How Should Sanctions Account for Bystander Countries?

By John Sturm*

Western countries have responded to Russia's invasion of Ukraine with unprecedented restrictions on international trade. One significant hindrance to the impact of these sanctions been Russia's ability to redirect its exports to so-called "bystander countries," notably India and China. At the same time, sanctioning countries in the EU have also benefitted from the ability to trade with bystanders, especially in liquid natural gas (Albrizio et al., 2022).

How should sanction design adapt to the presence of bystander countries? I address this question in a simple model of international trade in which a sanctionining country imports goods from a sanctioned country in the presence of an un-sanctioned bystander country, who serves as either an alternative seller to the sanctioner or an alternative buyer from the santionee.[1]

I have three main findings: First, imports that a sanctioning country can purchase not only from the sanctioned country but also from a bystander should face *lower* tariffs-as-sanctions. My second and third results concern goods that the sanctioned country can sell not only to the sanctioning country but also to a bystander. Such goods should face *higher* tariffs-as-sanctions than other goods that the sanctioned country supplies to the sanctioning country with the same elasticity of excess supply, but *lower* tariffs-as-sanctions than other goods that the sanctioned country supplies with the same total elasticity of supply.

This paper contributes to a recent literature on the design of international trade sanctions. While early work—such as Sturm (2022) and Gros (2022)—focused on the two-country case, more recent papers have emphasized the importance of international coordination (Hausmann et al., 2022). Sturm, Menzel and Schmitz (2022) consider the general case where there are bystanders on both sides of a market and trade taxes in the sanctioned country.

I. Model

I consider a stylized model of international trade with three countries—Home, Foreign, and Rest of the World (RoW)—and three goods. Each country contains a representative agent.

Good 1 is traded by all three countries, whereas good 2 is traded only between Home and Foreign. The latter provides a point of comparison for understanding the role of bystander countries. Good 3 is a numeraire traded by all three countries.

The preferences of each country's representative agent are additively separable across goods and linear in the numeraire. Home demands and does not supply both non-numeraire goods. Foreign supplies and does not demand both non-numeraire goods. I alternately consider the cases where (a) RoW supplies good 1 but does not demand it and (b) RoW demands good 1 but does not supply it. Except where specified, elasticities are common across goods 1 and 2 and constant in quantity.[2]

Home's government places ad-valorem tariffs t_1 and t_2 on imports from Foreign of goods 1 and 2, which trade at Foreign prices p_1 and p_2, respectively. Home leaves the numeraire and all trade with RoW untaxed and rebates tariff revenues to the Home agent lump-sum. I assume that Foreign and RoW engage in free trade.

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[1] Although I focus on the sanctioning country's imports, similar lessons apply to the case of exports.

[2] In the case of Proposition 2, I instead assume that Foreign's elasticity of (excess) export supply to Home—rather than its total elasticity of supply—is common across goods 1 and 2 and constant in quantity.

The Home government chooses t_1 and t_2 in maximize Home welfare subject to achieving a given level of Foreign welfare:

$$(t_1^*, t_2^*) \in \arg\max_{t_1,t_2} u^H(t_1, t_2) \quad \text{s.t.} \quad u^F(t_1, t_2) = \overline{u}^F, \tag{1}$$

where $u^H(t_1, t_2)$ and $u^F(t_1, t_2)$ are Home and Foreign welfare, respectively, at Home tariffs (t_1, t_2). The Home government is indifferent to welfare in RoW.

I denote by λ the Lagrange multiplier on the constraint in (1). λ has a natural interpretation: the Home government's willingness to pay for Foreign welfare with reductions in Home consumption (in units of the numeraire). $\lambda = 1$ corresponds to free trade; $\lambda = 0$, to full terms-of-trade manipulation; and $\lambda < 0$, to costly sanctions.

My results compare tariffs within the same economy across goods that do and do not have bystanders, rather than tariffs across economies with and without bystanders. This allows me to abstract from the effects of bystander countries on a sanctioner's willingness to pay for welfare (reductions) in a sanctioned country.[3]

II. Rest of the World as a Supplier

I begin with the case where RoW supplies good 1. Home can therefore still import good 1 even if it places severe sanctions on its bilateral trade with Foreign.

One might intuitively expect that Home's ability to acquire good 1 from RoW encourages it to tax trade with Foreign more than it does for the (otherwise analogous) good 2. After all, tariffs on good 1 hurt Home's importers of it from Foreign by less in the case of good 2, as they can substitute away to imports from RoW. My first result shows that this intuition is, in fact, incorrect. This result holds whenever Home values Foreign welfare less than its own (i.e. $\lambda < 1$).

[3]Such effects are generally ambiguous. For example, Foreign's ability to sell to RoW could either make Home more willing to pay for Foreign welfare reductions—as its sanctions no longer reduce Foreign welfare enough to cause humanitarian damage in Foreign—or less so—as it can no longer reduce Foreign welfare to a critical threshold required to acheive a political objective.

PROPOSITION 1: *All else equal, goods that Home imports not only from Foreign but also from Rest of the World face lower optimal tariffs, i.e.* $t_1 < t_2$.

To understand this result, consider the effects of a marginal reduction in imports from Foreign of either good 1 or good 2, acheived by further raising tariffs. First, reduced trade pushes down the Foreign price p_i, improving Home's terms of trade with Foreign and vice-versa. Second, Home loses the tariff revenue it initially earned on units no longer imported. These effects apply to good 1 and good 2. However, for good 1, there is a third effect: reduced supply from Foreign pushes up Home's residual demand for imports from RoW, raising the price $p_1(1 + t_1)$ at which Home trades with RoW and so worsening Home's terms of trade with RoW. Since this final effect discourages trade reductions, Home places a lower tariff on good 1 than good 2.

It is worth noting that, despite this result, the optimal percentage reduction in trade *quantities* may still be larger for good 1 than for good 2 (though it need not be). However, this does not imply that the optimal tariff is higher, since Home's subtitution toward RoW imports allows its imports from Foreign to react more to tariffs.

III. Rest of the World as a Demander

I now turn to the case where RoW demands good 1. Foreign can therefore still export good 1 even if Home places severe sanctions on their bilateral trade.

Similarly to the previous section, one might expect that Foreign's ability to sell good 1 to RoW discourages Home from taxing trade in that good. Indeed, if Foreign supplies goods 1 and 2 to Home with the same elasticity (i.e. elasticity of excess supply), then a percentage reduction in import quantity—which has the same percentage effect on Home welfare for either good—hurts Foreign suppliers to Home by less in the case of good 1, as they can substitute away from Home buyers. However, my next result shows this does not imply lower tariffs on good 1. This result holds whenever

Home is willing to forgo domestic welfare to reduce Foreign welfare (i.e. $\lambda < 0$).

PROPOSITION 2: *To the extent they are supplied to Home with the same elasticity of excess supply, goods that Foreign sells not only to Home but also to Rest of the World face higher optimal tariffs, i.e.* $t_1 > t_2$.

This result follows a similar logic to Proposition 1: For both goods 1 and 2, a marginal reduction in Home's imports from Foreign improves Home's terms-of-trade with Foreign and vice-versa, and it results in Home's loss of tariff revenue on units no longer imported. However, for good 1, there is an additional effect: The reduction in Foreign's exports to Home increases its excess supply to RoW, worsening its terms of trade vis-à-vis RoW. To the extent Home values reductions in Foreign welfare, this encourages it to further raise tariffs on good 1.

In supposing that Foreign supplies goods 1 and 2 to Home with equal elasticities, Proposition 2 puts itself in the shoes of a planner who, after finding these excess supply elasticities to be the same, realizes that Foreign trades good 1 but not good 2 with RoW. A subtly different scenario is that of a planner who, after finding that Foreign has the same *total elasticity of supply* for goods 1 and 2, realizes that Foreign trades good 1 but not good 2 with RoW. This implies Foreign's excess supply of good 1 to Home is more elastic than its excess supply of good 2.

My final result shows that this change in perspective reverses the implications of bystanders for tariff design.[4] This result holds whenever Home values Foreign welfare less than its own (i.e. $\lambda < 1$).

PROPOSITION 3: *To the extent they have the same total elasticity of supply, goods that Foreign sells not only to Home but also to Rest of the World face lower tariffs, i.e.* $t_1 < t_2$.

On one hand, restricting trade in good 1 improves Home's terms of trade with Foreign by less than does restricting trade in good 2. This is because Foreign's ability to substitute to exporting good 1 to RoW raises its elasticity of excess supply to Home. On the other hand, restricting trade in good 1 worsens Foreign's terms of trade with RoW, which restricting trade in good 2 does not. Home's planner values this when it wants to sanction Foreign (i.e. $\lambda < 0$). Proposition 3 shows that the first effect always dominates, so that—on net—Foreign's ability to export good 1 to RoW encourages Home to use lower tariffs on that good.

One promising avenue for future work would be to quantify this paper's qualitative results in a richer and more empirically-grounded model of trade.

[4]Scheuer and Werning (2017) consider a similar pair of comparisons in the context of income taxation.

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Mathematical Appendix

I now derive expressions for optimal tariffs in the cases where (a) RoW supplies the first good with constant elasticity ε_S^{RoW}, but does not demand it, and (b) RoW demands the first good with constant elasticity ε_D^{RoW}, but does not supply it. Propositions 1–3 follow from comparing Equations A3 and A7 across goods 1 and 2.

Case A: RoW supply In this case, the Foreign prices p_i of goods $i = 1, 2$ satisfy

$$S_i^F(p_i) + S_i^{RoW}(p_i(1+t_i)) = D_i^H(p_i(1+t_i)), \tag{A1}$$

where S_i^F and S_i^{RoW} are Foreign's and RoW's supply curves and D^H is Home's demand curve, respectively. Separately, the first-order condition for optimal tariffs implies

$$\begin{aligned} 0 &= \frac{du^H}{dt_i} + \lambda \frac{du^F}{dt_i} \\ 0 &= (\lambda-1)p_i Q_{H,i}^F d\log p_i - p_i(1+t_i)Q_{H,i}^{RoW}(d\log p_i + d\log(1+t_i)) + p_i t_i Q_{H,i}^F d\log Q_{H,i}^F \\ 0 &= (\lambda-1) - (1+t_i)\frac{1-s_{F,i}^H}{s_{F,i}^H}\left(1 + \frac{d\log(1+t_i)}{d\log p_i}\right) + t_i \varepsilon_{S,i}^F, \end{aligned} \tag{A2}$$

where $s_{F,i}^H$ is Foreign's (endogenous) share in Home's imports of i. Solving for t_i and applying the implicit function theorem to (A1) in order to substitute for $\frac{d\log(1+t_i)}{d\log p_i}$ gives

$$t_i = \frac{1-\lambda + \frac{1-s_{F,i}^H}{s_{F,i}^H}\left(1 + \frac{d\log(1+t_i)}{d\log p_i}\right)}{\varepsilon_{S,i}^F - \frac{1-s_{F,i}^H}{s_{F,i}^H}\left(1 + \frac{d\log(1+t_i)}{d\log p_i}\right)} = \frac{\frac{1-\lambda}{\varepsilon_{S,i}^F} - \frac{1-s_{F,i}^H}{\varepsilon_{D,i}^H + (1-s_{F,i}^H)\varepsilon_{S,i}^{RoW}}}{1 + \frac{1-s_{F,i}^H}{\varepsilon_{D,i}^H + (1-s_{F,i}^H)\varepsilon_{S,i}^{RoW}}}. \tag{A3}$$

Case B: RoW demand In this case, the Foreign prices p_i of goods $i = 1, 2$ satisfy

$$S_i^F(p_i) = D_i^H(p_i(1+t_i)) + D_i^{RoW}(p_i), \tag{A4}$$

where S_i^F is Foreign's supply curve and D^H and D^{RoW} are the demand curves of Home's and RoW's, respectively. Separately, the first-order condition for optimal tariffs implies

$$\begin{aligned} 0 &= \frac{du^H}{dt_i} + \lambda\frac{du^F}{dt_i} = (\lambda-1)p_i Q_{H,i}^F \frac{d\log p_i}{dt_i} + p_i t_i Q_{H,i}^F \frac{\log Q_{H,i}^F}{dt_i} + \lambda p_i Q_{RoW,i}^F \frac{d\log p_i}{dt_i} \\ 0 &= (\lambda-1) + t_i \varepsilon_{ES,i}^F + \lambda \frac{1-s_{H,i}^F}{s_{H,i}^F}, \end{aligned} \tag{A5}$$

where $s_{H,i}^F$ is Home's (endogenous) share in Foreign's exports of i, and where $\varepsilon_{ES,i}^F = \frac{\varepsilon_{S,i}^F + (1-s_{H,i}^F)\varepsilon_{RoW,i}^D}{s_{H,i}^F}$ is Foreign's elasticity of excess supply of i to Home.[5] Solving for t_i gives

$$t_i = \frac{1-\lambda-\lambda\frac{1-s_{H,i}^F}{s_{H,i}^F}}{\varepsilon_{ES,i}^F} = \frac{1-\lambda}{\varepsilon_{S,i}^F}\left(\frac{1 + \frac{1-s_{H,i}^F}{s_{H,i}^F}\left(1 - \frac{1}{1-\lambda}\right)}{1 + \frac{1-s_{H,i}^F}{s_{H,i}^F}\left(1 + \frac{\varepsilon_{RoW,i}^D}{\varepsilon_{S,i}^F}\right)}\right). \tag{A7}$$

[5] This expression can be derived as follows:

$$\begin{aligned} Q^{F,i}\varepsilon_{S,i}^F d\log p_i &= Q_{H,i}^F d\log Q_{H,i}^F + Q_{RoW,i}^F d\log Q_{H,i}^F = Q_{H,i}^F d\log Q_{H,i}^F - Q_{RoW,i}^F \varepsilon_{RoW,i}^D d\log p_i \\ \implies \varepsilon_{ES,i}^F \equiv \frac{d\log Q_{H,i}^F}{d\log p_i} &= \frac{\varepsilon_{S,i}^F + (1-s_{H,i}^F)\varepsilon_{RoW,i}^D}{s_{H,i}^F} = \varepsilon_{S,i}^F + \frac{1-s_{H,i}^F}{s_{H,i}^F}(\varepsilon_{S,i}^F + \varepsilon_{RoW,i}^D). \end{aligned} \tag{A6}$$