Indirect Effects of Price Changes

[C&B Ch. 7; S&W Ch. 10]

indirect effects : difficulties? It depends:

→ (1)
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[C&B Ch. 7; S&W Ch. 10]

indirect effects: difficulties? It depends:
→ (1) difficult to predict or identify

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Model this by a rise in price above the choke price.
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  \text{housing etc.}
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∴ Loss of consumer’s surplus.
Graphically:

\[ \Delta Q \neq 0 \]

\[ \Delta P = 0 \]

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\[ D_r(p_b) = \text{demand for rail trips, given price of bus } p_b \]
- initially \((p_r, q_r)\) at C
- finally \((p_r', q_r' = 0)\) at B as if price > \(p_r'\) (choke price)
  \[ \therefore \text{zero demand} \]

\[ \therefore \text{area ABC is the loss of Consumer Surplus, } \Delta CS. \]
But what happens in the bus market?
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New demand for bus trips $D_b(p_r')$
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New demand for bus trips $D_b(p_r')$

Then $\Delta CS = \text{area EFHG}$ is not a social benefit of rail closure—consumers’ surplus measures what consumers are willing to pay, in excess of what they are actually called on to pay, to consume a good.
Change in CS measures consumers’ loss.

\[ \Delta CS \] measures their loss if they have lost the opportunity to buy that good, area ABC (on the Rail diagram above).
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This is the only element of social loss to consumers. That the consumers’ surplus from bus trips has increased indicates that the closure of the rail service increases consumers’ willingness to pay for bus trips. (Nothing more.)
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Remember: the demand curve for railway travel already included the rail passengers’ realisation of the alternative travel opportunity of using the bus instead.
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Remember: the demand curve for railway travel already included the rail passengers’ realisation of the alternative travel opportunity of using the bus instead.

Or, the social loss that would be caused by closing the bus service would be greater if there were no alternative rail service than if there were such a service.
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2. those who travelled by train were not even prepared to pay \( p_b \) for the bus; now at least \( p_b \) for some
   ("." \( q'_b - q_b \) extra bus trips by displaced rail travellers)
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DGH, the amount of CS for buses, merely measures how much
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\( \Delta CS \) with a good measures a change in consumers’ welfare only if the
change in surplus is caused by a change in that good’s price or
availability, not changes in a substitute’s or a complement’s price or
availability.
Price Changes and $\Delta CS$: Conclusion
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The increase of the area of consumers’ surplus in the other good (bus) ($P_y = \text{constant}$) is not to be regarded as a gain of consumers’ surplus consequent upon the rise in $P_x$, the train.

This increase is simply the consequence of consumers’ bettering themselves by switching from the higher priced good $x$ to substitute good $y$.

Provided supply prices are constant, then the ceteris paribus conditions are met, and the partial analysis depicts the consumers’ gains wholly within the area of the demand curve of the good whose price has risen—irrespective of the resulting magnitude and direction of the shifts in demand for all other goods in the economy.
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Multipliers are measures of the impacts on other markets, but are wrong for two reasons:

• They may lead to double counting of benefits, which should be net of costs, not gross.
• They may measure transfers, as seen above.

[See DoF 3.11; see also C&B Ch. 13, on Economic Impact Analysis]
A fall in the price of $X$ results in a contraction of the demand for $Y$:
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$\Delta CS_X > 0$

$\Delta CS_Y < 0$

$p_1 X_1 + p_y Y_1 = \bar{M}$

$p_2 X_2 + p_y Y_2 = \bar{M}$

$\Delta CS_Y$?

$\Delta$ social welfare? = $\Delta CS_X$ only. (Pepsi)

Ignore the induced change in $CS_Y$. (Coke)
1. Pecuniary External Effects
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1. Pecuniary External Effects

*Consumers’ Surplus* measures what consumers are willing to pay, in excess of what they are actually called on to pay, to consume a good.

A change in the consumers’ surplus associated with a particular good measures a change in consumers’ welfare *only* if the change in surplus is caused by a change in the price of that good. (Not by changes in other related prices.)

So long as \( \text{price} = \text{marginal cost} \), and doesn’t change in response to a project, then *indirect* (i.e. in another market) net marginal social cost or benefit equals zero.
Pecuniary External Effects [C&B pp.134, 147, 155, 167–169; FP Ch. 11.2.2] occur—

if the price change whose effects are being evaluated itself causes, as an indirect effect via market mechanisms, a change in some other price.

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The price of commuting to Sydney from the Blue Mountains rises.
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**Example of indirect market effects (PEEs):**
The price of commuting to Sydney from the Blue Mountains rises. The first effect is to reduce the number of train trips. The second effect is to make Katoomba less attractive as a dormitory suburb of Sydney’s because of the higher travel costs.
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The price of commuting to Sydney from the Blue Mountains rises. The first effect is to reduce the number of train trips. The second effect is to make Katoomba less attractive as a dormitory suburb of Sydney’s because of the higher travel costs. The third effect is to reduce the weekly rentals in Katoomba. The lower price of housing might slightly increase the number of renting commuters, which would partly offset the effect of higher fares on rail travel.
Katoomba Rail and Renting \( \Delta \) CS in Housing:

e.g. Katoomba

rail: \((P_R, Q_R)\)
housing: \((P_H, Q_H)\)

considering raising the price of railway

(a) rail travel

\[ P_R \rightarrow P'_R \]

\[ \rightarrow \text{reduction in } D_H P_H \]

\[ \rightarrow \text{fall in } P_H \]

\[ \rightarrow P'_H \]

\[ \rightarrow \text{fall in } Q_H \]

\[ \rightarrow Q'_H \]

(b) housing
Katoomba: Dynamics and Change in Surplus

Fall in $P_H \rightarrow P_H' \rightarrow$ increase in $D_R \rightarrow D_R(P_H')$
$\rightarrow$ new quantity of trips $Q'_R$

Fall in consumers’ surplus in railway market (////)
Rise in consumers’ surplus in housing market (\\\\)

∴ net effect on consumers is (////) – (\\\\), a reduction in consumers’ surplus

∴ net effect on society (cons. + prod.) = $\Delta$ CS in rail-travel market, since housing markets changes cancel.

Area \\\ is a transfer: from landlords to tenants.
e.g. *Katoomba*

rail: \((P_R, Q_R)\)

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raising the price of railway

\[ P_R \rightarrow P'_R \]
\[ \rightarrow \text{reduction in } D_{HP_H} \]
\[ \rightarrow \text{fall in } P_H \]
\[ \rightarrow P'_H \]

fall in \(Q_H\)

\[ \rightarrow Q'_H \]

\( (a) \) rail travel

\[ (b) \) housing \]
Katoomba: Dynamics

A: \((P_R, Q_R) \& (P_H, Q_H)\) initial
B: \((P_R', Q_R') \& (P_H', Q_H')\) final
C: \((P_R, Q_R') \& (P_H, Q_H')\) old prices, new quantities
D: \((P_R', Q_R) \& (P_H', Q_H)\) new prices, old quantities

A preferred to C \(\Rightarrow\) losses of A \(\rightarrow\) B \(\geq\) losses of C \(\rightarrow\) B
B preferred to D \(\Rightarrow\) losses of A \(\rightarrow\) B \(\leq\) losses of A \(\rightarrow\) D

\[\therefore \text{losses of } C \rightarrow B \leq \text{losses of } A \rightarrow B \leq \text{losses of } A \rightarrow D\]

\[Q_R'(P_R' - P_R) - Q_H'(P_H - P_H') \leq \text{losses of } A \rightarrow B \leq Q_R(P_R' - P_R) - Q_H(P_H - P_H')\]
Katoomba cont.

e.g. Initially

\[ \begin{align*}
P_R &= \$5/\text{trip} \\
P_H &= \$50/\text{week rent} \end{align*} \quad \rightarrow \quad \begin{align*}
10,000 \text{ trips/week} &= Q_R \\
1,000 \text{ tenants} &= Q_H
\end{align*} \]
Katoomba cont.

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P_R = \$5/\text{trip} \quad P_H = \$50/\text{week rent} \quad \begin{cases} 
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\end{cases}
\]

Finally

\[
P'_R = \$6/\text{trip} \quad \begin{cases} 
9,000 \text{ trips/week} = Q'_R \\
980 \text{ tenants} = Q'_H \\
\$47.50/\text{week rent} = P'_H
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Then net loss to consumers:

\[
\begin{align*}
&= (6 - 5) \frac{(10,000 + 9,000)}{2} - (50 - 47.5) \frac{(1,000 + 980)}{2} \\
&= \$9,500 - \$2,475 = \$7,025/\text{week}
\end{align*}
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Then net loss to consumers:

\[ = (6 - 5) \frac{(10,000 + 9,000)}{2} - (50 - 47.5) \frac{(1,000 + 980)}{2} \]
\[ = $9,500 - $2,475 = $7,025/\text{week} \]

Landlords also lose loss of rent, tenants = $2,475

shaded area in (b) measures the loss of producer’s surplus because the only effect is the price fall.
Katoomba: Net losses

Thus ∴ net loss to consumers & landlords
= shaded area in (a) = $9,500/week

(Because shaded area in (b) cancels out—is a transfer from landlords to tenants
& is solely a price effect.)

Conclusion:
Katoomba: Net losses

Thus : net loss to consumers & landlords
    = shaded area in (a) = $9,500/week

(Because shaded area in (b) cancels out—is a transfer from landlords to tenants
& is solely a price effect.)

Conclusion:

with Pecuniary External Effects, we need only consider the effect on Consumers’ Surplus and Producers’ Surplus in the primary market.
2. Induced Price Changes

A company hires labour, manufactures output, & sells to customers.

Company is a price-taker in the labour market.

Then wage increases

\[ w \rightarrow w' \]

net loss to firm

= shaded area (a)

- shaded area (b)

net loss to consumers

= shaded area (b)

\[ \therefore \text{the social net loss} = \text{shaded area (a)} \]

If PPIC is sole criterion, then weight consumers = producers (a $ is a $) & need not look at induced price changes in competitive markets for Pecuniary External Benefit.
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- Several techniques to value external costs or benefits: different values according to whether *willingness to pay* (to avoid a cost) or *willingness to accept* (in compensation), since different underlying property rights.
- For large projects, benefits should include *the change in consumer surplus*, which depends on the price elasticity of demand.
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- Project input that is diverted from another project (because of higher prices) is valued at its market (tax-inclusive) price.
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- Project input that is diverted from another project (because of higher prices) is valued at its market (tax-inclusive) price.
- If both incremental and displacement effects are present, then the *shadow price is a weighted average.*
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• When a project will employ the unemployed (and some rigidity exists in the labour market), then the opportunity cost of labour will be less than the wage. The shadow price will lie between the higher net-of-tax wage, and the lower level of the dole, augmented by some amount for leisure forgone.
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• For valuing the costs and benefits of a project, markets provide much information at little cost. How justified is the need for the development of more accurate shadow prices? A CBA of a proposed CBA!
Overriding principle:  

*Opportunity cost*

- *transfers:* no opportunity cost
- *buyers:* tax-inclusive price, what they pay
- *sellers:* economic cost (net-of-tax), what they get

CBA always concerned with incremental costs and benefits, that is, with effects that would not have occurred in the absence of the project — DoF (1991).
Summary of Week 4

These lectures discussed the relevance of induced changes in other markets:

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These lectures discussed the relevance of induced changes in other markets:

- Why multipliers — numbers of additional jobs, etc. — are misleading.
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