On the Welfare Effects of Mergers in Open Economies

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Abstract

This paper uses a simple oligopoly model to examine relations between merger incentives and trade costs, and their welfare implications in open economies. Unlike the existing work, this paper considers synergies in domestic mergers and shows that (i) an increase in foreign competition leads to "defensive mergers" between domestic firms and (ii) such mergers could improve the domestic welfare. This paper also examines a foreign firm's choice on the entry mode to the domestic market to see which entry mode is the most desirable for the domestic welfare. This paper differs from the existing work in that it considers exporting, greenfield FDI, and cross-border M&A. It shows that restricting cross-border M&A could improve the domestic welfare by inducing the foreign firm to choose greenfield FDI, but such restriction policy could reduce the welfare when the foreign firm chooses exporting to the domestic market.

Facts and Theoretical Literature

- Facts:
  - Dramatic falls in both technological and artificial trade barriers in 1990s (Neary, 2007)
  - Mergers and Acquisitions account for the dominant share of FDI flows (Barba Navaretti and Venables, 2004)
- Literature on Trade and FDI theory:
  - Trade barriers and merger incentives: Long and Vousden (1995), Gaudet and Kanouni (2004), Benchekroun and Chaudhuri (2006)
  - Merger incentives and welfare implications: Head and Ries (1997), Falvey (1998), Kabiraj and Chaudhuri (1999), Huck and Konrad (2004)
  - Cross-border M&A vs. Greenfield FDI: Gorg (2000), Matoo, Olarreaga, and Saggi (2004), Bjorvatn (2004), Nocke and Yeaple (2007), Norback and Persson (2007)

Purposes

- Use a simple model to examine the following issues:
  - Relations between trade costs and merger incentives
  - Welfare implications of domestic and cross-border mergers and acquisitions
- Unlike the existing work, this paper considers the following aspects:
  - "Synergies" in domestic mergers
  - Choice on exporting, greenfield FDI, and cross-border M&A
- We expect to answer the following questions:
  - Does an increase in foreign competition lead to "defensive" domestic mergers?
  - If it does, do such mergers improve the domestic welfare?
  - Which entry mode of the foreign firm desirable for the host country, exporting, greenfield FDI, or cross-border M&A?

Model

- Inverse demand function: $p = a - bX$, $(a, b > 0)$
- Home firm's cost: $C = cx$, $(c > 0)$
- Foreign firm's cost: $C^* = c^* x^*$, $(c^* > 0)$
- Home firm's profit: $\pi = (p - c)\, x$
- Foreign firm's profit from exporting: $\pi^* = (p - c^* - t)x^*$, $(t > 0 :$ transport costs$)$
- Firms behave in the Cournot fashion.

Exporting Equilibrium in the Home Market

- Two home firms and one foreign firm
- Price: $p_e = \frac{1}{4}\left(a + 2c + c^* + t\right)$
- Total output: $X_e = \frac{1}{4b}\left[3a - 2c - \left(c^* + t\right)\right]$
- Home firm's output: $x_e = \frac{1}{4b}\left[a - 2c + \left(c^* + t\right)\right]$
- Foreign firm's output: $x_e^* = \frac{1}{4b}\left[a + 2c - 3\left(c^* + t\right)\right]$
- Profits: $\pi_e = bx_e^2$, $\pi_e^* = bx_e^{*2}$

Domestic Merger

- Two home firms are merged into one firm.
- Cost for a merged firm: $C_m = \lambda c$, (λ : parameter for synergies, $0 \leq \lambda \leq 1$)
- Profit for the merged firm: $\pi_m = (p_m - C_m)x_m$
- Merger equilibrium
- Price: $p_m = \frac{1}{3}\left[a + (c^* + t) + \lambda c\right]$
- Total output: $X_m = \frac{1}{3b}\left[2a - \lambda c - (c^* + t)\right]$
- Merged firm's output: $x_m = \frac{1}{3b}\left[a - 2\lambda c + (c^* + t)\right]$
- Foreign firm's output: $x_m^* = \frac{1}{3b}\left[a - 2(c^* + t) + \lambda c\right]$
- Profits: $\pi_m = bx_m^2$, $\pi_m^* = bx_m^{*2}$

The Profitability of the Domestic Merger

- The gain from the domestic merger: $g(\lambda, t) = \pi_m - 2\pi_e$

$$g(\lambda, t) = \frac{1}{9b}\left[a - 2\lambda c + c^* + t\right]^2 - \frac{1}{8b}\left[a - 2c + c^* + t\right]^2$$

- The surplus must be strictly positive for the merger to occur.
- Result 1: The merger does not occur if there are no synergies,

$$g(1, t) < 0.$$

- Result 2: The merger is profitable if the synergy effect is the largest,

$$g\left(0, t\right) > 0.$$

- Note: $g\left(0, t\right) > 0 \Leftrightarrow c \in \left(\frac{1}{6}(3 - 2\sqrt{2})\left(a + c^* + t\right), \frac{1}{2}(a + c^* + t)\right)$

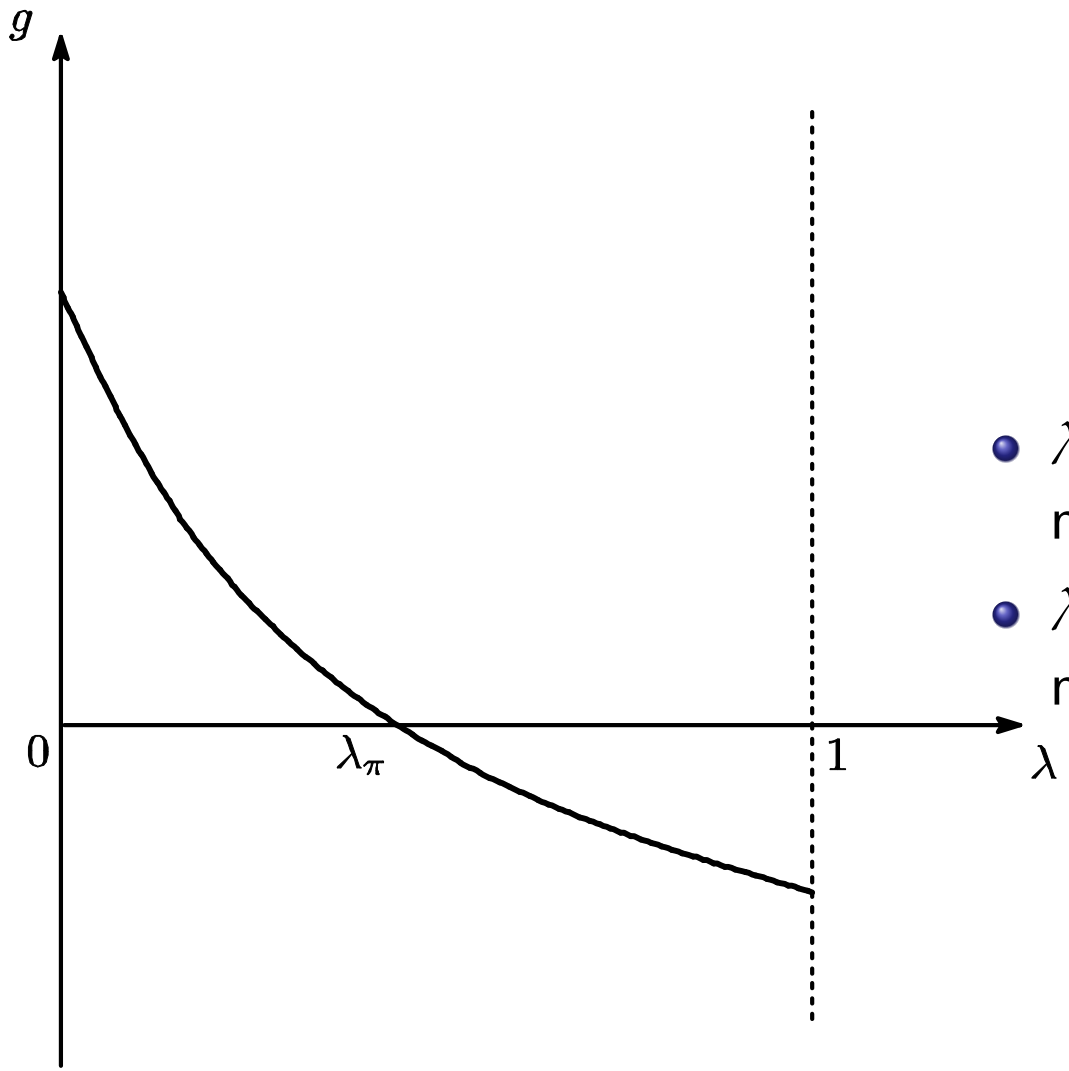
Trade Costs and Merger Incentives

- Result 3: There exists a critical $\lambda_\pi \in (0,1)$ such that $g(\lambda_\pi, t) = 0$,

$$\lambda_\pi = \frac{3\sqrt{2}}{4} - \frac{1}{8c}\left(3\sqrt{2} - 4\right)(a + c^* + t)$$

- Result 4: The domestic merger is profitable if $\lambda < \lambda_\pi$.
- Result 5: A reduction in trade costs enlarges the range of λ such that the domestic merger is profitable.

Merger Profitability



- $\lambda < \lambda_\pi$: The domestic merger is profitable
- $\lambda > \lambda_\pi$:The domestic merger is not profitable

Effects on the Price

- The effects on the price: $\Delta p = p_m - p_e$

$$\Delta p = \frac{1}{3}\left[a + (c^* + t) + \lambda c\right] - \frac{1}{4}\left(a + 2c + c^* + t\right)$$

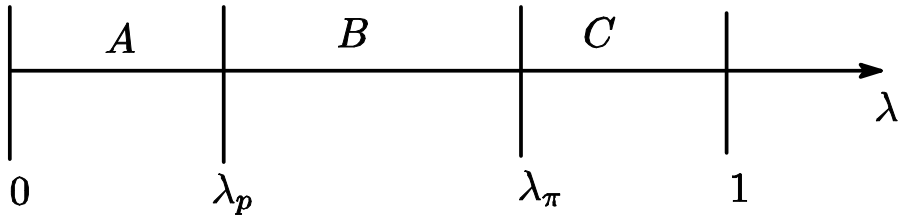
- Result 6: There exists a critical $\lambda_p \in (0, 1)$ such that $\Delta p = 0$,

$$\lambda_p = \frac{3}{2} - \frac{a + c^* + t}{4c}$$

- Note: $\lambda_p > 0 \Leftrightarrow c > \frac{a+c^*+t}{6}$
- Result 7: The domestic merger reduces the price, i.e., $\Delta p < 0$, if $\lambda < \lambda_p$
- Result 8: $\Delta \pi^* = \pi_m^* - \pi_e^* < 0 \Leftrightarrow \Delta p < 0$

Welfare Effects

- Result 9: $\lambda_\pi > \lambda_p$



- A: $g > 0$, $\Delta p < 0$, $\Delta\pi^* < 0$
- B: $g > 0$, $\Delta p > 0$, $\Delta\pi^* > 0$
- C: $g < 0$, $\Delta p > 0$, $\Delta\pi^* > 0$

- A: Domestic welfare $\Uparrow$ but Foreign profit $\Downarrow$
- B: Domestic welfare may $\Downarrow$ but Foreign profit $\Uparrow$
- A reduction in trade costs enlarges the range A.

Cross Border M&A

- One of the home firms is taken over by the foreign firm.
- Profit for the foreign acquiring firm: $\pi_a^* = (p_a - c^*)\, x_a^*$
- Cross-Border Acquisition Equilibrium
- Price: $p_a = \frac{1}{3}(a + c^* + c)$
- Total output: $X_a = \frac{1}{3b}(2a - c^* - c)$
- Foreign acquiring firm's output: $x_a^* = \frac{1}{3b}(a - 2c^* + c)$
- Home firm's output: $x_a = \frac{1}{3b}(a - 2c + c^*)$
- Profits: $\pi_a^* = bx_a^{*2}$, $\pi_a = bx_a^2$

The Profitability of Cross-Border Acquisition

- The gain from the cross-border acquisition: $g^*(t) = \pi_a^* - \pi_e - \pi_e^*$

$$g^*(t) = \frac{1}{9b}\left[a - 2c^* + c\right]^2 - \frac{1}{16b}\left[a - 2c + (c^* + t)\right]^2 - \frac{1}{16b}\left[a - 3(c^* + t) + 2c\right]^2$$

- $g(0) > 0 \Leftrightarrow c - c^* = \Delta c \in \left(\frac{a-c^*}{14}, \frac{a-c^*}{2}\right)$

The Effects of Trade Costs

- Acquisition Incentives: $g(t)' = -\frac{\partial \pi_e}{\partial t} - \frac{\partial \pi_e^*}{\partial t}$

$$\frac{\partial \pi_e}{\partial t} > 0, \frac{\partial \pi_e^*}{\partial t} < 0$$

- Home price: $\Delta p_a(t) = p_a - p_e$

$$\Delta p_a(t)' < 0$$

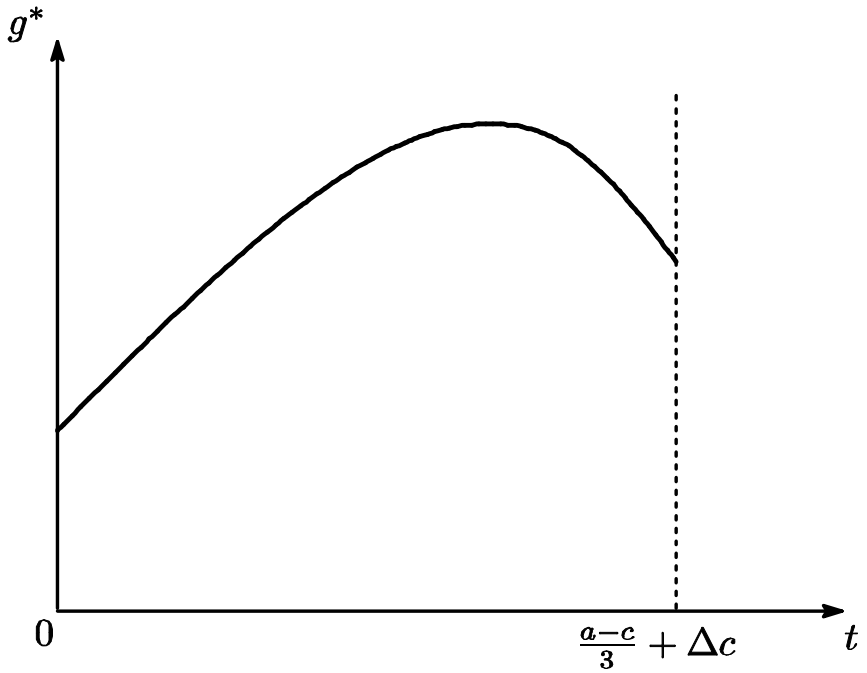
- Home firm's profit: $\Delta \pi_a(t) = \pi_a - \pi_e$

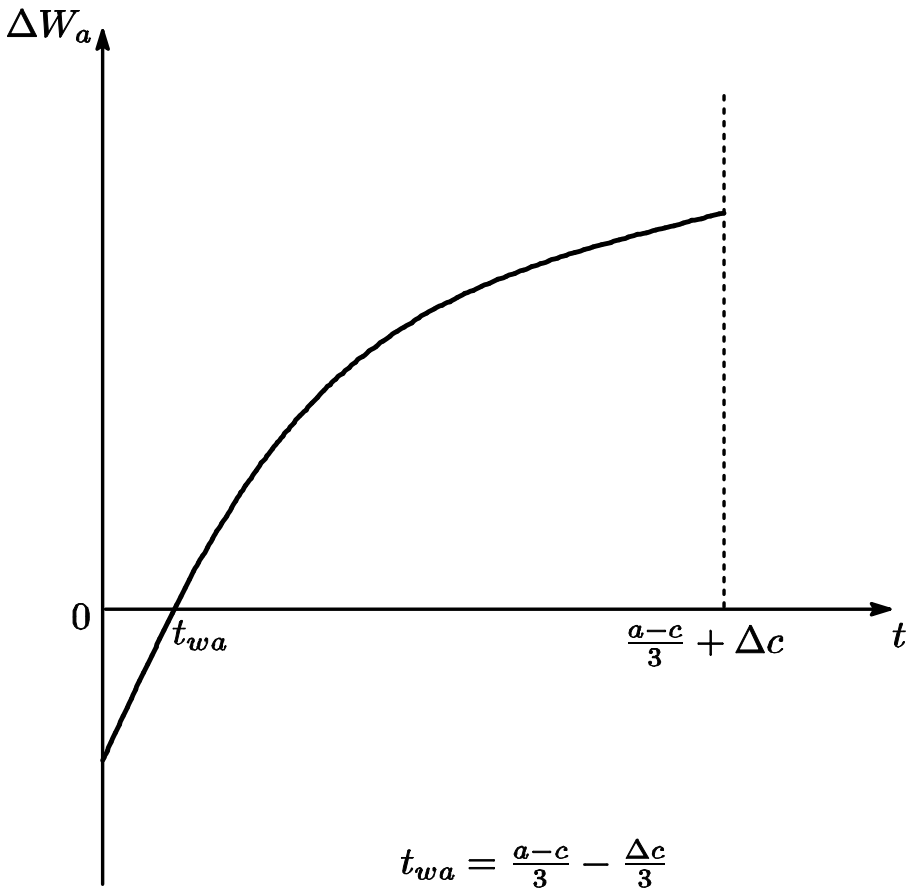
$$\Delta \pi_a(t)' < 0$$

- Welfare of Home: $\Delta W_a(t) = W_a - W_e = \Delta CS_a + \Delta \pi_a$

$$\Delta W_a(t)' > 0$$

Acquisition and Welfare





Welfare Effects of Foreign Acquisition

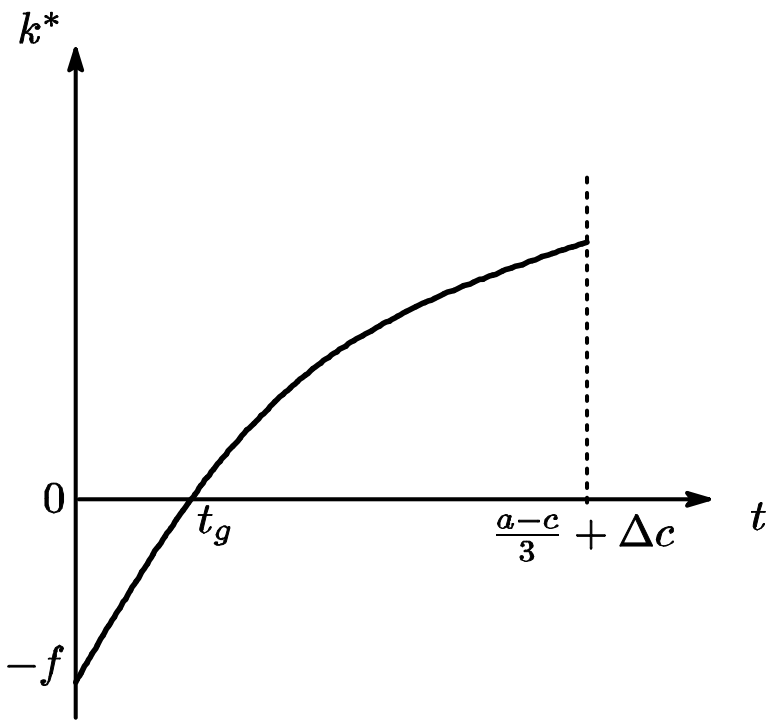
- Result 1: The acquisition by the foreign firm is profitable.
- Result 2: There exists a critical transport cost t_{wa} such that $\Delta W_a(t_{wa}) = 0$.
- Result 3: The acquisition by the foreign firm reduces the home welfare if $t < t_{wa}$.
- Result 4. $\Delta p_a > 0$ ($\Delta CS_a < 0$) and $\Delta \pi_a > 0 \Leftrightarrow t < t_{wa}$.

Greenfield FDI

- How does the possibility of greenfield investments change the results?
- GF equilibrium
- Foreign firm's profit: $\pi_g^* = (p_g - c^*)x_g^* - f$
- Home firm's profit: $\pi_g = (p_g - c)x_g$
- Price: $p_g = \frac{1}{4}(a + c^* + 2c)$
- Total output: $X_g = \frac{1}{4b}(3a - 2c - c^*)$
- Foreign firm's output: $x_g^* = \frac{1}{4b}(a + 2c - 3c^*)$
- Home firm's output: $x_g = \frac{1}{4b}(a + c^* - 2c)$

Greenfield vs. Exporting

- The gain from the greenfield investment: $k^*(t) = \pi_g^* - f - \pi_e^*$
- $k^*(0) = -f < 0$, and $k^{*\prime}(t) > 0$
- There exists t_g such that $k^*(t_g) = 0$.
- The foreign firm prefers Exporting to Greenfield if $t < t_g$.
- The foreign firm prefers Greenfield to Exporting if $t > t_g$.



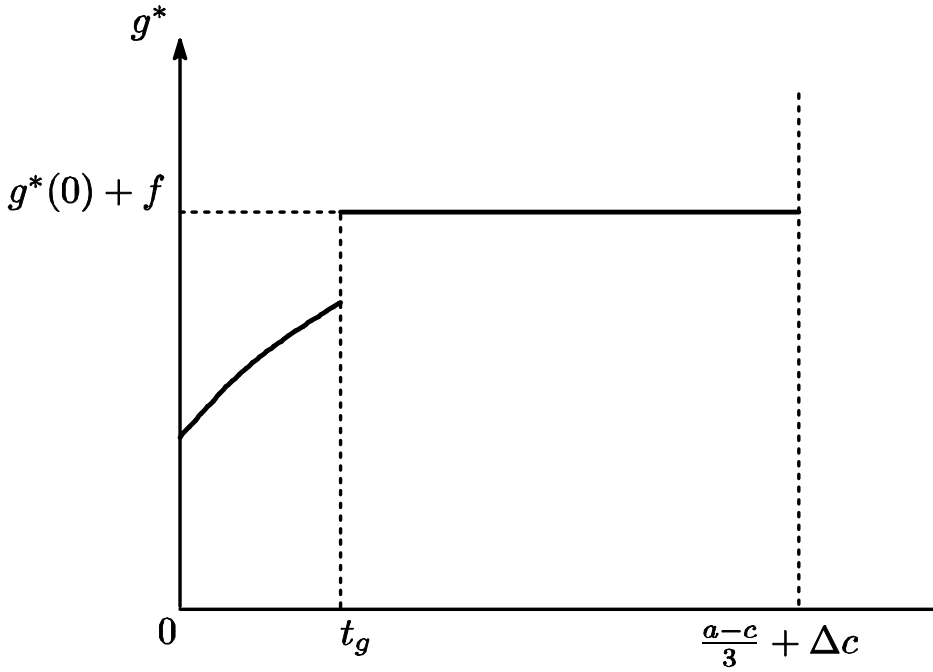
Acquisition, Exporting, and Greenfield

- Acquisition is more profitable than Greenfield:

$$\pi_a^* - (\pi_g^* - f) - \pi_g$$
$$= g^*(0) + f > 0$$

- For the foreign firm,

$$A \succ E \succ G \text{ if } t < t_g$$
$$A \succ G \succ E \text{ if } t > t_g$$



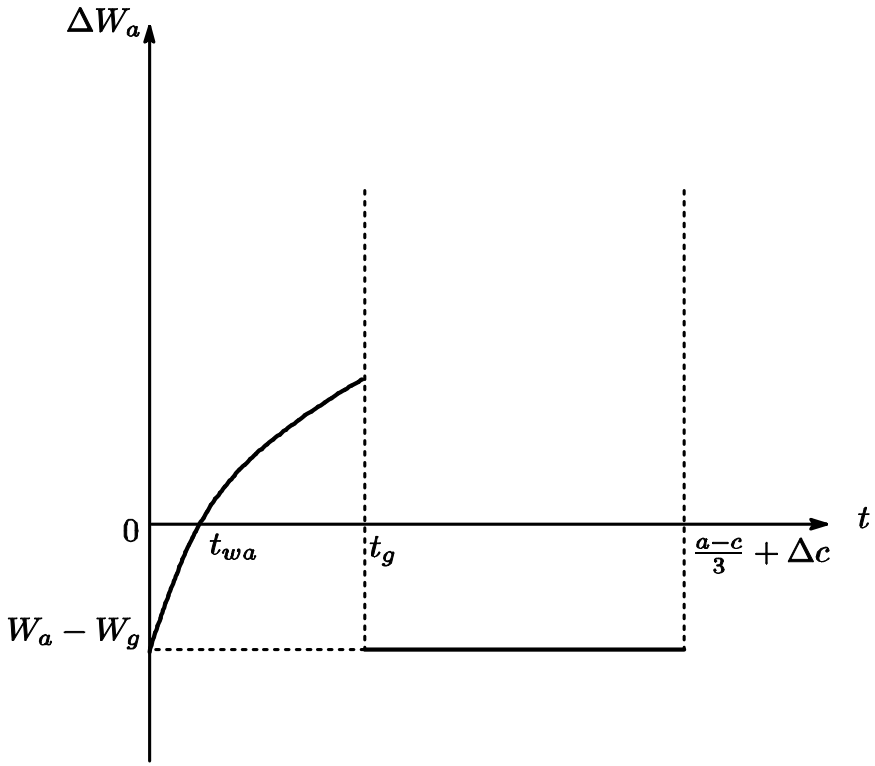
Welfare Effects

- The home country prefers Greenfield to Acquisition.

$$W_a - W_g$$
$$= \Delta W_a(0) < 0$$

- For the home country,

$$E \succ A \text{ if } t < t_{wa}$$
$$A \succ E \text{ if } t \in (t_{wa}, t_g)$$
$$G \succ A \text{ if } t > t_g$$



Does restricting acquisition improve the home welfare?

- Without any restrictions, the foreign firm would acquire the home firm.
- Suppose the home country restrict the acquisition by the foreign firm.

	$t < t_{wa}$	$t \in (t_{wa}, t_g)$	$t > t_g$
Foreign firm's entry mode	Export	Export	Greenfield
The welfare effects	$+$	$-$	$+$

Concluding Remarks

- An increase in foreign competition may lead to "defensive mergers" between domestic firms.
- Such mergers do not necessarily reduce the domestic welfare if the synergies effects are sufficiently large.
- The foreign government may disapprove such domestic mergers.
- A cross-border acquisition by the exporting firm could improve the domestic welfare due to (i) technology transfer and (ii) trade-cost savings.
- If trade costs are small, the cross-border acquisition could reduce the domestic welfare due to an increase in the market power.
- Restricting foreign acquisitions may improve the domestic welfare by inducing the foreign firm to make a greenfield investment.
- Such a restriction policy could fail to raise the welfare if the foreign firm chooses exporting to the domestic market.