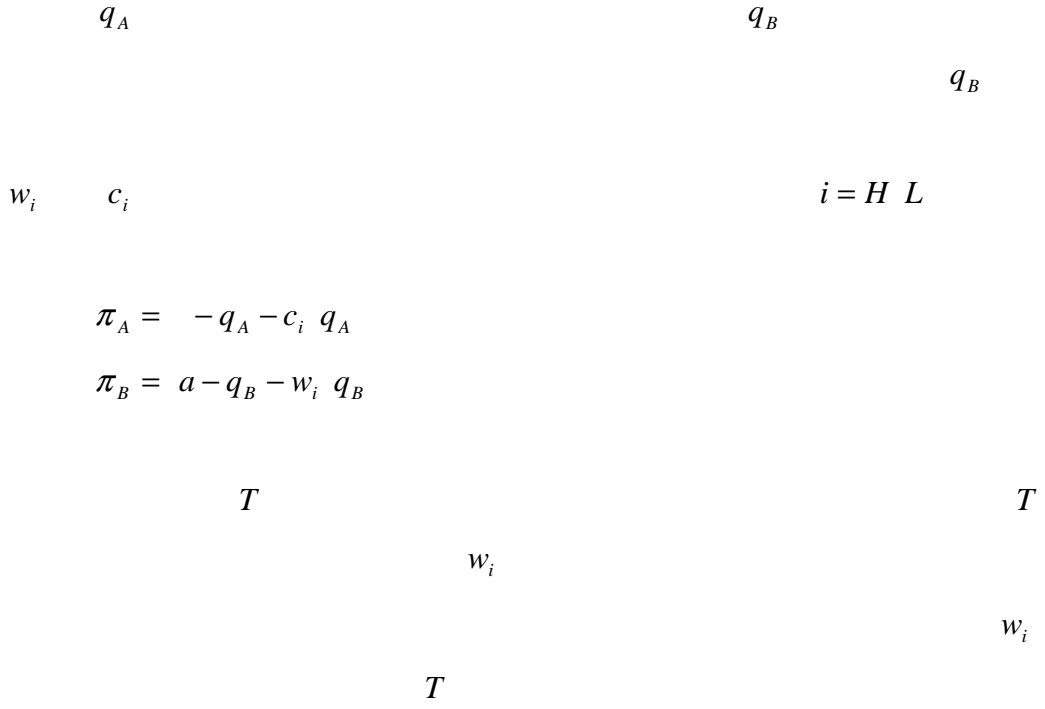


Parallel Imports and Cost Reducing Research and Development *

Abstract:

$wT \quad w$

T



w_i M w_i c_i A c_i B w_i $w_i - c_i q_B$ $w_i - k$
 4 0 0 11.9894 307.3197 34 77.767c

$$R_M w_L c_L - R_M w_H c_H = d$$

$$k$$

$$\Delta R_M = R_M w_L c_L - R_M w_H c_H = \pi_M w_L c_L - \pi_M w_H c_H = \frac{c_H - c_L + a - c_H + c_L}{b}$$

$$k = \frac{d}{b} - \frac{1}{\Delta R_M}$$

A1: $\alpha = d$

2.2. The case in which we allow parallel imports

$$\pi_{AM} = -q_{AM} + q_{AD} - c_i q_{AM}$$

$$\pi_{AD} = -q_{AM} + q_{AD} - w_i - t q_{AD}$$

$$q_{AM} \quad q_{AD} \quad q_{AM} + q_{AD}$$

$$w_i \quad T \quad \pi_{AM} \quad \pi_{AD}$$

$$q_B \quad \pi_B = a - q_B - w_i q_B$$

$$w_i \geq \pi_M w_i c_i = \pi_{AM} w_i c_i + \pi_{AD} w_i c_i + \pi_B w_i c_i + w_i - c_i q_{AD} w_i c_i + q_B w_i c_i - k^p$$

$$E_M^p = \alpha k^p R_M^p w_L c_L + -\alpha k R_M^p w_H c_H - k^p$$

$$R_M^p w_L c_L \quad R_M^p w_H c_H$$

$$w_L \quad w_H$$

$$\Delta R_M^p = R_M^p w_L c_L - R_M^p w_H c_H = \pi_M^p w_L c_L - \pi_M^p w_H c_H$$

$$k^p = \frac{d}{b} - \frac{1}{\Delta R_M^p}$$

$$c_i \geq + t$$

Proposition 1: *The relationship between T and c_i is not monotonic.*

i

+

$$+c_i + c_i$$

$$t \geq \frac{-c_i}{k}$$

$$w_i \geq M = \frac{-c_i}{k} + \frac{a - w_i}{k} + \frac{w_i - c_i}{k} \frac{a - w_i}{k} - k^p$$

Corollary 1

t , $\leq t < \frac{-c_i}{t}$ such that π_M decreases in t

when $\leq t < t$, increases in t when $t \leq t < \frac{-c_i}{t}$ and is constant when $t \geq \frac{-c_i}{t} > t$.

π_M

profit curve

global welfare curve.

t

$\leq t < t$

t

$t \leq t < \frac{-c_i}{t}$ t

π_M t $\frac{-c_i}{t} \leq t < \frac{-c_i}{t}$

$i = \frac{c_i}{t} - t$

$$t = \frac{c_i}{\dots}$$

$$\pi_M^p w_L c_L \geq \pi_M^p w_H c_H$$

$$R_M^p w_L c_L \geq R_M^p w_H c_H$$

$$c_j \in c_L c_H$$

$$\pi_M^p w_j c_j \quad R_M^p w_j c_j \quad c_j$$

Assumption 2: $-c_H + c_L >$

Proposition 3: $\frac{\partial \pi_M^p w_j c_j}{\partial c_j} <$ all $t \geq .$

Proposition 4: *Given assumption 1, the manufacturer has incentives to make investment in cost-reducing innovation.*

$$\leq t < \frac{-c_H}{}$$

$$w_H = \frac{+ t + c_H}{}$$

$$\frac{-c_H}{H} \leq t < \frac{-c_H}{H}$$

$$H = \frac{+c_H}{H} - t$$

Proposition 4.187 *Successful cost-reducing innovation is helpful in reducing the wholesale price.*



t

t

Corollary 4: *For every*

$$E_M \quad E_M^p$$

3.5. Impact of restricting parallel imports on expected welfare

Proposition 8: *Under assumption 1 and 2, restricting parallel imports*

(i). *reduces the expected consumer surplus in country A, raises the expected consumer surplus in country B and has ambiguous impact on expected global welfare when*

$$\leq t < \frac{-c_H}{-c_H};$$

(ii). *lowers the expected consumer surplus in country A, increases the expected consumer surplus in country B and has ambiguous impact on expected global welfare when*

$$\frac{-c_H}{-c_H} \leq t < \frac{-c_L}{-c_L};$$

(iii). *does not impact on the expected consumer surplus in country A, but raises the expected consumer surplus in country B and increases expected global welfare when*

$$\frac{-c_L}{-c_L} \leq t < \frac{-c_H}{-c_H};$$

(iv). *has no impact on the expected consumer surplus in country A, but increases the expected consumer surplus in country B and raises the expected global welfare when*

$$\frac{-c_H}{-c_H} \leq t < \frac{-c_L}{-c_L};$$

(v). *does not impact on the expected consumer surplus in both countries and the expected global welfare when $t > \frac{-c_L}{-c_L}$.*

Appendix

A. *not*

$$\pi_A = -q_A - c_i q_A$$

$$\pi_B = a - q_B - w_i q_B$$

$$i = L H$$

$$q_A c_i = \frac{-c_i}{p_A c_i} \quad p_A c_i = \frac{+c_i}{\pi_A c_i} \quad \pi_A c_i = \frac{-c_i}{\pi_A c_i}$$

$$q_B w_i = \frac{a - w_i}{p_B w_i} \quad p_B w_i = \frac{a + w_i}{\pi_B w_i} \quad \pi_B w_i = \frac{a - w_i}{\pi_B w_i}$$

$$w_i \geq \pi_M w_i c_i = \pi_A c_i + \pi_B w_i + w_i - c_i q_B w_i - k$$

$$\frac{-c_i}{\pi_A c_i} + \frac{a - w_i}{\pi_B w_i} + \frac{a - w_i}{\pi_B w_i} \frac{w_i - c_i}{\pi_B w_i} - k$$

$$\frac{-w_i - c_i}{\pi_B w_i} =$$

$$w_i = c_i$$

$$T_i = \frac{a - c_i}{\pi_A c_i} \quad \pi_M w_i c_i = \frac{-c_i}{\pi_A c_i} + \frac{a - c_i}{\pi_B w_i} - k$$

B. *allow*

$$T_i = \begin{cases} C & \text{if } \leq t < \frac{-c_i}{-} \\ \frac{a + t - -c_i}{-} & \text{if } \frac{-c_i}{-} \leq t < \frac{-c_i}{-} \\ \frac{a - c_i}{-} & \text{if } t \geq \frac{-c_i}{-} \end{cases}$$

$$= \begin{cases} - + - - + - + + - & \leq < \frac{-}{-} \\ - + - + - - - + - & \frac{-}{-} \leq < \frac{-}{-} \\ \frac{- + -}{-} - & \geq \frac{-}{-} \end{cases}$$

$$w_L = \frac{+c_L}{-t} \quad \frac{-c_H}{-t} \leq t < \frac{-c_L}{-t}$$

$$w_L = \frac{+c_L}{-t} \leq \frac{+c_L}{-t} - \frac{-c_H}{-t} = \frac{c_H + c_L}{-t} < c_H$$



$$\lim_{t \rightarrow \frac{-c_H}{-}}^+ \Delta R_M^p = c_H + ac_H - c_H - c_L - ac_L - c_H c_L + c_L = \lim_{t \rightarrow \frac{-c_H}{-}}^+ \Delta R_M^p$$

$$\lim_{t \rightarrow \frac{-c_L}{-}}^+ \Delta R_M^p = c_H + ac_H - c_H - c_L - ac_L - c_H c_L + c_L$$

$$= -c_H - c_L + t - c_H + c_L > \Delta R_M > \Delta R_M^p \quad k > k^p$$

$$\frac{-c_H}{a} \leq t < \frac{-c_L}{c} \quad \Delta R_M - \Delta R_M^p = \frac{c_H - c_L + a - c_H + c_L}{t + c_H - c_L + tc_H + tc_L - c_H + c_L}$$

$$\frac{-c_H}{a} \leq t < \frac{-c_L}{c} \quad \Delta R_M - \Delta R_M^p = \frac{c_H - c_L + a - c_H + c_L}{t + c_H - c_L + tc_H + tc_L - c_H + c_L}$$

$$\frac{\partial \Delta R_M - \Delta R_M^p}{\partial t} = - + t + c_L = - t - \frac{-c_L}{t} < \Delta R_M - \Delta R_M^p$$

$$t = \frac{-c_L}{k} \quad \Delta R_M - \Delta R_M^p > \Delta R_M - \Delta R_M^p \Big|_{t=\frac{-c_L}{k}} =$$

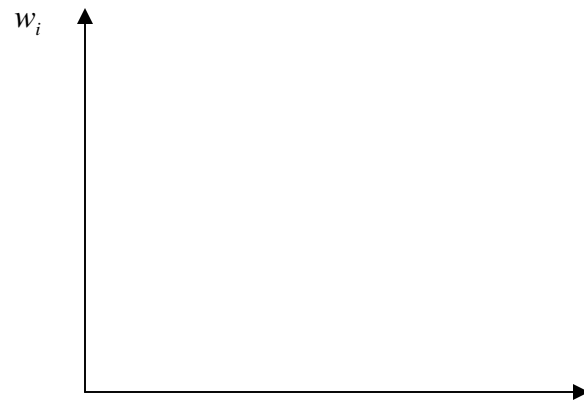
$$\Delta R_M > \Delta R_M^p \quad k > k^p$$

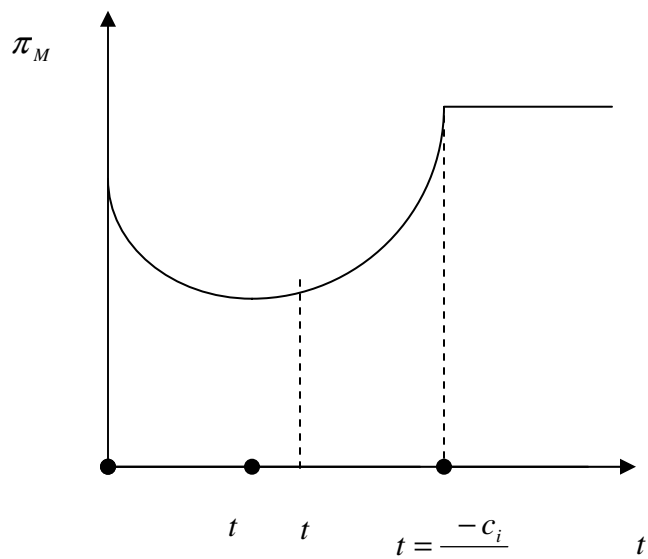
$$t \geq \frac{-c_L}{k}$$

$$ECS_A^p = \frac{1}{t - c_L} \alpha k + \frac{1}{t - c_H} - \alpha k$$

$$ECS_B^p = \frac{1}{t - c_L} \alpha k + \frac{1}{t - c_H} - \alpha k$$

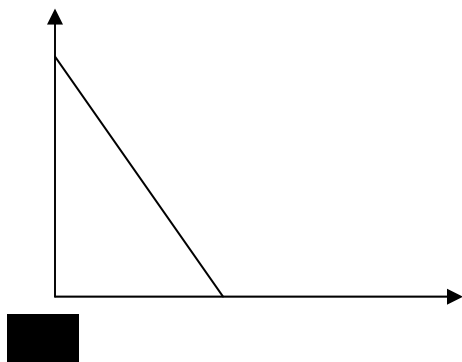
$$- \frac{1}{t - c_i} - \frac{1}{t - c_i} \quad t$$

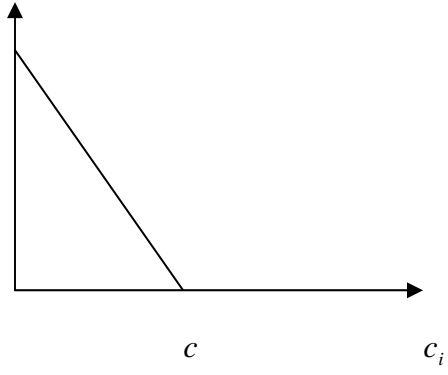




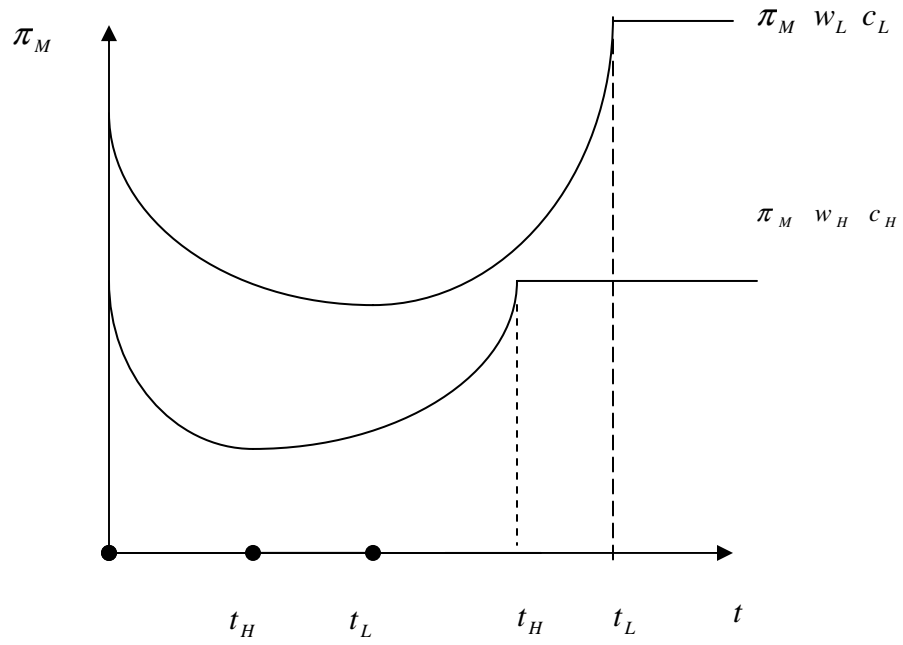
π_M

$$t = \frac{-c_i}{} \quad t = \frac{-c_i}{}$$

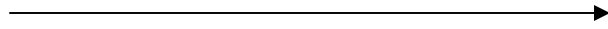


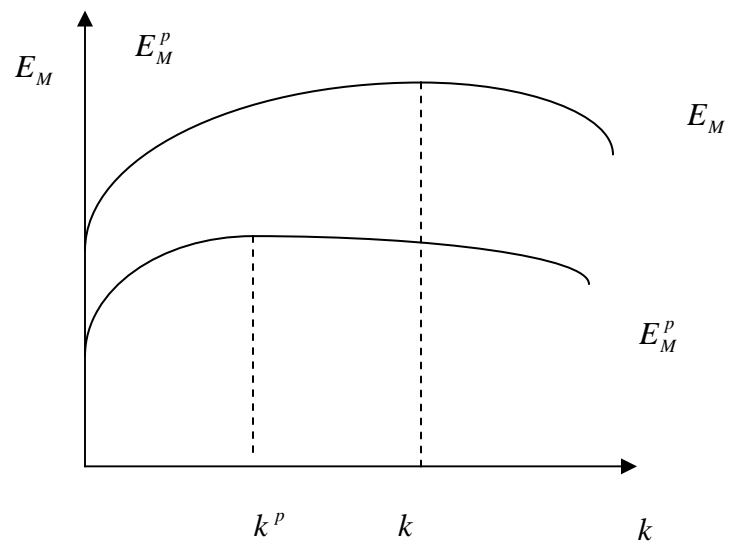


$$- \frac{t}{c} = - \frac{t}{c}$$



$$t_H = \frac{-c_H}{\dots} \quad t_L = \frac{-c_L}{\dots}$$





References

