

# Antidumping in the Aggregate

Kim J. Ruhl

New York University, Stern School of Business

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## Antidumping

- Ad valorem duties, based on import price behavior
- Meant to punish “unfair” trade practices
- Implemented as
  - ▶ Firm-specific tariffs
  - ▶ “All others” tariff
- Gaining popularity
  - ▶ Success of GATT/WTO tariff reductions and binding
  - ▶ Worldwide: almost 200 cases initiated per year
  - ▶ In the US: 1200 cases initiated since 1980

## Future of US Trade Policy

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*We've brought trade cases against China at nearly twice the rate as the last administration — and it's made a difference. But we need to do more. Tonight, I'm announcing the creation of a Trade Enforcement Unit that will be charged with investigating unfair trading practices in countries like China. (B. Obama, 2012 State of the Union)*

## Questions to Answer

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- How distortionary is antidumping law?
- What are the welfare implications of antidumping law?

## Previous Studies

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- IO–Game theory: foreign firm playing against domestic firm
  - ▶ Collude through suspension agreements (Prusa 1990)
  - ▶ Enforce tacit international collusion (Staiger 1989)
  - ▶ Importer prices less aggressively (Staiger and Wolak 1992)
- Main idea is always: AD softens competition
- Complicated, dynamic games
- Difficult to use in aggregate models
  - ▶ This paper: tractable model of AD that softens competition

## This Paper

- Simple model of antidumping policy
- Incorporate key AD properties
  - ▶ Exporters charging low prices, more likely to be punished
  - ▶ Size of punishment varies with price
  - ▶ Uncertainty over entry and exit of dumping duties
- Otherwise standard model
  - ▶ Heterogenous firms, monopolistic competition
  - ▶ Fixed costs

## Preview of Results

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- AD policy increases prices
  - ▶ When paying AD duties
  - ▶ When not paying duties: lower probability of dumping
- Eliminating AD
  - ▶ Equivalent (in some ways) to 6% decrease in tariffs
  - ▶ Works mostly on intensive margin
  - ▶ Eliminates 2% of domestic tradable firms
- Adding new trade partners
  - ▶ Relative wages fall by 7%
  - ▶ Pass-through without AD, 100% larger
  - ▶ Welfare gain without AD, 50% larger

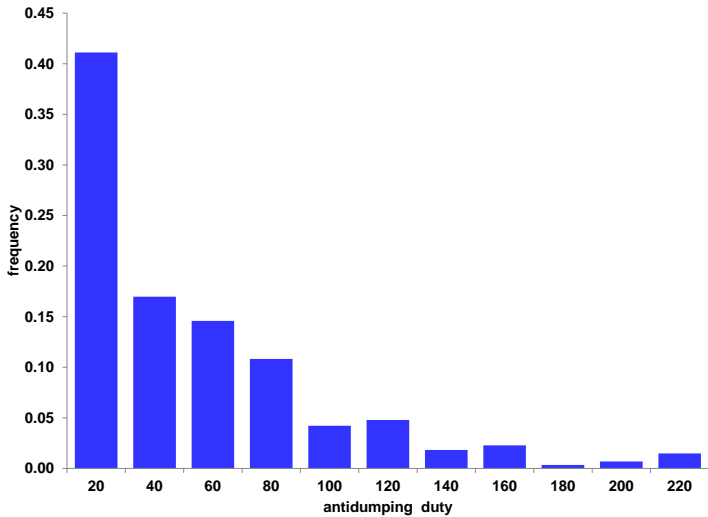
## U.S. Antidumping Law

- Domestic firms file petition
- Must show
  1. Imports being sold below “fair value”
  2. Dumped imports causing—or could cause—material harm
- If found guilty of dumping the antidumping duty is

$$\tau_{AD}(\hat{p}) = 1 + \frac{\bar{p} - \hat{p}}{\hat{p}}$$



## U.S. Antidumping Duties



## Determining Fair Value

- What prices to compare?
  - ▶ If possible, identical good sold at home
  - ▶ Else, “next most similar” product
- The fair value price can be found as
  - ▶ Price of good sold in firm’s home country
  - ▶ Price of good in other export markets
  - ▶ Constructed value
  - ▶ Nonmarket economy (China): price in surrogate (India)
  - ▶ “Facts available:” usually data from petitioners
- More recently: could also show pricing below cost

## Arbitrary Antidumping

- Significant leeway in determining normal price
  - ▶ Avg. AD duty: 10% in 1980 to 40% in 1990s (Blonigen 2006)
- Political influence on dumping cases
  - ▶ Moore(1992), Hansen and Prusa (1996)

## Arbitrary Antidumping

- Significant leeway in determining normal price
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- Using AD *offensively*

*The domestic manufacturers who are having difficulty competing with low priced imports need to consider bringing an antidumping [...] case as an element of a market strategy or a 5 year business plan. (tradelawyersblog.com)*

## The Model

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- 2 countries, home and foreign
- Continuums of tradable goods, nontradable goods
- Heterogenous firms, monopolistic competition
  - ▶ No incentive for dumping
  - ▶ Upper bound on gain from eliminating AD law
- In equilibrium
  - ▶ Aggregate variables constant
  - ▶ Firm variables not constant

## Households

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$$\max \sum_{t=1}^{\infty} \beta^t \left( \mu_T C_{T,t}^\gamma + C_{NT,t}^\gamma \right)^{\frac{1}{\gamma}}$$

$$P_{T,t} C_{T,t} + P_{NT,t} C_{NT,t} + B_{t+1} \leq w_t L + (1 + r_t) B_t + \Pi_t + T_t$$

$$C_{T,t} = \left( \int_{i \in I_{T,t}} c_{it}^\rho di + \int_{i \in I_{M,t}} c_{it}^\rho di \right)^{\frac{1}{\rho}}$$

$$C_{NT} = \left( \int_{i \in I_{NT,t}} c_{it}^\rho di \right)^{\frac{1}{\rho}}$$

## Firms

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- Technology

$$y_{it} = \varphi_i l_{it}$$

- Firm type,  $\varphi$  : constant, distributed  $g(\varphi)$
- Fixed costs,  $\kappa_x$ ,  $\kappa_d$  for selling abroad, home
- Measure 1 of *potential* tradable good firms

$$\pi^x(p_{it}, \tau_x) = p_{it} c_{T,t}^*(\tau_x p_{it}) - \frac{c_{T,t}^*(\tau_x p_{it}) w_t}{\varphi_{it}} - w_t \kappa_x$$

$$\pi^d(p_{it}) = p_{it} c_{T,t}(p_{it}) - \frac{c_{T,t}(p_{it}) w_t}{\varphi_{it}} - w_t \kappa_d$$

- Measure 1 of *potential* nontradable good firms

$$\pi^n(p_{it}) = p_{it} c_{NT,t}(p_{it}) - \frac{c_{NT,t}(p_{it}) w_t}{\varphi_{it}} - w_t \kappa_d$$

## Antidumping Policy

1. A probability of being found guilty of dumping,  $f(p, \bar{p})$

$$f'(p, \bar{p}) < 0 \text{ if } p < \bar{p}$$

$$f(p, \bar{p}) = 0 \text{ if } p \geq \bar{p}$$

where  $\bar{p}$  is the fair value price: the average domestic price

2. An antidumping duty,  $\tau_{AD}(\hat{p})$

$$\tau_{AD}(\hat{p}) = 1 + \frac{\bar{p} - \hat{p}}{\hat{p}} \xi,$$

where  $\hat{p}$  is the price charged when found to be dumping

3. If paying antidumping duties, exit with probability  $\theta$



## Value Functions

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- Firm not paying AD duties

$$V_N(\varphi) = \max_{p, X_N \in \{0,1\}} X_N (\pi(p, \tau_x) + f(p, \bar{p})\beta V_D(\varphi, p) + (1 - f(p, \bar{p}))\beta V_N(\varphi)) \\ + (1 - X_N)\beta V_N(\varphi)$$

- Firm paying AD duties

$$V_D(\varphi, \hat{p}) = \max_{p, X_D \in \{0,1\}} X_D \pi(p, \tau_{AD}(\hat{p})) + (1 - \theta)V_D(\varphi, \hat{p}) + \theta V_N(\varphi)$$

$\hat{p}$  = firm's price when charged with dumping

## Laws of Motion

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- $X_D(\varphi) = 1$  if type  $\varphi$  exports when faced with AD duties

$$\mu_D^{\prime X}(\varphi) = (1 - \theta)\mu_D^X(\varphi) + X_D(\varphi)f(p(\varphi), \bar{p})\mu_N^X(\varphi)$$

$$\mu_N^{\prime X}(\varphi) = \theta\mu_D^X(\varphi) + (1 - f(p(\varphi), \bar{p}))\mu_N^X(\varphi) + \theta\mu_D^{NX}(\varphi)$$

$$\mu_D^{\prime NX}(\varphi) = (1 - X_D(\varphi))f(p(\varphi), \bar{p})\mu_N^X(\varphi) + (1 - \theta)\mu_D^{NX}(\varphi)$$

$$\mu_N^{\prime NX}(\varphi) = \mu_N^{NX}(\varphi).$$

## Aggregate Relationships

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$$T_t = \int_{\varphi} (\tau_x - 1) p_{\varphi} c_{T,t}(\tau_x p_{\varphi}) \mu_N^X(\varphi) d\varphi \\ + \int_{\varphi} (\tau_{AD}(\hat{p}_{\varphi}) - 1) p_{\varphi} c_{T,t}(\tau_{AD}(\hat{p}_{\varphi}) p_{\varphi}) \mu_D^X(\varphi) d\varphi.$$

$$\Pi_t = \int_{\varphi} \pi^d(p_{\varphi t}) g(\varphi) d\varphi + \int_{\varphi} \pi^x(p_{\varphi t}, \tau_{AD}(\hat{p}_{\varphi})) \mu_D^X(\varphi) d\varphi \\ + \int_{\varphi} \pi^x(p_{\varphi t}, \tau_x) \mu_N^X(\varphi) d\varphi + \int_{\varphi} \pi^n(p_{\varphi t}) g(\varphi) d\varphi.$$

$$L = \int_{\varphi} (l_t^d(\varphi) + \kappa_d) g(\varphi) d\varphi + \int_{\varphi} (l_{Dt}^x(\varphi) + \kappa_x) \mu_D^X(\varphi) d\varphi \\ + \int_{\varphi} (l_{Nt}^x(\varphi) + \kappa_x) \mu_N^X(\varphi) d\varphi + \int_{\varphi} (l_t^n(\varphi) + \kappa_d) g(\varphi) d\varphi.$$

## Equilibrium

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Allocations  $(C_T, C_{NT}, B)$  for households; policy functions  $(X_D(\varphi), X_N(\varphi), p(\varphi), l(\varphi))$  and value functions  $(V_D(\varphi, p), V_N(\varphi))$  for tradable good firms;  $(p(\varphi), l(\varphi))$  for nontradable good firms; aggregate quantities  $(\Pi, T)$  and prices  $(r, w)$ , and analogous objects in the foreign country, such that, in both countries:

1. Allocations solve the households' maximization problems
2. Firms' allocations solve the firms' maximization problems
3. Markets clear for each tradable and nontradable variety
4. Labor markets clear
5. The government budget constraint is satisfied
6. Aggregate profits are consistent with firm profits
7. Bond markets clear,  $B = B^* = 0$

## Pricing Decisions

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$$V_N(\varphi) = \max_{p, X_N \in \{0,1\}} X_N (\pi(p, \tau_x) + f(p, \bar{p})\beta V_D(\varphi, p) + (1 - f(p, \bar{p}))\beta V_N(\varphi)) \\ + (1 - X_N)\beta V_N(\varphi)$$

- F.O.C., conditional on exporting

$$\frac{d\pi(p, \tau_x)}{dp} + \frac{df(p, \bar{p})}{dp} \beta V_D(\varphi, p) + f(p, \bar{p}) \beta \frac{dV_D(\varphi, p)}{d\tau_{AD}} \frac{d\tau_{AD}(p)}{dp} \\ - \frac{df(p, \bar{p})}{dp} \beta V_N(\varphi) = 0$$

## Pricing Decisions: No Antidumping Policy

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- FOC

$$\frac{d\pi(p, \tau_x)}{dp} + \frac{df(p, \bar{p})}{dp} \beta V_D(\varphi, p) + f(p, \bar{p}) \beta \frac{dV_D(\varphi, p)}{d\tau_{AD}} \frac{d\tau_{AD}(p)}{dp} - \frac{df(p, \bar{p})}{dp} \beta V_N(\varphi) = 0$$

- No antidumping policy,  $f(p, \bar{p}) = 0$

$$\frac{d\pi(p, \tau_x)}{dp} = 0$$

$$p = p_m = \frac{w}{\varphi\rho}$$

- Firms choose statically optimal price

## Pricing Decisions: With Antidumping Policy

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- FOC

$$\frac{d\pi(p, \tau_x)}{dp} + \frac{df(p, \bar{p})}{dp} \beta V_D(\varphi, p) + f(p, \bar{p}) \beta \frac{dV_D(\varphi, p)}{d\tau_{AD}} \frac{d\tau_{AD}(p)}{dp} - \frac{df(p, \bar{p})}{dp} \beta V_N(\varphi) = 0$$

- if  $p_m \geq \bar{p}$  then  $p = p_m$
- if  $p_m < \bar{p}$  the  $p > p_m$
  
- Firms increase price to decrease probability of dumping penalty
- Distortion depends on the productivity of the firm
  - ▶ More productive firms face larger distortions

## Calibration

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- Calibrate to U.S. and symmetric country, 1992
- Antidumping policy

$$f(p, \bar{p}) = 1 - \left(\frac{p}{\bar{p}}\right)^\alpha \quad \text{if } p < \bar{p}$$
$$f(p, \bar{p}) = 0 \quad \text{if } p \geq \bar{p}$$

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Parameter	Target	Target Value
$\alpha$	standard deviation of antidumping duties (percent)	45
$\xi$	median antidumping duties (percent)	43
$\theta$	duration of dumping penalty (years)	5

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# Calibration

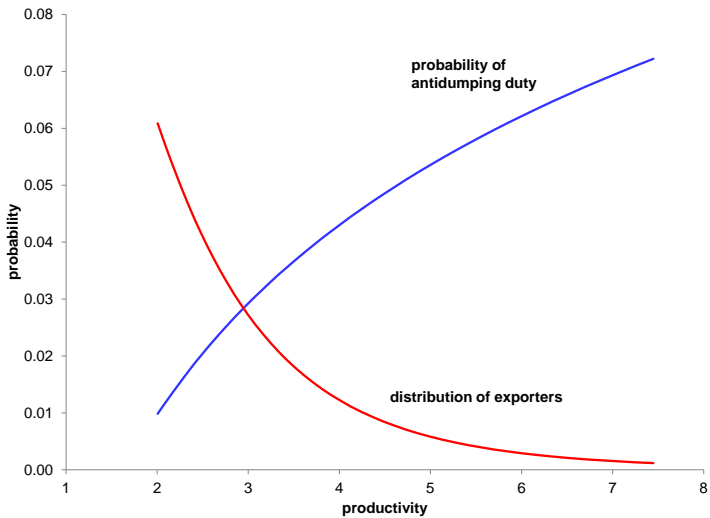
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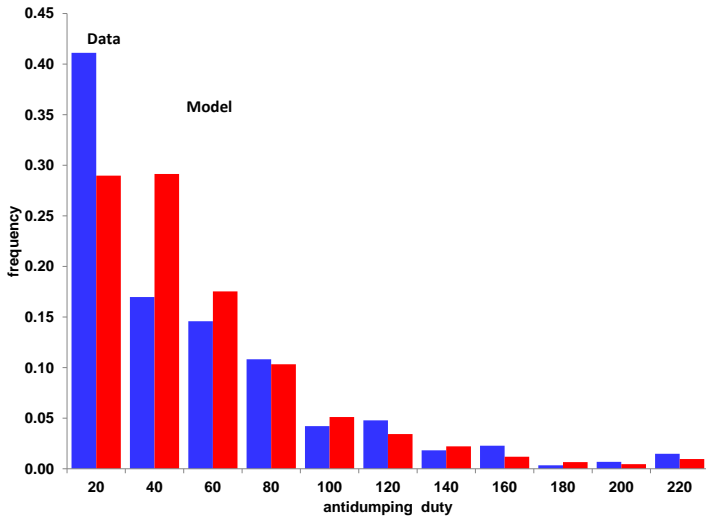
Parameter	Target	Target Value
$\rho$	elasticity of substitution between varieties	4
$\gamma$	tradable and nontradable goods elasticity	0.5
$\beta$	annual interest rate (percent)	4.0
$\mu_T$	share of nontradable expenditure in total expenditure	0.62
$\tau_x$	export-sales ratio, conditional on exporting (percent)	13.3
$\kappa_x$	export participation rate	0.20
$\sigma_\varphi$	standard deviation of firm employment	175

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## Equilibrium Dumping Probability



## Observed Antidumping Duties in Data and Model



## Small Duties

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- Difficult to generate small antidumping duties
  - ▶ Data: 10 percent of observed duties less than 3 percent
  - ▶ Model: smallest observed duty is 11 percent
- Marginal exporter prices are less than  $P_T$
- Firms near the margin raise prices to decrease  $f(p, \bar{p})$ 
  - ▶ Exporters charge average of 2 percent larger markup

## Cost of Antidumping Policy

- Counterfactual: eliminate antidumping policy

	No Antidumping (percent change)	Tariff Equiv. (percent change)
Exports	18	
$P_T$	-1.5	
$P_N$	0.0	
Export part.	0.1	
Export-sales ratio	15	
Aggregate profit	0.0	
Mass of domestic firms	-2.0	
Welfare	0.8	

## Cost of Antidumping Policy

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- Counterfactual: decrease  $\tau_x$  until exports grow by 18 percent
  - ▶ Decrease  $\tau_x$  by 6 percent

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	No Antidumping (percent change)	Tariff Equiv. (percent change)
Exports	18	18
$P_T$	-1.5	-0.7
$P_N$	0.0	0.0
Export part.	0.1	14
Export-sales ratio	15	8
Aggregate profit	0.0	0.0
Mass of domestic firms	-2.0	-1.7
Welfare	0.8	0.8

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## Antidumping vs. Uniform Tariffs

- AD mostly works on the intensive margin
- Antidumping targets firms that charge low prices
  - ▶ These are productive firms
  - ▶ AD policy lowers profits, but not enough to force exit
  - ▶ Charge higher prices, sell less
- Uniform tariffs hit all firms
  - ▶ Including the less productive firms
  - ▶ Tariffs lower profits, marginal firms exit
  - ▶ Charge higher prices, sell less

## New Trading Partners

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- Counterfactual: ROW increases by 50 percent

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	Baseline (percent change)	No Antidumping (percent change)
$w_f/w_h$	-7.0	-6.6
Exports	22	42
$P_T$	-1.5	-2.6
$P_N$	0.0	0.0
Foreign Export part.	9	9
Foreign Export-sales ratio	-17	-9.7
Aggregate profit	0.0	0.0
Mass of domestic firms	-2.0	-2.0
Welfare	1.5	2.3
Markup	1.44	1.33

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## New Trading Partners

- Change in  $w_f/w_h$  about the same with and without AD, but
  - ▶ Tradable goods price fall almost 2X more without AD
- Implication for pass-through
  - ▶ Old idea
  - ▶ Need a dynamic model of production costs
  - ▶ This framework should be tractable enough to use
  - ▶ Model in progress...

## The Wrap-up

- Antidumping is an important policy for restricting trade
  - ▶ Empirically hard to tie to predatory actions
  - ▶ Used *offensively* by domestic firms, policy makers
  - ▶ Politically influenced
- Much of the previous theoretical work difficult to aggregate
  - ▶ Complex dynamic games
- This model: abstract from strategic motives
- Antidumping policy
  - ▶ As trade restrictive as a 6 percent tariff
  - ▶ Works mostly on the intensive margin
  - ▶ Biased towards more productive firms
  - ▶ Implications for international pricing, pass-through