Can a tariff be used to close a long-run trade deficit?

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What tariff policy closes a long-run trade deficit? As it turns out, this is an ill-posed question. A tariff policy, generally, cannot close a long-run trade deficit, unless it inflicts a negative valuation effect on the international financial position of the country. In other words, absent such valuation effects, formally defined below, the long-run trade deficit is exogenous to any tariff policy, whether static or dynamic.

Since the publication of the now (in)famous CEA note, the profession was grappling with the tariff formula that could close a trade deficit. The intuition was that an infinite tariff can eliminate all trade and hence would close the trade deficit from any initial position. This was viewed as suggestive that there exist finite tariffs that can also close a trade deficit, at least to a significant extent.[1] This is a faulty logic. In fact, even in the limit of an unbounded tariff, long-run trade deficit measured in dollars does not change, unless there is a valuation effect on net foreign assets. The real quantities of goods exported and imported can converge to zero under such tariff, without a change in the dollar value of trade deficit.

The argument is as follows. Long-run trade deficit, under general circumstances, equals the sum of the exogenous initial net foreign asset position plus current and all future valuation effects (or excess returns) on gross assets and liabilities of the countries by virtue of the country budget constraint:

$$\text{LR Trade Deficit} = \text{Initial NFA} + \text{On-impact VE} + \text{Future Excess Returns}, \tag{1}$$

where VE stands for valuation effects on the initial NFA position and Future Excess Returns include both expected and surprise excess returns on gross international assets and liabilities. If the last two terms in (1) do not change in response to tariffs, the long-run trade deficit is

[1] An alternative view was suggested from the perspective of Lerner symmetry which states that an import tariff is equivalent, under fairly general circumstances, to an export tax. Both policies reduce total quantity of trade, exports and imports alike, with an ambiguous effect on trade imbalance. Indeed, from a macroeconomic perspective, current account deficit (a close cousin of trade deficit) equals the gap between aggregate savings and investment as a matter of accounting, and it is not clear why border taxes would have a robust impact on this macroeconomic gap.

fully exogenous. The only reason there can be an adjustment in the long-run trade deficit is the effect of the tariff policy on the current and future financial returns on international assets and liabilities, and not directly via the value of trade in goods and services. The long-run trade deficit can improve if the tariff policy inflicts a negative valuation effect on the country portfolio, and not otherwise. To be clear, tariffs do in general have such valuation effects, as we discuss below.

There is an alternative well-posed question: what dynamic path of tariffs closes trade deficit for a specific finite period of time which needs to be specified. Other well-posed question can be in the space of real quantities of exports and imports (e.g., the optimal tariff and terms of trade manipulation), but not in terms of the dollar value of the long-run trade deficit.

Formal argument Consider the general evolution of net foreign assets (NFA):

$$\underbrace{\sum\nolimits_{j\in J_t} Q_t^j B_t^j}_{\equiv \mathcal{B}_t} - \underbrace{\sum\nolimits_{j\in J_{t-1}} (Q_t^j + D_t^j) B_{t-1}^j}_{\equiv \mathcal{R}_t \mathcal{B}_{t-1}} = NX_t, \tag{2}$$

where NX_t is the dollar value of trade deficit (value of exports minus value of imports) in period t net of domestic tariffs (i.e., from the perspective of cash flows of the rest of the world). $\mathcal{B}_{t-1}$ is the initial net foreign asset position (NFA) at the end of previous period $t-1$. It is the sum of all individual asset positions B_{t-1}^j for available assets $j \in J_{t-1}$ with period t dollar values $Q_t^j B_{t-1}^j$ and payout (dividend) $D_t^j B_{t-1}^j$. The gross realized return on the NFA position between t and $t+1$ is defined as:[2]

$$\mathcal{R}_{t+1} \equiv \frac{\sum_{j\in J_t} (Q_{t+1}^j + D_{t+1}^j) B_t^j}{\sum_{j\in J_t} Q_t^j B_t^j}, \tag{3}$$

while $R_{t+1}^j \equiv (Q_{t+1}^j + D_{t+1}^j)/Q_t^j$ is the realized return on individual asset j. We denote with $\bar{R}_t$ the risk-free interest rate between periods t and $t+1$ (and known at t, hence the subscript).

The intertemporal budget constraint — obtained by aggregating flow budget constraints (2) discounted with a risk-free interest rate — must hold along any future path of events:

$$\mathcal{R}_t \mathcal{B}_{t-1} + \sum\nolimits_{s=t}^{\infty} q_{t,s} NX_s + \sum\nolimits_{s=t}^{\infty} q_{t,s+1} \left(\mathcal{R}_{s+1} - \bar{R}_s\right) \mathcal{B}_s - \lim_{s\to\infty} q_{t,s} \mathcal{B}_s = 0, \tag{4}$$

where $q_{t,t} = 1$ and $q_{t,s} = \mathbb{E}_t \Theta_{t,s} = \left(\prod_{i=0}^{s-t-1} \bar{R}_{t+i}\right)^{-1}$ for $s \geq t+1$ is the risk-free discount factor based on linked one-period risk-free rates $\bar{R}_s$. The last term $\lim_{s\to\infty} q_{t,s} \mathcal{B}_s = 0$ by no bubble condition on the international asset position (non-explosive NFA position), which some models may violate, and then these term should be included in the financial position as part

[2]Note that $\mathcal{R}_t$ can be defined from the value of $\mathcal{R}_t \mathcal{B}_{t-1}$ whenever $\mathcal{B}_{t-1} \neq 0$, otherwise we work directly with $\mathcal{R}_t \mathcal{B}_{t-1}$ which is generally non-zero even when $\mathcal{B}_{t-1} = 0$.

of the excess return. We can rewrite the intertemporal budget constraint (4) as:

$$\underbrace{-\sum_{s=t}^{\infty} q_{t,s} NX_s}_{\text{long-run trade deficit}} = \underbrace{\bar{R}_{t-1}\mathcal{B}_{t-1}}_{\substack{\text{exogenous} \\ \text{initial NFA}}} + \underbrace{(\mathcal{R}_t - \bar{R}_{t-1})\mathcal{B}_{t-1}}_{\substack{\text{on-impact} \\ \text{valuation effect}}} + \underbrace{\sum_{s=t}^{\infty} q_{t,s+1}\left(\mathcal{R}_{s+1} - \bar{R}_s\right)\mathcal{B}_s}_{\text{future realized excess returns}}, \tag{5}$$

which can be summarized in words as (1) above. This is the sense in which the long run trade deficit is entirely determined by the financial position of the country — a combination of existing net foreign assets and the stream of valuation effects and excess returns on the gross assets and liabilities.

A corollary of equation (5) is that the long-run trade deficit can change only as a result of either the valuation effect on impact $\mathcal{R}_t$ on the pre-determined initial NFA position $\mathcal{B}_{t-1}$, or as a result of changes in future excess returns reflected in the terms $\left(\mathcal{R}_{s+1} - \bar{R}_s\right)\mathcal{B}_s$.[3]

Equation (5) further simplifies when all assets j are priced by the same stochastic discount factor (SDF) $\Theta_{t,s}$. In this case, the last term in (5) must be zero in expectation using this discount factor, as there can be no expected risk-adjusted excess returns, and the only change in the expected long-run trade deficit can come as a result of a surprise valuation effect on impact of the policy announcement at t. Indeed, for an SDF $\Theta_{s,s+1}$ that prices every asset $j \in J_s$, we have $\mathbb{E}_s\{\Theta_{s,s+1}R^j_{s+1}\} = 1$, and therefore also $\mathbb{E}_s\{\Theta_{s,s+1}\mathcal{R}_{s+1}\} = 1$ by definition of $\mathcal{R}_{s+1}$ above. As a result, we can use the flow budget constraint to obtain:

$$\underbrace{-\sum_{s=t}^{\infty} \mathbb{E}_t\{\Theta_{t,s} NX_s\}}_{\text{expected long-run trade deficit}} = \bar{R}_{t-1}\mathcal{B}_{t-1} + (\mathcal{R}_t - \bar{R}_{t-1})\mathcal{B}_{t-1}, \tag{6}$$

where $\Theta_{t,t} = 1$ and $\Theta_{t,s} = \prod_{i=0}^{s-t-1} \Theta_{t+i,t+i+1}$ for all $s \geq t+1$ is the stochastic discount factor between periods t and s (note that $q_{t,s} = \mathbb{E}_t\Theta_{t,s}$). By consequence, we have that the change in the expected long-run trade deficit equals exactly the on-impact valuation effect:

$$\underbrace{\mathrm{d}\left(-\sum_{s=t}^{\infty} \mathbb{E}_t\{\Theta_{t,s} NX_s\}\right)}_{\text{change in expected LR trade deficit}} = \underbrace{\mathrm{d}\mathcal{R}_t \cdot \mathcal{B}_{t-1}}_{\substack{\text{on-impact} \\ \text{valuation effect}}},$$

and it is equal to zero when there are no on-impact valuation effects, $\mathrm{d}\mathcal{R}_t = 0$, irrespective of tariff policies and trade elasticities. Note that in the world with no arbitrage opportunities, there always exists an SDF that equation (6) applies. Equation (5) holds more generally, even in cases where certain agents may have arbitrage opportunities (e.g., "exorbitant privilege" that we discuss below).

[3] In an environment with a constant risk-free rate $\bar{R}_{t+i} = \bar{R} = 1/\beta$ for all i, formula (5) simplifies:

$$-\sum_{s=t}^{\infty} \beta^{s-t} NX_s = \bar{R}\mathcal{B}_{t-1} + (\mathcal{R}_t - \bar{R})\mathcal{B}_{t-1} + \sum_{s=t}^{\infty} \beta^{s+1-t}\left(\mathcal{R}_{s+1} - \bar{R}\right)\mathcal{B}_s.$$

Discussion The long-run trade deficit is pinned down by the financial position of the country, not by the relative prices in the goods market. As a result, unless the financial position of the country is affected by the tariff policy, the tariff has no effect on the long-run trade deficit. Equations (5) and (6) provide the formalization of this claim. The financial position of the country can change as a result of the valuation effect on the initial net foreign position or the change in the future path of excess returns on international assets and liabilities. While tariffs generally have such valuation effects, these effects are often independent from the goods market elasticities, and in particular from the elasticity of imports with respect to tariff. Furthermore, in certain cases, these valuation effects can be ruled out altogether irrespective of the structure of the goods market. For example, in a single-bond economy, there are no excess returns and no valuation effects on impact, hence the long-run trade balance cannot change in response to a tariff policy. This is not to say that this is a realistic case in practice, but rather to illustrate that the question of an import tariff that closes the long-run trade imbalance is not a well-defined one.[4]

We now turn to the practical case of the United States where net foreign assets are negative, but the country arguable enjoys expected excess returns on its assets over liabilities which is sometimes labeled as "exorbitant privilege". Furthermore, the US foreign liabilities are disproportionately in the US dollar. The direct effect of an import tariff is, generally, to appreciate the exchange rate, and hence causes a valuation effect towards the rest of the world. However, if the trade war caused a loss of confidence in the US assets by foreign investors, this can result in a dollar depreciation and an increase in the required yield on the US assets, eliminating partially or fully the excess returns (privilege). In both cases, the trade war has a potential to causes a deterioration in the financial position of the United States as captured by the two final terms in equations (1) and (5). This should lead to a partial or full rebalancing of the US long-term trade deficit, but through the mechanism entirely independent from the adjustment in the goods market and the import demand elasticity. Specifically, the mechanism that rebalances the long-run trade deficit is the loss of the US international net wealth.

Lastly, we address the case of an infinite tariff. In this case, the formula (5) (and its stylized representation (1)) still applies, however, the tariff and the associated exchange rate adjustment fully erase the real purchasing power of international assets. Therefore, while in dollars, the long-run trade deficit still satisfies (5), there are effectively no goods that cross the border in this limit, i.e. real quantities of imports and exports converge to zero. Note, however, that the dollar value of the trade deficit may still not be zero in this limit. This again illustrates that the goal of eliminating trade deficit in any nominal unit of account is not a well-defined objective. Meaningful objectives must be stated in the space of real quantities of imports and exports.

[4]The same applies in static trade models with an imbalanced international asset position, where trade deficits are exogenous. This note suggests that such static models are, in fact, adequate for the analysis of the impact of tariffs on the long-run trade deficit, which is nil unless there is a valuation effect on the net foreign asset position.