The Optimal Macro Tariff: A Note*

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The optimal macroeconomic import tariff on the rest of the world ("foreign") equals:

$$\tau = \frac{1}{\eta \cdot \left(1 + \frac{\text{NFA}^*}{\text{Exports}^*}\right) - 1} \cdot \frac{1}{\Lambda^*}, \tag{1}$$

where η is the foreign elasticity of substitution from imports, Λ^* is the foreign expenditure share on the local goods, making $1/\Lambda^*$ the relevant combined measure of openness and size of the rest of the world, and NFA*/Exports* are foreign's accumulated net foreign assets (NFA) relative to the net present value of future export revenues. The import tariff τ reduces global trade (both home and foreign exports), but increases the relative purchasing power of home exports relative to its imports, resulting in the welfare gain at home from the improved terms of trade. The size of the tariff is larger the less elastic the foreign demand and the smaller and more open is the rest of the world. However, it is smaller the larger are the net foreign assets held by the rest of the world against home. The intuition is that the improvement in the terms of trade in the goods market from the import tariff are partially offset by the valuation effect increasing the purchasing power of foreign NFA. From the country budget constraint, NFA must equal the net present value of future trade deficits, and therefore the import optimal tariff can be equivalently rewritten as:

$$\tau = \frac{1}{\eta \cdot \frac{\text{Imports}^*}{\text{Exports}^*} - 1} \cdot \frac{1}{\Lambda^*}, \tag{2}$$

where Imports*/Exports* is the ratio of the net present value of foreign imports over the net present value of foreign exports after the tariff is imposed (or, equivalently, the ratio of home Exports to Imports).

We set up the equilibrium environment in Section 1 and characterize the optimal tariff in Section 2. We discuss the properties of the optimal tariff in Section 3, including the issues of retaliation and global trade war equilibrium, the dynamics of trade imbalances, and the hedge that foreign-currency NFA position provides against a trade war with a major trade partner.

*Updated version will be posted at https://itskhoki.com/papers/OptimalMacroTariff.pdf

1 Setup

Consider a two-region world consisting of the home economy and the rest of the world (foreign). Home is contemplating to impose a broad tariff on all imports from the rest of the world. The trade between home and the rest of the world is generally imbalanced as a result of the accumulated net foreign asset (NFA) position. We characterize the optimal long-run import tariff against the rest of the world taking the initial NFA position as given.

Formally, home and foreign have endowments Y and Y^*, respectively, each of their own good. Both regions have preferences with home-bias over consumption of both goods. For concreteness, we assume the preferences are CES, but allow for different elasticities of substitution and arbitrary home bias parameters. Specifically, the home and foreign aggregate real consumption are given by:

$$C = \left[(1-\gamma)^{\frac{1}{\theta}} C_H^{\frac{\theta-1}{\theta}} + \gamma^{\frac{1}{\theta}} C_F^{\frac{\theta-1}{\theta}}\right]^{\frac{\theta}{\theta-1}} \qquad \text{and} \qquad C^* = \left[\gamma^{*\frac{1}{\eta}} C_H^{*\frac{\eta-1}{\eta}} + (1-\gamma^*)^{\frac{1}{\eta}} C_F^{*\frac{\eta-1}{\eta}}\right]^{\frac{\eta}{\eta-1}},$$

where $\theta, \eta > 0$ are the elasticities of substitution, and $\gamma, \gamma^* \in [0, 1)$ are openness parameters such that $\gamma + \gamma^* < 1$, reflecting home bias. The market clearing requires that:

$$Y = C_H + C_H^* \qquad \text{and} \qquad Y^* = C_F + C_F^*.$$

The trade costs are not model explicitly and are implicitly reflected in smaller values of γ, γ^*, i.e., greater home bias.

The associated consumer price indexes are denoted by:

$$P = \left[(1-\gamma)P_H^{1-\theta} + \gamma P_F^{1-\theta}\right]^{\frac{1}{1-\theta}} \qquad \text{and} \qquad P^* = \left[\gamma^* P_H^{*1-\eta} + (1-\gamma^*)P_F^{*1-\eta}\right]^{\frac{1}{1-\eta}},$$

where (P_H, P_F) are home consumer prices and (P_H^*, P_F^*) are foreign consumer prices of the two goods, respectively, denominated in the same unit of account. We consider a flexible price equilibrium and normalize $P_H = 1$ as the numeraire. We denote with $p \equiv P_F^*/P_H$ the relative price of the two goods quoted in their respective local markets (without international tariffs). The import tariff τ introduces a wedge in the home price of the foreign good:

$$P_F = (1+\tau)P_F^*.$$

Finally, we assume no export tax and the law of one price holding for the home good, $P_H^* = P_H$. While we consider flexible prices, this description also applies to a world with sticky producer prices (or sticky wages in an extension where $Y = L$) and monetary authorities stabilizing local producer prices, while the floating nominal exchange rate accommodates the adjustment in the relative price p.[1]

Given this pricing protocol, the equilibrium consumer price levels are fully determined by the relative price p and the tariff τ as follows:

$$P(p,\tau) = \big[(1-\gamma) + \gamma[p(1+\tau)]^{1-\theta}\big]^{\frac{1}{1-\theta}} \quad \text{and} \quad P^*(p) = \big[\gamma^* + (1-\gamma^*)p^{1-\eta}\big]^{\frac{1}{1-\eta}}. \tag{3}$$

The real exchange rate is defined as $\mathcal{Q} \equiv P^*/P$, and is generally increasing in p and decreasing in τ for a given p. $\mathcal{Q}$ measures the number of home consumption bundles that are needed to be sold to purchase one foreign consumption bundle, and hence an increase in $\mathcal{Q}$ is the home's real depreciation.

Consumer optimization implies that demand schedules at home and abroad are given by:

$$C_H = (1-\gamma)\left(\frac{P_H}{P}\right)^{-\theta} C \qquad \text{and} \qquad C_F = \gamma\left(\frac{P_F}{P}\right)^{-\theta} C,$$

$$C_H^* = \gamma^*\left(\frac{P_H^*}{P^*}\right)^{-\eta} C^* \qquad \text{and} \qquad C_F^* = (1-\gamma^*)\left(\frac{P_F^*}{P^*}\right)^{-\eta} C^*,$$

respectively. Note that $P_H/P = 1/P(p,\tau)$, $P_F/P = p(1+\tau)/P(p,\tau)$, $P_H^*/P^* = 1/P^*(p)$ and $P_F^*/P^* = p/P^*(p)$, thus also expressed as functions of p and τ only.

Finally, the equilibrium requires that the country budget constraint holds:

$$B + NX = 0, \qquad \text{where} \qquad NX = P_H^* C_H^* - \frac{P_F}{1+\tau} C_F,$$

$P_H^* C_H^*$ are home exports, $P_F C_F$ are home consumer expenditure on imports, and $P_F/(1+\tau)$ is the import price paid to foreign. Therefore, the terms of trade are $\frac{P_F}{1+\tau}/P_H^* = p$. Furthermore, B is the exogenously given net foreign asset position of home, and $B > 0$ allows to run a trade deficit, $NX < 0$. The NFA position is in real bonds paying in the units of home good.[2] Note that the NFA position of the rest of the world is $B^* = -B$, and the foreign budget constraint $B^* - NX = 0$ is satisfied by Walras Law.

[1]Indeed, in this world the law of one price holds for export prices up to a tariff, exactly as we assumed. Furthermore, $P_H = 1$ and $P_F^* = 1$ by the choice of the monetary policy, where P_F^* is now quoted in foreign currency with $\mathcal{E}$ denoting the nominal exchange rate (units of home currency for one unit of foreign currency). Therefore, the relative price is now given by $p = (P_F^*\mathcal{E})/P_H = \mathcal{E}$, where the nominal exchange rate ensures the equilibrium adjustment of this relative price (approximating the producer-price real exchange rate in the data).

[2]If the NFA position is fully or partially in terms of the foreign real bond, $B = B_h + pB_f$, with B_f paying in units of the foreign good, then the optimal tariff must take into account the effect of τ on B via p. Also note that the real bond formulation is equivalent to a nominal bond paying in units of local home numeraires in a monetary model where the home monetary authority stabilizes local producer prices, $P_H = 1$, while the floating nominal exchange rate $\mathcal{E}$ ensures the adjustment of relative prices, $p = (P_F^*\mathcal{E})/P_H = \mathcal{E}$. In this case, the NFA can be fully or partially in terms of nominal foreign-currency debt, $B = P_H B_h + \mathcal{E} P_F^* B_f$, and then one needs to similarly take account of the effect of τ on NFA via $p = (P_F^*\mathcal{E})/P_H$.

The equilibrium in this economy is the vector of prices and consumption that satisfy consumer demand, market clearing, and country budget constraint for a given NFA position B, tariff τ, and endowments Y, Y^*. Note, in particular, that we can combine these conditions, substituting consumer demand into market clearing and using the expressions for relative prices, into three equations characterization the equilibrium (p, C, C^*):

$$\begin{aligned} Y &= (1-\gamma)CP(p,\tau)^{\theta} + \gamma^* C^* P^*(p)^{\eta}, \\ Y^* &= \gamma[p(1+\tau)]^{-\theta} CP(p,\tau)^{\theta} + (1-\gamma^*)p^{-\eta} C^* P^*(p)^{\eta}, \\ B &= \gamma p[p(1+\tau)]^{-\theta} CP(p,\tau)^{\theta} - \gamma^* C^* P^*(p)^{\eta} \end{aligned} \tag{4}$$

as a function of (τ, B, Y, Y^*) and given the definitions of price indexes $P(p, \tau)$ and $P^*(p)$ in (3). These are the implementation constraints on the policymaker choosing τ to maximize domestic real consumption C. We denote the Lagrange multipliers on these constraints as ν, ν^* and μ, respectively.

2 Derivation of the Optimal Import Tariff

We write the Lagrangian $\mathcal{L}(B, Y, Y^*)$ for $\max_{\tau,p,C,C^*} C$ subject to equilibrium constraints (4) with associated Lagrange multipliers (ν, ν^*, μ):

$$\begin{aligned} \mathcal{L}(B,Y,Y^*) = C &+ \mu\left[B - \gamma p[p(1+\tau)]^{-\theta} CP(p,\tau)^{\theta} + \gamma^* C^* P^*(p)^{\eta}\right] \\ &+ \nu\left[Y - (1-\gamma)CP(p,\tau)^{\theta} - \gamma^* C^* P^*(p)^{\eta}\right] \\ &+ \nu^*\left[Y^* - \gamma[p(1+\tau)]^{-\theta} CP(p,\tau)^{\theta} - (1-\gamma^*)p^{-\eta} C^* P^*(p)^{\eta}\right], \end{aligned}$$

where $P(p, \tau)$ and $P^*(p)$ are given by (3).

The necessary optimality condition with respect to C^* is given by:

$$0 = \frac{\partial \mathcal{L}}{\partial C^*} = P^*(p)^{\eta}\left[\mu\gamma^* - \nu\gamma^* - \nu^*(1-\gamma^*)p^{-\eta}\right],$$

and it implies the following relationship:

$$\frac{\mu}{\nu} = 1 + \frac{\nu^*}{\nu}\frac{1-\gamma^*}{\gamma^*}p^{-\eta}. \tag{5}$$

The necessary optimality condition with respect to C, after simplification using other optimality conditions, simply states that $\nu = P(p, \tau)$, which is a side equation determining the value of ν, and not otherwise necessary for our characterization.

The necessary optimality condition with respect to τ is given by:

$$0 = \frac{\partial \mathcal{L}}{\partial \tau} = -\theta C P(p,\tau)^{\theta-1}\left[\mu\gamma p^{1-\theta}(1+\tau)^{-\theta} + \nu(1-\gamma) + \nu^*\gamma p^{-\theta}(1+\tau)^{-\theta}\right]\frac{\partial P(p,\tau)}{\partial \tau}$$
$$+ \theta\gamma p^{1-\theta}(1+\tau)^{-\theta-1} C P(p,\tau)^{\theta}\left[\mu + \nu^* p\right].$$

From (3), note that $\frac{\partial P(p,\tau)}{\partial \tau} = P(p,\tau)^{\theta}\gamma p^{1-\theta}(1+\tau)^{-\theta}$. Substituting this into the first condition, we can simplify as follows:

$$\frac{\mu}{\nu}\gamma[p(1+\tau)]^{1-\theta} + (1-\gamma)(1+\tau) + \frac{\nu^*}{\nu}\gamma p^{-\theta}(1+\tau)^{1-\theta} = P(p,\tau)^{1-\theta}\left[\frac{\mu}{\nu} + \frac{\nu^*}{\nu}p\right].$$

Next we use the fact that $P(p,\tau)^{1-\theta} = (1-\gamma) + \gamma[p(1+\tau)]^{1-\theta}$ and the optimality condition (5) to substitute for μ/ν, which after some simplification yields the optimality condition for the choice of the import tariff:

$$\tau = \frac{\nu^*}{\nu}\frac{\gamma^* + (1-\gamma^*)p^{1-\eta}}{\gamma^* p}. \tag{6}$$

The final necessary optimality condition is with respect to p, which is needed to find the optimal value of ν^*/ν and τ. We have:

$$0 = \frac{\partial \mathcal{L}}{\partial p} = \nu\gamma[p(1+\tau)]^{-\theta} C P(p,\tau)^{\theta}\Big[\underbrace{\frac{\mu}{\nu}(\theta-1) + \theta\frac{\nu^*}{\nu}p^{-1}}_{=\theta(1+\tau)-\frac{\mu}{\nu}\ \text{using (5) and (6)}}\Big]$$
$$-\nu\theta C P(p,\tau)^{\theta-1}\Big[\underbrace{\frac{\mu}{\nu}\gamma p[p(1+\tau)]^{-\theta} + (1-\gamma) + \frac{\nu^*}{\nu}\gamma[p(1+\tau)]^{-\theta}}_{=(1-\gamma)+\gamma[p(1+\tau)]^{1-\theta}=P(p,\tau)^{1-\theta}\ \text{using (5), (6) and (3)}}\Big]\frac{\partial P(p,\tau)}{\partial p}$$
$$+\nu\eta\gamma^* C^* P^*(p)^{\eta-1}\Big[\underbrace{\frac{\mu}{\nu} - 1 - \frac{\nu^*}{\nu}\frac{1-\gamma^*}{\gamma^*}p^{-\eta}}_{=0\ \text{by (5)}}\Big]\frac{\partial P^*(p)}{\partial p} + \eta\nu^*(1-\gamma^*)p^{-1-\eta}C^* P^*(p)^{\eta}.$$

Substituting in the expression for $\partial P(p,\tau)/\partial p$ implied by (3) and simplifying yields our third optimality condition, along with (5) and (6), linking together $(\tau, \mu/\nu, \nu^*/\nu)$:

$$\frac{\mu}{\nu}\cdot\gamma p[p(1+\tau)]^{-\theta} C P(p,\tau)^{\theta} = \frac{\nu^*}{\nu}\cdot\eta(1-\gamma^*)p^{-\eta}C^* P^*(p)^{\eta}. \tag{7}$$

These three optimality conditions are sufficient to characterize the optimal tariff in terms of measurable sufficient statistics:

Proposition 1 *The optimal import tariff on the rest of the world is given by:*

$$\tau = \frac{1}{\eta \cdot \frac{\text{Imports}^*}{\text{Exports}^*} - 1} \cdot \frac{1}{\Lambda^*}, \tag{8}$$

where η *is the foreign elasticity of substitution from import goods,* $\Lambda^* \equiv \frac{P_F^* C_F^*}{P^* C^*} = \frac{(1-\gamma^*)p^{1-\eta}}{\gamma^* + (1-\gamma^*)p^{1-\eta}}$ *is the foreign expenditure share on their local goods,* $\text{Imports}^* = P_H^* C_H^* = \gamma^* C^* P^*(p)^\eta$ *is the foreign import expenditure (or home exports), and* $\text{Exports}^* = \frac{P_F}{1+\tau} C_F = \gamma p [p(1+\tau)]^{-\theta} C P(p,\tau)^\theta$ *is the foreign export revenues (or home import expenditure net of tariff).*

Proof: follows from the three optimality conditions (5)–(7). Rewrite (7) as:

$$\frac{\mu}{\nu} = \underbrace{\frac{\nu^*}{\nu} \frac{(1-\gamma^*)p^{-\eta}}{\gamma^*}}_{=\mu/\nu - 1 \text{ by (5)}} \cdot \; \eta \frac{\gamma^* C^* P^*(p)^\eta}{\gamma p [p(1+\tau)]^{-\theta} C P(p,\tau)^\theta}.$$

This implies that:

$$\frac{1}{\eta \frac{\gamma^* C^* P^*(p)^\eta}{\gamma p [p(1+\tau)]^{-\theta} C P(p,\tau)^\theta} - 1} = \frac{1}{\frac{\mu/\nu}{\mu/\nu - 1} - 1} = \frac{\mu}{\nu} - 1 = \frac{\nu^*}{\nu} \frac{1-\gamma^*}{\gamma^*} p^{-\eta},$$

where the last equality uses (5) again. Finally, (6) implies:

$$\tau = \frac{\nu^*}{\nu} \frac{(1-\gamma^*)}{\gamma^*} p^{-\eta} \cdot \frac{\gamma^* + (1-\gamma^*)p^{1-\eta}}{(1-\gamma^*)p^{1-\eta}},$$

and therefore using the previous equation the optimal tariff equals:

$$\tau = \frac{1}{\eta \frac{\gamma^* C^* P^*(p)^\eta}{\gamma p [p(1+\tau)]^{-\theta} C P(p,\tau)^\theta} - 1} \cdot \frac{1}{\frac{(1-\gamma^*)p^{1-\eta}}{\gamma^* + (1-\gamma^*)p^{1-\eta}}}. \tag{9}$$

This formula implies (8) using the structure of the model (demand schedules) and the definitions in the text of the proposition. ■

Note that this characterization applies as a fixed point in a new equilibrium with tariff: import share Λ^*, as well as import and export values in (8) correspond to the new equilibrium with tariff. Also note that characterizing the new optimal-tariff equilibrium given by (τ, p, C, C^*) is, in fact, significantly less tractable than deriving the optimal tariff formula: it requires solving the non-linear system of equilibrium conditions (4) together with the condition for the optimal tariff (9). Nonetheless, the equilibrium system (4) can be manipulated to solve out (C, C^*) and show that the equilibrium relative price p decreases in τ. In words, an import tariff results in an appreciation of the home real exchange rate.

Lastly, we show the corollary to Proposition 1:

Corollary 1 *The optimal import tariff on the rest of the world* (8) *can be also expressed as:*

$$\tau = \frac{1}{\eta \cdot \left(1 + \frac{\text{NFA}^*}{\text{Exports}^*}\right) - 1} \cdot \frac{1}{\Lambda^*}, \tag{10}$$

where $\text{NFA}^* = B^* = -B$ *are the accumulated net foreign assets of the rest of the world against home, and* $\text{NFA}^*/\text{Exports}^*$ *are foreign accumulated NFA relative to the net present value of foreign future export revenues.*

Proof: From the country budget constraint $B + NX = 0$, and expanding these from the perspective of the foreign yields:

$$B^* + \underbrace{\gamma p [p(1+\tau)]^{-\theta} C P(p,\tau)^{\theta}}_{=\text{Exports}^*} - \underbrace{\gamma^* C^* P^*(p)^{\eta}}_{=\text{Imports}^*} = 0.$$

Expressing out $\text{Imports}^*/\text{Exports}^*$ and substituting into (8) gives (10). ■

Note that since this is the long-run model, NFA^* have a standard interpretation of accumulated net foreign assets, inclusive of potential partial default endogenous or exogenous to the tariff, and Exports^* should be interpreted as the net present value of all future exports from the rest of the world to home once the tariff is imposed (exclusive of the tariff).

3 Properties of the Optimal Macro Tariff

We now discuss the implications of Proposition 1 and its Corollary above for the properties of the optimal macroeconomic import tariff against the rest of the world. Consider first the situation without a global imbalance, that is when $B = B^* = NX = 0$ before the tariff. In this situation, an import tariff τ is equivalent to the export tax of the same magnitude τ and results in no trade imbalance. Both foreign import expenditure Imports^* and foreign export revenues Exports^* fall by the same amount, supported by a decrease in p (home real exchange rate appreciation) under an import tariff and by an increase in p (home real depreciation) under an export tax. This is the seminal 1936 Lerner symmetry result.

Consider first the case when the home country is small, that is, $\Lambda^* = 1$ in (8), i.e., (almost) all expenditure in the rest of the world is on their own goods. Nonetheless, there is an optimal import tariff in this case, $\tau = \frac{1}{\eta - 1} > 0$ from (8) provided that $\eta > 1$ (and an infinite tariff otherwise, when $\eta \leq 1$), or an equivalent export tax of the same magnitude. Even a small open economy has an optimal tariff given the downward sloping demand for the home good in the rest of the world: the optimal tariff is larger the less elastic is the foreign demand. Note that the optimal tariff does not depend on the home elasticity θ, only on the foreign elasticity η.

When the home economy is large in the sense that the rest of the world spends a non-trivial share of expenditure on the home good, $1 - \Lambda^* > 0$, the optimal tariff increases. Specifically, the optimal tariff is larger the larger is the share of foreign expenditure on home goods and hence the smaller is their own share Λ^*: $\tau = \frac{1}{\eta-1} \cdot \frac{1}{\Lambda^*}$. Λ^* is a sufficient statistic that captures jointly the size and the openness of the foreign economy (to home goods).

Why is it optimal to impose a tariff, even when a country is small, and when it reduces both imports and exports proportionally? Despite the destruction in consumer surplus around the world due to less efficient exchange of goods, the home government collects export revenues which increase the purchasing power of the home economy in the world market improving its terms of trade.

The negative terms of trade externality imposed on the rest of the world improves the welfare at home, assuming the rest of the world does not retaliate. If the rest of the world retaliates with a proportional tariff, it eliminates welfare gains for the home and generally results in a welfare loss everywhere in the world. The optimal tariff (8) characterizes the unilaterally optimal behavior taking the trade policy in the rest of the world as given. Therefore, the Nash equilibrium in a tariff war game has both the home and the rest of the world using the optimal tariff formula. The region of the world with more elastically substitutable demand (η vs θ) and with a smaller expenditure share on the imported good ($1-\Lambda^*$ vs $1-\Lambda$ with Λ symmetrically defined for home) will end up with a higher equilibrium tariff. All countries in the modern world are less than a quarter of the world economy, and hence are likely to lose more than the rest of the world in a trade war against the rest of the world.

We now turn the case with net asset and trade imbalance, where $\text{NFA}^* \neq 0$ in (10) and $\text{Imports}^* \neq \text{Exports}^*$ in (8). Given the elasticity η and the size of the rest of world captured by Λ^*, the optimal macro tariff given by (10) is smaller the larger are the net foreign assets accumulated by the rest of the world against home. The reason is that while the tariff improves the terms of trade in the goods market (making foreign exports less valuable relative to foreign imports), it also increases the purchasing power of foreign's net foreign assets (also relative to foreign exports). In other words, for the home economy, the favorable terms of trade effect in the goods market is partially offset by an unfavorable valuation effect on its net foreign assets and liabilities. Note that in this case the import tariff is no longer equivalent to the export tax, as the two have differential implications for the valuation of NFA (via a reduction in p under import tariff and an increase in p under an export tax).[3]

Interestingly, the insight above about the effects of foreign NFA on the optimal import tariff suggests that accumulating NFA against the major trade partner (e.g., as a consequence of an export-led growth strategy) also acts as a hedge against a potential trade war and reduces the optimal import tariff in case of such war. This is the case when the rest of the world accumulates NFA vis-à-vis home in terms of home bonds, providing a rationale for FX reserves. Note that the optimal tariff formula (10) takes in the foreign NFA position after a potential

[3]Recall that a reduction in p corresponds to an exchange rate appreciation which increases the purchasing power of foreign NFA when NFA is in terms of home bonds (see footnotes 1 and 2).

exogenous partial default. An endogenous valuation effect from the tariff when NFA is in terms of foreign bonds results in a different formula for the optimal import tariff which takes into account this additional effect resulting in a larger optimal tariff.

The optimal tariff formula (8) is, of course, a restatement of the same logic discussed above using (net present values) of import and export values. A country with a negative NFA position must have the net present value of its exports exceed the net present value of imports (assuming no default on NFA), and therefore the optimal tariff is decreasing in the relative value of home exports over home imports (that is, in the relative value of foreign imports over foreign exports). This provides a seemingly conflicting result for a country with both a negative NFA and a negative trade balance. Since this is a characterization of the long-run optimal macro tariff, the focus on NFA is more appropriate assuming the country plans to satisfy its budget constraint (otherwise, NFA needs to be adjusted downwards to reflect full or partial default, and the formula still applies). Short and medium-term dynamics of trade deficits does not change the insight about the optimal long-run tariff, since a period of persistent but transitory trade deficits must be eventually followed by the long-run trade surplus to satisfy the budget constraint.

The next iteration of this note will explore multilateral tariffs and the optimal dynamics of tariffs in an environment with a persistent global imbalance where a starting point is a negative NFA position simultaneously with a persistent trade deficit.