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Trade Liberalization on the EU-US GMO Agreement: A Political Economy Approach

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GM Regulation and Trade

- EU: Strict
  - All food (including processed food) or feed which contains more than 0.9% of approved GMOs must be labelled
  - Import around 30 million tons of GM grain for animal feed per year.
- US: Not so strict
  - Voluntary labelling
  - Largest commercial grower of GM crops

  Agricultural imports from the EU growing

Main Idea

- The Transatlantic Trade and Investment Partnership (TTIP)
  - Reduce tariff and non-tariff barriers between the EU and the US: Genetically Modified (GM)
  - Maybe a starting point for a change in GM policy
- Use a political economy model to
  - GM policy: a political rivalry between interest groups (Anderson, Rausser and Swinnen 2013; Graff, Hochman and Ziberman 2009; Qaim 2009, etc.)
  - Describe negotiation over a GM Organism (GMO) Trade Agreement (GTA) and assess effect of negotiations on welfare and lobbying efforts

Main Findings

- Our findings consistent with Grossman and Helpman (1995) and are specific on GMO debate
- A promise of lower GM import costs will intensify lobbying efforts. An agreement will induce a welfare increase for the pro-GM lobby and a welfare decrease for the anti-GM lobby.
- The domestic GM regulation effect will be dampened if trade agreement also allows for increased exports in the domestic country

Structure of the Paper

- Pre-GTA conditions
- A bilateral GTA negotiation
- The GTA effects
- The GTA effects with non-GM exports

Main Assumptions

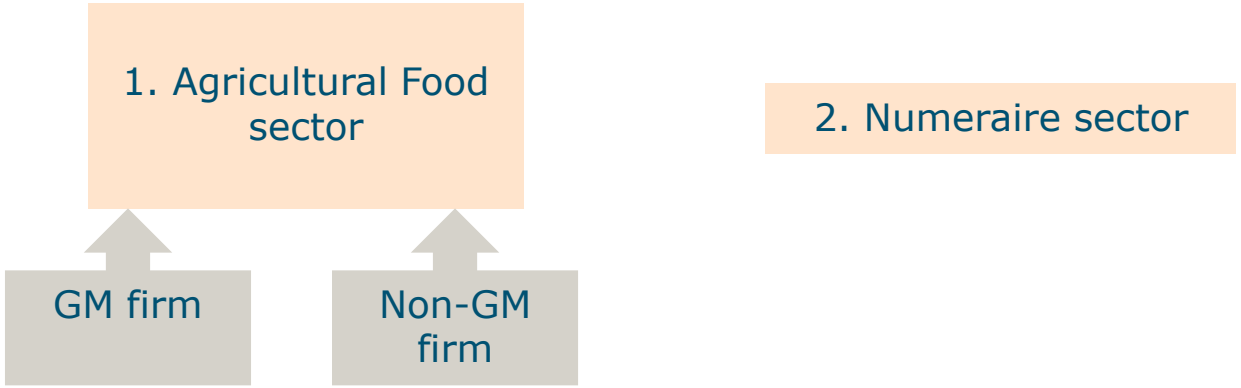
- Politically determined GM policy

  GM policy compliance cost: θ

- Two countries

Main Assumptions (cont.)

- Production:



- Consumers:

GM consumers α + Non-GM consumers β + Indifferent consumers γ $= 1$

Pre-GTA Conditions

- Groups' welfare:

$$W^{\alpha} = \alpha w\bar{L} + \pi_G(\theta) + cs_G^{\alpha}(\theta) + \alpha t_G^0 m^A$$
$$W^{\beta} = \beta w\bar{L} + \pi_N(\theta) + cs_N^{\beta}(\theta) + \beta t_G^0 m^A \qquad (1)$$
$$W^{\gamma} = \gamma w\bar{L} + cs_G^{\gamma}(\theta) + cs_N^{\gamma}(\theta) + \gamma t_G^0 m^A$$

and $cs_G = cs_G^{\alpha} + cs_G^{\gamma}$ $cs_N = cs_N^{\beta} + cs_N^{\gamma}$

- Aggregate social welfare *W* is the sum of groups' welfare.
- FOC⟶socially optimal GM regulations.

Pre-GTA Conditions (cont.)

- Government payoff function:

$$G(\theta) = aW(\theta) + C^{\alpha}(\theta) + C^{\beta}(\theta) \qquad (2)$$

FOC $\longrightarrow$ politically determined θ

- $W^i - \left(1+\lambda^i\right)C^i \geq 0$

$\longrightarrow$ the optimal contribution schedule:

$$\frac{\partial C^{i*}(\theta)}{\partial \theta} = \frac{1}{(1+\lambda^i)} \frac{\partial W^i(\theta)}{\partial \theta} \qquad (3)$$

λ^i is the lobbying efficiency.

Pre-GTA Conditions (cont.)

- Trade policy(politically determined): *t*
  - regulation costs = Non-tariff Barriers (NTBs)
  - *t* is measured as a tariff equivalent of NTBs
- Domestic GM policy → country's trade policy:
  - high θ → large t.
- The politically determined GM trade policy:

$$\frac{dG}{dt_0} = a\frac{\partial W(t_0)}{\partial t_0} + \frac{\partial C^{\alpha}(t_0)}{\partial t_0} + \frac{\partial C^{\beta}(t_0)}{\partial t_0} = 0 \qquad (4)$$

A bilateral GTA negotiation

- Aim: reduce the NTBs on GM imports
- Players:
  - Pro-GM lobby: (potential) profit and CS gain → lobby for lower t and a potentially lower θ
  - Anti-GM lobby: may lose the domestic market due to a lower GM price → lobby for same t as previous or higher
  - Government: an increase in its payoff because of the welfare and contributions' change → incentive to start negotiating

A bilateral GTA negotiation (cont.)

- The aggregate welfare of the domestic country under a GTA:

$$W^B = w\bar{L} + \pi_G^B + \pi_N^B + cs_G^B + cs_N^B + t\left(m^B - m^A\right) \quad (5)$$

$t\left(m^B - m^A\right)$ is the tariff equivalent rents from NTB reduction.

- The government will pursue the GTA only if the change of its payoff after the negotiation is positive:

$$\Delta G = a\left(\Delta W\right) + \Delta C^{\alpha} + \Delta C^{\beta}$$

$$= a(W^B - W^A) + \left[\left(C^{\alpha B} - C^{\alpha A}\right) + \left(C^{\beta B} - C^{\beta A}\right)\right] \geq 0 \quad (6)$$

A bilateral GTA negotiation (cont.)

- Unilateral stances: positions that the government will choose in response to the domestic interest groups equilibrium contributions: $\{t_e\}$, $e \in \{D, F\}$
- The optimal unilateral regime is determined by:

$$\frac{\partial \Delta G_e}{\partial t} = a\frac{\partial \Delta W(\bar{t_e})}{\partial t} + \left[\frac{\partial \Delta C^{\alpha}(\bar{t_e})}{\partial t} + \frac{\partial \Delta C^{\beta}(\bar{t_e})}{\partial t}\right] = 0 \qquad (7)$$

- The bilateral GTA equilibrium t^* is a solution when both $\Delta G_D \geq 0$ and $\Delta G_F \geq 0$.

A bilateral GTA negotiation (cont.)

- The government need to pursue an agreement policy that close to t* to get a higher payoff during the negotiation.

- The bilateral GTA equilibrium *t** is the Nash Bargaining solution which satisfies:

$$\max_t \left[\underbrace{(u_D(t^*) - u_D(t_0))}_{=\Delta G_D} \underbrace{(u_F(t^*) - u_F(t_0))}_{=\Delta G_F} \right] = \max_t \left[\left(\Delta G_D\right)\left(\Delta G_F\right) \right]$$

The GTA effects

- **Pro-GM lobby:**

Compare marginal welfare effects to the regulation before and after the GTA negotiation:

$$\frac{\partial W^{\alpha B}}{\partial t_G} - \frac{\partial W^{\alpha A}}{\partial t_G} = \alpha \underbrace{(m^B - m^A)}_{>0} + \alpha \underbrace{\left(\frac{\partial cs_G^B}{\partial t_G} - \frac{\partial cs_G^A}{\partial t_G} \right)}_{>0} + \underbrace{\left(\frac{\partial \pi_G^B}{\partial t_G} - \frac{\partial \pi_G^A}{\partial t_G} \right)}_{<0} \quad (8)$$

More GM imports, and GM price decreases.

If the marginal loss for the GM firm is small, the marginal benefit will be larger under the GTA.

The GTA effects (cont.)

- Since we have $\frac{\partial W^i(t)}{\partial t} = (1+\lambda^i)\frac{\partial C^i(t)}{\partial t}$ for $i=a,\beta$

$$\frac{\partial W^{\alpha B}}{\partial t_G} - \frac{\partial W^{\alpha A}}{\partial t_G} = (1+\lambda^{\alpha B})\frac{\partial C^{\alpha B}}{\partial t_G} - (1+\lambda^{\alpha A})\frac{\partial C^{\alpha A}}{\partial t_G} \quad (9)$$

A larger marginal welfare gain of the pro-GM group will stimulate the group to update its contribution schedule. It will contribute more for a lower *t*.

The GTA effects (cont.)

- Anti-GM lobby:

$$\frac{\partial W_\beta^B}{\partial t_G} - \frac{\partial W_\beta^A}{\partial t_G} = \beta \underbrace{(m^B - m^A)}_{>0} + \beta \underbrace{\left(\frac{\partial cs_N^B}{\partial t_G} - \frac{\partial cs_N^A}{\partial t_G} \right)}_{<0} + \underbrace{\left(\frac{\partial \pi_N^B}{\partial t_G} - \frac{\partial \pi_N^A}{\partial t_G} \right)}_{<0} \qquad (10)$$

GM imports large→price of GM food ↓, so more consumers from γ group will choose GM food. Non-GM firm will lose its market share.

Since the anti-GM lobby is large in the domestic country, the marginal welfare loss from a smaller *t* will be larger under the GTA condition.

The GTA effects (cont.)

- The marginal welfare change after the GTA negotiation

$$\frac{\partial W^{\beta B}}{\partial t_G} - \frac{\partial W^{\beta A}}{\partial t_G} = (1+\lambda^{\beta B})\frac{\partial C^{\beta B}}{\partial t_G} - (1+\lambda^{\beta A})\frac{\partial C^{\beta A}}{\partial t_G} \qquad (11)$$

is larger $\rightarrow$ anti-GM lobby increases contribution to lobby for a lower marginal welfare loss and keep the import regulation cost as high as feasible.

The GTA effects (cont.)

- The marginal contribution change of the pro-GM lobby is larger than the anti-GM lobby, because the marginal welfare gain from more contributions of the pro-GM lobby is larger.
- As the government enters the GTA negotiation, $\lambda^{\beta B} > \lambda^{\beta A}$, so the anti-GM lobby needs to spend more money on lobbying, which also decreases its marginal welfare gain from lobbying.
- The domestic GM debate will be intensive because two lobbies both increase their contributions.

The GTA effects with non-GM exports

- We assume the non-GM firm can export conventional food to the foreign country under the GTA and earns extra profits *E* from it, so

$$\pi_N^A = \left(\pi_N^E + E\right) > \pi^{NB}$$

$$\frac{\partial \pi_N^E}{\partial t_G} < \frac{\partial \pi_N^B}{\partial t_G} < \frac{\partial \pi_N^A}{\partial t_G}$$

- Marginal welfare loss is smaller (compensate by non-GM export earnings), spend less on lobbying

- Domestic debate will be less intensive

Summary

- The paper investigates the welfare effects of a trade agreement between two countries, two goods (GM and non-GM good), two regulatory standards (high in the domestic and low in the foreign country) and two lobby groups.
- Additional non-GM exports in the GTA negotiation will ease the domestic debate on GMOs
- The governments are more likely to have agreement on the NTB reduction on sufficient GM imports and non-GM exports through the negotiation.

Next:

- Numerical model to find:
  - Determine t^*
  - Optimal lobbying schedules in the negotiation
  - Different regulation effects on groups' welfare
  - Equilibrium quantity for GM import and non-GM export


thank You