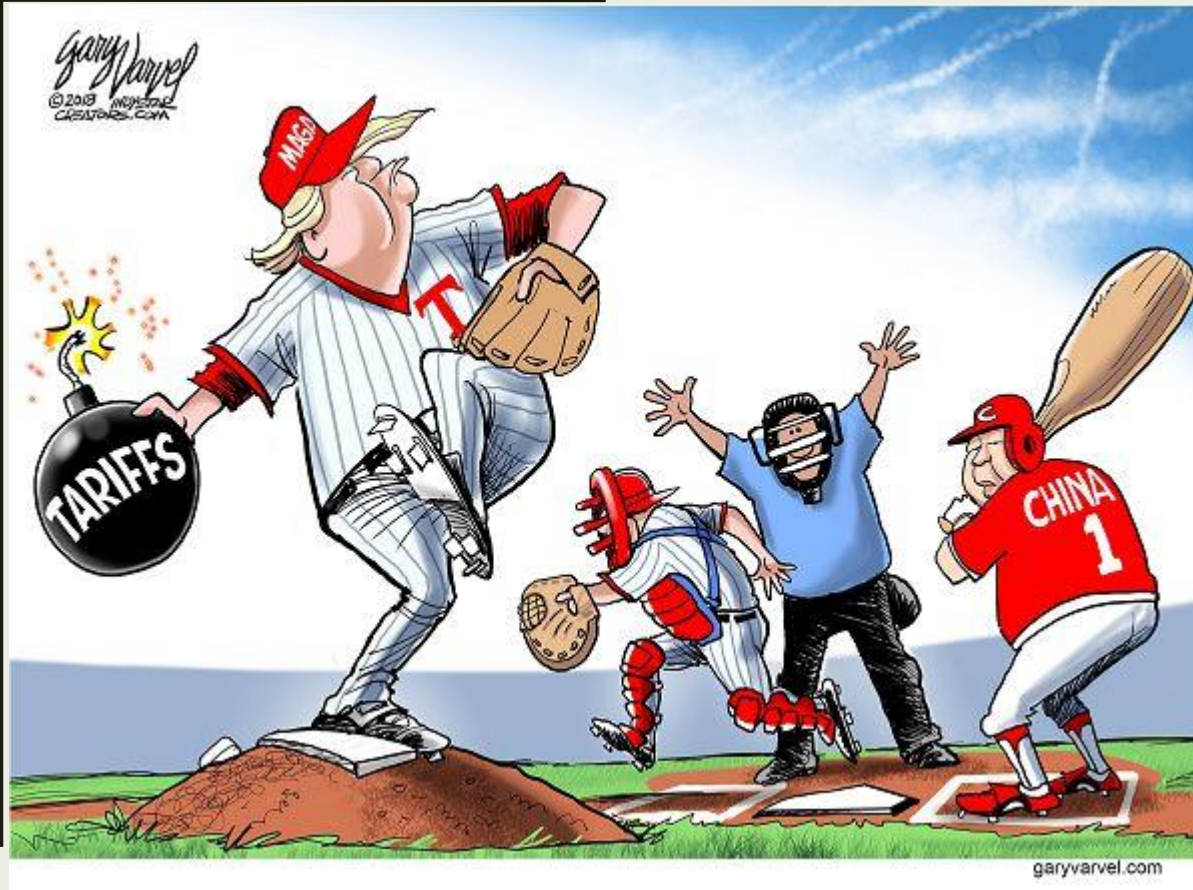


TRADE POLICY



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Mumbai, August 2020

Types of Trade Policy

Import tariffs and safeguard

Countervailing and Anti-dumping duties

Import quotas and VERs

Export subsidies

Trade strategies to aid development

Import Substitution

Export Promotion

Export promotion

Export led growth – East Asian Tigers



Germany, Finland, Japan, Korea, China, Malaysia, Thailand, Taiwan (China) and Singapore

Does it work?

- *Global conditions – end of cold war*
- *IT revolution*
- *Strong demand from OECD countries*
- *Open environment for capital flows*

Debt

- East-Asian financial crisis
- China – high firm-level debt, ghost cities
- <https://www.wired.com/2016/02/kai-caemmerer-unborn-cities/>

Import substitution, infant industry

- Latin America, India

Does it work?

- May allow domestic capacity building

BUT:

Inefficiencies, rent seeking behaviour

High cost of inputs for domestic firms

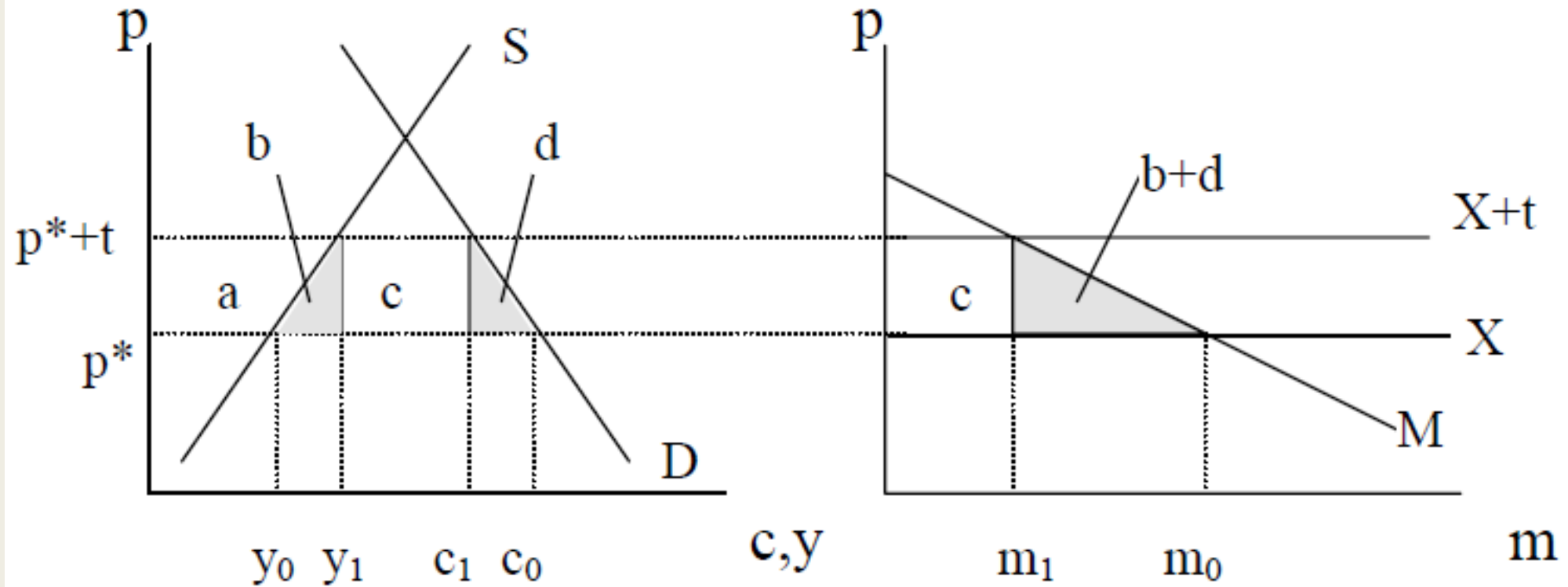
Lack of gains from varieties



Steps

- Consider welfare effects of each policy under:
 - *perfect competition*
 - *Small country*
- Look at large countries and how they are different
- Relax perfect competition:
 - *What happens in a monopoly?*
 - *Duopoly?*
- Dumping and welfare

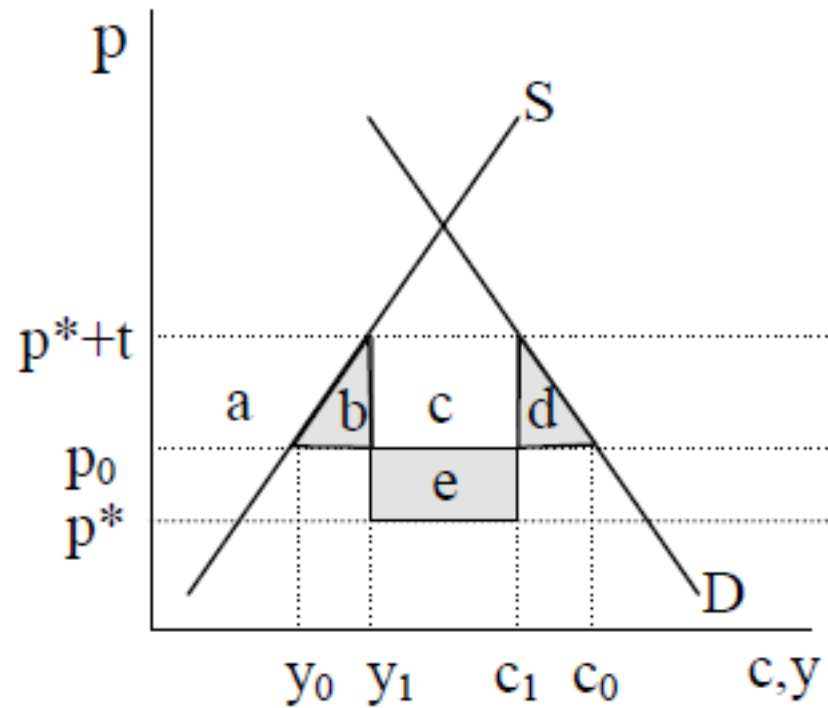
Small country



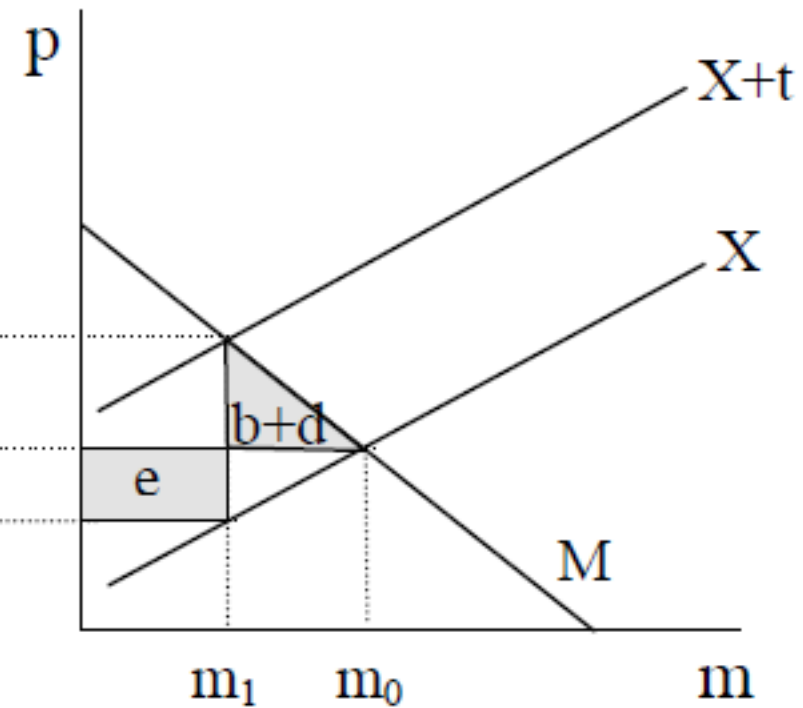
(a) Domestic market

(b) Import market

Large country



(a) Domestic market



(b) Import market

Demand and production

Utility

$$c_0^h + U^h(c^h)$$

Demand

$$c^h = d^h(p)$$

Numeraire perfectly traded at price one

$$c_0^h = I^h - p' d^h(p)$$

Production and trade

Labor is the only factor of production

One unit of labor produces one unit of the numeraire

Perfect competition in the labor market ensures wage is one

Cost $C(y)$:

Only one trade good subject to a specific tariff

$$p = p^* + t$$

Welfare

$$W(p, I) \equiv \sum_{h=1}^H I^h - p' d^h(p) + U^h[d^h(p)]$$

$$\partial W / \partial p = \sum_{h=1}^H -d^h(p) \equiv -d(p)$$

Why? Because:

$$\frac{\partial W}{\partial p} = -p \frac{\partial d^h}{\partial p} - d^h(p) + U^{h'} \frac{\partial d^h}{\partial p}$$

But from the FOC of utility maximization (unconstrained, because income has been substituted in), where we maximize W with respect to d^h :

$$-p + U^{h'} = 0$$

Thus, $U^{h'} = p$ and we can substitute in expression for $\frac{\partial W}{\partial p}$

Welfare

$$W(p, I) \equiv \sum_{h=1}^H I^h - p' d^h(p) + U^h[d^h(p)]$$

$$\partial W / \partial p = \sum_{h=1}^H -d^h(p) \equiv -d(p)$$

$$W[p, L + tm + py - C(y)] \equiv W(t)$$

$$\frac{dW}{dt} = -d(p) \frac{dp}{dt} + m + \left(t \frac{dm}{dp} + y \right) \frac{dp}{dt} + [p - C'(y)] \frac{dy}{dt}$$

$$= m \left(1 - \frac{dp}{dt} \right) + t \frac{dm}{dp} \frac{dp}{dt} + [p - C'(y)] \frac{dy}{dt}$$

$$= t \frac{dm}{dp} \frac{dp}{dt} - m \frac{dp^*}{dt} + [p - C'(y)] \frac{dy}{dt}.$$

Small country, perfect competition: Optimal tariff is Zero.

$$\frac{dW}{dt} = t \frac{dm}{dp}$$

$$\left. \frac{dW}{dt} \right|_{t=0} = 0$$

$$\left. \frac{d^2W}{dt^2} \right|_{t=0} = \frac{dm}{dp} < 0$$

What is the welfare loss from a tariff? Small.

$$W(t) \approx W(0) + t \left. \frac{dW}{dt} \right|_{t=0} + \frac{1}{2} t^2 \left. \frac{d^2W}{dt^2} \right|_{t=0}.$$

$$W(t) - W(0) \approx \frac{1}{2} t^2 \left. \frac{d^2W}{dt^2} \right|_{t=0} = \frac{1}{2} t^2 \frac{dm}{dp} = \frac{1}{2} \Delta p \Delta m < 0$$

$$\frac{W(t) - W(0)}{pm} \approx \frac{1}{2} \left(\frac{t}{p} \right)^2 \left(\frac{dm}{dp} \frac{p}{m} \right)$$

Large country – The optimal tariff is positive

$$\frac{dW}{dt} = t \frac{dm}{dp} \frac{dp}{dt} - m \frac{dp^*}{dt}$$

$$\left. \frac{dW}{dt} \right|_{t=0} = -m \frac{dp^*}{dt} > 0$$

$$\frac{dW}{dt} = 0 \Rightarrow \frac{t^*}{p^*} = \left(\frac{dp^*}{dt} \frac{m}{p^*} \right) / \left(\frac{dm}{dp} \frac{dp}{dt} \right)$$

Interpretation – functions of import/export elasticity

$$m = x \Rightarrow \frac{dm}{dp} \frac{dp}{dt} = \frac{dx}{dt}$$

$$\frac{t^*}{p^*} = \left(\frac{dp^*}{dt} \frac{x}{p^*} \right) / \left(\frac{dx}{dt} \right) = 1 / \left(\frac{dx}{dp^*} \frac{p^*}{x} \right)$$

$$\frac{t^*}{p} = \left(\frac{dm}{dp} \frac{p}{m} \right)^{-1} \left(\frac{dp^*}{dt} / \frac{dp}{dt} \right)$$

Foreign Monopolist, Brander and Spencer (1984)

- Maximize

$$\pi^*(x) = x[p(x) - t] - C^*(x)$$

$$\pi^{*'}(x) = p(x) + xp'(x) - [C^{*'}(x) + t] = 0$$

$$\pi^{*''}(x)dx - dt = 0$$

$$\frac{dx}{dt} = \frac{1}{\pi^{*''}(x)} < 0$$

$$\frac{dp}{dt} = p'(x) \frac{dx}{dt} = \frac{p'(x)}{\pi^{*''}(x)} > 0$$

- The tariff reduces export sales and raises the domestic price
- But by how much? More or less than the tariff?

Pass-through (terms of trade effect)

- Foreign supplier partly absorbs the tariff if

$$p'(x) > \pi^{*''}(x) = 2p'(x) + xp''(x) - C^{*''}(x)$$

- Assume constant MC

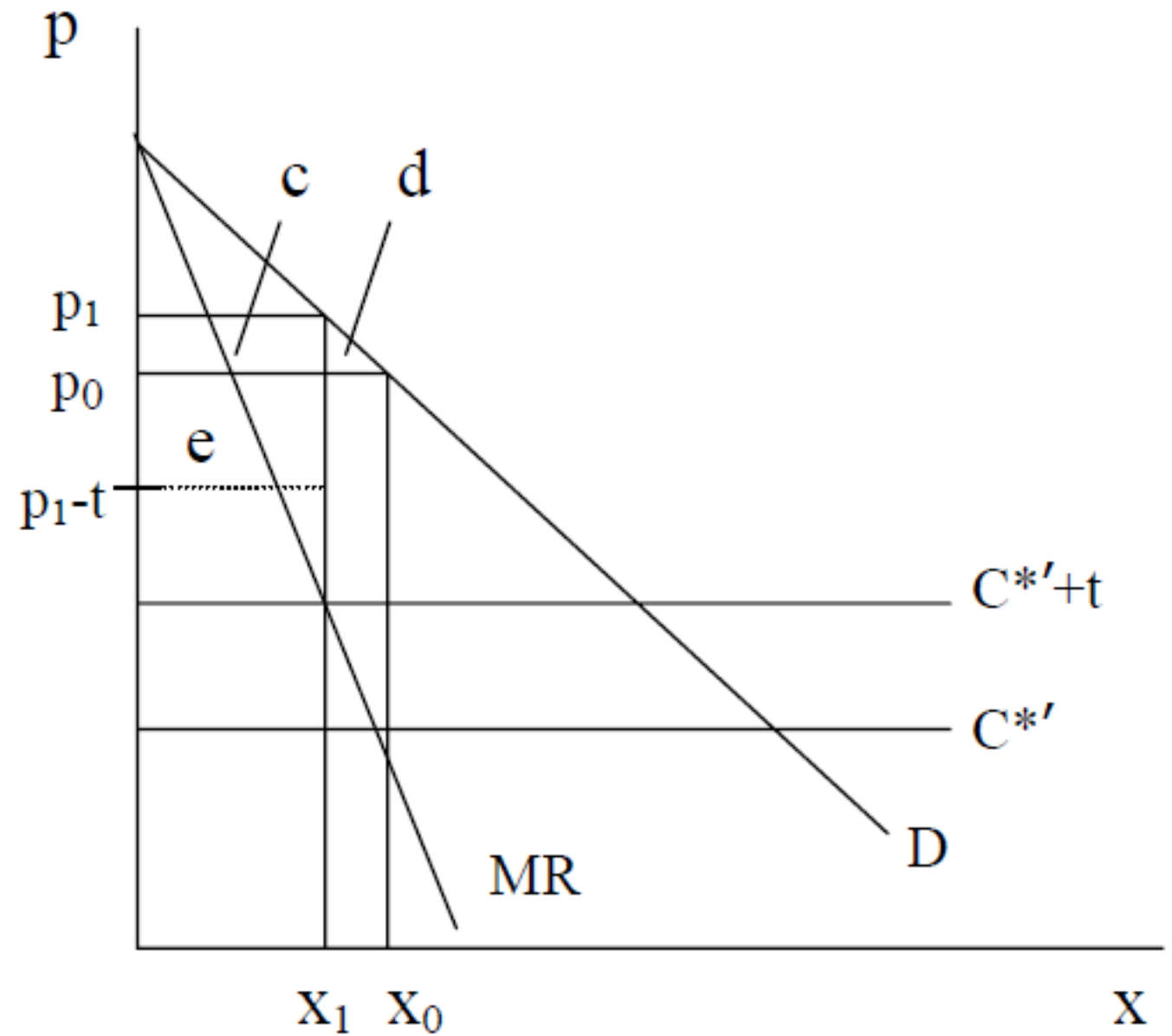
$$p'(x) + xp''(x) < 0,$$

- Or, MR is steeper than demand (happens for linear or concave demand curves)
- If elasticity is constant, then

$$mr(x) = p(x)[1 - (1/\eta)]$$

$$-mr'(x) = -p'(x)[1 - (1/\eta)] < -p'(x)$$

Foreign Monopoly



Cournot duopoly

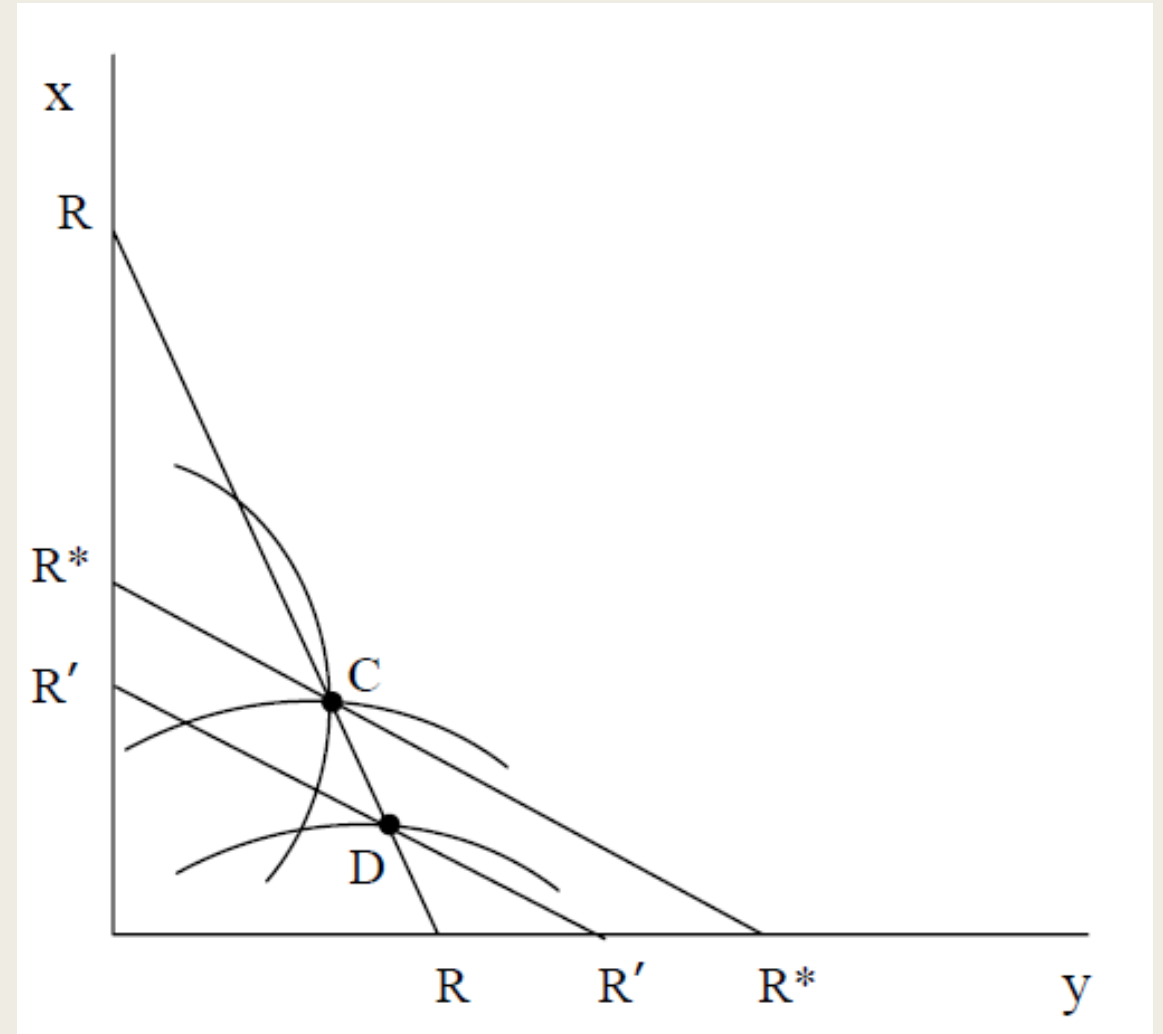
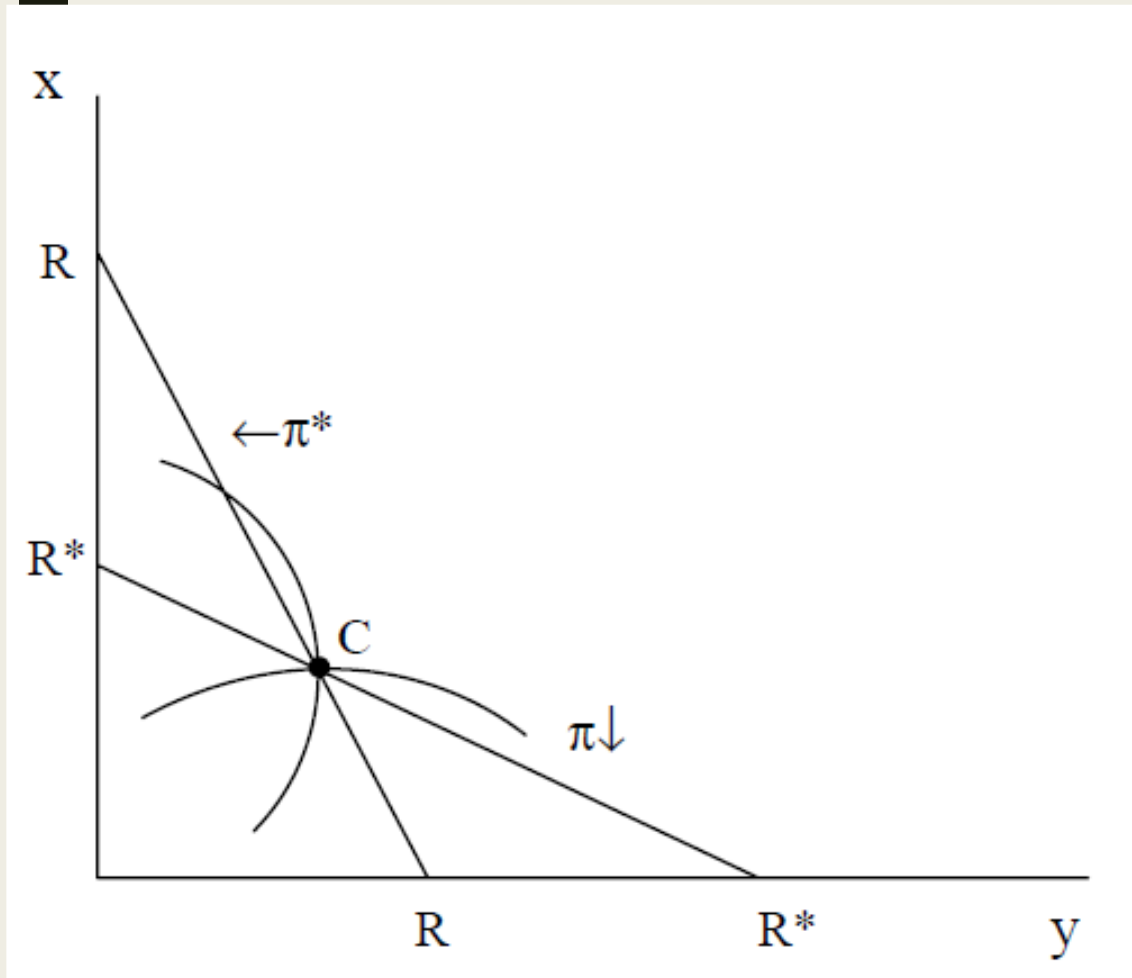
$$\pi^* = x[p(z) - t] - C^*(x),$$

$$\pi = yp(z) - C(y),$$

$$\pi_x^* = p(z) + xp'(z) - [C^{*'}(x) + t] = 0.$$

$$\pi_y = p(z) + yp'(z) - C'(y) = 0.$$

Reaction functions



Is there a terms of trade effect?

- Add the FOCs together

$$2p(z) + zp'(z) = C'(y) + [C^*(x) + t]$$

$$\frac{dz}{dt} = \frac{1}{[3p'(z) + zp''(z)]}$$

$$\frac{dp}{dt} = \frac{p'(z)}{[3p'(z) + zp''(z)]}$$

- Less than 1 if MR slopes down

$$p'(z) > 3p'(z) + zp''(z) \Leftrightarrow 2p'(z) + zp''(z) < 0$$

Profit shifting

- The third term denoting 'efficiency' need not always be positive, though profit will always increase with a tariff
- Profit shifting need not imply welfare gains from the tariff
- If there is free entry in the home country, we can show that welfare only rises if the import share in the industry is greater than the tariff pass-through

Dumping

Dumping can occur if:

An exporter sells to a foreign market at price

- *Below the market price in the destination country*
- *Below its own domestic price*
- *Below cost*

Anti-dumping duties – Initial investigation

- p/T is f.o.b price and p and p^* are c.i.f prices
- Dumping occurs if $p/T < p^*$
- Anti-dumping duty in the second period equals
- Incentive for firms to raise period 1 price.
- Withdrawal of cases

$$(1+\tau_2) = p^*/(p_1/T)$$

Anti-dumping duties – Continuing investigation

- Continuing investigations:

$$(1+\tau_3)=p^*/[p_2/T(1+\tau_2)]$$

$$(1+\tau_3)= (1+\tau_2)[p^*/(p_2/T)],$$

- Firm can only avoid a dumping charge iff

$$p_2/[T(1+\tau_2)] \geq p^* \Leftrightarrow p_2 \geq p^* T(1+\tau_2) > p_1(1+\tau_2),$$

- To avoid continuing anti-dumping duties, import price must rise by

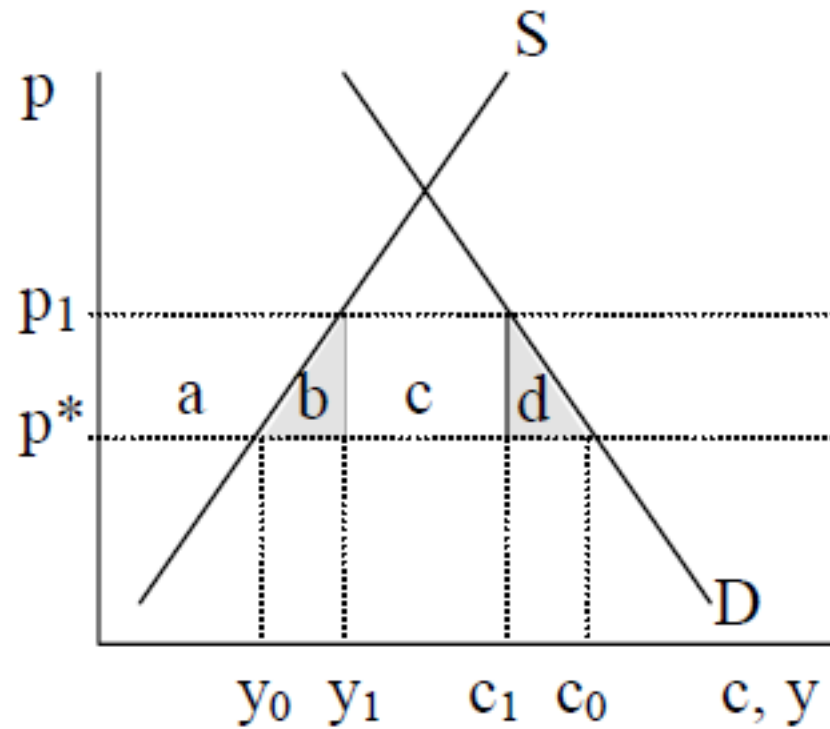
$$p_2/p_1 > (1+\tau_2)$$

- More than complete pass-through of period 2 duty!

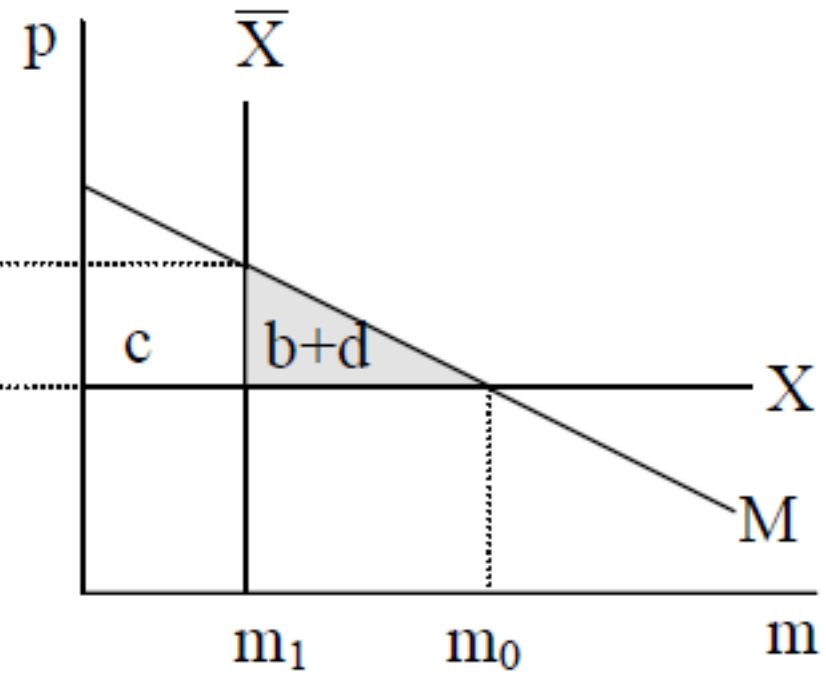
Import Quotas

- The Multifibre Agreement (MFA) quotas on textile and apparel
- Lifted in 2005
- Surging imports into OECD from China, Bangladesh, India.

Import quotas - equivalence



(a) Domestic market



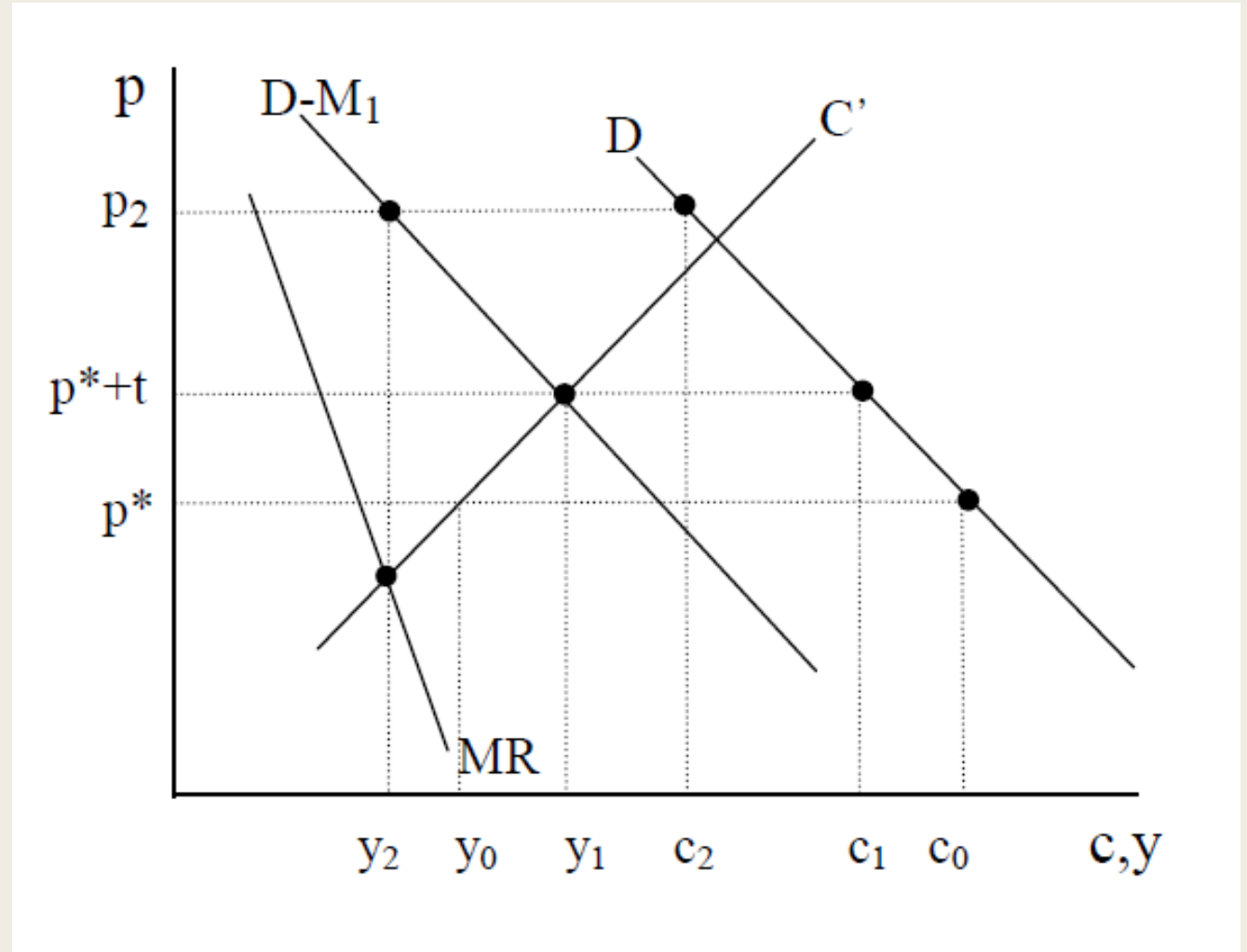
(b) Import market

Import quota license allocation

- Rent-seeking behaviour
- Efficient allocation
- Auctions
- Voluntary Export Restraint (VER)

Non-equivalence: 1- Imperfect Competition

Domestic monopoly



Cournot and Bertrand competition

- Cournot – Restricting the foreign firm shifts sales toward domestic firm
- Bertrand competition – The domestic firm has an incentive to increase its price and shift sales to the foreign firm.
- The foreign firm cannot respond with an increase in quantity and hence has to raise its price – Stackleberg Leader

Non-equivalence: 2- Quality differentiation

N varieties differing in quality

$$L = U[f(z_1)c_1, \dots, f(z_N)c_N] + \lambda(I - \sum_{i=1}^N p_i c_i)$$

$$q_i \equiv p_i/f(z_i).$$

$$U(d_1, \dots, d_N) + \lambda(I - \sum_{i=1}^N q_i d_i),$$

Profit max is given by

$$\max_{p_i, z_i} \sum_{i=1}^M [p_i - g_i(z_i)]c_i = \max_{q_i, z_i} \sum_{i=1}^M \left[q_i - \frac{g_i(z_i)}{f(z_i)} \right] d_i(q, I).$$

Assuming CES demand, we get

$$p_i = \mu g_i(z_i),$$

Quota

- Assume a quota is imposed on imports

$$\sum_{i=1}^M c_i = \sum_{i=1}^M d_i / f(z_i) \leq \bar{X},$$

- Profit max for (either domestic or foreign) firms

$$\begin{aligned} L &= \max_{q_i, z_i} \sum_{i=1}^M \left[q_i - \frac{g_i(z_i)}{f(z_i)} \right] d_i(q_i, I) + \lambda \left(\bar{X} - \sum_{i=1}^M \frac{d_i(q_i, I)}{f_i(z_i)} \right) \\ &= \max_{q_i, z_i} \sum_{i=1}^M \left[q_i - \frac{g_i(z_i) + \lambda}{f(z_i)} \right] d_i(q_i, I) + \lambda \bar{X}, \end{aligned}$$

- Yielding

$$p_i = \mu [g_i(z_i) + \lambda],$$

Upgrading across products

Suppose there are two products 1 and 2 such that

$$g_1(z_1) > g_2(z_2).$$

Then in the absence of a quota

$$p_1 = \mu g_1(z_1) > p_2 = \mu g_2(z_2),$$

With a quota

$$(p_1' / p_2') = [g_1(z_1) + \lambda] / [g_2(z_2) + \lambda] < g_1(z_1) / g_2(z_2) = p_1 / p_2.$$

Dollar increase leads to smaller % increase in high-priced product shifting demand towards it

Brambilla, Khandelwal and Schott (2007)

BKS estimate the impact of China's entry post quota removal on other exporters

They estimate

$$\Delta \ln q_{crht} = \beta_{1rt} \text{ChinaBound}_{h,t-1} + \beta_{2rt} \text{ChinaUnbound}_{h,t-1} + \nu_{crht}$$

Kuwait (-2.89)	Taiwan (-0.55)	UAE (-0.26)	Mozambique (0.05)
Russia (-2.81)	Swaziland (-0.54)	Ukraine (-0.25)	Malawi (0.05)
Maldives (-2.35)	Sweden (-0.52)	El Salvador (-0.23)	Slovakia (0.06)
Micronesia (-2.14)	Ghana (-0.51)	Guatemala (-0.23)	Trinidad and Tobago (0.09)
Georgia (-1.99)	Mali (-0.48)	Gambia (-0.23)	Iceland (0.09)
Guinea (-1.85)	Bahrain (-0.48)	Turkey (-0.23)	Vietnam (0.09)
Oman (-1.82)	Mauritius (-0.47)	Czech Republic (-0.21)	Chile (0.11)
Suriname (-1.38)	Slovenia (-0.46)	Lebanon (-0.21)	Germany (0.12)
Cyprus (-1.35)	Poland (-0.45)	Nicaragua (-0.21)	Cambodia (0.12)
Albania (-1.25)	Venezuela (-0.45)	Colombia (-0.20)	Indonesia (0.13)
Kyrgyzstan (-1.24)	Argentina (-0.45)	Ecuador (-0.18)	Bangladesh (0.15)
Kazakhstan (-1.21)	Hungary (-0.44)	Brunei (-0.17)	Switzerland (0.16)
Azerbaijan (-1.13)	Barbados (-0.40)	Australia (-0.15)	Armenia (0.16)
Tajikistan (-1.09)	Belarus (-0.39)	Brazil (-0.15)	Uzbekistan (0.18)
Macedonia (Skopje) (-1.00)	Malaysia (-0.39)	Belgium (-0.15)	Cook Islands (0.18)
South Africa (-0.98)	Honduras (-0.37)	Ireland (-0.14)	Bolivia (0.22)
Ivory Coast (-0.91)	Costa Rica (-0.36)	United Kingdom (-0.14)	Jordan (0.24)
Ethiopia (-0.91)	Romania (-0.35)	Italy (-0.13)	Peru (0.24)
Syria (-0.90)	Finland (-0.35)	Spain (-0.13)	Panama (0.25)
Moldova (-0.87)	Greece (-0.35)	Japan (-0.12)	Botswana (0.26)
Korea, South (-0.85)	Guyana (-0.34)	Namibia (-0.11)	Uganda (0.30)
Mongolia (-0.84)	Dominican Republic (-0.34)	Uruguay (-0.10)	Saudi Arabia (0.32)
Nepal (-0.77)	Haiti (-0.34)	Portugal (-0.10)	Nigeria (0.48)
Israel (-0.72)	Fiji (-0.33)	Croatia (-0.10)	Qatar (0.51)
Singapore (-0.69)	Latvia (-0.32)	Estonia (-0.07)	Bosnia-Herzegovina (0.63)
Zambia (-0.69)	Sri Lanka (-0.31)	Mexico (-0.07)	Senegal (0.67)
Bermuda (-0.69)	Canada (-0.31)	Paraguay (-0.04)	British Virgin Islands (0.69)
Sierra Leone (-0.68)	Austria (-0.31)	Turkmenistan (-0.04)	San Marino (0.75)
Jamaica (-0.65)	New Zealand (-0.31)	Kenya (-0.02)	Malta (0.90)
Cape Verde (-0.62)	Zimbabwe (-0.30)	Morocco (-0.02)	Bahamas (1.35)
Hong Kong (-0.62)	France (-0.30)	Tanzania (0.01)	Netherlands Antilles (1.60)
Belize (-0.61)	Egypt (-0.29)	Lithuania (0.02)	Laos (1.88)
Denmark (-0.59)	Norway (-0.28)	Tunisia (0.02)	Somalia (1.94)
Madagascar (-0.57)	Philippines (-0.28)	Pakistan (0.02)	Tokelau (2.05)
Lesotho (-0.57)	Bulgaria (-0.27)	India (0.03)	Mauritania (3.43)
Macao (-0.55)	Thailand (-0.26)	Netherlands (0.05)	

Notes: Table regresses change in the (log of) country-product quantity on country-year fixed effects on the set of China's Phase IV products that were subject to binding quotas in 2004. The 2005 coefficients for each country are reported in parantheses. Bold denotes that export response is statistically significant at the 10 percent confidence level (robust standard errors).

Khandelwal, Schott and Wei (2013)

- Adopt a difference-in-differences approach to analyse the impact of the MFA quota removal on market-share of Chinese firms

- Hypotheses:

- *Auction allocation model (efficient allocation of quotas) with predictions*
 - High-productivity incumbents must see greater market-share increases, fall in prices
 - Entrants should have higher unit-values relative to incumbents

- Results inconsistent with model predictions

TABLE 3—DECOMPOSITION OF MARKET SHARE CHANGES

Margin	Difference-in-differences (Quota-Bound versus Quota-Free, 2004–2005 versus 2003–2004)			
	All	SOE	Domestic	Foreign
Incumbents	−0.122***	−0.106***	−0.013	−0.003
Net entry				
Adders	0.116***	−0.011	0.071***	0.056***
New exporters	0.037***	−0.003	0.035***	0.005
Exiters	−0.031	−0.027	−0.001	−0.003
Total net entry	0.122***	−0.041	0.105***	0.058***
Total	0.000	−0.147***	0.092***	0.055**

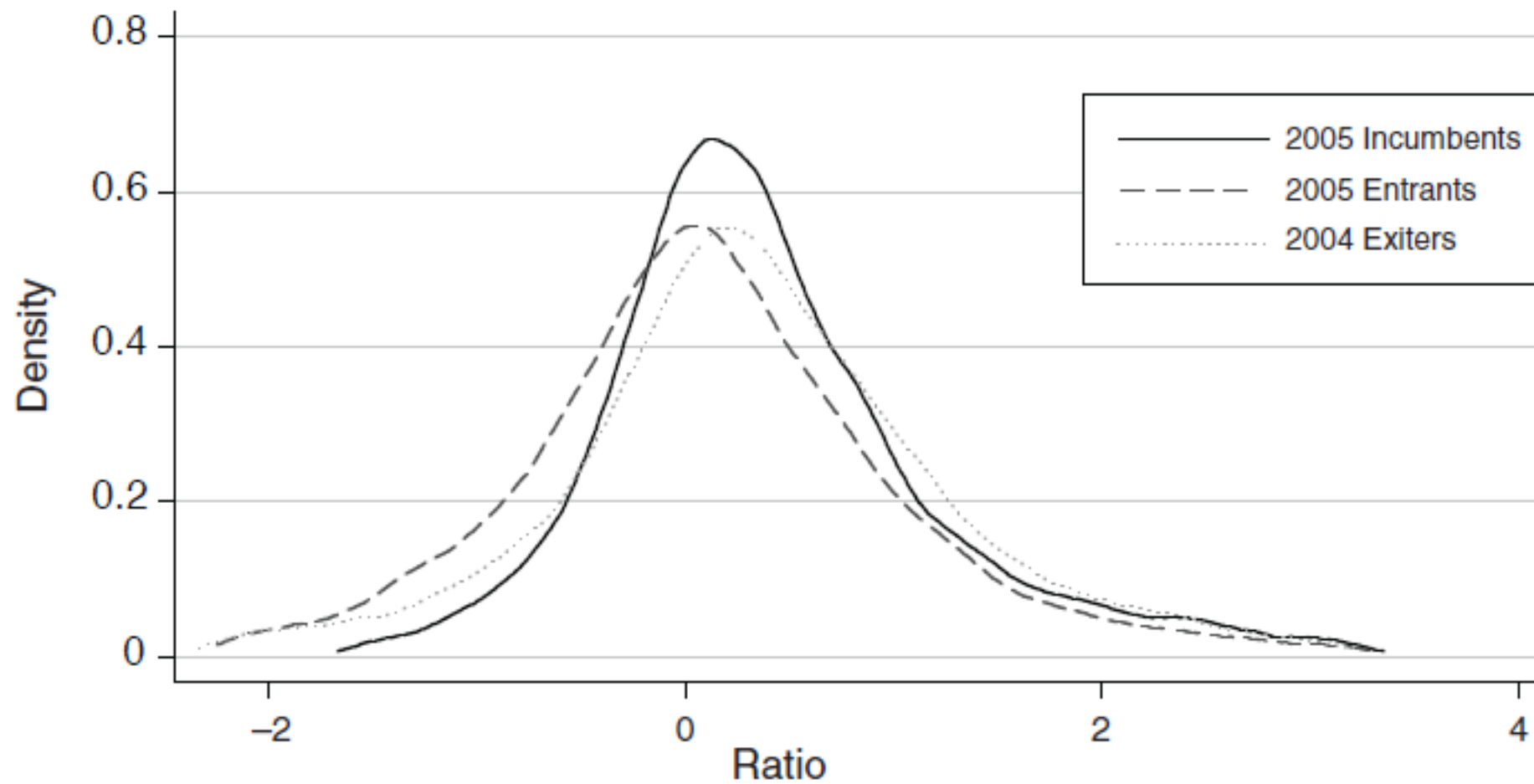


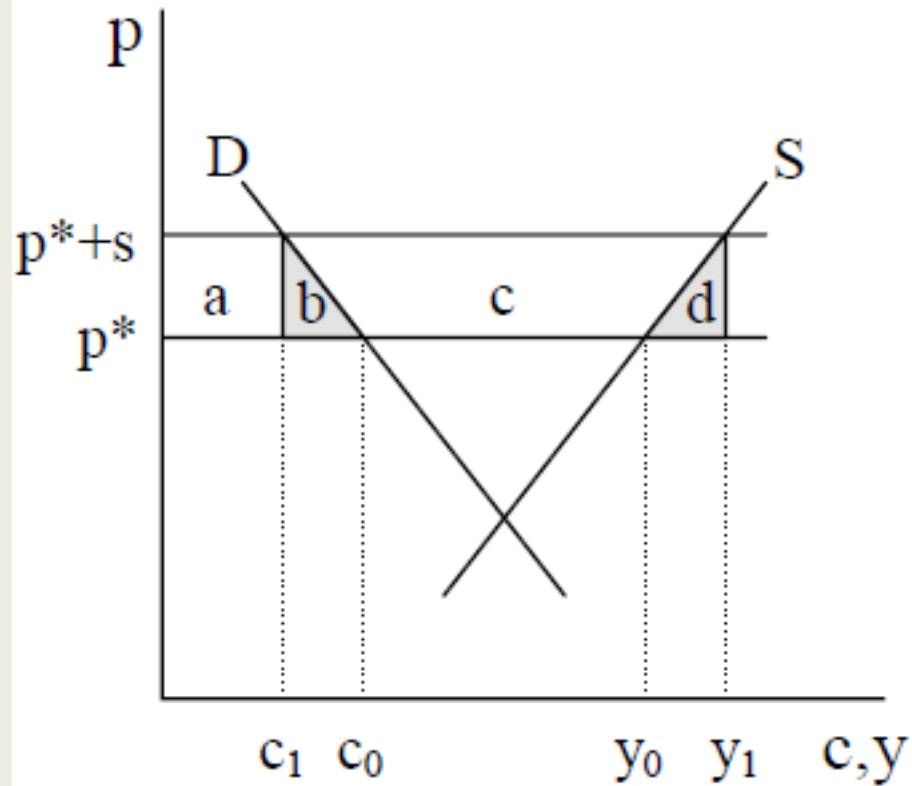
FIGURE 2. DISTRIBUTION OF QUOTA-BOUND EXPORT PRICES, BY MARGIN

Export Subsidies

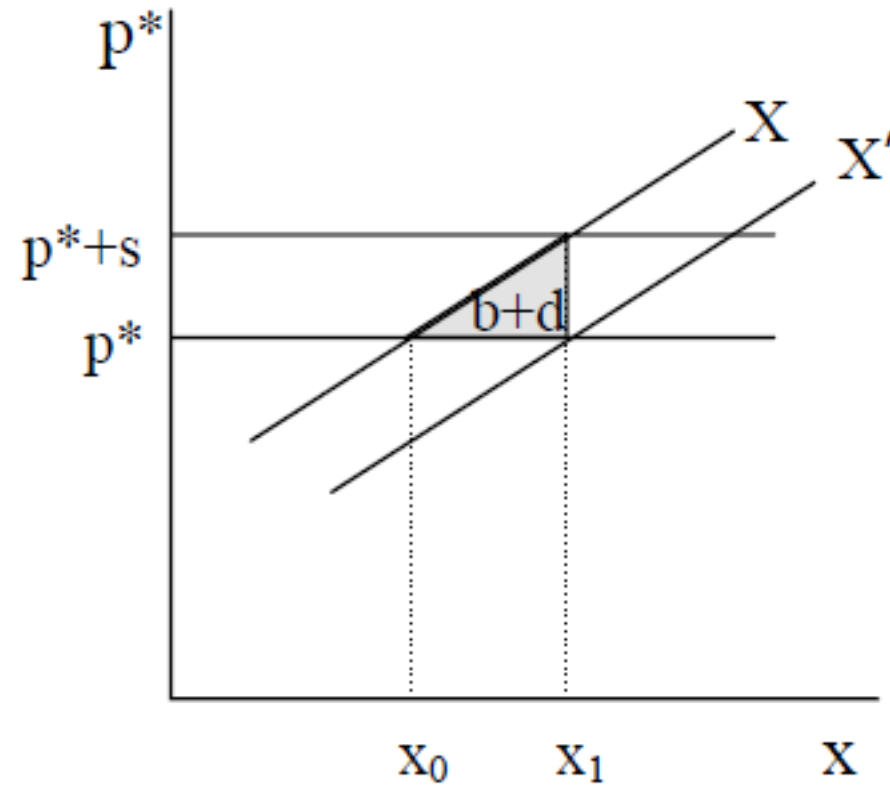
- Export subsidy: Payment to firm for every unit exported
- Analysis exactly like the tariff:
 - *Welfare effects depend upon small or large country*
 - *Perfect or imperfect competition*
- Export subsidies rarely welfare improving
 - *depends on nature, extent of competition*
 - *R&D subsidies or subsidies to certain industries have better prospects*

Export subsidy

Perfect competition, Small country



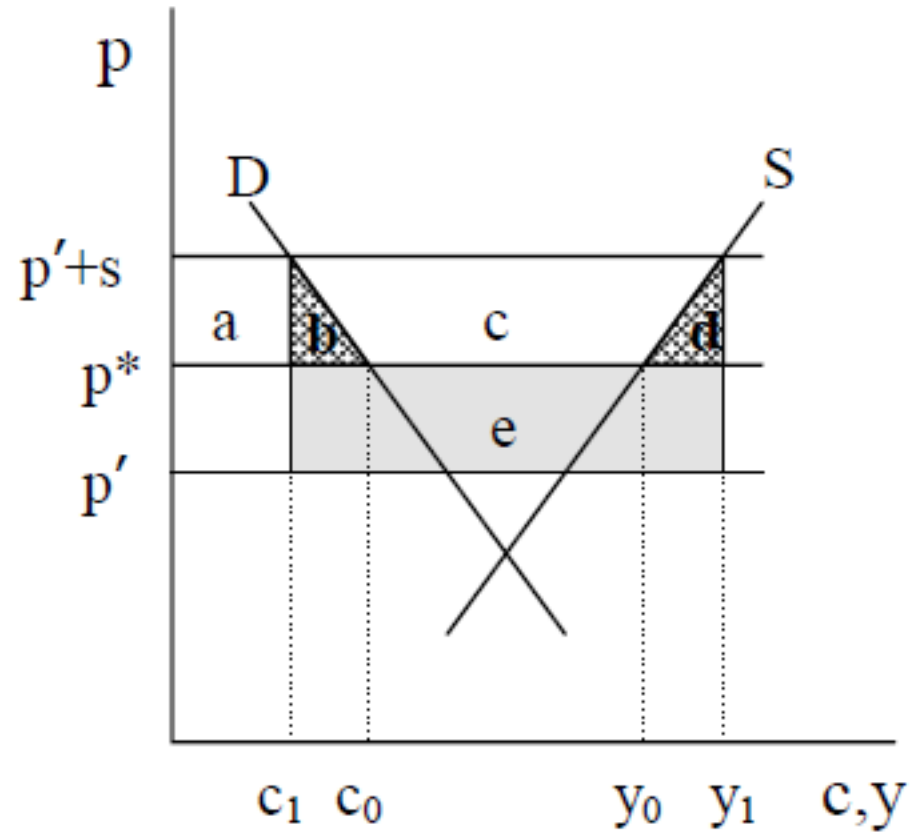
(a) Domestic Market



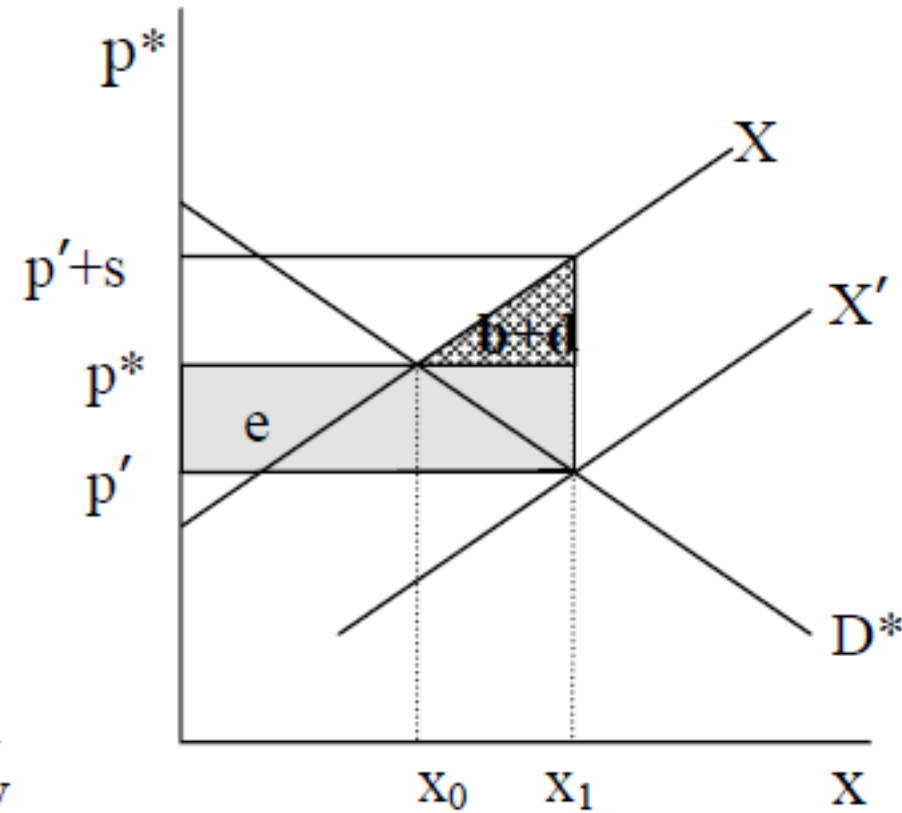
(b) Export Market

Export subsidy

Perfect competition, Large country



(a) Domestic Market



(b) Export Market

Impact of Export Subsidies

- Distributional effects:
 - *Increase in domestic price of subsidized products*
 - *HO:*
 - famers benefit from agricultural subsidies

Implications for other countries

- Terms of trade effect of agricultural subsidies:
 - *Benefits net importers of agricultural products*
 - *Has implications for food security*
- Who loses?
 - *Other emerging exporters of agriculture*

Export subsidies – the bane of the WTO

- A constant struggle between developed and developing countries

<http://thebricspost.com/brazil-to-seek-g20-commitment-not-to-raise-agricultural-subsidies/#.V-h7wyF96Uk>

Imperfect Competition – Cournot Duopoly

Home and Foreign firm selling x and x^* to THIRD market

Differentiated products – home price $p(x, x^*)$ and foreign price $p^*(x, x^*)$

Home firm profit max (foreign firm does the same):

$$\pi = p(x, x^*)x - C(x),$$

FOCs and SOC

$$\pi_x = p(x, x^*) + xp_x - C'(x) = 0,$$

$$\pi_{xx} = 2p_x + xp_{xx} - C'' < 0.$$

The FOC gives reaction functions RR and R^*R^* .

Suppose Home firm receives a specific subsidy of s .

Home profits with a subsidy

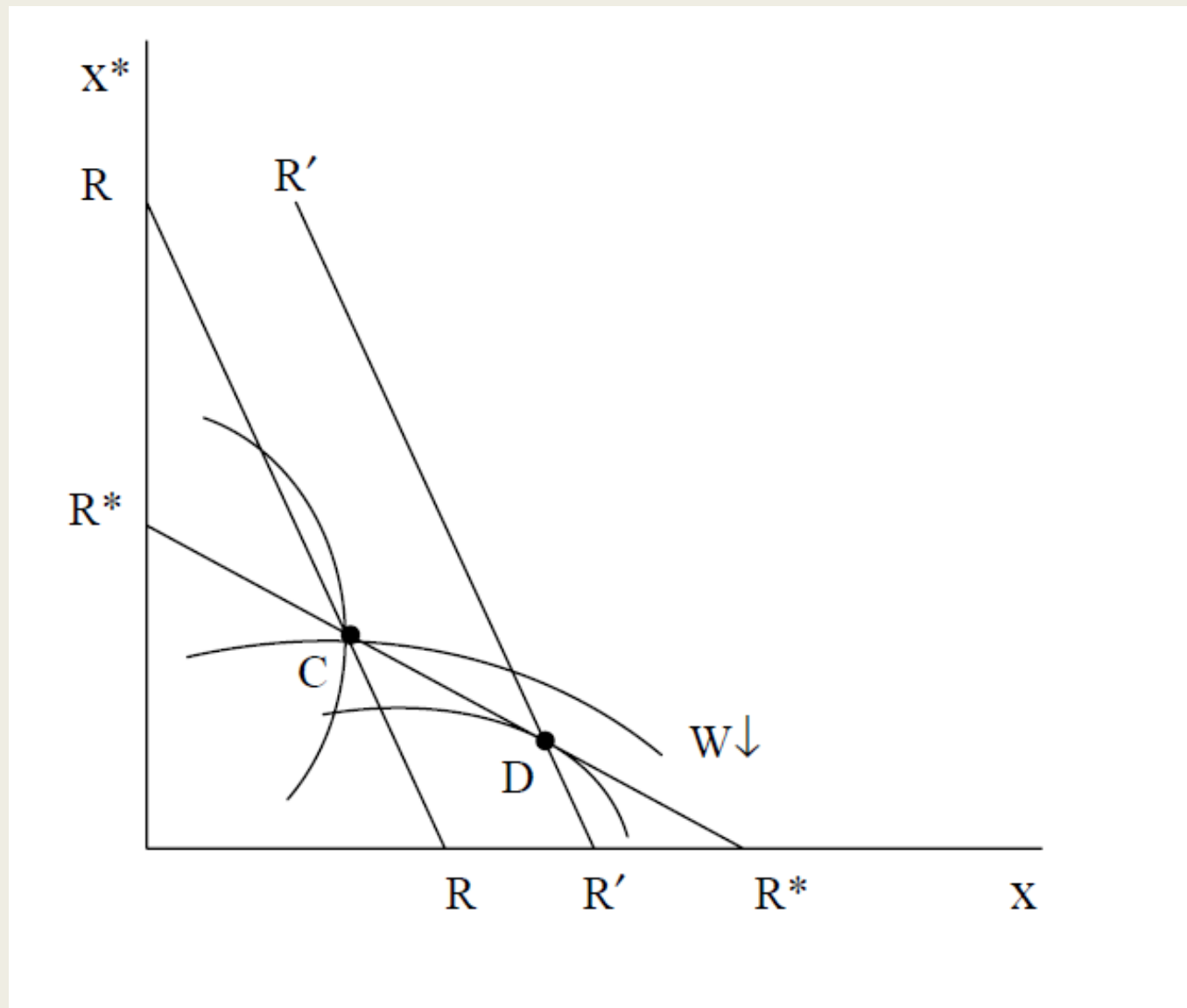
$$\pi = [p(x, x^*) + s]x - C(x)$$

$$\pi_x = p(x, x^*) + s + xp_x - C'(x) = 0$$

Totally differentiating the FOC and using the SOC:

$$\frac{dx}{ds} = -\frac{1}{\pi_{xx}} > 0$$

Reaction function with subsidy



Subsidy and Welfare

$$W = [p(x, x^*) + s]x - C(x) - sx = p(x, x^*)x - C(x)$$

But this is equal to original profit.

Hence, welfare increases with a subsidy.

What is the optimal subsidy?

Imperfect competition – Bertrand

- Home profits are

$$\pi = (p + s)x(p, p^*) - C[x(p, p^*)].$$

- With FOCs

$$\pi_p = x(p, p^*) + (p + s)x_p - C'(x)x_p = 0.$$

Giving us reaction functions

- Imposing a subsidy shifts the home reaction function

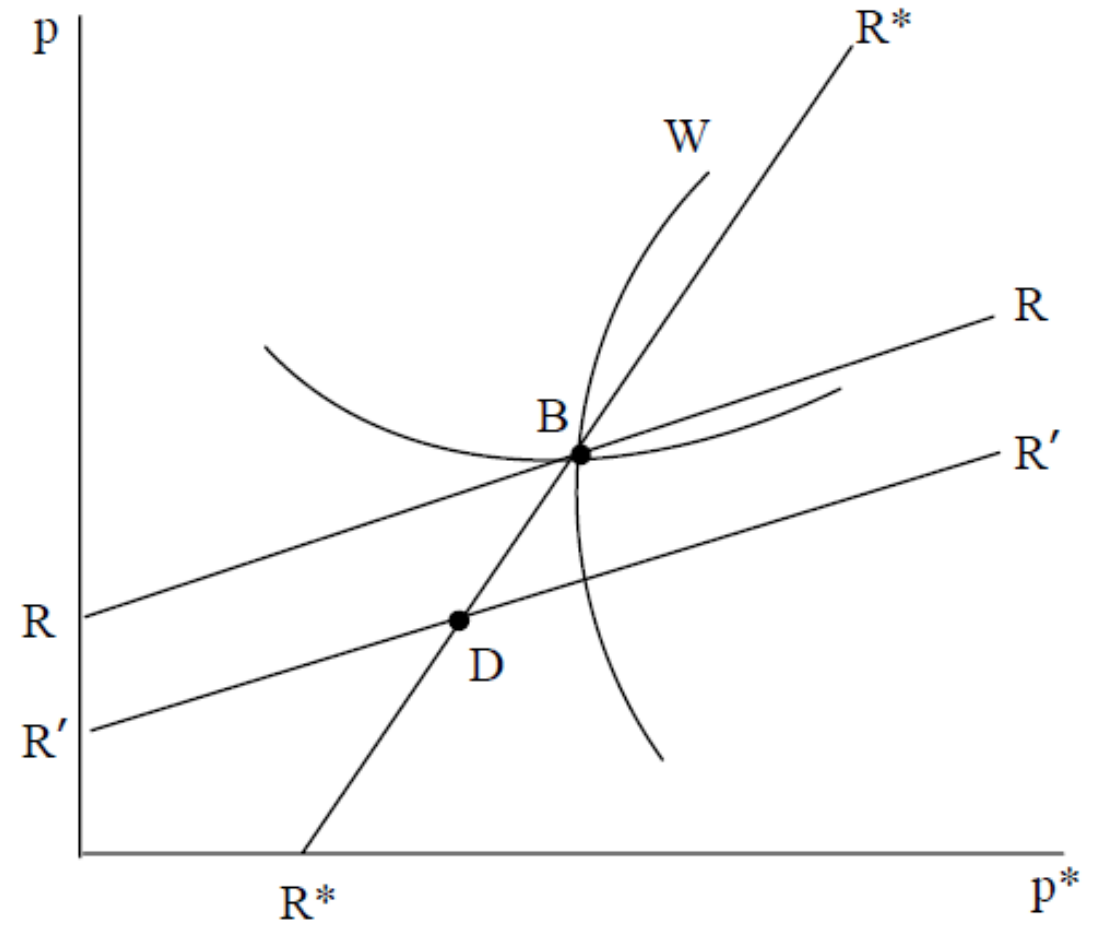
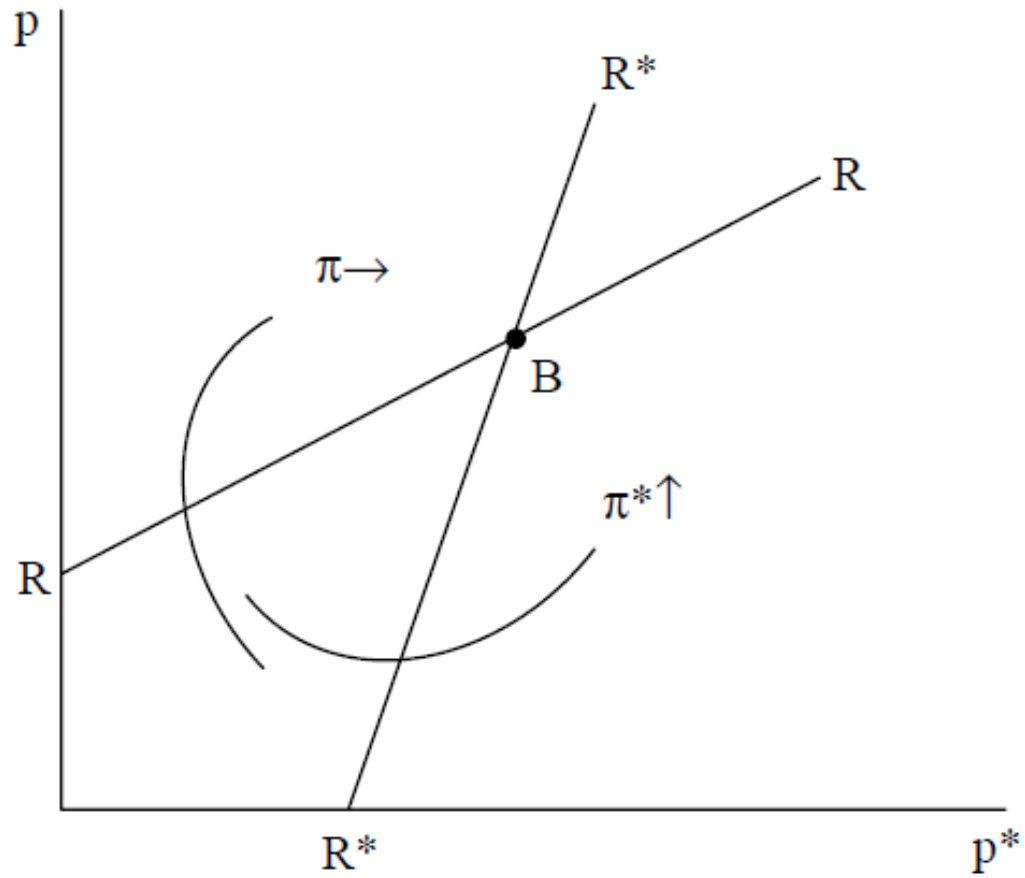
Effects of the subsidy

- Totally differentiate the FOC:

$$\frac{dp}{ds} = -\frac{X_p}{\pi_{pp}} < 0$$

- Reaction function shifts

Reaction functions



Welfare

- Welfare is given by

$$W = (p + s)x(p, p^*) - C[x(p, p^*)] - sx(p, p^*) = px(p, p^*) - C[x(p, p^*)].$$

- Which is reduced (from the reaction function and iso-profit curves)

Theorem

Theorem (Brander and Spencer, 1985, Eaton and Grossman, 1986)

- (a) Under Cournot duopoly, a subsidy to exports raises home welfare;
- (b) Under Bertrand duopoly, a tax on exports raises home welfare.

Practicalities

- Export tax may be better!
- But difficult to implement politically
- Hard to know what kind of market firms are operating in

Further reasons subsidies might not work

- Possible gains may be dissipated by free entry in the home country.
- Subsidy wars
- Exporters differ in their productivities – efficient firms get a subsidy and less efficient get a tax

When subsidies might be welfare improving

- Subsidies to R&D
 - *Influence whether the firm enters or not*
- Subsidies in markets with learning over time
 - *Like infant industry argument for tariff*

EU provides a subsidy to Airbus

		Produce	Airbus	Not produce
Boeing	Produce	-\$5 million	\$20 million	\$100 million
	Not produce	\$0	\$125 million	\$0

Aerial bombardment; Aircraft manufacturing

Publication info: The Economist ; London 424.9059 (Sep 23, 2017): 67.

[ProQuest document link](#)

FULL TEXT

Boeing takes off on a flight of hypocrisy against Bombardier

"WE WON'T do business with a company that is busy trying to sue us." So said an uncharacteristically stern Justin Trudeau, Canada's prime minister, alongside his British counterpart, Theresa May, in Ottawa on September 18th. The two had teamed up to take on Boeing. The giant American aeroplane-maker is pressing Donald Trump's administration to impose duties on commercial jets made by Canada's Bombardier. Boeing says its smaller rival is using Canadian government subsidies to sell aircraft to Delta, an American carrier, at below cost price.

Aircraft market

- Duopoly with Boeing and Airbus
- Agreement between Europe and the US to avoid subsidy war
- Subsidy cannot exceed 33% of development costs
- No production subsidies OR interest rate discounts

The Airbus A380

- Europe was to subsidize the airbus A380 (33%)



- Irwin and Pavcnik (2001) modelled demand and mark-ups for wide-body air crafts and simulate effect of entry of the Airbus A380
- Boeing responded by aggressively cutting price of the Boeing 747
- Also, they found that the Airbus A380 would not be profitable. With discounts, it would not sell required number of aircrafts

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