Trade Agreements, the Nature of Price Determination and Offshoring

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A fundamental question for modern research on commercial policy: What is the purpose of international trade agreements?

Answer has implications for understanding the design and operation of trade agreements that we observe.

Two broad views:
- internalize international policy externalities
- help governments make commitment to their own private sectors

International externality view dominates in accounting for observed features and operation of trade agreements.

But what form does the international externality take? And if the form of the externality changes, must trade agreements change to remain successful?
Introduction

- Theme 1: Nature of international price determination a key determinant of the nature of the international externality, can have profound impact on the design of an effective trade agreement

- Theme 2: Rise of offshoring may alter the design of effective trade agreements through its impact on the nature of price determination

- First discuss trade agreements and the nature of price determination (Antràs and Staiger, 2012)

- Then through this lens discuss implications for trade agreements of rise in offshoring (Antràs and Staiger, forthcoming)
Terms-of-Trade Theory of Trade Agreements:
- In the Nash equilibrium, tariffs are inefficiently high but domestic policies are internationally efficient.
- Negotiations over tariffs alone, coupled with a "market access preservation rule," can bring governments to the efficiency frontier — "shallow" integration.

Nature of international price determination is important for these predictions:
- "Deep" integration needed when prices are not fully disciplined by market clearing (bilateral bargaining).
Perfectly competitive trade model: Foreign (‘*’) exports a single good to Home.

- Measure $\frac{1}{2}$ of H consumers with demand $D(p)$
- Measure $\frac{1}{2}$ of F consumers with demand $D(p^*)$
- Measure 1 of firms in F with increasing-concave production technology $y^* = F(L^*)$
- Measure $\Lambda$ of workers in each country paid a wage of 1 (pinned down by outside sector)
Market Clearing with Perfect Competition

- H has import tariff $\tau$, F has both export tax $\tau^*$ and labor subsidy $s^*$ (applied only to the export sector), all defined in specific terms
- Governments are social welfare maximizers ($W$ and $W^*$)
- Efficient policies maximize world welfare and deliver $T^e \equiv \tau^e + \tau^{*e} = 0$, $s^{*e} = 0$. No surprise (no frictions)
- Nash policies: FOCs $\Rightarrow \tau^N = \hat{p}^* / \eta^*_E$, $\tau^{*N} = \hat{p} / \eta^*_M$ and $s^{*N} = 0$ (where all prices and elasticities are evaluated at the Nash policies)
- Why isn’t $s^{*N}$ distorted? $\tau^*$ is first best for terms of trade manipulation in this setting
Market Clearing with Perfect Competition

- **Shallow integration:** Suppose H agrees to eliminate its tariff and F agrees to eliminate its tariff and in addition F agrees to a “market access preservation” constraint on its future choices of $s^*$:

$$
\frac{d\tau^*}{ds^*} = -\frac{d\hat{p}}{ds^*} \frac{d\hat{p}}{d\tau^*}
$$

- Reflects essential mission of GATT/WTO rules: provide secure property rights over negotiated market access

- Then F solves

$$
\frac{dW^*}{ds^*} = \frac{\partial W^*}{\partial s^*} - \frac{\partial W^*}{\partial \tau^*} \frac{d\hat{p}}{ds^*} \frac{d\hat{p}}{d\tau^*} = 0
$$

with $W^*$ evaluated at $\tau = 0$

- Delivers $s^{*R} = 0$ and $\tau^{*R} = 0$. Hence, with $\tau = 0$, efficiency frontier achieved
Market Clearing with Market Power

- Does this result depend on absence of market power?
- A monopoly firm in F; H and F markets segmented
  - special form of imperfect competition, but insights are more general
- Efficient policies $T^e = 0, \ s^e = 1/\eta^*_D$: No role for tariffs, but F subsidizes labor to ensure that price in each market is equated to marginal cost
- Nash policies: FOCs $\Rightarrow \tau^N = -\hat{x} / (d\hat{x} / d\tau) - \hat{p} / \eta_D, \ \tau^*_N = \hat{p}^* / \eta^*_D$ and $s^*_N = 1/\eta^*_D$ (with all prices/elasticities evaluated at the Nash policies)
- Note: $s^*_N \neq s^e$, but conditional on trade volume $s^*_N$ (and $s^*_R$) is efficient
**Shallow integration:** Suppose H agrees to eliminate its tariff and F agrees to set its tariff at a level $\bar{\tau}^*$ s.t. $\hat{x}(s^N, 0 + \bar{\tau}^*) = \hat{x}(s^e, T^e)$, and F agrees to constrain its future choices of $s^*$ according to

$$\frac{d\tau^*}{ds^*} = \frac{-d\hat{x}/ds^*}{d\hat{x}/d\tau^*}$$

Then F solves

$$\frac{dW^*}{ds^*} = \frac{\partial W^*}{\partial s^*} - \frac{\partial W^*}{\partial \tau^*} \frac{d\hat{x}/ds^*}{d\hat{x}/d\tau^*} = 0$$

with $W^*$ evaluated at $\tau = 0$

Delivers $s^R = s^e$ and $\tau^R = 0$. Hence, with $\tau = 0$, efficiency frontier again achieved (key: $s^R = s^e$ conditional on efficient trade volume)
Matching Model

- Now suppose international prices determined by bilateral bargaining
- Measure 1 of consumers each matched with measure 1 of producers; no possibility of rematching (0 outside option of the agents)
  - extreme assumption but results generalize to any pricing not fully disciplined by market clearing
- Each producer produces an amount of $x$ with the production function $F(L)$ in anticipation of payoff obtained upon matching
- Consumer utility $u(x)$, where $u$ is increasing and concave
- With cost of producing $x$ sunk at time of matching, consumer and producer Nash bargain over the surplus, with producer capturing share $\alpha \in (0, 1)$
International match: F seller takes her good to H market; tariff costs not sunk at time of bargaining, so ex-post surplus over which parties negotiate is

\[ S(L, \tau + \tau^*) \equiv u(F(L)) - (\tau + \tau^*) F(L) \]

Labor \( L \) hired by F selling to H is then determined by maxing \( \alpha S(L, \tau + \tau^*) - (1 - s^*) L \), which defines \( \hat{L}(s^*, \tau + \tau^*) \) and trade volume \( F(\hat{L}) \)

Local (F) match: tariffs irrelevant to bargaining surplus, so labor hired by F selling to F is \( \hat{L}^*(s^*) \) and production for local sales is \( F(\hat{L}^*) \)
Matching Model

- Efficient policies $T^e = 0$, $s^* = 1 - \alpha$: no role for tariffs, and F labor subsidy resolves the under-investment in $L$
- Nash policies: FOCS $\Rightarrow \tau^N + \tau^{*N} > 0$, $s^{*N} > 1 - \alpha$
- Hence, $T^N > T^e$, but now $s^{*N}$ is inefficient even conditional on trade volume
Matching Model: Shallow Integration

- Consider F’s preferred $\tau^*$ and $s^*$ to deliver efficient trade volume.
- Efficient trade volume is $F(\hat{L}(1 - \alpha, 0))$, so starting from efficient policies changes in $\tau^*$ and $s^*$ must satisfy

$$\frac{d\tau^*}{ds^*} = -\frac{d\hat{L}/ds^*}{d\hat{L}/d\tau^*}$$

- Then F solves

$$\frac{dW^*}{ds^*} = \frac{\partial W^*}{\partial s^*} - \frac{\partial W^*}{\partial \tau^*} \frac{d\hat{L}/ds^*}{d\hat{L}/d\tau^*} = 0$$

- Delivers $s^R > s^e$. Hence, shallow negotiations cannot achieve the efficiency frontier.
Matching Model: Another Interpretation

“World”/exporter price:

\[ \hat{p}^w = \frac{\alpha u(F(\hat{L}))}{F(\hat{L})} + (1 - \alpha) \tau^* - \alpha \tau \]

- But \( \frac{-d\hat{L}}{ds^*} > 0 \), so \( F \) maintains trade volume with an increase in \( \tau^* \) and \( s^* \) while raising \( \hat{p}^w \) and improving its terms of trade
- Shallow integration cannot fully eliminate terms-of-trade manipulation when international prices are determined through bargaining
- But if negotiations impose \( s^* = s^{*e} \) (i.e., “deep” integration), then efficiency frontier is immediately achieved
According to ToT theory, Nash tariffs inefficiently high but domestic policies internationally efficient, market access/shallow integration approach can achieve efficiency

But when prices are not fully disciplined by market clearing (bilateral bargaining), deep integration needed

How much are international prices disciplined by market clearing?
  - arguably less and less so with the increase in offshoring (Antràs and Staiger forthcoming)

How sensitive is the performance of the market-access/shallow integration approach to the nature of international price determination?
  - some suggestive evidence: rise of deep-integration FTAs (Orefice and Rocha 2011)

Important questions for the architecture of the WTO moving forward
Offshoring and the Role of Trade Agreements

• Offshoring the production of inputs an increasingly dominant feature of the world economy
  
  • has come to symbolize the current wave of “globalization”

• Now examine the role and design of trade agreements in the presence of offshoring
Intermediate inputs often customized/involve costly search, and hence exhibit lock-in for buyers and sellers

Contractual safeguards for international transactions difficult to enforce

Two features of offshoring implied:

- terms of trade determined by *bilateral bargaining* between foreign suppliers and domestic producers, not disciplined by market clearing considerations
- potential for *international hold up*

Show that second feature can give rise to activist role for trade policy, but first feature has fundamental implications for the role and design of trade agreements
Main Findings

- The rise in offshoring complicates the task of trade agreements in two ways:
  - mechanism for international cost-shifting is more complex and extends to wider set of policies, so negotiations must extend to wider set of policies as well
  - underlying problem that a trade agreement must address in the presence of offshoring varies with the political preferences of member governments

- Implication of rise in offshoring for design of trade agreements:
  - increasingly difficult for governments to rely on traditional GATT/WTO concepts and rules – such as market access, reciprocity and non-discrimination – to help them solve their trade-related problems

- Some suggestive evidence:
  - signs of greater difficulty liberalizing trade through WTO negotiations in sectors where customized inputs are especially prevalent (Figure 1)
good over which the negotiations occur. Specifically, for a sample of 16 countries that joined the WTO after its creation in 1995, Figure 1 shows that tariff concessions were markedly greater in sectors with low levels of input customization – which we measure, following Nunn (2007), as the share of an industry’s inputs not traded in organized exchanges – than in sectors with high levels of input customization. While only suggestive, the pattern displayed in Figure 1 points to the possibility that countries have more difficulty liberalizing trade through WTO negotiations in sectors where customized inputs are especially prevalent, broadly in line with our message above.

Our paper is related to several literatures. First, as emphasized above, by exploring the role of trade agreements in a model with intermediate input trade and in an environment with relationship-specific investments and incomplete contracting, we complement and extend an established literature on international trade agreements (see Bagwell and Staiger, 2010, for a recent review). In suggesting a novel rationale for trade agreements, our paper also complements the recent papers of Ossa (2011) and Mrazova (2009). Second, by considering endogenous trade policy choices in this context, our paper also complements the recent papers of Ossa (2011) and Mrazova (2009). Second, by considering endogenous trade policy choices in this

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5 Figure 1 is constructed using the same data and methodology as Figure 1 in Bagwell and Staiger (2011) (see that paper for details). Nunn’s (2007) input contractibility measure was merged into the dataset using a concordance available from the BEA website. Nunn (2007) also proposes an alternative measure that treats goods referenced in trade publications as homogenous goods. With that alternative measure, the relationship between tariff concessions and the degree of input customization is less clear-cut.

6 This possibility is reinforced from a different angle by the empirical results of Orefice and Rocha (2011). They find that the importance of trade in parts and components between two countries as a share of their total trade is a significant predictor that the two countries will sign a “deep” preferential agreement containing provisions of a domestic regulatory nature. As we discuss further in the conclusion, such findings suggest that WTO-member governments whose countries have experienced significant increases in offshoring may see preferential agreements as a way to achieve the deep integration and idiosyncratic bargains that WTO commitments in their current form can not adequately provide.
Plan for Remainder of Talk

- Sketch of the Benchmark Model
- Nash Trade Policy
- Trade Agreements: Beyond Market Access
- Benchmark Model with Political Economy
- Trade Agreements: Beyond the Terms of Trade
- Sensitivity
- Final Thoughts & Some Open Questions
Benchmark Model

Setup

- Two small countries, \( H \) and \( F \), face fixed price at which a final good \( 1 \) is available on world markets
- Consumer preferences in country \( j \in \{H, F\} \) given by
  \[
  U^j = c_0^j + u(c_1^j); \quad u' > 0 \text{ and } u'' < 0
  \]
- Numeraire good \( 0 \) is costlessly traded / always consumed in both \( H \) and \( F \)
- Choose units so (fixed) price of good \( 1 \) on world markets is \( 1 \); with free trade, price is \( 1 \) everywhere
Good 1 produced with customized input $x$ according to concave $y(x)$
Producers in $H$ must import $x$ from suppliers in $F$
Choose units so (fixed) marginal cost of $x$ in $F$ is 1; for now trade in $x$ is free
Note: production efficiency requires $y'(x^E) = 1$
Ex-ante contracts ruled out (e.g., unverifiable quality), hence:
  the price at which each supplier in $F$ sells its inputs to a producer in $H$
  is decided ex-post (through bargaining) once investment in $x$ has been made
All agents have ex-ante zero outside option
Unit measure of producers in $H$ and suppliers in $F$ randomly matched
Timing

stage 1. Match occurs; if both agents stay with the match, producer provides supplier with list of customized input specifications; otherwise both exit and receive zero outside option

stage 2. Each supplier decides on amount $x$ of customized input to produce

stage 3. Each producer-supplier pair (Nash) bargains over price of the input, with bargaining weights $\alpha$ and $(1 - \alpha)$ for home producer and foreign supplier, resp

stage 4. Each producer in $H$ imports $x$ from its partner-supplier; produces the final good with the acquired $x$; payments agreed in stage 3 are settled
Consider stage 3 for producer in $H$ and supplier in $F$ matched in stage 1

<table>
<thead>
<tr>
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<th>$y(x)$</th>
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<tbody>
<tr>
<td>agm. jt. p/o</td>
<td>$y(x)$</td>
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<td>d/agm. p/o</td>
<td>pr: 0</td>
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<td>quasi-rents</td>
<td>$y(x)$</td>
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<tr>
<td>stage-3 p/o</td>
<td>pr: $\alpha y(x)$</td>
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In stage 2, input supplier chooses $x$ to maximize $(1 - \alpha)y(x) - x$, so the optimal quantity $\hat{x}$ of input satisfies $(1 - \alpha)y'(\hat{x}) = 1$

Note: $\hat{x} < x^E$ for $\alpha > 0$; under-investment associated with hold up

**Proposition 1** *In the Benchmark Model, a hold-up problem exists under free trade, leading to an inefficiently low volume of input trade ($\hat{x} < x^E$).*
International nature of hold-up problem makes organizational/contractual remedies especially problematic

In the absence of these remedies, can trade policy help to alleviate hold-up?

**stage 0.** A social planner selects a home-country trade tax $\tau_1^H$ on the final good $1$, a home-country import tax $\tau_x^H$ on home imports of the input $x$, and a foreign-country export tax $\tau_x^F$ on foreign exports of the input $x$

Note: $p_1^H = (1 + \tau_1^H)$

Define $\tau_x \equiv (\tau_x^H + \tau_x^F)$
Consider stage 3 for producer in $H$ and supplier in $F$ matched in stage 1

<table>
<thead>
<tr>
<th>agm. jt. p/o</th>
<th>$(1 + \tau_1^H) y(x) - \tau_x x$</th>
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<td>spl: $(1 - \alpha)$ q.r.</td>
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In stage 2, input supplier chooses $x$ according to FOC

$$(1 - \alpha) \left(1 + \tau_1^H\right) y'(\hat{x}) = 1 + (1 - \alpha)\tau_x,$$

implicitly defining $\hat{x}(\tau_1^H, \tau_x)$. Note: If $\tau_1^H = 0$, then $\tau_x^E \equiv -\alpha / (1 - \alpha)$ achieves $\hat{x} = x^E$ w/o consumption distortion

**Proposition 2** In the Benchmark Model, the constrained-efficient trade policy choices maintain free trade in the final good and subsidize importation of the input so as to solve the hold-up problem and achieve an efficient volume of input trade ($\hat{x} = x^E$).
Does $H$ have a unilateral incentive to “do the right thing?”

stage 0. The home government $H$ selects a trade tax $\tau_{1}^{H}$ on the final good $1$, and a trade tax $\tau_{x}^{H}$ on the imported input $x$; the foreign government $F$ remains passive, i.e., $\tau_{x}^{F} \equiv 0$

Two goals for $H$: achieve the desired $\hat{x}$; and extract inframarginal surplus from $F$’s supplier
Unilateral Home Policy

- Inframarginal surplus extraction:
  \[
  \frac{d \pi^F (\tau_1^H, \tau_x^H (\tau_1^H))}{d \tau_1^H} \bigg|_{d \hat{x} = 0} = (1 - \alpha) \hat{x} \left[ \frac{y (\hat{x})}{\hat{x}} - y' (\hat{x}) \right]
  \]

- What stops \( H \) from extracting all surplus from foreign suppliers?
  \[
  \frac{d W^H (\tau_1^H, \tau_x^H (\tau_1^H))}{d \tau_1^H} \bigg|_{d \hat{x} = 0} = \tau_1^H \frac{\partial D_1^H}{\partial p_1^H} - (1 - \alpha) \hat{x} \left[ \frac{y (\hat{x})}{\hat{x}} - y' (\hat{x}) \right]
  \]

  - Negative at \( \tau_1^H = 0 \) due to concavity of \( y(x) \). Hence, \( \hat{\tau}_1^H < 0 \)
  - Note: \( \tau_1^H = 0 \) efficient for any level of \( \hat{x} \):
    \[
    \frac{d W^W (\tau_1^H, \tau_x^H (\tau_1^H))}{d \tau_1^H} \bigg|_{d \hat{x} = 0} = \tau_1^H \frac{\partial D_1^H}{\partial p_1^H}
    \]
  
  - Hence, \( p_1^H = (1 + \tau_1^H) \) inefficiently low for any level of \( \hat{x} \)
Desired $\hat{x}$ satisfies

$$y' (\hat{x}) = 1 - (1 - \alpha) \frac{\hat{x}}{\partial \hat{x} / \partial \tau^H_x} > 1$$

Hence, $\hat{x} < x^E$
stage 0. The home government $H$ selects a trade tax $\tau_H^1$ on the final good 1, and a trade tax $\tau_H^x$ on the imported input $x$; simultaneously, the foreign government $F$ selects a trade tax $\tau_F^x$ on the exported input $x$.

- $F$ has no reason to distort $\tau_F^1$, and can pass cost of $\tau_F^x > 0$ on to producers in $H$ who accept lower bargaining surplus.

- **Proposition 3** In the Nash equilibrium of the Benchmark Model, $F$ maintains free trade in the final good and taxes the exports of the input, while $H$ intervenes in both the final-good and input markets, resulting in (i) an inefficiently low volume of input trade ($\hat{x} < x^E$), and (ii) an inefficiently low local price for the final good in $H$’s market.
Trade Agreements: Beyond Market Access

- Two inefficiencies to correct: inefficiently low volume of input trade, and inefficiently low local price for the final good in H’s market.
- Hence, an agreement on input trade volume alone cannot achieve efficiency frontier in presence of offshoring.

To see why, suppose F agrees to $\bar{\tau}_x^F$ and H may choose $\tau_1^H$ and $\tau_x^H$ to satisfy $\hat{x}(\tau_1^H, \tau_x^H + \bar{\tau}_x^F) = x^E$. Then H’s choices satisfy

$$
\frac{dW^H(\tau_1^H, \tau_x^H(\tau_1^H), \bar{\tau}_x^F)}{d\tau_1^H} \bigg|_{d\hat{x}=0} = \tau_1^H \frac{\partial D_1^H}{\partial \rho_1^H} - (1 - \alpha) x^E \left[ \frac{y(x^E)}{x^E} - y'(x^E) \right] = 0
$$

implying $\tau_1^H < 0$

- So efficiency requires negotiations over $\tau_x^H$, $\tau_x^F$ and $\tau_1^H$. 

Define $p^*_x$, the international (untaxed) price negotiated in stage 3 for exchange of inputs between foreign supplier and home producer:

$$p^*_x(\tau^H_1, \tau^H_x, \tau^F_x) \equiv (1 - \alpha) (1 + \tau^H_1) \frac{y(\hat{x}(\tau^H_1, \tau^H_x))}{\hat{x}(\tau^H_1, \tau^H_x)} - (1 - \alpha) \tau^H_x + \alpha \tau^F_x$$

But

$$\frac{dp^*_x(\tau^H_1, \tau^H_x(\tau^H_1), \bar{\tau}^F_x)}{d\tau^H_1} \bigg|_{d\hat{x}=0} = (1 - \alpha) \left[ \frac{y(\hat{x})}{\hat{x}} - y'(\hat{x}) \right] > 0$$

$$\implies \frac{dW^H(\tau^H_1, \tau^H_x(\tau^H_1), \bar{\tau}^F_x)}{d\tau^H_1} \bigg|_{d\hat{x}=0} = \tau^H_1 \frac{\partial D^H_1}{\partial p^H_1} - \bar{x} E \frac{dp^*_x(\tau^H_1, \tau^H_x(\tau^H_1), \bar{\tau}^F_x)}{d\tau^H_1} \bigg|_{d\hat{x}=0} = 0$$

Evidently, market access focus inadequate because $H$ retains policy flexibility to manipulate its ToT
Absent offshoring and the bilateral bargaining over international price that offshoring implies, an agreement over input trade volume would work (ToT theory)

**Proposition 4** *In the presence of offshoring, an efficient trade agreement must achieve deep integration, requiring governments to agree to constraints on policies that extend beyond market access commitments.*

Note: Propositions 3 and 4 hold for \( \alpha \to 0 \), and hence regardless of whether lock-in effect leads to hold-up problem

Key for the results is bilateral determination of prices resulting from lock-in effects
Introduce political economy weights:

\[ W^j = CS^j + \gamma^j \pi^j + \text{Trade Tax Revenue}^j, \quad \text{with } \gamma^j \geq 1, \text{ for } j \in \{ H, F \} \]

- Can ensure that model predicts import tariffs and export subsidies with sufficient political economy forces.
- Focus on different point: in the presence of offshoring, political economy leads to new inefficiencies that are not associated with international cost-shifting.
To establish this point, useful to express home and foreign government welfare in terms of local and international prices that policies induce:

\[
W^H = \tilde{W}^H \left( p^H_1(\tau^H_1), \ p^H_x(\tau^H_1, \tau_x), \ p^F_x(\tau^H_1, \tau_x), \ p^*_x(\tau^H_1, \tau^H_x, \tau^F_x) \right)
\]

and

\[
W^F = \tilde{W}^F \left( p^H_1(\tau^H_1), \ p^H_x(\tau^H_1, \tau_x), \ p^F_x(\tau^H_1, \tau_x), \ p^*_x(\tau^H_1, \tau^H_x, \tau^F_x) \right)
\]

And world welfare:

\[
W^W = \tilde{W}^W \left( p^H_1(\tau^H_1), \ p^H_x(\tau^H_1, \tau_x), \ p^F_x(\tau^H_1, \tau_x) \right)
\]
Efficient policies satisfy:

\[ \bar{W}_W \frac{\partial p_x^H}{\partial \tau_x} + \bar{W}_W \frac{\partial p_x^F}{\partial \tau_x} = 0 \]

\[ \bar{W}_{p_x^H} + \bar{W}_{p_x^H} \left( \frac{\partial p_x^H}{\partial \tau_1^H} + \frac{\partial p_x^H}{\partial \tau_x} \frac{d\tau_x^H}{d\tau_1^H} \bigg|_{dp_x^*=0} \right) = 0 \]

At efficient policies, a small change in \( \tau_x \) must have no first-order impact on world welfare.

And small changes in \( \tau_1^H \) and \( \tau_x^H \) that hold fixed \( p_x^* \) and hence \( p_x^F \) must have no first-order impact on world welfare either.
Note. An increase in $\tau_1^H$ that is accompanied by a change in $\tau_x^H$ which prevents $p_x^*$ from changing must alter the equilibrium volume of input trade $\hat{x}$:

$$
\frac{\partial \hat{x}(\tau_1^H, \tau_x)}{\partial \tau_1^H} + \frac{\partial \hat{x}(\tau_1^H, \tau_x)}{\partial \tau_x} \left. \frac{d\tau_x^H}{d\tau_1^H} \right|_{dp_x^*=0} = \frac{\left[ \frac{y(\hat{x})}{\hat{x}} - y'(\hat{x}) \right] \hat{x}}{p_1^H \left( \left[ \frac{y(\hat{x})}{\hat{x}} - y'(\hat{x}) \right] + \hat{x}y'' \right)} \neq 0
$$

This is why efficiency requires that the impacts of small changes in $\tau_1^H$ and $\tau_x^H$ that hold fixed $p_x^*$ must have no first-order impact on home and foreign welfare.

Different from ToT theory, where foreign welfare automatically unaffected; comes from bilateral bargaining over $p_x^*$.
Nash policies satisfy:

$$
\bar{W} \frac{\partial p^H_x}{\partial \tau_x} + \bar{W} \frac{\partial p^F_x}{\partial \tau_x} = -x^N
$$

and

$$
\bar{W}^H_{p^H_1} + \bar{W}^H_{p^H_x} \left( \frac{\partial p^H_x}{\partial \tau^H_1} + \frac{\partial p^H_x}{\partial \tau_x} \frac{d\tau^H_1}{d\tau_x} \bigg|_{dp^*_x=0} \right) = 0
$$

Easy to see: Nash not efficient; not surprising, as international cost-shifting motive still active when political economy motives present

More interesting question: Is international cost-shifting still the only source of inefficiency?
Trade Agreements: Beyond the Terms of Trade

- Political Optimum: unilateral choices “as if” $\tilde{W}_{p_x^*}^H \equiv 0 \equiv \tilde{W}_{p_x^*}^F$. If efficient, then int. cost-shifting (“ToT manipulation”) is the problem.

- Politically Optimal policies imply:

  $$\tilde{W}_{p_x^*}^W \frac{\partial p_x^H}{\partial \tau_x} + \tilde{W}_{p_x^*}^W \frac{\partial p_x^F}{\partial \tau_x} = 0$$

  $$\tilde{W}_{p_x^*}^H + \tilde{W}_{p_x^*}^H \left( \frac{\partial p_x^H}{\partial \tau_1^H} + \frac{\partial p_x^H}{\partial \tau_x} \frac{d \tau_x^H}{d \tau_1^H} \bigg|_{dp_x^* = 0} \right) = 0$$

- But at political optimum, also have

  $$\tilde{W}_{p_x^*}^F + \tilde{W}_{p_x^*}^F \left( \frac{\partial p_x^H}{\partial \tau_1^H} + \frac{\partial p_x^H}{\partial \tau_x} \frac{d \tau_x^H}{d \tau_1^H} \bigg|_{dp_x^* = 0} \right) =$$

  $$\frac{(\gamma^F - 1) \hat{x}}{2} \left[ \frac{y(\hat{x})}{\hat{x}} - y'(\hat{x}) \right] > 0$$

- When $\gamma^F > 1$, PO inefficient; ToT manipulation not the only problem.
A trade agreement can generate additional Pareto gains beyond providing governments with an avenue of escape from a ToT-driven Prisoners’ Dilemma.

Beginning from PO, a small increase in $\tau_1^H$ coupled with a change in $\tau_x^H$ that leaves $p_x^*$ unchanged implies second-order loss for $H$ but first-order gain for $F$.

- $\tau_x^H$ and $\tau_x^F$ can then be adjusted holding $\tau_x$ fixed to compensate $H$ and still leave $F$ with gain.

What is new problem to solve?
Interpreting the Non-ToT Problem

- Recall: trade volume $\hat{x}$ will be altered as a result of the policy adjustments described above.
  - and at PO, F’s politically motivated government is offering an export subsidy to its input producers.

- Impact on $W^H$ is second-order, but impact on $W^F$ is

  $$dW^F = \gamma^F [p^F_x - 1] d\hat{x} + \tau^F_x d\hat{x}.$$  

- When $\gamma^F = 1$, PO implies $p^*_x = 1$ and $dW^F$ simplifies to

  $$dW^F = \gamma^F [p^*_x - 1] d\hat{x} = 0.$$  

- But when $\gamma^F > 1$, $dW^F > 0$ because H’s policies can help provide a more efficient means of redistributing income toward input suppliers in $F$ than is possible with $F$’s own policies alone.

- $\implies$ a need for additional international policy coordination beyond that required to eliminate ToT manipulation.
Proposition 5: In the presence of offshoring, an efficient trade agreement must serve two roles: it must provide governments with an avenue of escape from a terms-of-trade driven Prisoners’ Dilemma; and when the foreign government objectives include political economy considerations, it must coordinate the setting of policies across countries so as to reduce the deadweight loss associated with export promotion programs for traded intermediate inputs.
Sensitivity

- Secondary Market
- Ex-Ante Lump-Sum Transfers
- Other Extensions:
  - Vertical Integration
  - Multiple Foreign Countries and Search Costs
  - Ad Valorem Tariffs
  - Domestic Suppliers
  - Two-sided Investments
Final Thoughts & Some Open Questions

- How much are international prices disciplined by market clearing?
  - arguably less and less so with the increase in offshoring

- How sensitive is the performance of the market-access/shallow integration approach to the nature of international price determination?

- And how sensitive is the performance of reciprocity/non-discrimination rules to the nature of international price determination?
  - novel “political externalities”

- Some suggestive evidence
  - rise of deep-integration FTAs (Orefice and Rocha 2011)
  - signs of greater difficulty liberalizing trade through WTO negotiations in sectors where customized inputs are especially prevalent (Figure 1, Antràs and Staiger forthcoming)

- Important questions for the architecture of the WTO moving forward