OFFSHORING AND THE ROLE OF TRADE AGREEMENTS

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November 15, 2008

Introduction

- Offshoring an increasingly dominant feature of the world economy.

- Initiate study of trade agreements in the presence of offshoring.

Introduction (cont.)

- Emphasize two features of offshoring that follow from the prominence of *relationship-specific investments* and *incomplete contracts* and distinguish offshoring from traditional trade flows:

    1. Terms of trade determined by *bilateral bargaining* between foreign suppliers and domestic producers; and

    2. Potential for *international hold up*.

- Show that these features have important implications for the nature and purpose of trade agreements.

- The rise in offshoring will *complicate* the task of trade agreements.

Main Findings (cont.)

- If governments seek to *maximize real national income*, then the purpose of a trade agreement is to mitigate international *cost-shifting* motives, as in TOT theory, but:

  - The mechanism for international cost-shifting extends to *a wider set of policies*, i.e., those that can affect bilateral bargaining outcomes;

  - Traditional market access concerns too narrow for efficiency.

Main Findings (cont.)

- If governments have *political economy motives*, then there is a *new problem* for a trade agreement to solve, distinct from cost-shifting/TOT problem:

  - A "political externality"; must internalize direct impact of trade policies on political goals of trading partner;

  - If political economy motives are widespread and varied, then underlying problem that must be addressed *varies* with political preferences of governments;

  - Difficult for governments to rely on simple and general rules such as reciprocity and non-discrimination.

Plan of the Talk

1. Sketch of the Benchmark Model
2. Nash Trade Policy and Role of Trade Agreements
3. Introducing Political Economy
4. Sensitivity
5. Conclusion

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
  $U^j = c_0^j + u\left(c_1^j\right)$; $u' > 0$ 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.

Setup (cont.)

- 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.

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.

Free Trade Equilibrium

Consider producer in H and supplier in F matched in *stage* 1.

agm. jt. p/o		$y(x)$	
d/agm. p/o	pr: 0		spl: 0
quasi-rents		$y(x)$	
stage-3 p/o	pr: $\frac{1}{2}y(x)$		spl: $\frac{1}{2}y(x)$

In *stage* 2, input supplier chooses x to maximize $\frac{1}{2}y(x) - x$, so the optimal quantity $\hat{x}$ of input satisfies $y'(\hat{x}) = 2$.

Note: $\hat{x} < x^E$; 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 ($\hat{x} < x^E$).*

Second-Best Trade Policy

- 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 τ_1^H on the final good 1, a home-country import tax τ_x^H on home imports of the input x, and a foreign-country export tax τ_x^F on foreign exports of the input x.

Second-Best Trade Policy (cont.)

Consider producer in H and supplier in F matched in *stage* 1.

agm. jt. p/o		$\left(1 + \tau_1^H\right) y\left(x\right) - \left(\tau_x^H + \tau_x^F\right) x$	
d/agm. p/o	pr: 0		spl: 0
quasi-rents		$\left(1 + \tau_1^H\right) y\left(x\right) - \left(\tau_x^H + \tau_x^F\right) x$	
stage-3 p/o	pr: $\frac{1}{2}$q.r.		spl: $\frac{1}{2}$q.r.

In *stage* 2, input supplier chooses x to maximize

$$\frac{1}{2}\left(1 + \tau_1^H\right) y'\left(\hat{x}\right) = 1 + \frac{1}{2}\left(\tau_x^H + \tau_x^F\right).$$

Note: If $\tau_1^H = 0$, then $\tau_x^E \equiv \tau_x^{HE} + \tau_x^{FE} = -1$ achieves $\hat{x} = x^E$ w/o consumption distortion.

Proposition 2 *In the Benchmark Model, the second-best 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 τ_1^H on the final good 1, and a trade tax τ_x^H on the imported input x; the foreign government F remains passive, i.e., $\tau_x^F \equiv 0$.

In *stage* 2, input supplier chooses x to maximize

$$\frac{1}{2}\left(1 + \tau_1^H\right) y'\left(\hat{x}\right) = 1 + \frac{1}{2}\tau_x^H.$$

- Two goals for H: achieve the desired $\hat{x}$; and extract infra-marginal surplus from F's supplier.

Unilateral Home Policy (cont.)

- Infra-marginal surplus extraction:

$$\frac{dW^H(\tau_1^H, \tau_x^H, \hat{x})}{d\tau_1^H}\Big|_{d\hat{x}=0} = \tau_1^H \frac{\partial D_1^H}{\partial p_1^H} - \frac{1}{2}\hat{x}\left[\frac{y(\hat{x})}{\hat{x}} - y'(\hat{x})\right].$$

  - Negative at $\tau_1^H = 0$ due to concavity of $y(x)$. Hence, $\hat{\tau}_1^H < 0$.
- Desired $\hat{x}$ satisfies

$$y'(\hat{x}) = 1 - \frac{1}{2}\frac{\hat{x}}{\partial\hat{x}/\partial\tau_x^H} > 1.$$

  - Hence, $\hat{x} < x^E$.

Proposition 3 *In the Benchmark Model, when only H intervenes with trade policy, its unilaterally optimal policy choices lead to (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.*

stage 0. The home government H selects a trade tax τ_1^H on the final good 1, and a trade tax τ_x^H on the imported input x; simultaneously, the foreign government F selects a trade tax τ_x^F on the exported input x.

F has no reason to distort τ_1^F, and can pass cost of $\tau_x^F > 0$ on to producers in H who accept lower bargaining surplus.

Proposition 4 *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.*

The Role of a Trade Agreement

Proposition 5 *In the Benchmark Model, the role of a trade agreement is to: (i) secure the adoption of input trade policies that expand input trade volume to the internationally efficient level; and (ii) secure the adoption of final-good trade policies in H that raise the local price of the final good in H's market to the internationally efficient level.*

The Role of a Trade Agreement (cont.)

- When input prices determined by *market clearing*, negotiations over τ_x^H that imply a domestic market access commitment are enough (combined with τ_x^F: no need to negotiate over τ_1^H.
  - If H can't alter volume of imported inputs demanded, then can't alter market-clearing price, and F's interests are protected.
- But when input prices determined by *bilateral bargaining*, this is no longer true.
  - H can alter price at which inputs are imported independently of volume:

  $$\frac{dW^F(\tau_1^H, \tau_x^H, \hat{x})}{d\tau_1^H}|_{d\hat{x}=0} = \frac{1}{2}\hat{x}\left[\frac{y(\hat{x})}{\hat{x}} - y'(\hat{x})\right].$$

  - So F's interests are not protected by market access commitment alone.

Corollary *When international trade involves the offshoring of specialized components, an effective trade agreement must extend its focus beyond the traditional market access concerns of establishing and maintaining conditions of competition to cover as well the conditions of bargaining.*

Benchmark Model with Political Economy

- Introduce political economy weights:

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

- Can ensure that model predicts import tariffs and export subsidies:

$$\hat{\tau}_1^{HN} = -\frac{\left(1 - \frac{\gamma^H}{2}\right)\hat{x}\left[\frac{y(\hat{x})}{\hat{x}} - y'(\hat{x})\right]}{|\partial D_1/\partial p_1^H|}, \quad \hat{\tau}_x^{FN} = \frac{\left(\frac{\gamma^F}{2} - 1\right)\hat{x}}{\partial \hat{x}/\partial \tau_x^F}.$$

A Modified Terms-of-Trade Interpretation

- Define international price p_x^* as (untaxed) price negotiated in *stage* 3 for exchange of inputs between F's suppliers and H's producers:

$$p_x^* = p_x^*(\hat{x}, \tau_1^H, \tau_x^H, \tau_x^F) \equiv \frac{1}{2}(1 + \tau_1^H)\frac{y(\hat{x})}{\hat{x}} - \frac{1}{2}\left(\tau_x^H - \tau_x^F\right),$$

- Define "bad" terms-of-trade manipulation as associated with *pure rent-shifting*. E.g., for τ_x^H: $\frac{\partial W^H}{\partial p_x^*}\frac{\partial p_x^*}{\partial \tau_x^H}$.

- Define "good" terms-of-trade manipulation as associated with *movements in $\hat{x}$*. E.g., for τ_x^H: $\frac{\partial W^H}{\partial p_x^*}\frac{\partial p_x^*}{\partial \hat{x}}\frac{\partial \hat{x}}{\partial \tau_x^H}$.

- Define *politically optimal* policies as unilateral choices not motivated by bad TOT manipulation.

A Modified Terms-of-Trade Interpretation (cont.)

- A modified TOT interpretation for the inefficiency of input tariffs? Yes.

Proposition 6 *In the Benchmark Model, the international inefficiency associated with the Nash choices of input tariffs can be given a modified terms-of-trade interpretation: with regard to input tariffs, the role of a trade agreement is to eliminate the "bad" terms-of-trade manipulation while maintaining the "good."*

A Modified Terms-of-Trade Interpretation (cont.)

- A modified TOT interpretation for the inefficiency of final-good tariffs? Not if political economy motives present.
- Efficient choice of τ_1^H:

$$\tau_1^H \frac{\partial D_1}{\partial p_1^H} + \left(\frac{1}{2} \left(\gamma^H + \gamma^F \right) - 1 \right) \hat{x} \left[\frac{y\left(\hat{x}\right)}{\hat{x}} - y'\left(\hat{x}\right) \right] = 0.$$

- Politically optimal choice of τ_1^H:

$$\tau_1^H \frac{\partial D_1}{\partial p_1^H} + \left(\frac{\gamma^H - 1}{2} \right) \hat{x} \left[\frac{y\left(\hat{x}\right)}{\hat{x}} - y'\left(\hat{x}\right) \right] = 0.$$

Proposition 7 *In the Benchmark Model, the international inefficiency associated with the home government's Nash choice of final-good tariff can be given a modified terms-of-trade interpretation if and only if the foreign government is not motivated by political economy considerations.*

Sensitivity

- General Bargaining Power.
- Ex-Ante Lump-Sum Transfers.
- Multiple Foreign Countries and Search Costs.
- Ad Valorem Tariffs.

Conclusion

- Offshoring an increasingly dominant feature of the world economy.
- The rise in offshoring will *complicate* the task of trade agreements.
    - The mechanism for international cost-shifting extends to *a wider set of policies* that can affect bilateral bargaining outcomes;
    - Traditional market access concerns too narrow for efficiency.
    - A new "political externality" introduced.
    - If political economy motives are widespread and varied, then underlying problem that must be addressed *varies* with political preferences of governments;
    - Difficult for governments to rely on simple and general rules such as reciprocity and non-discrimination.

Conclusion (cont.)

- Our paper raises many new questions.
- Are international prices predominantly determined by countless bilateral bargains between buyers and sellers, or through anonymous market clearing mechanisms?
- Are the effects of tariffs on hold-up empirically important?
  - These effects can help explain some "stylized facts" of the sensitivity of trade flows to tariffs (Ornelas and Turner, 2008); consistent with new evidence on the effects of tariffs on the organization of the firm (Diez, 2008).
- Are there aspects of the evolving architecture of the GATT/WTO that can be understood from the perspective of our theory as responses to the rise of offshoring?
- Does the changing nature of international trade indicate the need for fundamental changes in the nature of regional and multilateral institutions that govern the world trading system?