Competition Authority Substantive Standards and Social Welfare

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Basic Question…

What is the proper standard an Antitrust Authority should use in order to appraise firms' practices?

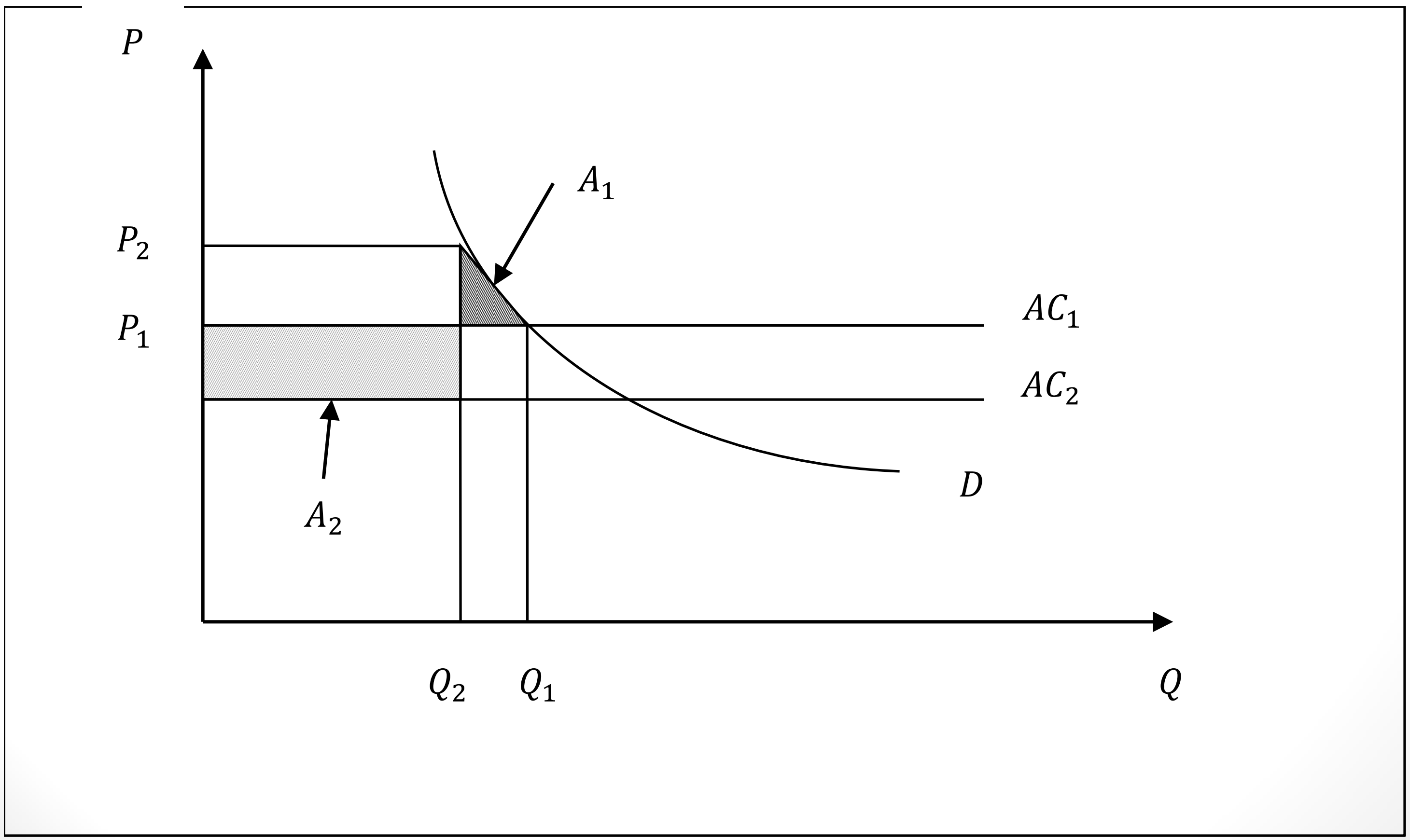
- Long debate with recent resurgence concerning optimal substantive standard.

Consumer Surplus Standard *Vs* Total Welfare Standard.

- Besanko and Spulber, 1993; Neven and Roeller, 2000; Lyons, 2002; Padilla, 2005; Carlton, 2007; Farell and Katz, 2006; Heyer, 2006; Fridolsson, 2007; Pittman, 2007; Salop, 2010; Armstrong and Vickers, 2010; Kaplow, 2011, Lianos, 2013; Blair and Sokol, 2013.

Williamson's trade off (1968)

- The net allocative effect of the merger $(A_2 - A_1)$ may be negative or positive depending on the level of cost savings, the price increase and the demand.



Consumer surplus standard (CSS) Vs. Total Welfare Standard (TWS)

- **Consumer Surplus Standard (CSS)** is the standard used by the world's largest economies, Europe and USA.
- According to the CSS the Competition Authorities only tests the impact of a practice on prices, product quality and output.

- **Total Welfare Standard (TWS)** *also* takes into account the producers' profit and efficiencies that only affect the profit of the firms, for example fixed cost savings.
- A standard that is at least approximating TWS has been adopted by Competition Authorities in Canada and Australia.

Basic Arguments in favor of a TWS

Proponents of TWS argue that:

- **(Short run) TWS is more likely to maximize long run Consumer Surplus than a (short run) CSS.** Especially in dynamic high-tech industries with high fixed cost savings that enhance firms' incentives to invest in R&D.

- **Distributional concerns in favor of a CSS standard are premised on a false vision of who are consumers and who are producers**
  - In modern economies most transactions are *between* firms.
  - Consumers are also shareholders, so profits flow back to them.
  - Different groups of consumers might be differently affected from an action.

- **A CSS would treat buying cartels as perfectly legal.**

Basic Arguments in favor of a CSS

Proponents of a CSS standard argue that:

- **There is no reason to think that adopting a TWS would maximize long run consumer surplus.** New technology diffusion is neither instantaneous nor complete and there might exist entry barriers.

- **CSS does not mean that the income is redistributed but that it is not redistributed *away* from consumers.**

- **Adopting the TWS would lead to inefficient conduct.**

- The last point is the most important to our analysis.

Interaction between firms and CAs

"The adoption of an aggregate welfare standard likely would not require firms to engage in conduct that maximizes aggregate welfare" (Salop 2010)

That is, the welfare standard used by CAs constitutes just a threshold rule utilized on actions *taken* – with an action deemed illegal if its effect does not satisfy the standard.

<u>BUT</u> we should also think of the impact of the substantive standard on the choice of actions made by the firms.

Interaction between firms and CAs

- The choice of the welfare standard affects the practices proposed and undertaken by the firms since different actions will be treated differently. This interaction between firms and CAs creates a different issue in the context of the above debate.

That is, accepting that the ultimate goal of antitrust policies is the maximization of total welfare, which is the appropriate standard that should be used by a CA (the agent) to fulfill this goal?

- An important theoretical concept behind this question is the concept of ***strategic delegation***.

Strategic Delegation

Related literature

- Besanko and Spulber ;1993.

  The adoption of a standard that gives strictly greater weight to consumer surplus can counterbalance the asymmetric information problems between Authorities and firms regarding efficiencies and move equilibrium closer to the first best solution.

- Neven and Roller; 2000.

  Under a standard with a consumer surplus bias the Authorities become tougher and less sensitive to perks / lobbying.

Strategic Delegation

Related literature

- Lyons; 2002.

  When there is a range of alternative mutually exclusive **mergers**, antitrust enforcement should account for self selection of the firms.

- Other literature related to Lyons: Farrell and Katz; 2006, Fridolfsson; 2007, Armstrong and Vickers; 2010, Nocke and Whinston; 2011.

This paper

- We re-examine the insight of Lyons by generalizing his analysis to the case where firms choose between mutually exclusive potentially anticompetitive actions of ***any type***, not just mergers.
- Firms differ in the environment from which they come from.
- Actions enhance ability to increase price – cost margin but also can reduce marginal cost.

This paper

- We show that there will exist environments for which having a consumer welfare standard may induce firms to choose lower profit actions that result in higher welfare than higher-profit actions, which would be chosen under a total welfare standard. We call this effect the ***Lyons Effect***.

- However, there will always be some other environments for which welfare is higher under a total welfare standard because a consumer surplus standard would deter firms from taking any action even though there are welfare – enhancing actions that could have been chosen.

This paper

Assumptions

- All actions will be detected and assessed by the CA
- The CAs make no errors.
- There is no delay in reaching a decision.
- We always allow of the default action of doing nothing.
- Firms know the standard that will be adopted and the impact on any action they take of the welfare standard.
- If the action will be disallowed firms will have to pay a penalty.

The Model

- $p^0 - c^0 = \Delta m^0 \geq 0 \qquad (1)$

  Assume $c^0 = 1$

- $\Delta p = p^1 - p^0 = \Delta m - \Delta c - \Delta m^0 \qquad (2)$

  where $\Delta m = p^1 - c^1 \,\square\, 0$ and $\Delta c = c^0 - c^1, 0 \leq \Delta c \leq 1$

- The demand function $p = 1 + A - Q, A > 0 \qquad (3)$

  so $\Delta Q = -\Delta p$

- The inverse demand elasticity in the default position is

$$\varepsilon^0 = -\frac{dp}{dQ}\frac{Q^0}{p^0} = -\frac{Q^0}{p^0}$$

The Model

- $\varepsilon^0(p^0 = 1) = A$ (4)
- $\varepsilon^0(p^0 = 1 + \Delta m^0) = \dfrac{A - \Delta m^0}{1 + \Delta m^0} < \varepsilon^0(p^0 = 1)$ (5)

In what follows we will use parameters A and Δm^0 (and hence ε^0) to represent the ***environment*** from which a firm comes.

The Model

- We assume that the price cost margin is some fraction of that which the firm would have charged had it been a monopolist:

$$p^M - c^1 = M = \frac{(1+A)-c^1}{2} = \frac{\Delta c + A}{2} \qquad (6)$$

- if the counterfactual is competitive:

$$\Delta m = \mu(\Delta c + A),\ 0 \leq \mu \leq 1/2 \qquad (7)$$

- While if there exist market power in the counterfactual:

$$\Delta m = \mu(\Delta c + A),\ \Delta m^0 / A \leq \mu \leq 1/2 \qquad (8)$$

- In what follows the ***action*** will be characterised by the pair of parameters *(μ, Δc)*. A *trivial action* is one for which this is (0, 0).

The Model

- The change in price will be

$$\Delta p = -(1-\mu)(\Delta c + \Delta m^0) + \mu(A - \Delta m^0) \qquad (9)$$

- The change in Consumer Surplus will be

$$\Delta CS = \frac{1}{2}[(1-\mu)(\Delta c + A) - (A - \Delta m^0)][(1-\mu)(\Delta c + A) + (A - \Delta m^0)] \qquad (11)$$

- The increase in profits will be

$$\Delta \pi = \mu(1-\mu)(\Delta c + A)^2 - \Delta m^0 (A - \Delta m^0) \qquad (12)$$

- The change in Total Welfare will be

$$\Delta W = \Delta c(A - \Delta m^0) + \tfrac{1}{2}[\Delta c - \mu(\Delta c + A) + \Delta m^0][\Delta c + \mu(\Delta c + A) + \Delta m^0] \qquad (13')$$

Q^0 ΔQ

The Model

$$DW = DcQ^0 + \frac{1}{2} DQ[Dc + m(Dc + A) + Dm^0]$$

Benefits from cost reduction if output where to remain at the same level.

The effect of the change in output (increase of decrease)

The Model

- When no market power in the counterfactual position

$$p^0 = c^0, \Delta m^0 = 0, \varepsilon^0 = \mathrm{A}$$

- $\Delta CS = \frac{1}{2}[(1-\mu)^2(\Delta c + \varepsilon)^2 - \varepsilon^2]$ (11’’)
- $\Delta \Pi = \mu(1-\mu)(\Delta c + \varepsilon)^2$ (12’)
- $DW = Dc.e + \frac{1}{2}[Dc - m(Dc + e)][Dc + m(Dc + e)]$ (14’)

The Model

- Since

$$\Delta CS = \frac{1}{2}[(1-\mu)^2(\Delta c+\varepsilon)^2 - \varepsilon^2]$$

for any non-trivial action we have the following:

- The change in Consumer Surplus is a ***strictly increasing function of Δc*** and a ***strictly decreasing function of μ***.
- Also, if $\varepsilon < \underline{\varepsilon} = \frac{\Delta c(1-\mu)}{\mu}$ then the change in consumer surplus is positive, while if $\varepsilon > \underline{\varepsilon} = \frac{\Delta c(1-\mu)}{\mu}$ it is negative.

The Model

$$\Delta\Pi = \mu(1-\mu)(\Delta c+\varepsilon)^2$$

- For ***any environment*** and ***any non-trivial action***, the change in profits is positive and is a strictly increasing function of both Δc and μ and also ε.

The Model

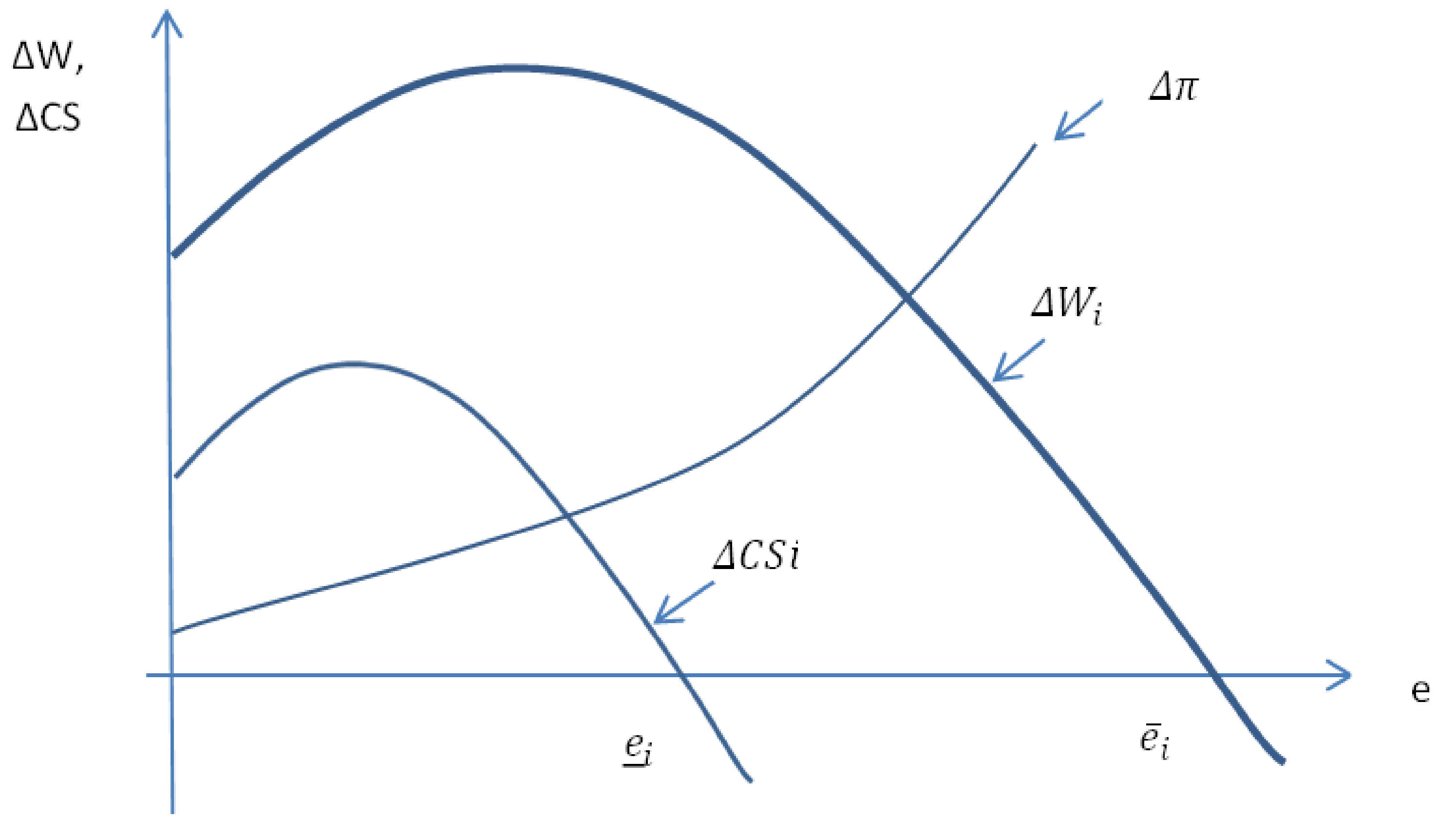
$$\Delta W = \Delta c.\varepsilon + \frac{1}{2}[\Delta c - \mu(\Delta c + \varepsilon)][\Delta c + \mu(\Delta c + \varepsilon)]$$

- The change in total welfare is a ***strictly increasing function of Δc*** and a ***strictly decreasing function of μ***.
- If $\varepsilon < \underline{\varepsilon} = \frac{\Delta c(1-\mu)}{\mu}$ the change in total welfare is positive.
- There exists an $\bar{\varepsilon} > \underline{\varepsilon} = \frac{\Delta c(1-\mu)}{\mu}$ such that the change in total welfare is positive if $\varepsilon < \bar{\varepsilon}$ and negative if $\varepsilon > \bar{\varepsilon}$.

The Model

- The above results immediately tell us that if there is just a ***single non-trivial action*** that firms can take, then welfare is higher under a total welfare standard than under a consumer surplus standard.

Comparison of welfare standards when $\Delta m^0 = 0$ and $\Delta c^1 = \Delta c^2 = \Delta c$



Comparison of welfare standards when Δm(0)=0

- What happens when there is ***more that one (non-trivial) actions j***?
- Indexing the environment by e=ε/Δc > 0 assume that

1. for all $j > 0, \exists \underline{e}_j > 0$ such that
   a. $\Delta CS(j,e) > 0$ if $e < \underline{e}_j$
   b. $\Delta CS(j,e) < 0$ if $e > \underline{e}_j$
2. for all *j>0* and for all *e>0, Δπ(j,e)>0*
3. for all j>0, $\exists \bar{e}_j > \underline{e}_j$ such that
   a. $\Delta W(j,e) > 0$ if $e < \bar{e}_j$
   b. $\Delta W(j,e) < 0$ if $e > \bar{e}_j$

Comparison of welfare standards when Δm(0)=0

Under any welfare standard each firm will choose the action that maximises their private benefit.

Let

- $\widehat{j}^{CS}(e) = \arg\max \Delta\pi(j,e) \text{ s.t. } \Delta CS(j,e) \geq 0$ be the action chosen by a firm from environment e under a consumer surplus standard and $\Delta\widehat{W}^{CS}(e) = \Delta W[\widehat{j}^{cs}(e), e]$ be the representative welfare change.

- $\widehat{j}^{T}(e) = \arg\max \Delta\pi(j,e) \text{ s.t. } \Delta W(j,e) \geq 0$ be the action chosen by a firm from environment e under a total welfare standard and $\Delta\widehat{W}^{T}(e) = \Delta W[\widehat{j}^{T}(e), e]$ be the respective welfare change.

Comparison of welfare standards when Δm(0)=0 and Δc1=Δc2=Δc

- Let $e = \varepsilon / \Delta c$ then

$$\Delta CS(\mu, e) = \frac{1}{2}\{[(1-\mu)(1+e)]^2 - e^2\}$$

$$\Delta\pi(\mu, e) = \mu(1-\mu)(1+e)^2$$

$$\Delta W(\mu, e) = e + \frac{1}{2}\{1-[\mu(1+e)]^2\}$$

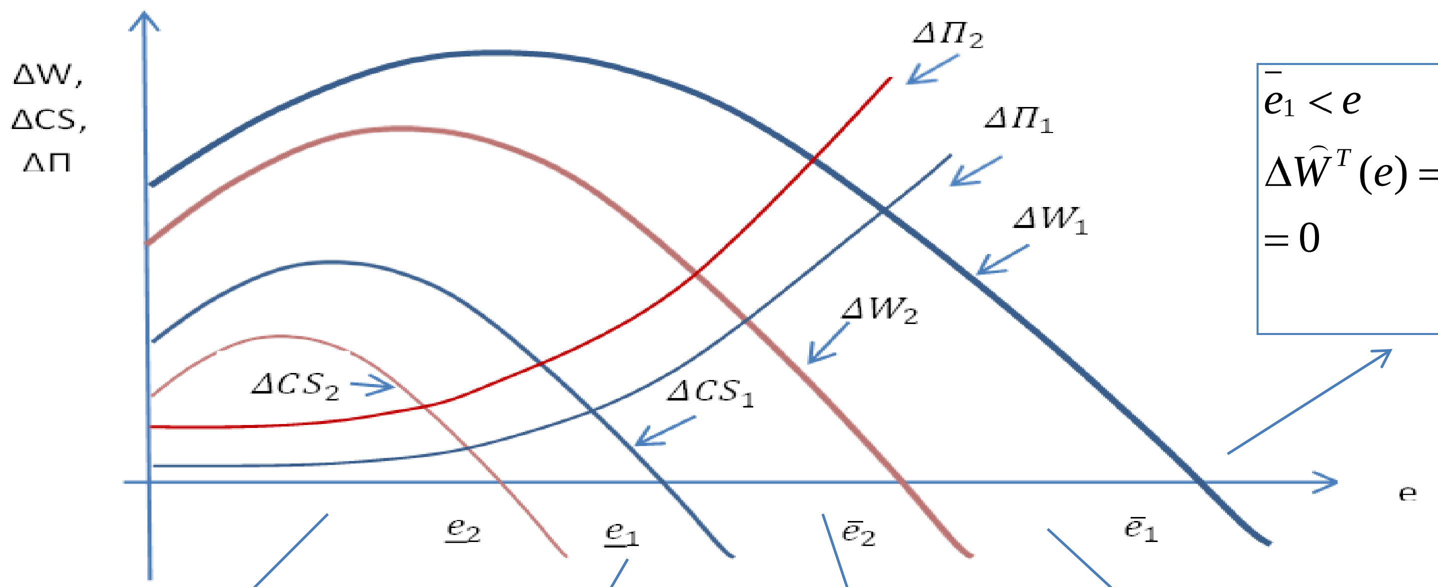
Comparison of welfare standards when Δm(0)=0 and Δc1=Δc2=Δc

- Consider two actions with common *Δc*:

$$a_j = (\mu, \Delta c),\ j = 1,2,\ 0 < \mu_1 < \mu_2 < 1/2$$

- Then the action 2 is more profitable and so will be chosen whenever both are available though that will lead to lower welfare.

Comparison of welfare standards when Δm(0)=0 and Δc1=Δc2=Δc

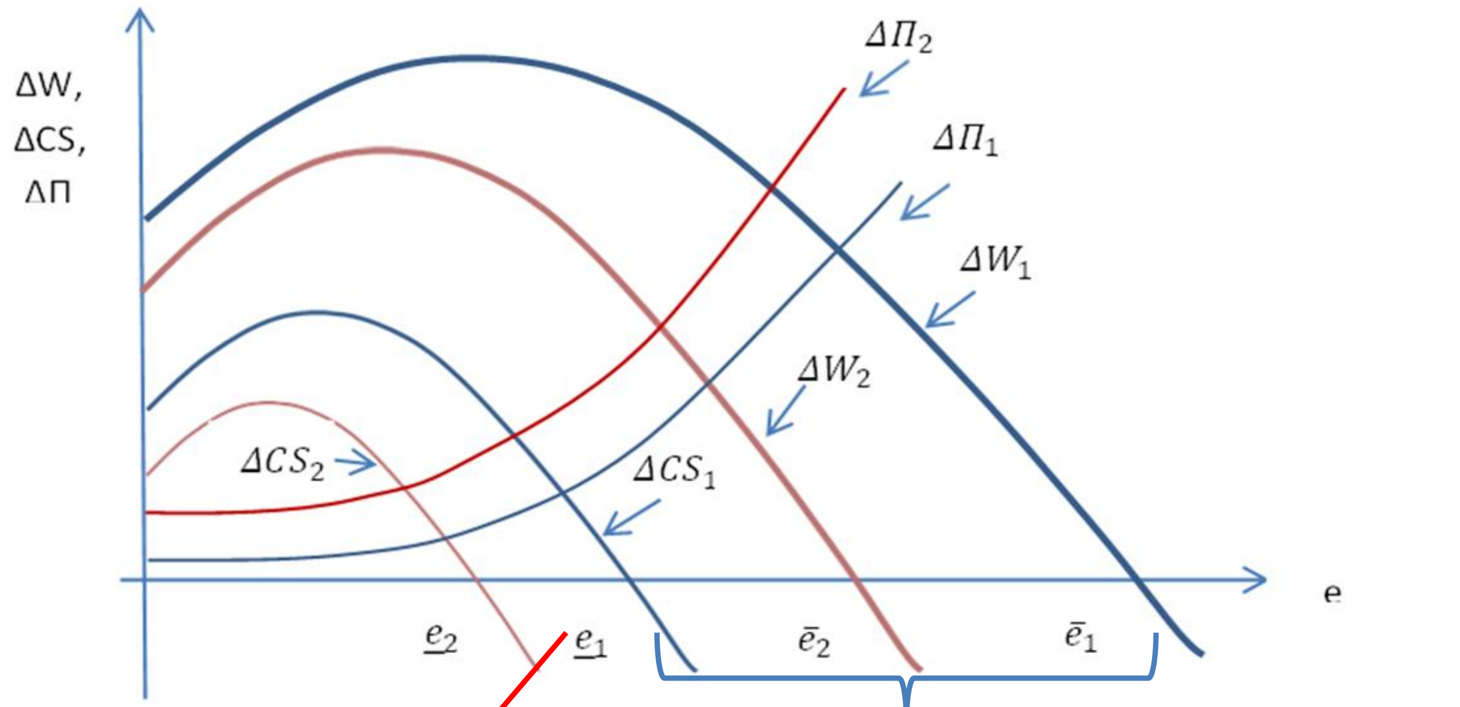


$\bar{e}_1 < e$

$\Delta\widehat{W}^{T}(e) = \Delta\widehat{W}^{CS}(e) = 0$

$0 < e < \underline{e}_2$	$\underline{e}_2 < e < \underline{e}_1$	$\underline{e}_1 < e < \bar{e}_2$	$\bar{e}_2 < e < \bar{e}_1$
$\Delta\widehat{W}^{CS}(e) = \Delta\widehat{W}^{T}(e) = \Delta W_2$	$\Delta\widehat{W}^{CS}(e) = \Delta W_1$	$\Delta\widehat{W}^{T}(e) = \Delta W_2$	$\Delta\widehat{W}^{T}(e) = \Delta W_1$
	$\Delta\widehat{W}^{T}(e) = \Delta W_2$	$\Delta\widehat{W}^{CS}(e) = 0$	$\Delta\widehat{W}^{CS}(e) = 0$
	$\Delta\widehat{W}^{CS}(e) > \Delta\widehat{W}^{T}(e)$	$\Delta\widehat{W}^{CS}(e) < \Delta\widehat{W}^{T}(e)$	$\Delta\widehat{W}^{CS}(e) < \Delta\widehat{W}^{T}(e)$

Comparison of welfare standards when Δm(0)=0 and Δc1=Δc2=Δc



LYONS EFFECT

A Consumer Surplus Standard would deter firms from taking actions that are welfare enhancing

Comparison of welfare standards when Δm(0)=0 and Δc1≠Δc2

- Defining $e = \frac{e}{\Delta c_1}$ and $k = \frac{\Delta c_2}{\Delta c_1}$
- For action 1:

$$\Delta CS_1(e) = 1/2\{[(1-\mu_1)(1+e)]^2 - e^2\}$$

$$\Delta \pi_1(e) = \mu_1(1-\mu_1)(1+e)^2$$

$$\Delta W_1(e) = e + 1/2\{1-[\mu_1(1+e)]^2\}$$

- For action 2:

$$\Delta CS_2(e) = 1/2\{[(1-\mu_2)(k+e)]^2 - e^2\}$$

$$\Delta p_2(e) = \mu_2(1-\mu_2)(k+e)^2$$

$$\Delta W_2(e) = ke + 1/2\{k^2 - [\mu_2(k+e)]^2\}$$

Comparison of welfare standards when Δm(0)=0 and Δc1≠Δc2

Case 1: k>1 (cost reduction greater for action 2)

- For all environments $\Delta\pi_2 > \Delta\pi_1$
- But now it is less clear how the two actions compare from the point of view of Consumer Surplus and Total Welfare
- If $k \geq \frac{\mu_2(1-\mu_1)}{\mu_1(1-\mu_2)}$ then $\underline{e}_2 \geq \underline{e}_1$.

Proposition 2:

- If the cost differences are sufficiently large in favour of the action with the higher price-cost margin, specifically if $k \geq \frac{\mu_2(1-\mu_1)}{\mu_1(1-\mu_2)}$ then a total welfare standard dominates a consumer surplus standard.

Comparison of welfare standards when Δm(0)=0 and Δc1≠Δc2

Case 2: k<1 (cost reduction greater for action 1)

- Under both standards action 2 is worse than action 1 ($\underline{e}_2 < \underline{e}_1$ and $\bar{e}_2 < \bar{e}_1$).
- However it is less clear which of the two actions is more profitable.

Proposition 3

- The greater the cost differences in favour of the action with the lower price-cost margin, that is the further is *k* from 1 then the less likely is the Lyons effect to exist, and it may disappear altogether if *k* lies sufficiently far below 1.

General Comparison ($\Delta m_0 > 0$)

Example

	Δm(0)=0,25,μ=0,25						Δm(0)=0,25,μ=0,125			
				Δc=0,5				Δc=0,5		
	A	ε	ΔCS2	ΔW2	Δp2	ΔΠ2	ΔCS1	ΔW1	Δp1	ΔΠ1
Indifferent	0,5	0,2	0,25	0,375	-0,5	0,125	0,352	0,398	-0,625	0,047
Indifferent	1	0,6	0,352	0,586	-0,375	0,234	0,58	0,639	-0,563	0,059
Indifferent	1,5	1	0,344	0,781	-0,25	0,438	0,75	0,875	-0,5	0,125
Indifferent	2	1,4	0,227	0,961	-0,125	0,734	0,861	1,107	-0,438	0,246
CSS is better	2,5	1,8	0	1,125	0	1,125	0,914	1,335	-0,375	0,442
CSS is better	3	2,2	-0,336	1,27	0,125	1,609	0,91	1,56	-0,3125	0,652
CSS is better	4	3	-1,336	1,523	0,375	2,86	0,721	1,998	-0,1875	1,27
CSS is better	4,2	3,16	-1,588	1,566	0,425	3,154	0,655	2,084	-0,163	1,429
CSS is better	4,4	3,32	-1,858	1,606	0,475	3,464	0,58	2,169	-0,138	1,589
CSS is better	4,6	3,48	-2,146	1,643	0,525	3,789	0,496	2,253	-0,113	1,757
CSS is better	4,8	3,64	-2,451	1,678	0,575	4,129	0,402	2,337	-0,088	1,935
CSS is better	5	3,8	-2,773	1,711	0,625	4,48	0,299	2,42	-0,0625	2,12
TWS is better	6	4,6	-4,64	1,83	0,875	6,48	-0,0357	2,826	0,0625	3,18
TWS is better	7	5,4	-6,91	1,898	1,125	8,859	-1,248	3,217	0,1875	4,465
TWS is better	…	…	…	…	…	…	…	…	…	…
TWS is better	14	11	-35,398	0,586	2,875	35,984	-14,045	5,514	1,063	19,559
TWS is better	15	11,8	-41,21	0,148	3,125	41,359	-16,811	5,779	1,188	22,59

Result 1: Effect of Δm(0)

Given Δc and two actions μ1<μ2, as Δm(0) increases the range of A (or ε) values over which the Lyons effect holds increases

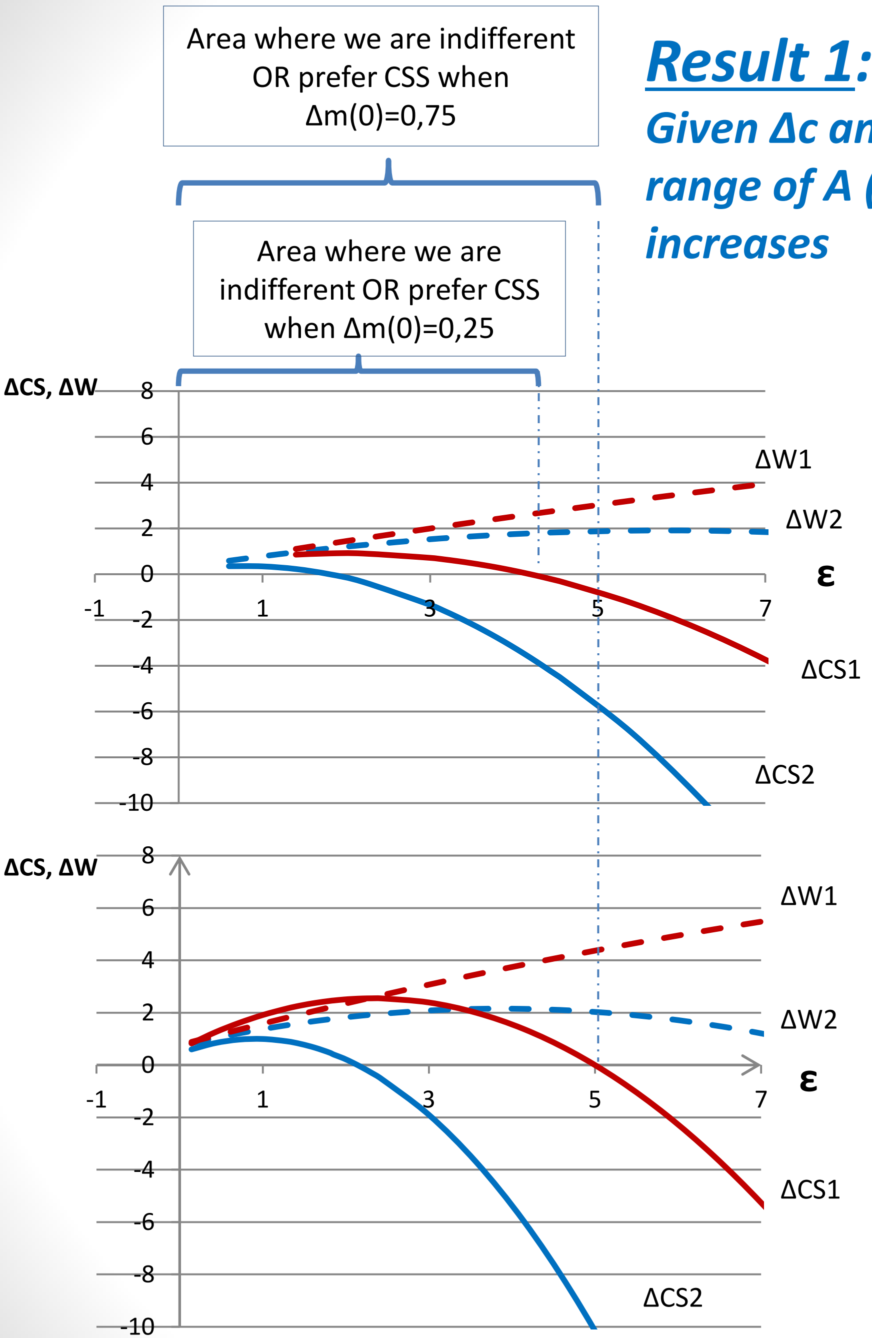


Diagram 1:

Initial price cost margin is low (Δm(0)=0,25)

For action 1:

ΔCS1=ΔCS(μ1=0,125), ΔW1=ΔW(μ1=0,125)

For action 2:

ΔCS2=ΔCS(μ2=0,25), ΔW2=ΔW(μ2=0,25)

Both actions generate Δc=0,5

Diagram 2:

Initial price cost margin is high (Δm(0)=0,75)

For action 1:

ΔCS1=ΔCS(μ1=0,125), ΔW1=ΔW(μ1=0,125)

For action 2:

ΔCS2=ΔCS(μ2=0,25), ΔW2=ΔW(μ2=0,25)

Both actions generate Δc=0,5

Result 2: Effect of Δc

Given Δm(0) and two actions μ1<μ2, as Δc increases the range of A (or ε) values over which the Lyons effect holds increases

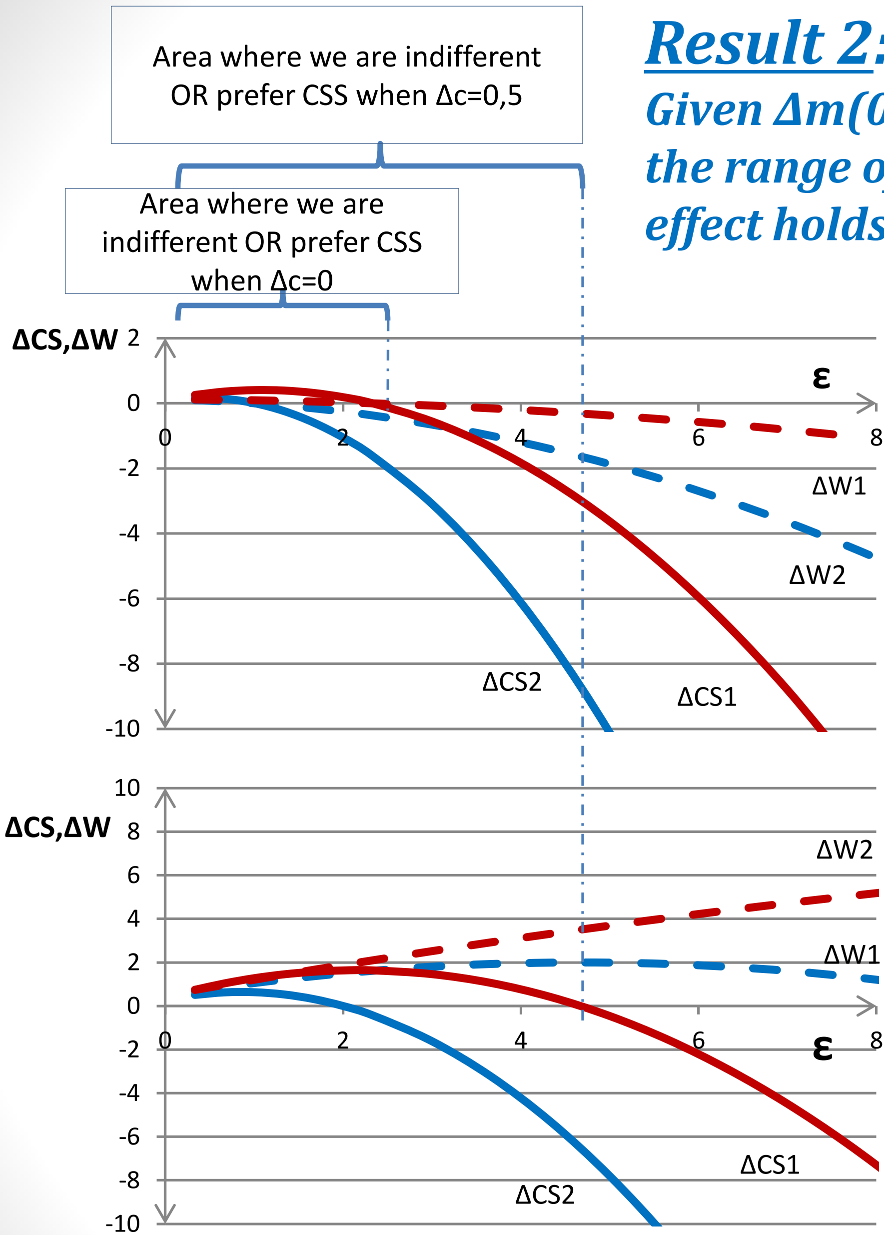


Diagram 3:

There is no efficiency effect generated by actions 1&2 (Δc=0)

Initial price-cost margin Δm(0)=0,5

For action 1:

ΔCS1=ΔCS(μ1=0,125), ΔW1=ΔW(μ1=0,125)

For action 2:

ΔCS2=ΔCS(μ2=0,25), ΔW2=ΔW(μ2=0,25)

Diagram 4:

Both actions 1&2 generate efficiency effect Δc=0,5

Initial price-cost margin Δm(0)=0,5

For action 1:

ΔCS1=ΔCS(μ1=0,125), ΔW1=ΔW(μ1=0,125)

For action 2:

ΔCS2=ΔCS(μ2=0,25), ΔW2=ΔW(μ2=0,25),

Result 3: Effect of the difference between μ1 & μ2

Given Δc and Δm(0), the range of A (or ε) values over which the Lyons effect holds increases when difference in μ1 and μ2 increases

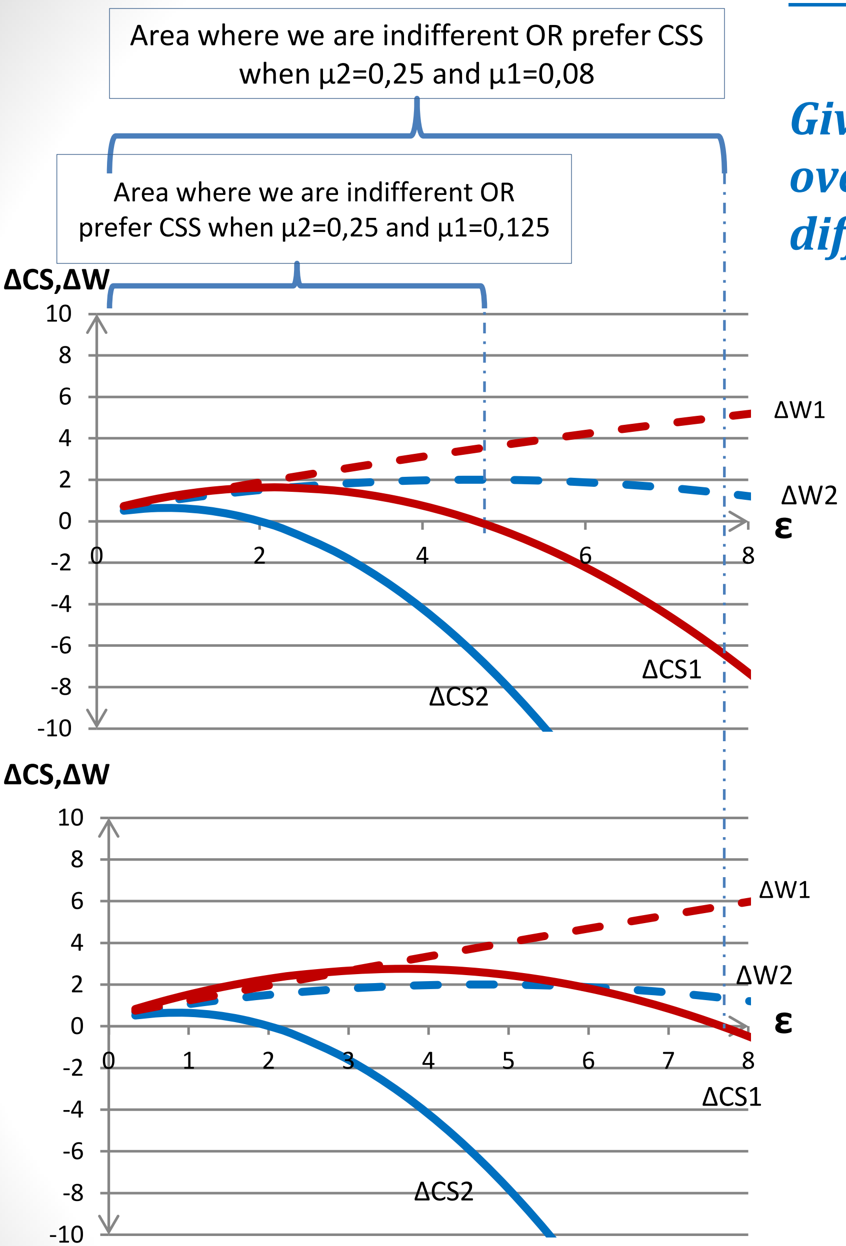


Diagram 4 (Same as before):

μ2=0,25 and μ1=0,125

Both actions 1&2 generate efficiency effect Δc=0,5

Initial price-cost margin Δm(0)=0,5

For action 1:

ΔCS1=ΔCS(μ1=0,125), ΔW1=ΔW(μ1=0,125)

For action 2:

ΔCS2=ΔCS(μ2=0,25), ΔW2=ΔW(μ2=0,25)

Diagram 5:

μ2=0,25 and μ1=0,08

Both actions 1&2 generate efficiency effect Δc=0,5

Initial price-cost margin Δm(0)=0,5

For action 1:

ΔCS1=ΔCS(μ1=0,125), ΔW1=ΔW(μ1=0,125)

For action 2:

ΔCS2=ΔCS(μ2=0,08), ΔW2=ΔW(μ2=0,08)

Thank you!!

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