

# **Imperfect Competition and State Trading**

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# Motivation

- **State trading enterprises (STEs) widely used among major agricultural importers and exporters, including Canada, China, India, Indonesia, Japan and South Korea**
- **Concerns with STEs are that in importing markets, they prevent market access, while in exporting case, provide “unfair” advantages among competing exporters**
- **If concerns are justified, STEs are non-tariff barriers to undistorted trade, their effects being measurable in terms of import tariff or export subsidy equivalents**
- **Potential of STEs to distort trade has been recognized (OECD, 2009), but often their treatment is inadequate, characterized in terms of “monopoly status” alone**

# Definition of STEs

- **STEs come in a variety of forms, ranging from state-owned monopolies to a number of private firms that have *exclusive rights* to import/export through licenses, and who compete with firms in private sector**
- **The essential issue of STEs relates to nature of these exclusive rights:**
  - **procurement on domestic market and subsequent sale, e.g., a marketing board such as the Canadian Wheat Board**
  - **exclusive rights to import a good from world market**
- **In some cases, rights may result in a single trading entity, referred to as a “single desk”**

# Definition and Incidence of STEs

- Legitimacy of STEs long-recognized by GATT, Article XVII drafted to ensure STEs act in accordance with “normal commercial considerations” and abide by GATT rules
- Not until after Uruguay Round in 1994 that definition of STEs made more precise:

“Government and non-governmental enterprises, including marketing boards, which have been granted exclusive or special rights or privileges, including statutory or constitutional powers, in the exercise of which they influence, through their purchase or sales the level of imports or exports” (WTO, 1995)

# Definition and Incidence of STEs

- **Two key features of definition:**
  - not ownership *per se* that matters, but nature of exclusive rights/privileges, e.g., a state-owned STE (Australian Wheat Board) may be privatized, but is still STE by WTO definition if exclusive rights apply to private enterprise
  - effect of exclusive rights/privileges on trade that is relevant
- **Dissatisfaction with current rules on STEs, e.g., US believes importing STEs should have exclusive right to import ended, while Japan and Korea argue exporting STEs can distort world markets**

# Definition and Incidence of STEs

- **Difficult to identify accurately incidence of STEs in world economy – however, under current rules, existence and purpose of STEs have to be notified to WTO, with about 70% being in agricultural sector**
- **Japan Food Agency accounts for 99% of rice imports and almost all imports of wheat**
- **In Korea, state trading covers imports of cereals, meat, soybeans, fruit, groundnuts, garlic and other commodities, while in India it covers cereals, copra and coconut oil**
- **Practices of STEs are heterogeneous, and vary between countries as well as across commodities**

# Rent-Shifting and STEs

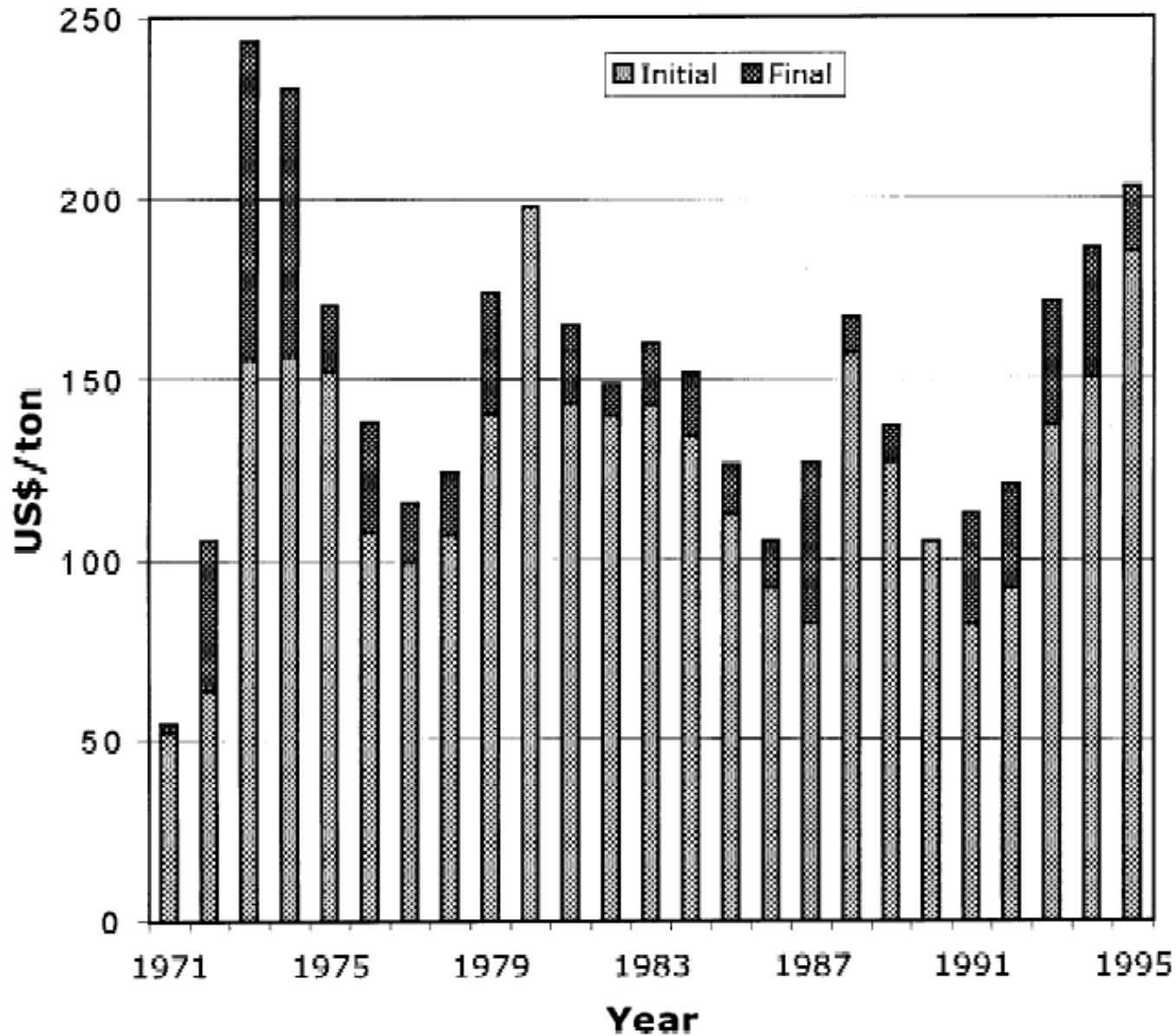
- **Key result of strategic trade theory is idea that a government can employ trade policy as a pre-commitment device to transfer profits from foreign to domestic firms (Brander and Spencer, 1985)**
- **Hamilton and Stiegert (2002) develop model and empirical analysis applied to Canadian Wheat Board's (CWB) exports of durum wheat**
- **CWB major player in world market, with only limited number of other exporters**
- **Durum wheat also a relatively homogeneous commodity with limited substitution possibilities in end uses such as pasta and semolina flour**

# Rent-Shifting and STEs

- ***Delayed payment system*** a key feature of CWB, producers initially being paid low/below market prices, and later being paid a lump-sum (see Figure 1)
- Literature on *vertical restraints*, e.g., Bonanno and Vickers (1988), shows that such a payment system between upstream and downstream firms generates pre-commitment mechanism necessary to achieve Stackelberg equilibrium
- Delayed payment system creates credible marginal cost advantage for STE, allowing rent-shifting to occur, so that delayed payment is equivalent to a direct export subsidy



**Figure 1: CWB Durum Wheat Payments, 1971-1995**



# Theoretical Structure

- **Export commodity produced in domestic region, organized via STE, and in foreign region made up of  $n$  independent producers**
- **Production in vertical system comprised of upstream market, and single downstream international market**
- **Upstream firms produce with constant unit costs of  $c_D$  and  $c_F$  in domestic and foreign region respectively, while each downstream firm acts purely as an intermediary in production of final product**
- **STE has exclusive control over all input purchases, and has authority to set upstream price, while in foreign region, input purchased on spot market**

# Theoretical Structure

- **Interaction of agents modeled as 2-stage game:**
  - **stage 1: STE selects upstream transfer price  $w$ , participation at this price being mandatory upstream**
  - **stage 2: STE and foreign marketing agents compete in quantities in international market, oligopoly rents earned by STE returned to producers as lump-sum**
- **$Q$  is quantity of final good, inverse demand downstream being  $P(Q)$ , and downstream marketing costs are subsumed into market price**
- **$P(Q)$  is strictly decreasing and twice continuously differentiable, with stability ensured by  $P'(Q)+QP''(Q)<0$** 
  - **also implies outputs are strategic substitutes**

# Theoretical Structure

- **STE maximizes profit function:**

$$(1) \quad \pi_D(q_D, Q, w) = (P(Q) - w)q_D$$

where  $\pi_D$  and  $q_D$  are profit and output for STE, and first-order condition is:

$$(2) \quad P(Q) + q_D P'(Q) - w = 0$$

- **Let  $q_{Fi}$  be output of foreign marketing agent  $i$ , aggregate foreign output being  $q_F = \sum_1^n q_{Fi}$ , the objective function of  $i$  being:**

$$(3) \quad \pi_F(q_F, Q) = (P(Q) - c_F)q_F$$

with first-order condition:

$$(4) \quad P(Q) + q_{Fi} P'(Q) - c_F = 0$$

# Theoretical Structure

- Equilibrium at downstream stage found by simultaneously solving  $n+1$  equations in (2) and (4)
- Assuming symmetric foreign firms, i.e.,  $q_{Fi} = (1/n)q_F, \forall i$   
aggregation of (4) yields first-order condition for representative firm:

$$(5) \quad P(Q) + (1/n)q_F P'(Q) - c_F = 0$$

- Equilibrium exports of final good from STE and foreign agents,  $q_i(w,c)$ ,  $i=D,F$ , and total exports  $Q(w,c)$  are obtained by solving (2) and (5) simultaneously
- At first stage, STE selects  $w$  to maximize profits:

$$(6) \quad \pi_D(w) = (P(Q(w,c)) - c)q_D(w,c)$$

# Theoretical Structure

- If  $w^*$  is solution to (6), upstream price set by STE with optimal rent-shifting downstream is:

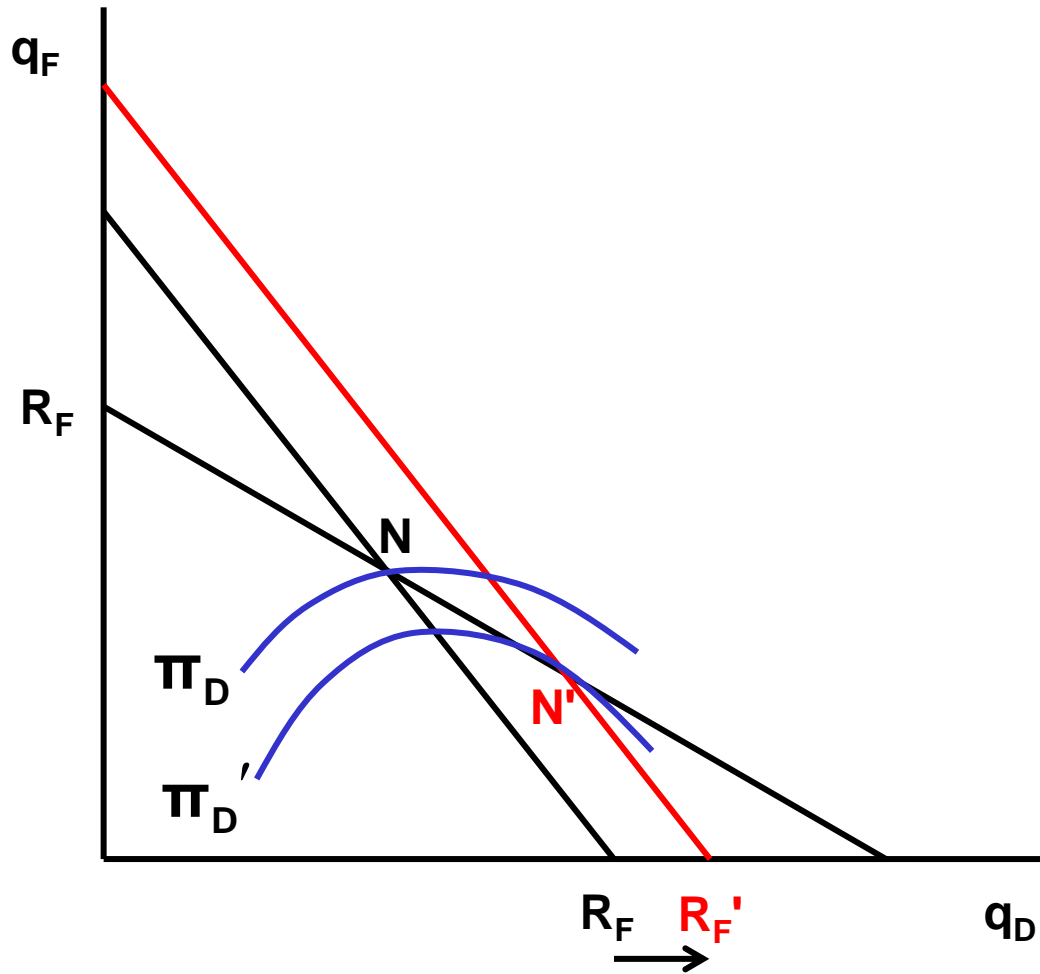
$$(7) \quad w^* - c_D = -q_D^* P'(Q^*) \frac{\partial q_F}{\partial q_D}(q_D^*, Q^*) < 0, \text{ where:}$$

$$\frac{\partial q_F}{\partial q_D}(q_D^*, Q^*) = (nP'(Q^*) + q_F^* P''(Q^*)) [n+1)P'(Q^*) + q_F^* P''(Q^*)]^{-1}$$

i.e., the ratio of comparative statics of (2) and (5) implied by STE's choice of  $w$ , (7) holding due to stability condition

- In (7), profit-maximizing  $w$  set by STE specifies upstream producers sell input below marginal cost, increasing STE export market share

Figure 2: Rent-Shifting and STE



# Empirical Analysis

- Hamilton and Stiegert (2002) estimate conjectural variations version of model, using data for 1972-1995
- Counterparts to (2) and (5) are written as:

$$(2') \quad P + q_D P' \lambda_D - c_D + m = 0$$

$$(5') \quad P + q_F P' \lambda_F - c_F = 0$$

where  $\lambda_i = 1 + \nu_i$  is a conduct parameter, and variable

$\nu_i \equiv (dq_j / dq_i), i \neq j$ , is conjectural variation, departure of  $\lambda_i$  from 1 being a test of whether Cournot-Nash is an accurate description of industry equilibrium

$m = c_D - w$ , is markdown of input price by STE



# Empirical Analysis

- Estimation of model established  $\lambda_D = 1.05$  and  $\lambda_F = 0.74$ , both being statistically significant, indicating world durum market was imperfectly competitive over period
- $\lambda_D = 1$  could not be rejected, i.e., hypothesis that CWB shifted rent through its delayed producer payment program could not be rejected
- Additional tests confirm observed transfer payments set by CWB, consistent with rent-shifting behavior
- Results provide empirical support for strategic trade theory, and confirm concerns of those who worry about distorting effect of STEs in export markets

# Effects of STEs on Market Access

- Analyzing impact of STEs on market access poses several challenges:
  - Benchmark structure: with an STE, market structure imposed by government – but without an STE, what would structure look like? Want to be certain analyst does not impose an incorrect one and pre-determine results
  - Objectives of STE vs. private firm: STEs are instruments of policy, and hence payoff function may reflect aims of government policy, i.e., it may not be profit-maximization but instead some weighted social welfare function  $W = \alpha_1 PS + \alpha_2 CS + \alpha_3 \pi$

# Effects of STEs on Market Access

- **Characterization of exclusive rights: WTO definition does not imply state ownership, but what matters is nature of exclusive rights**

**Suppose there are two sources of procurement of input – domestic production and imports; here there are three possibilities:**

**(i) STE has exclusive rights over both sources of procurement and distribution to consumers**

**(ii) STE has exclusive import rights, but private firms procure from domestic market**

**(iii) STE has exclusive rights over domestic procurement, and private firms procure imports**

# Effects of STEs on Market Access

- **Combination of characteristics of STEs that lead to potential impact of STEs on market access**

**Remaining challenge is how to capture the potential trade-distorting effects in a single tariff-equivalent measure**

- **Specifically, suppose there is a producer-biased STE that has joint-exclusive rights – from this, solve out for the level of imports implied by this market specification**

**Then ask: what is level of implied tariff that would have to be imposed on private firms to give same level of imports as with STE? Implicit tariff is measure of tariff-equivalence**

# Effects of STEs on Market Access

- Approach has several advantages:
  - (i) Brings about concordance between any characterization of STE and private firm benchmark
  - (ii) No prescription of the benchmark – any private market structure can be captured
  - (iii) Other features of importing country can be captured in implicit tariff measure, e.g., domestic price support
  - (iv) Implicit tariff equivalent can be measured by using models that can be calibrated with country-specific data
- Key benefit of measure is transparency, and ability to evaluate trade-liberalizing effects of STE reform

# Case-Study of Japan Food Agency

- **McCorrison and MacLaren (2012) have derived model of STEs and then calibrated it to case of Japan Food Agency and wheat market, using techniques pioneered by Dixit (1988) (see paper for technical details)**
- **Important case study for several reasons:**
  - **Japan is key player in ongoing Doha Round, and is commonly seen as country where there is limited market access – its policy being strongly biased to producers**
  - **in recent years, government has changed exclusive rights that apply to its STE, i.e., it can only import wheat, and there is no price support for wheat farmers, although they do receive a lump-sum transfer**

# Case-Study of Japan Food Agency

- **Model is calibrated to Japanese wheat market for 2000, assuming a strong bias to Japanese farmers in the government's objective function**
- **Three cases examined:**
  - **Japan Food Agency has joint exclusive rights over procurement of imports and domestic output of wheat, along with price supports for wheat**
  - **Joint exclusive rights are maintained, but price support for wheat is removed**
  - **Japan Food Agency can only import wheat, and price support for wheat is removed**

# Case-Study of Japan Food Agency

## Trade Effects of Japan Food Agency in Wheat Market (US\$/tonne)

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	Tariff Equivalent
Joint Exclusive Rights with domestic price support	517 (86%)
Joint Exclusive Rights with no domestic price support	688 (115%)
Import Only	342 (57%)

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Source: McCorriston and MacLaren (2012)



# Case-Study of Japan Food Agency

- **Japan Food Agency does cause a trade distortion, although extent has been significantly reduced following change in exclusive rights that apply**
- **- with switch to import rights only, and no domestic farm support, tariff equivalent falls from 86 to 57%**
  - in joint exclusive case with domestic support, inverse farm supply curve is flat, so there is no domestic oligopsony, so STE procures less from domestic farmers, less is sold to domestic consumers, and imports are lower**
  - in joint exclusive case with no price support though, negative effects on market access increase, tariff equivalent increasing to 115%**