How Do Terms of Trade Effects Matter for Trade Agreements

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Pasargad Summer School, International Trade Workshop

Introduction: The Terms of Trade Theory of Tariffs

- Unilaterally optimal tariffs are increasing in the **import market power** of the importing country (Bickerdike 1906 - - - Grossman and Helpman 1995.)
  - Tariffs dampen demand for foreign goods.
  - Therefore, tariffs could increase a country's welfare by reducing the relative import prices (i.e., improving ToT).
  - The ToT effect of tariff in a sector is greater the greater is the country's import market power in that sector.
- Evidence: Broda, Limao and Weinstein 2008.
- The tariff game is a Prisoner's dilemma:
  - Tariffs have negative externality on the foreign countries.
  - A lose-lose game.

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Potential deviations from a first-best trade agreement

- The objective of Trade Agreements is to contain the ToT effects (Bagwell and Staiger 1999).
  - A **first-best trade agreement** should completely eliminate the link between tariffs and import market power.
- In practice, the negotiators may be unable to achieve a first-best trade agreement.

1. Asymmetric Information (Beshkar, Bond, Rho 2016)
2. Free-riding problem (Ludema and Mayda 2013)
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The Structure of Tariff Commitments

- Negotiated and applied tariffs under the GATT and the WTO show a great variation across sectors and countries.
  - The 10th and the 90th percentile of negotiated tariffs are 30% and 200% in Bangladesh, 3% and 18% in China, 0% and 25% in Australia, and the 0% and 9.4% in the U.S.
- Negotiated tariffs are in the form of caps on applied tariffs (**Tariff Binding**).
- Applied tariffs are often below the binding, creating **Tariff Overhang**.
- Why do governments negotiate such high tariff caps that are very often non-binding?

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The premise of the Model

1. The objective of the governments in negotiations is to contain the negative externalities of unilateral trade policy.
   - Maximizing the **expected joint welfare**.
2. Government preferences for trade policy are subject to shocks.
   - **Flexibility in the obligations is valued.**
3. Some interested parties may not join negotiations.
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Government Preferences

- Political welfare of Home (importing country):

$$V(t;\theta) \equiv S(p(t)) + (1+\theta)\Pi(p(t)) + tp^*(t)m(p(t)),$$

where θ is the extra weight given to profits in the government's objective function.

- Welfare of the foreign (exporting) country j :

$$V_j^*(t) \equiv S_j^*(p^*(t)) + \Pi_j^*(p^*(t)).$$

- $\theta \in [\underline{\theta}, \bar{\theta}]$ is a random variable with pdf $f(\theta)$.
- Home has private information about the realized θ.

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Objective of Negotiations

- The subject of negotiations: tariff binding rate for a given sector of Home.
- The objective of negotiations: maximizing the joint welfare of the **participating countries** $\forall j \in P$:

$$t^B(P) = \arg\max_{t^B} \int_{\underline{\theta}}^{\theta^B} \left[V(t^N(\theta);\theta) + \sum_{j \in P} V_j^* \left(t^N(\theta) \right) \right] f(\theta) d\theta$$

$$++ \int_{\theta^B}^{\bar{\theta}} \left[V(t^B;\theta) + \sum_{j \in P} V_j^* \left(t^B \right) \right] f(\theta) d\theta,$$

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Optimal Tariff Bindings

- The maximization problem yields a corner solution if

$$\left(1+\frac{1}{\omega}\right)\frac{1}{\phi} < \frac{\eta-\underline{\theta}}{E[\theta]-\underline{\theta}}.$$

Theorem

(i) If $\left(1+\frac{1}{\omega}\right)\frac{1}{\phi} < \frac{\eta-\underline{\theta}}{E[\theta]-\underline{\theta}}$, *there will be no tariff overhang under the optimal tariff binding, which is given by* $t^B = \frac{E[\theta]+\eta(1-\phi)\omega}{\eta-E[\theta]}$. *Moreover, if* $\phi < 1$, *the optimal tariff binding will be increasing in* ω *and this correlation diminishes as* ϕ *increases.*

(ii) If $\left(1+\frac{1}{\omega}\right)\frac{1}{\phi} > \frac{\eta-\underline{\theta}}{E[\theta]-\underline{\theta}}$, *there exists a local optimum under which tariff overhang is positive for some states of the world,* θ. *Moreover, for a sufficiently large* $\phi < 1$, *the optimal tariff binding is decreasing in* ω *and this correlation strengthens as* ϕ *increases.*

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Expected Applied Tariffs

- The expected applied tariff may be written as

$$E\left[t^A\right] = \int_{\underline{\theta}}^{\theta^B} t^N(\theta) f(\theta)\, d\theta + \int_{\theta^B}^{\bar{\theta}} t^B(\theta) f(\theta)\, d\theta.$$

- Taking derivative of this equation with respect to IMP yield

$$\frac{dE\left[t^A\right]}{d\omega} = \int_{\underline{\theta}}^{\theta^B} \frac{dt^N(\theta)}{d\omega} f(\theta)\, d\theta + \int_{\theta^B}^{\bar{\theta}} \frac{dt^B(\theta)}{d\omega} f(\theta)\, d\theta$$

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Expected Applied Tariffs

Theorem

Under the negotiated tariff bindings, the expected applied tariff will be
i) increasing in ω *if* ω *is sufficiently low,*
ii) decreasing in ω *if* ω *is sufficiently close to but strictly less than* $\bar{\omega}$*, and* ϕ *is sufficiently large,*
iii) independent of (increasing in) ω *if* $\omega > \bar{\omega}$ *and* $\phi = 1$ $(\phi < 1)$.
Moreover, the positive relationship in case of $\phi < 1$ *weakens monotonically as* ϕ *increases.*

The Baseline Specification

- The baseline specification:

$$t_{ik}^{B} = \alpha + \beta_1 MP_{ik} + \beta_2 (MP * H)_{ik} + \beta_3 PS_i + \beta_4 (FTAShare/\mu)_{ik} + \beta_5 H_{ik} + \delta_{HS2} + \varepsilon_{ik},$$

The Baseline Specification

	log (inverse export elasticity)				Rauch PDI	log(inverse)	
	IV-Tobit PDI included		IV-Tobit		Tobit	IV-Tobit	
	FTA	PTA	FTA	PTA	FTA	FTA	PTA
MP	-3.811***	-3.770***	-4.116***	-4.223***		-3.810***	-3.787***
	(0.499)	(0.767)	(0.542)	(0.709)		(0.501)	(0.829)
MP*HHI	-4.792***	-4.352***	-4.786***	-4.119***	-2.164	-4.803***	-4.350***
	(0.953)	(0.959)	(0.848)	(0.681)	(1.545)	(0.956)	(0.923)
Political Stability	-7.830***	-7.697***	-7.908***	-7.765***	-10.88***	-7.830***	-7.702***
	(0.464)	(0.532)	(0.618)	(0.515)	(0.481)	(0.465)	(0.609)
FTAShareMu	0.230**	0.202	0.0664	0.0621	0.694***	0.229**	0.0182
	(0.0901)	(0.141)	(0.0647)	(0.0501)	(0.180)	(0.0902)	(0.0463)
HHI	-10.40***	-11.32***	-10.31***	-10.70***	11.46***	-10.39***	-11.30***
	(2.666)	(2.973)	(2.752)	(2.106)	(1.182)	(2.678)	(2.853)
Rauch PDI					3.501***	2.664***	2.434***
					(1.050)	(0.588)	(0.558)
Constant	16.19***	17.18***	15.31***	15.95***	21.39***	13.51***	14.66***
	(2.920)	(2.682)	(2.637)	(3.425)	(2.134)	(2.972)	(3.743)
Observations	73,479	72,065	90,677	88,890	85,001	73,479	72,065

[1] Clustered standard errors by Country-HS2 in parentheses

[2] *** p<0.01, ** p<0.05, * p<0.1

[3] HS2 dummies included in all estimations

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Taking into account the non-monotinicity

- Two strategies:

1. Alternative specification:

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Alternative specification

	FTA	PTA	FTA
MP*SB	6.824***	5.816***	6.767***
	(0.960)	(1.239)	(1.518)
MP*WB	-8.348***	-9.267***	-8.301***
	(0.711)	(0.916)	(0.880)
MP*HHI	-3.549***	-1.722**	-3.239***
	(0.889)	(0.823)	(0.913)
Political Stability	-5.858***	-5.826***	-5.814***
	(0.497)	(0.451)	(0.624)
FTAShareMu	0.0673	0.0663*	0.191*
	(0.0424)	(0.0398)	(0.114)
HHI	-4.827*	-2.160	-3.766
	(2.675)	(2.763)	(2.472)
Rauch PDI			2.786***
			(0.688)
Constant	1.241	-0.375	-1.452
	(3.264)	(3.765)	(4.148)
Observations	90,677	88,890	73,479

[1] Clustered standard errors by Country-HS2 in parentheses

[2] *** p<0.01, ** p<0.05, * p<0.1

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Strongly bound sectors

	All Countries		LM Countries	
	FTA	PTA	FTA	PTA
MP	2.744***	1.832***	2.464***	1.932***
	(0.431)	(0.473)	(0.437)	(0.484)
MP*HHI	-4.480***	-2.565***	-3.853***	-2.707***
	(0.788)	(0.722)	(0.608)	(0.618)
Political Stability	-10.84***	-10.99***	-14.39***	-14.67***
	(1.008)	(0.959)	(1.435)	(1.326)
FTAShareMu	0.0212	0.0145	0.0522	0.0404
	(0.0836)	(0.0756)	(0.107)	(0.133)
HHI	-3.584**	0.511	-0.691	0.614
	(1.544)	(1.502)	(1.481)	(1.173)
Constant	11.92**	10.75***	17.33***	17.41***
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