax, $s (= t)$ applied to the domestic price of good y . It is again clear that as long as neither trade tax is prohibitive, relative goods prices – and hence the equilibrium pattern of production – will be the same under either the tariff or its equivalent export

16 It seems that NAFTA's Chapter 11, which protects foreign investors' returns from changes in local ordinances, may be a step in this direction. Foreign-owned enterprises are still subject to pre-existing local laws, however, suggesting that the Chapter 11 legislation is designed more to dampen expropriative motives than to skirt existing local laws.

17 The result extends easily to the case of foreign claims on domestically located factors of production, since total factor returns are homogeneous of degree one in *local* goods prices. For instance, in a standard two-good three-factor Ricardo-Viner model, the nominal rate of return on x -sector specific capital (r) is sensitive to the local price level (holding the relative goods prices and the world price fixed) according to $dr/dp_x|_{\Delta p=0} = (q_x - \partial w/\partial p_x|_{\Delta p=0} L_x)1/K_x$, where $w \equiv w(p, L_x)$ denotes the wage to labour and $L_x(p)$ denotes the equilibrium allocation of labour in the x sector.

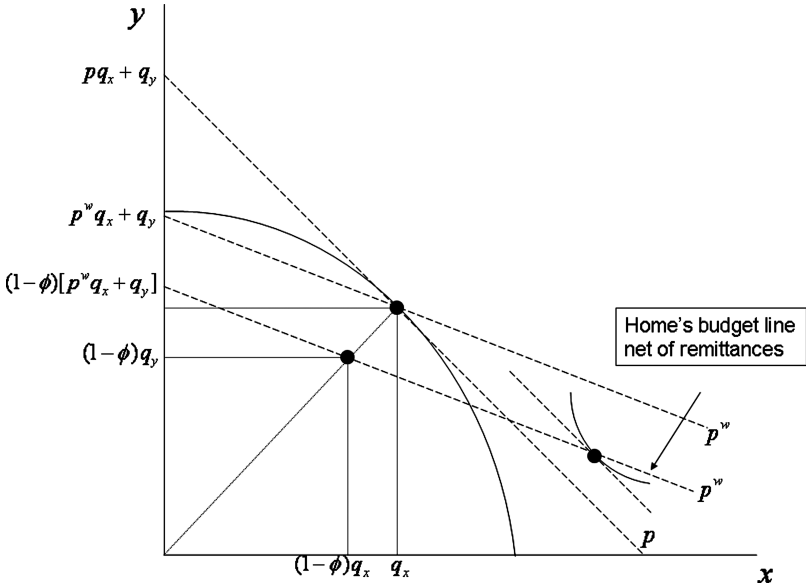


FIGURE 1 The Home economy with a fixed money transfer, $\Phi_A \equiv \phi(p_x^w q_x + p_y^w q_y)$

tax. The value of the transfer to foreign investors, however, will be $(1 + t)$ higher in the tariff economy than in the export tax economy, since the local price level in the tariff economy is $(1 + t)$ times that of the export tax economy. Using $\Phi^t(\Phi^s)$ to denote remittances under the tariff (export tax) policy, we see that

$$\Phi_B^s \equiv \phi(p_x^s q_x + p_y^s q_y) = \phi\left(p_x^w q_x + \frac{p_y^w}{1 + s} q_y\right) \tag{6}$$

$$\begin{aligned} \Phi_B^t &\equiv \phi(p_x^t q_x + p_y^t q_y) = \phi((1 + t)p_x^w q_x + p_y^w q_y) \\ &\Rightarrow \Phi_B^t = (1 + t)\Phi_B^s. \end{aligned} \tag{7}$$

The following figures illustrate.

Figure 2 depicts the economy under an ad valorem tariff, t . The economy produces at the tangency between the local price ratio and the country's production possibilities frontier. Home's national budget constraint (GNP) measured in units of good y at the world price is given by $I/p_y^w \equiv p^w q_x + q_y - \Phi^t/p_y^w \equiv (1 - \phi)(p^w q_x + q_y) - t p^w \phi q_x$. Note that Home's budget line now lies below the benchmark of Home country's budget constraint in figure 1. The difference between the two, $(p - p^w)\phi q_x$, is exactly the protection premium enjoyed by foreign investors (at the expense of the Home government's revenue) on its Home-located x production, ϕq_x .

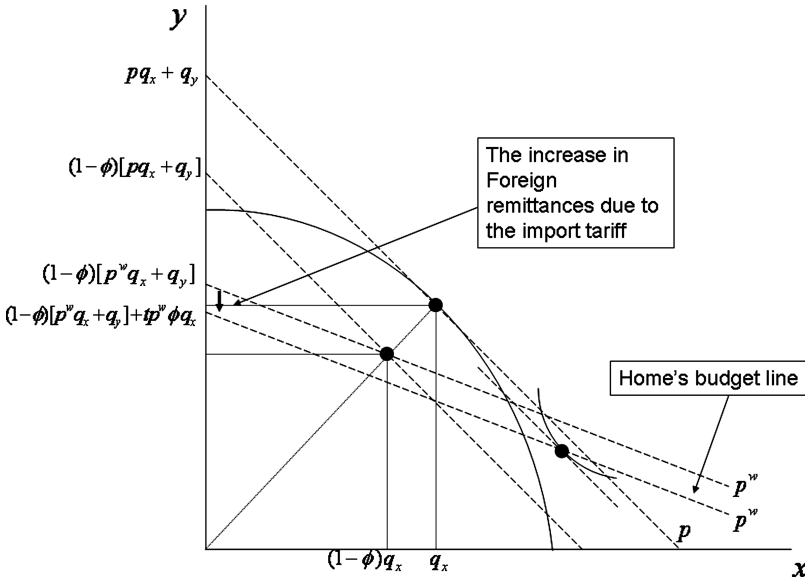


FIGURE 2 The Home economy with an import tariff and $\Phi_B \equiv \phi(p_x q_x + p_y q_y)$

Figure 3 represents the economy under the export tax, rather than the equivalent import tariff. Home's budget line lies further out under the export tax, allowing Home a larger budget set than in either figure 1 or figure 2. The difference between the national budget line in the benchmark case shown by figure 1 and Home's GNP under the export tax is $(s/(1 + s))\phi q_y$, which represents the additional revenue generated by taxing foreign investors in the local export sector.

The intuition behind the trade tax asymmetry is simple. Import tariffs subsidize local industry at the expense of consumers, while export taxes benefit local consumers at the expense of industry.¹⁸ To the extent that industry returns are claimed in part by foreign investors, while all local consumers are domestic nationals, a country's constituency as a whole is better served by shifting surplus from industry to consumers through export taxes than by taxing consumers to subsidize industry via import tariffs. Moreover, it is clear that governments should have asymmetric preferences over trade tax *instruments* as well as levels in the presence of international investment.

18 Recall that starting from free trade, a small import tariff leads to import-competing industry gains that are only partly offset by export sector losses; the net industry gain represents a net loss of consumer surplus. Similarly, under a (small) export tax, export sector losses exceed import sector gains, and the net industry losses are captured as an increase in consumer surplus. It is simple to confirm that if the percentage of industry ownership differs across industries, the government will have incentive to shift rents across industries by manipulating absolute *and* relative prices; in the next section the assumption of an industry-neutral pattern of foreign ownership thus proves a more meaningful simplification.

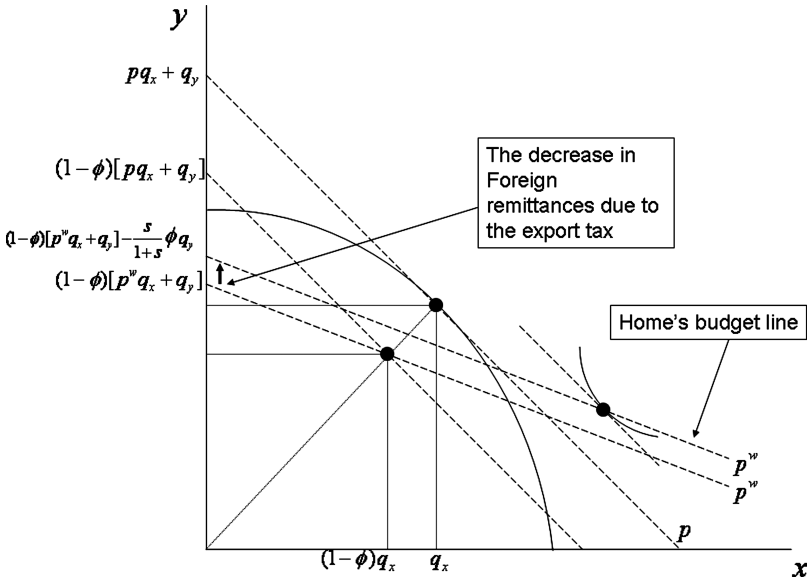


FIGURE 3 The Home economy with an export tax and $\Phi \equiv \phi(p_x q_x + p_y q_y)$

3. Optimal instrument choice

The importance of international investment for optimal trade policy is readily apparent from a quick comparison of figures 1–3. If, as in figure 1, a country’s trade imbalance is due to a fixed value transfer, two-good Lerner Symmetry holds, so that a national income maximizing government will be indifferent between a given ad valorem import tariff or its equivalent export tax.¹⁹ If the country is sufficiently small relative to the rest of the world that it cannot influence world goods prices, its optimal policy will be free trade.

If the returns to international investment depend on the local price level, however, that same national income-maximizing government’s optimal trade policy will depend on whether it has a rent-seeking opportunity. If foreign investment is sunk, for instance, or if investment returns in the home country exceed the world average because of capital market frictions or investment controls, the Home government may be able to capture some or all of foreign investors’ rents by manipulating domestic prices. Of course, if investment markets are frictionless and complete, then any rent-seeking attempts by the home country would induce foreign investors to leave.²⁰

19 The import tariff revenue will be strictly less (greater) than the real revenue generated by the equivalent export tax if the country is running a trade surplus (deficit). If the government is revenue seeking, it therefore may have asymmetric preferences over trade policy instruments.

20 The investment host country may not benefit from the foreign investment in the first place (or it may want more), but this much deeper question depends on the nature and source of the

Formally, starting from free trade, consider whether Home has an incentive to change its trade policy, conditional on the requirement that the policy maintain the same level of foreign investment. Using the model from the previous section, denote Home's remittances to the rest of the world under free trade by

$$\Phi = \phi[p_x^w q_x(p^w) + p_y^w q_y^{ft}(p^w)]. \tag{8}$$

Suppose first that foreign investors require a return of at least Φ^{ft} to stay in the home country (i.e., there is no rent-seeking opportunity; investors will leave if remittances fall below the free trade level). The Home government's national income-maximizing import tariff, t^o , solves

$$t^o = \arg \max_t V \equiv v(p_x, p_y, I(p_x, p_y, p_x^w, p_y^w, \Phi)) \tag{9}$$

s.t. $\Phi \geq \Phi^{ft}$,

where nominal income is defined in (5). The first-order condition reveals that Home's optimal import tariff is zero:

$$V_t = v_t \left\{ t p^w \underbrace{\frac{dM_x}{dp} \frac{dp}{dt}}_{(-)} \right\} = 0, \tag{10}$$

since $dM_x/dp < 0$ and $dp/dt = p^w > 0$. This makes sense; in the absence of a rent-seeking opportunity, the value of Home's remittances to the rest of the world is bound from below, so that the trade imbalance is effectively a fixed transfer. Since the Home government cannot reduce foreign investors' returns, its optimal policy is free trade. It is obvious that the optimal export tax is also zero by symmetry of the problem.

Now, suppose instead that starting from free trade, foreign investors will maintain the free trade level of investment as long as total remittances exceed some exogenous hurdle value $\Phi^w < \Phi^{ft}$.²¹ The Home government's optimal tariff, t^o , is given by

$$t^o = \arg \max_t V \equiv v(p_x, p_y, I(p_x, p_y, p_x^w, p_y^w, \Phi)) \tag{11}$$

s.t. $\Phi \geq \Phi^w$.

The first-order condition reveals that at least a small import subsidy will be optimal:

international investment and is therefore purposely set aside. The goal here is simply to understand how optimal trade policy depends on the level of foreign ownership, given the equilibrium investment level.

21 If foreign investment is sunk, the hurdle value is presumably zero; if instead foreign investors initially earn rents above the world market level (for instance because of because of capital controls), then the hurdle value is the opportunity cost of the investment in Home.

$$V_t = v_I \left\{ t p^w \frac{dM_x}{dp} - \underbrace{\phi q_x \frac{dp}{dt}}_{(+)} \right\} = 0. \quad (12)$$

The Home government can appropriate at least a small part of foreign investors' rents by decreasing the local price level, and starting from free trade, there is no distortionary cost from a small change in p .²²

The same logic applies to the case of an export tax, but in that case Home must set a strictly *positive* export tax to engineer the same decrease in the local price level. The first-order condition for Home's optimal export tax problem (also given by (11), substituting s for t to distinguish notationally the export tax from the import tariff) confirms that at least a small positive export tax is optimal:

$$V_s = v_I \left\{ s p^w \frac{dE_y}{dp} + \underbrace{\frac{1}{1+s} \phi q_y}_{(+)} \right\} = 0. \quad (13)$$

If restricted to a single policy instrument, Home's optimal rent-seeking trade tax thus would be either a *negative* import tariff or a *positive* export tax.²³ Figures 2 and 3 illustrate the point; starting from free trade, a small import subsidy or export tax would afford Home a first-order increase in its national budget set by decreasing the real value of foreign remittances at the cost of a second-order distortion in the local relative price (which would fall under an import subsidy or rise under an export tax). Yet, if allowed, Home clearly would prefer to use both trade taxes simultaneously. By combining an import subsidy (applied to the local price of the import good) with the same ad valorem export tax, Home could engineer a decrease in the local price level at no distortionary cost and thereby appropriate the entirety of foreign investors' excess rents (such that $\Phi = \Phi^w$). Together, an import subsidy paired with the equivalent ad valorem export tax thus constitutes a direct means by which a local government can appropriate foreign investors' returns.

Perhaps surprisingly, this twin import subsidy-export tax policy is *not* tantamount to a local currency appreciation in the presence of international

22 If the pattern of foreign ownership is not industry neutral, the first-order condition would include an additional term: a residual of the envelope condition, $v_I(\phi_x - \phi_y)pq_s(p)$, which represents the government's motive to manipulate the relative goods price in favour of the relatively less foreign-owned industry. As a natural extension to the finding by Neary and Ruane (1988) that the cost of (tariff) protection is higher the more intensive is foreign capital use in the import competing sector, this augmented first-order condition reveals that optimal import subsidy (export tax) will be greater the greater the bias of foreign ownership towards the import (export) oriented sector. See also Blanchard (2006) for this 'compositional' effect of FDI on optimal tariffs.

23 Recall that Home is small in this model. A large country's government would weigh the (first-order) terms of trade effect of the trade policy against the (first-order) appropriative motive. Thus, a large country would prefer the export tax (which yields a terms of trade gain) over an otherwise commensurate import subsidy (which would worsen the terms of trade).

investment, contrary to findings in the context of balanced trade, suggested by Dixit and Norman (1980) and Meade (1955). Trade taxes carry real implications for the value of Home-located production at world prices – and hence the real value of the trade imbalance – while changes in the exchange rate do not. Arbitrage conditions in goods markets ensure that the value of Home-produced goods *measured in the world currency* is unaffected by exchange rate changes. While a t % appreciation of the local currency would cause the local nominal prices to fall by t , that t % loss in nominal returns to foreign investors would be exactly outweighed by the t % appreciation enjoyed by foreign investors upon converting their nominal (Home currency) returns back into the world currency.²⁴ Thus, there is a fundamental difference in the real implications of trade taxes and exchange rates in the presence of international investments that is not apparent from earlier models that assume balanced trade.

Taken together, this section's findings suggest that, in the presence of international investment, endogenous trade policy models warrant consideration of an explicit tax on foreign investment returns to distinguish foreign-investor rent seeking from governments' more conventional political economy motives for trade taxes.

4. Revised tax equivalence

As important as recognizing the trade tax asymmetry inherent to models with international investment is understanding which collections of policies governments can employ to reach their trade policy targets. To the extent that individual trade taxes carry potentially unintended consequences for the real value of foreign remittances, it is clear that in general a single trade policy instrument will be inefficient. As demonstrated in the previous section, using both import tariffs and export taxes in tandem is a first-best means by which to extract rent from foreign investors, but it still fails to orthogonalize governments' motives over trade taxes from its potential rent-seeking motives. The question is under what circumstances governments can separate completely trade tax policy from the pattern of international investment.

First, note the trivial case. Under any set of policies for which the value of remittances to foreign investors is indexed to world rather than local prices, the investment-host government will not have a rent-seeking opportunity. Trade tax policy is then necessarily independent of foreign ownership and, moreover, import tariffs and export taxes constitute equivalent (and first-best) trade policy instruments. But as noted earlier, such a scenario is decidedly implausible, since

24 This result differs from the provocative finding by Canzoneri (1989) that governments have an incentive to use expropriative seignorage as a means to extract rent from foreign owners of government debt. The critical difference is that a country's debt in Canzoneri's framework is a fixed transfer of local currency, whereas the nominal value of a country's 'debt' in the context of international investment will vary with exchange rates, owing to arbitrage in goods markets.

it would mean that goods produced locally in part or in full by foreign interests would be both exempt from export taxes and simultaneously subject to import tariffs. Not only would such a policy be virtually unenforceable in practice, but it would also violate the national treatment clauses included in most multilateral trade and investment treaties.

A more realistic mechanism for separating governments' revenue-seeking motives from the use of potentially distortionary trade taxes is to introduce a direct tax on foreign investors' returns. By allowing governments to extract rents directly through an explicit tax on foreign remittances, the 'pure' trade policy motives are restored. Moreover, as first shown by Kaempfer and Tower (1982), any given ad valorem tax on all balance of payments credits is interchangeable with the equivalent ad valorem tax on all balance of payments debits. In the context of international investment, a $t\%$ tax applied to the local price of a country's exports thus can be replaced by a $t\%$ tax on *both* the world price of its imports *and* its foreign investors' net returns. The point is easily confirmed by noting that a country's national balanced budget condition would be the same under either the import tariff/investment tax policy or the export tax policy; under an ad valorem investment tax/import tariff of t :²⁵

$$p_x^w M_x = p_y^w E_y - \Phi + t p_x^w \phi \left(q_x + \frac{p_y}{p_x} q_y \right), \quad \text{or}, \quad (14)$$

$$p^w M_x = E_y - \phi(p^w q_x + q_y) + \phi q_y \left(\frac{t}{1+t} \right). \quad (15)$$

Under an ad valorem export tax of s , Home's balanced budget condition is

$$p_x^w M_x = p_y^w E_y - \Phi \quad (16)$$

or

$$p^w M_x = E_y - \phi(p^w q_x + q_y) + \phi q_y \left(\frac{s}{1+s} \right). \quad (17)$$

Home's national budget constraint is therefore the same under either the import tariff/investment tax or export tax policy if and only if $s = t$.²⁶

Furthermore, the symmetry between these two collections of policies – the export tax or the paired import tariff/remittance tax – will obtain under an endogenous policy framework. A direct tax on foreign remittances allows the

25 Some care is needed in the accounting identities here, since foreign remittances need to be taxed at the same rate as imports; an easy way to do this is to convert net remittances to units of x , then charge the ad valorem tax on the world price of x .

26 The domestic price ratio – and thus the pattern of production – would be the same under either policy. Then, for any given level of demand, real national income (implicitly defined by (14) and (16)) is the same under both policies, so that (14) and (16) are equivalent in equilibrium.

investment-host country to extract any available rents (if there is a rent-seeking opportunity) from foreign investors directly without resorting to trade taxes. If the government has additional, orthogonal, objectives over trade flows, it then can employ either an import tariff or the appropriately adjusted export tax to achieve those ends without unintended second-order distortionary effects.

5. Closing remarks

This paper demonstrates that international investment disturbs the symmetry between import tariffs and export taxes found by Lerner (1936). Import tariffs, which imply a transfer of rents from consumers to producers, increase the value of remittances paid to foreign investors, while export taxes have the opposite effect. Both national income and trade tax revenue thus depend on the government's choice of trade policy instrument.

Trade tax asymmetry is even more striking when policy is endogenous. When foreign interests hold claims on local production, the investment host-country has an incentive to extract rents from foreign investors by manipulating local prices. Thus, an investment host-country will strictly prefer an export tax over the equivalent ad valorem import tariff, *ceteris paribus*, as the former allows the government to extract rent from foreign investors via local export sector losses, whereas the latter would subsidize foreign investors, owing to local import-competing sector gains. Notably, the symmetry between import tariffs and export taxes is restored by introducing an additional policy tool in the form of a direct tax on foreign remittances.

Given these findings, and in light of the overwhelming evidence of significant and increasing non-trade economic integration, future study of international commercial policy should at the very least acknowledge explicitly the trade tax asymmetry implied by permanent trade imbalances and ideally would address directly the issue of optimal instrument choice and the potential role of direct investment taxes.

Appendix: Proof of proposition 1

Compare two economies, T and S , each of which must remit a net payment (valued in the single world currency) of Φ^t or Φ^s , respectively, to the rest of the world. The T economy applies an ad valorem tariff of rate t on imports as a percentage of their world price. The S economy leaves imports untaxed and unsubsidized, but imposes an ad valorem export tax s on exports as a percentage of their domestic price. Economies T and S face the same world prices and are in all other ways identical. Let $s = t$ and assume that neither the import tariff nor the export tax would be prohibitive. Denote variables in economy $T(S)$ by ${}^t({}^s)$ and use a tilde to identify equilibrium values.

- (1) Assuming that neither t nor s is prohibitive, the equilibrium prices in each economy are

| T Economy | S Economy | |
|--------------------------------|---|------|
| $\tilde{p}_x^t = (1 + t)p_x^w$ | $\tilde{p}_x^s = p_x^w$ | (A1) |
| $\tilde{p}_y^t = p_y^w$ | $\tilde{p}_y^s = \frac{p_y^w}{(1 + s)}$ | |

- (2) Since production depends on the local relative price only, it must hold that in equilibrium when $t = s$:

$$\begin{aligned}\tilde{q}_x^t &= \tilde{q}_x^s \\ \tilde{q}_y^t &= \tilde{q}_y^s.\end{aligned}\tag{A2}$$

- (3) The value of output measured at world prices is therefore the same for economies T and S when $t = s$:

$$Z \equiv p_x^w \tilde{q}_x^t + p_y^w \tilde{q}_y^t = p_x^w \tilde{q}_x^s + p_y^w \tilde{q}_y^s.\tag{A3}$$

- (4) Since demand is homogeneous of degree zero in prices and income, and the price level is factor $(1 + t)$ higher in the T economy than in the S economy according to (A1), the two economies will deliver the same level of demand if the nominal income level in T is $(1 + t)$ times that of the S economy.

In economy T , import tariff revenue is $R^t = tp_x^w M_x$. Substituting into (1) and rearranging yields

$$I^t = Z - \Phi^t + tp_x^w d_x^t.\tag{A4}$$

The export tax revenue in S is $R^s = sp_y E_y$, which together with (1) and the balanced budget condition in (2) yields

$$(1 + s)I^s = Z - \Phi^s + sp_y^w d_x^s.\tag{A5}$$

These income expressions are implicitly defined, since they include demand, which depends on income. To establish that the T and S economies will deliver the same level of demand in equilibrium, then, it is sufficient to establish that $I^t = (1 + t)I^s$ for any given level of demand. Suppose, then, that $d_x^t = d_x^s$, and use this to substitute (A4) into (A5):

$$I^t = (1 + t)I^s - (\Phi^t - \Phi^s)\tag{A6}$$

or

$$I^t = (1 + t)I^s \iff \Phi^t = \Phi^s.\tag{A7}$$

Thus, equilibrium demand in the T economy is equivalent to equilibrium demand in the S economy if and only if $\Phi^t = \Phi^s$. Together with (A1) and (A2), (A7) establishes that equilibrium relative prices, real income, production, and consumption are equivalent across the two economies if and only if $\Phi^t = \Phi^s$.

- (5) When the value of foreign remittances depends on sales revenue, residual profits, or the local value marginal product of the investment, Φ depends on the local price level. Specifically, if $\Phi \equiv \Phi(p_x, p_y)$, then $\Phi^t \equiv \Phi^t((1+t)p_x^w, p_y^w)$ whereas $\Phi^s \equiv \Phi^s(p_x^w, p_y^w/(1+s))$. Then, since the domestic price level is factor $(1+t)$ higher under the import tariff than under the equivalent ad valorem export tax (by (A1)), $\Phi^t \neq \Phi^s$ and two-good Lerner Symmetry cannot obtain. ■

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