

Barbarians at the Gates

The competitive provision of
airport terminal services



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Today's presentation

- Background – the Dublin debate
- Terminal competition – why, how and what?
- A simple model of Bertrand competition in prices
- Three specifications
- Other problems with terminal competition – and an agenda for further research

Background – the Dublin debate



Dublin is the dominant airport in Ireland - handles approximately 80% of enplanements

Owned by Dublin Airport authority, which is in turn owned solely by Irish government

Growth in traffic since late 90s driven by LCCs, especially Ryanair

Background – the Dublin debate



Ryanair claimed its airport charges doubled in late 90s

Began highly public campaign for construction of a “competing second terminal”

Repeated reference to “inefficiency” of incumbent terminal operator

My research question: explore economic implications of such a regime

Investigate role of competition in infrastructure provision

Terminal competition: why?

Overcomes barriers to airport competition

Same accessibility and zoning as the existing terminal

UK Civil Aviation Authority (2001):

- avoids “heavy” regulation
- provision of better value service at reduced cost to users
- service provision in line with users’ needs

Competition in quality → greater range of offerings

Terminal competition: how?

Passengers don't select the terminal – they go wherever they need to in order to use their chosen airline

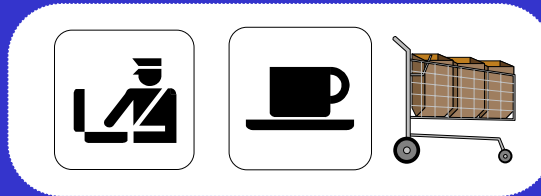
[except where delays and queues impose high time costs]

Terminal competition relates to the choice of terminal by airlines

The crucial market is that in which the airport sells to airlines

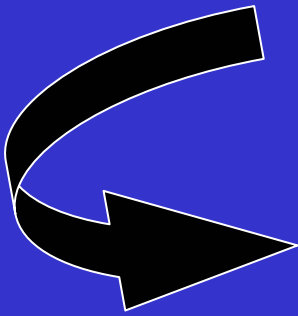
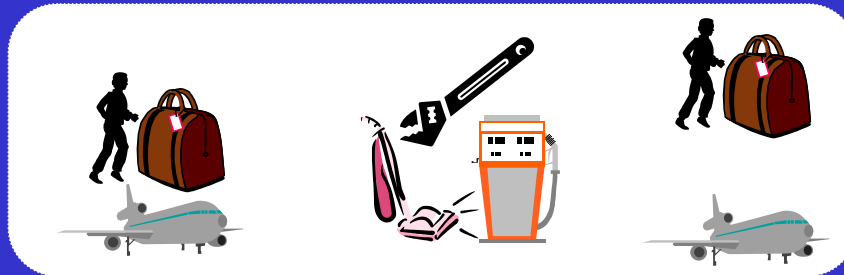
What do airports actually sell to airlines?

Terminal competition: what?



PASSENGER HANDLING

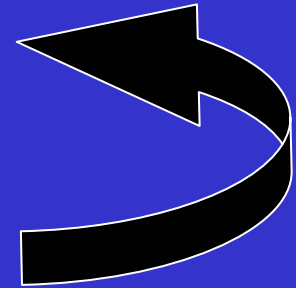
AIRCRAFT HANDLING



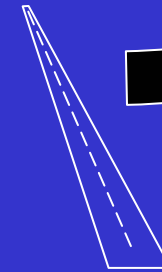
APPROACH



LANDING & TAXI



TAKEOFF



TAXI & TAKEOFF

TIME



Terminal competition: how?



The bare phrase “competing terminals” implies rivalry between terminals to capture airline business

Auction process:

Spare capacity → terminals bid lower prices to attract airlines

Congestion → airlines bid higher prices to secure stands

... but a “spot market” is inappropriate

Terminal competition: how?



Implicit in the model proposed is “open access”:

- No airline is involved in the management of the terminal
- Use of the terminal is open to any airline that is prepared to pay

Sounds reasonable enough, but nobody else does it!

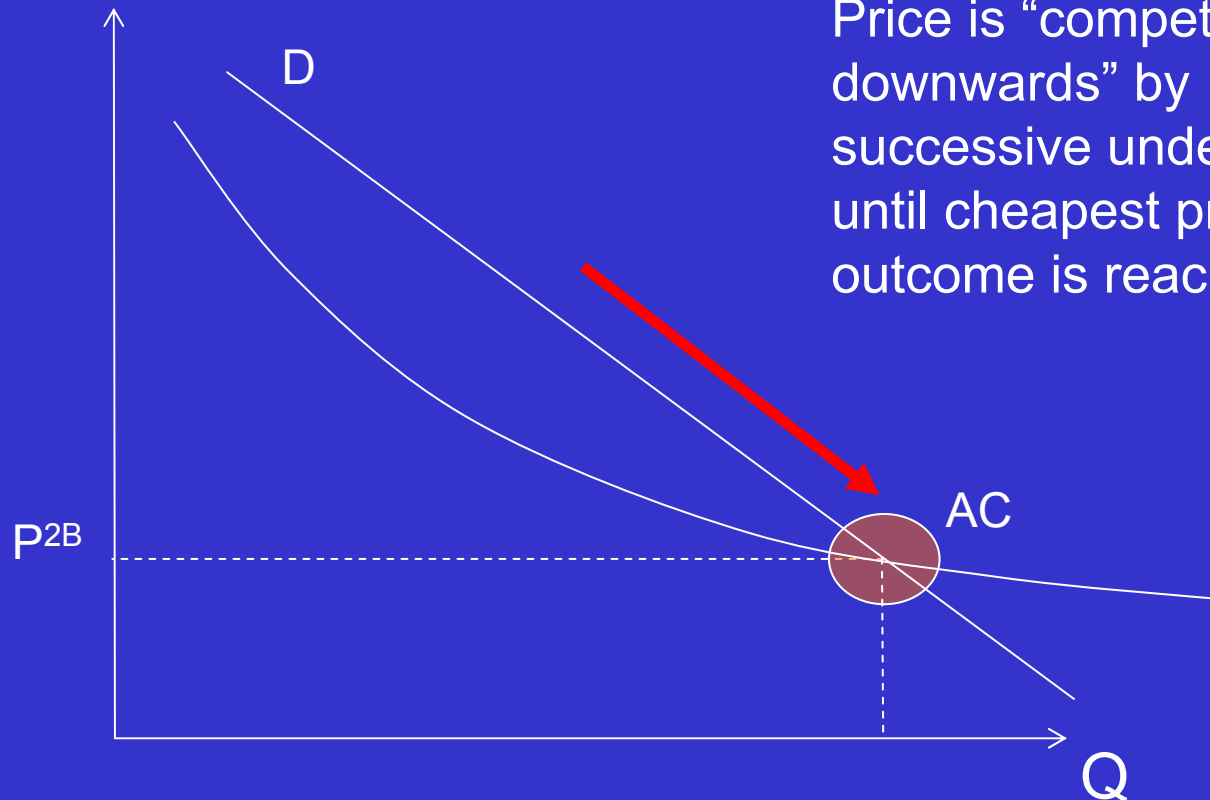
1991-1996: Pearson (Toronto) Terminal 3 under private ownership, but traffic allocated by Transport Canada

Open access illustrated

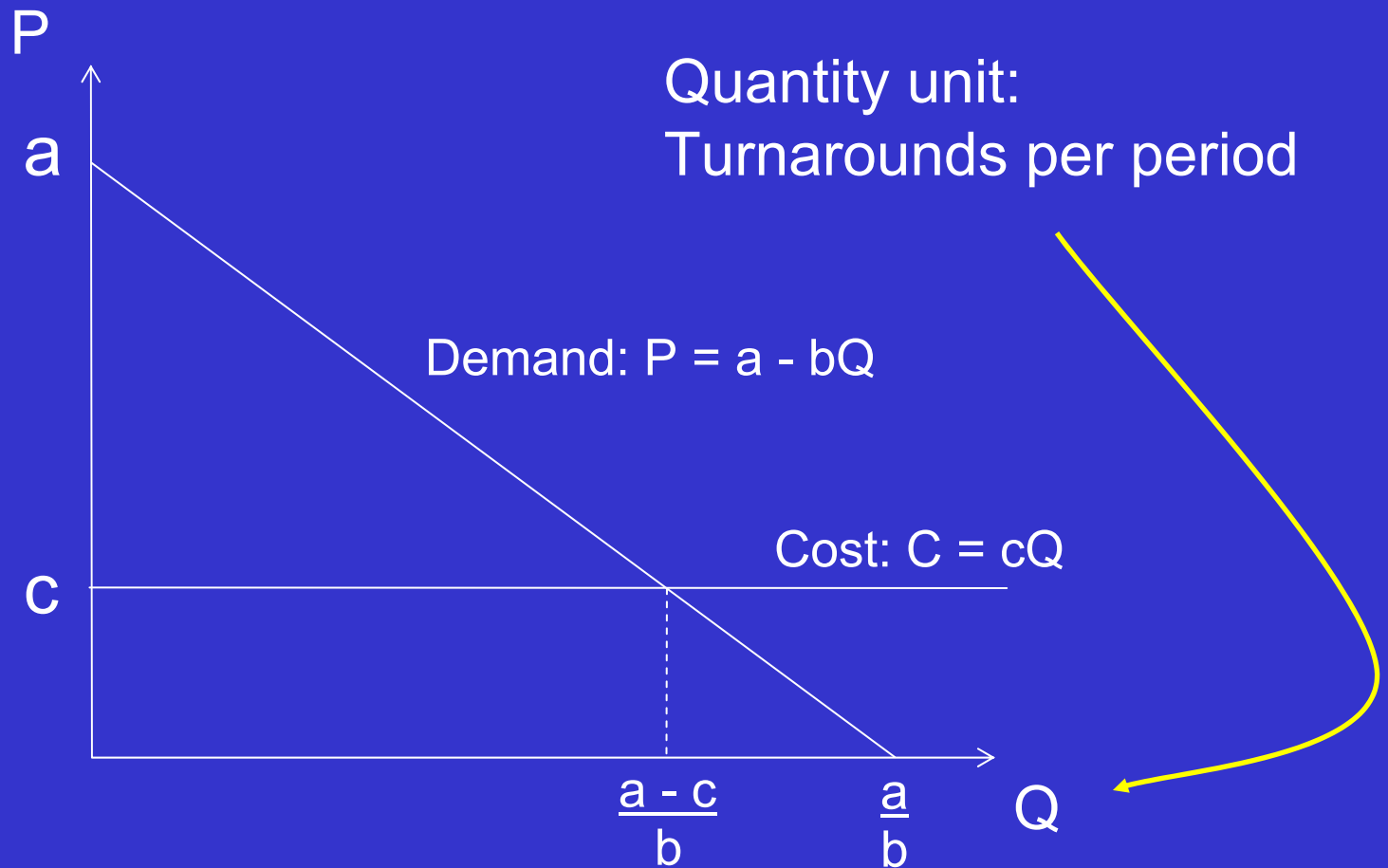
Price, Costs

A rough depiction of open access competition:

Price is “competed downwards” by successive underbidding, until cheapest profitable outcome is reached:



A (trivially) simple model



A (trivially) simple model

Some major simplifications:

Demand assumed to be static, and cyclical fluctuations do not arise

Oum et al (2004): 75-80% of revenue at large US airports is derived from non-aeronautical sources. See also Starkie (2002) ...

... whereas note that this model is concerned only with turnarounds. Retail symmetry between rival terminals?

A (trivially) simple model

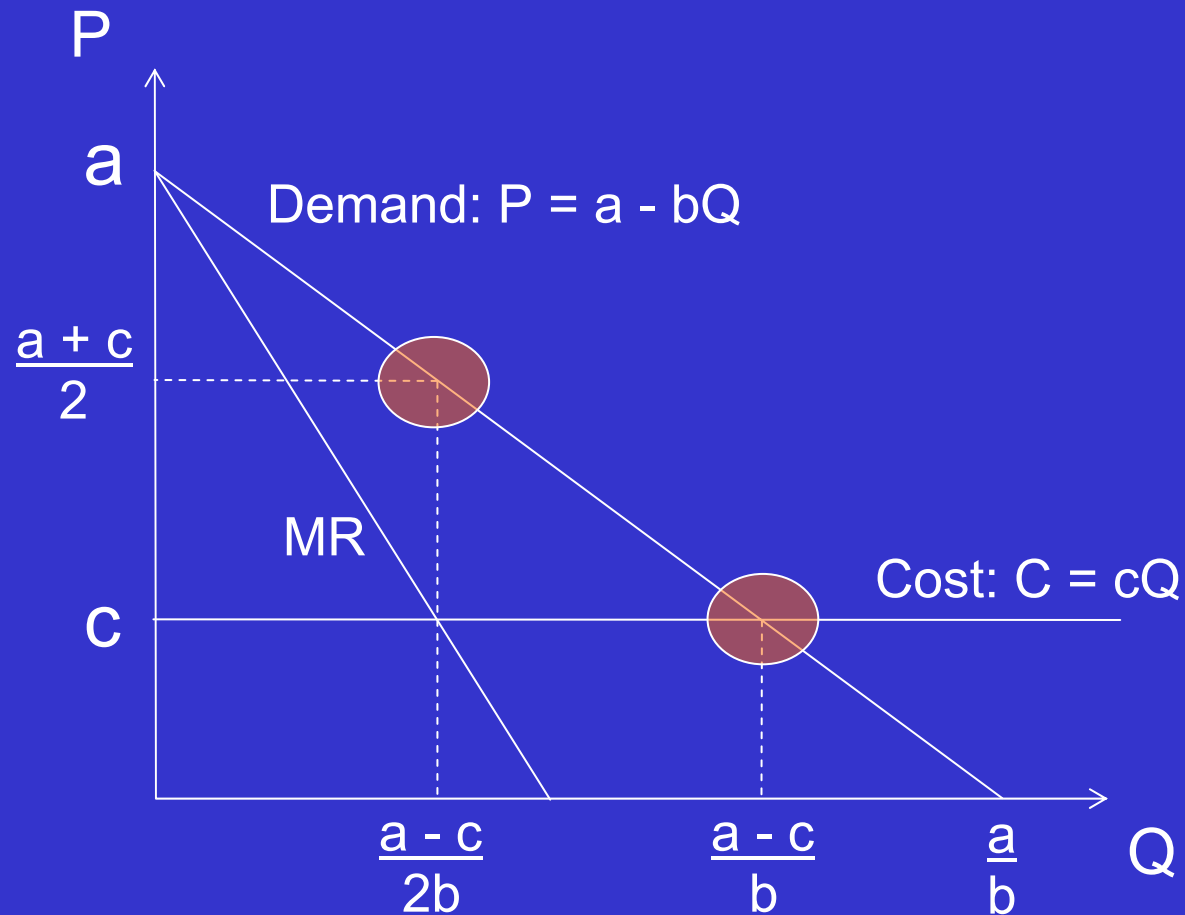
Some major simplifications:

Turnarounds are homogeneous – identical full aircraft

No product differentiation or bundling – no LCC/FSC distinction

Constant marginal cost

Brief review: monopoly



The constrained monopolist



Oum et al (2004):

“there is not a single unregulated profit-maximising airport or unconstrained welfare-maximising airport in the world“

Statutory remit of Commission for Aviation Regulation is wide – “efficiency” balanced with “financial viability”

Presumably the intention of regulation is to induce operator to choose socially optimal price and level of production...

The constrained monopolist



... and if this is achieved, there are no potential gains from competition!

A literature exists the failure of regulation for various reasons – eg. Posner’s “regulatory capture”

Hence competition between terminals suggests a dissatisfaction with regulation

On this basis, competition and explicit regulation would seem to be mutually exclusive options.

The mode of competition



Bertrand competition in prices is the most intuitively appealing specification. In support:

- no spatial or quality differences
- price is much easier to adjust than quantity in an infrastructural context

The mode of competition

This working paper operates at an “entry level” of complexity.

The rules of this simple Bertrand price competition:

$$Q_1 = \begin{cases} 0 & \text{if } P_1 > P_2 \\ \frac{Q(P)}{2} & \text{if } P_1 = P_2 \\ Q(P_1) & \text{if } P_1 < P_2 \end{cases}$$

Specification 1



Entrant and incumbent have identical cost structures.

Classic result:

Both operators charge monopolist's profit-maximising price, and share monopoly profits

Political constraint: unless previous regulatory regime was lax, this behaviour will be obvious and unpopular

The “competitive” alternative, a price war down to constant $MC (= AC)$, is socially optimal, but not profit-maximising

Specification 2

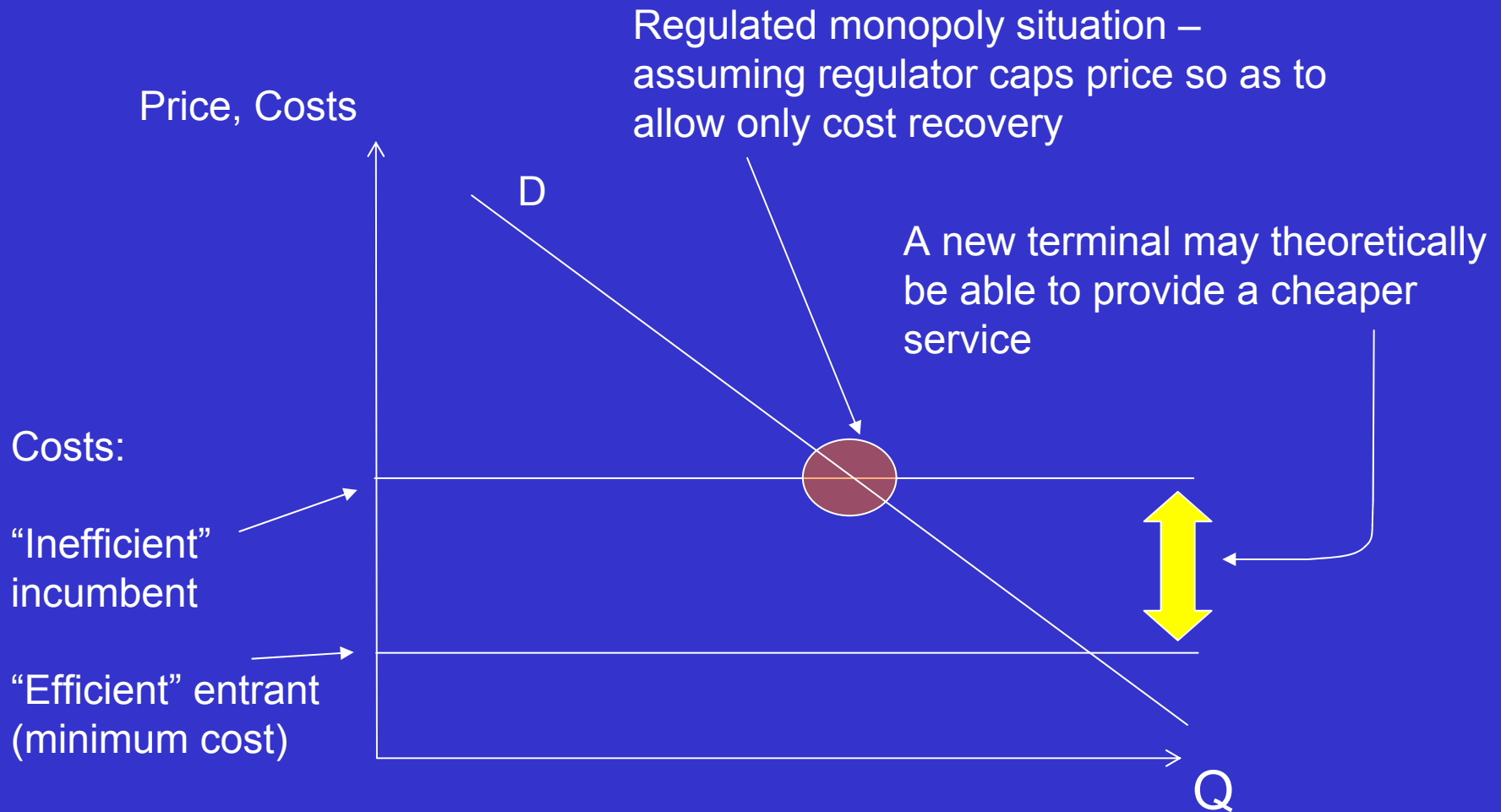
Entrant and incumbent have divergent cost structures

Entrant has lower constant marginal cost

Eg. Leibenstein's (1966) "x-inefficiency": the failure of a firm to reach the production frontier or, equivalently, to minimise its costs

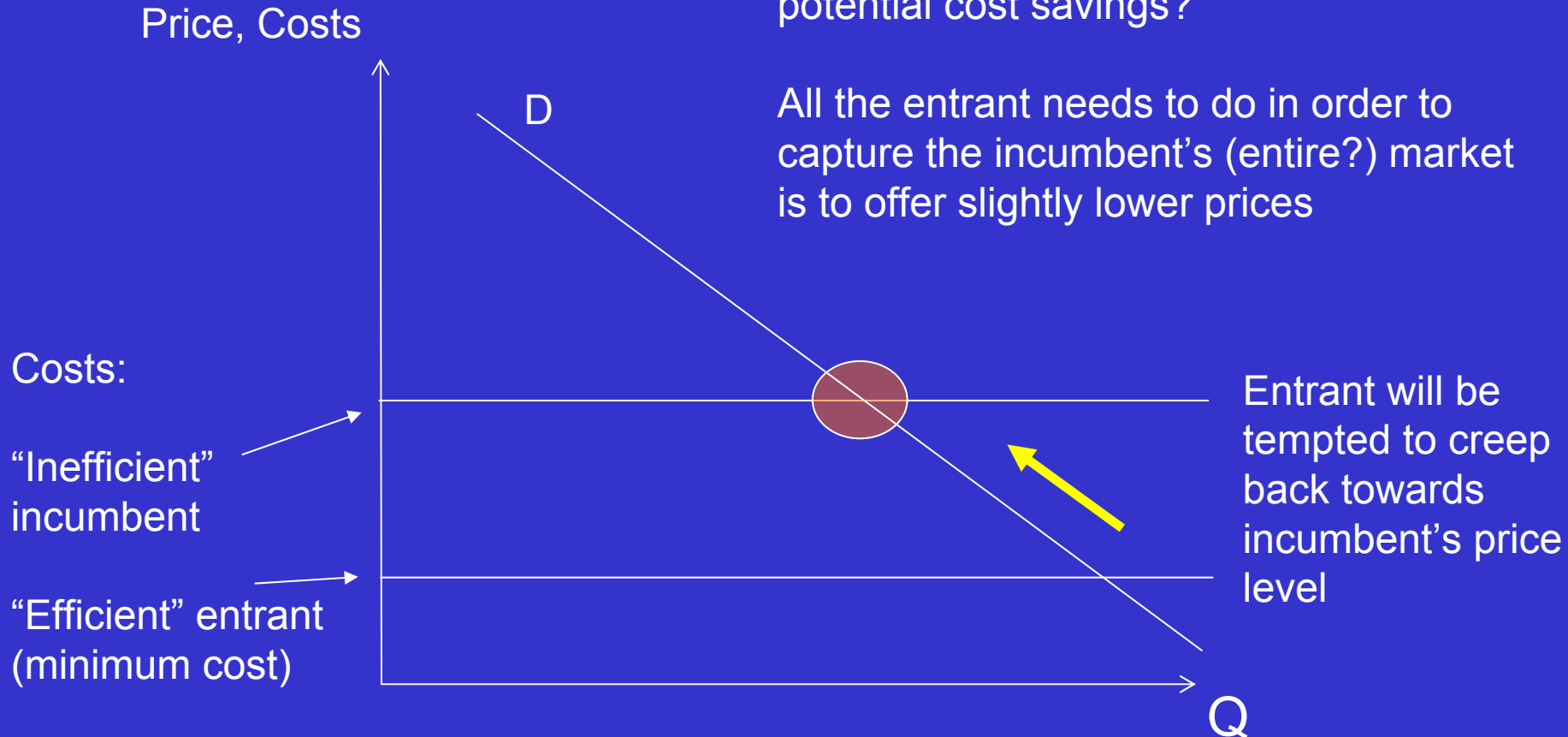
This assertion is implicit to much of the agitation for competition between terminals

Specification 2



Specification 2

But where is the incentive to fully exploit potential cost savings?



Specification 2



Query: can efficiencies be fully exploited through a competitive tendering process to select entrant?

To be effective, this process would require all potential entrants to make binding pricing commitments – effectively a competitively-determined price cap

This implies a credible threat of punishment in the event that such a commitment is broken

This seems to be a strange hybrid of competition and regulation.

Specification 2



Perhaps the most problematic aspect of this result is its implication for the business of the incumbent

The entrant is able to attract all business away from the incumbent

All of the incumbent's assets are stranded!

This is not a problem under our specification, as no value or cost is attached to the provision of capacity

Now consider a specification that does value capacity

Specification 3



Each firm's cost function now includes a term rk , which is the per-period cost of maintaining capacity level k

Capacity is measured in units that correspond to the number of turnarounds that can be supplied in each period, so that for the j th operator:

$$Q_j \leq k_j$$

Capacity selection now becomes important, but note the difference circumstances under which incumbent and entrant make this choice

Specification 3

Assume that capacity cannot be “un-installed”.

The incumbent will have previously selected a level of capacity that reflects its protected position as the sole provider of terminal services, so that:

$$Q_i = k_i$$

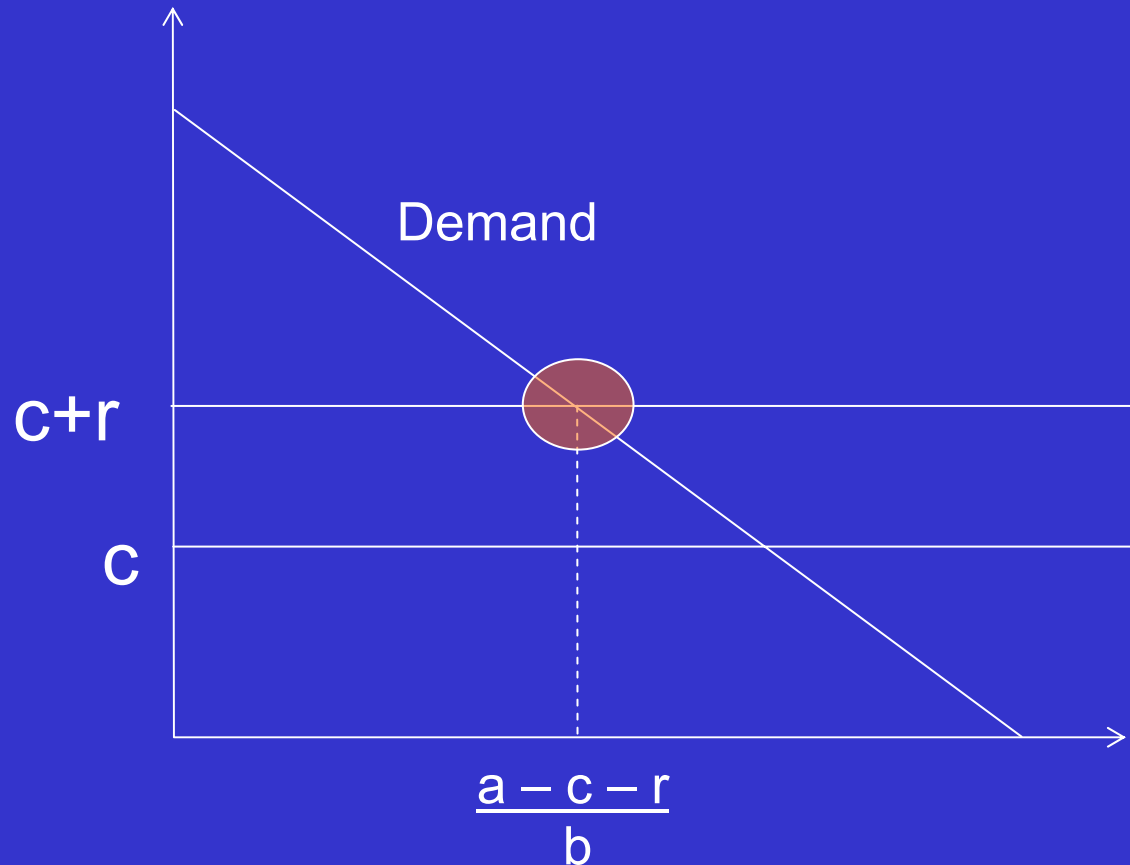
Which implies that:

$$\begin{aligned} C_i(Q_i) &= c Q_i + r k_i \\ &= (c + r) Q_i \end{aligned}$$

Capacity cost is therefore a supplement to marginal cost

Specification 3

Price, Costs



Specification 3

The incumbent's average cost (previously equal to marginal cost) will now be:

$$AC_i = \frac{C_i}{Q_i} = c + \frac{r \left(\frac{a - c - r}{b} \right)}{Q_i}$$



Assume that entry is then facilitated.

The entrant can ensure that its costs are lower than those of the incumbent, by simply selecting less capacity.

Specification 3

If the entrant builds capacity sufficient to serve a fraction of the incumbent's market demand:

$$Q_e = \alpha \left(\frac{a - c - r}{b} \right) \quad \text{where } 0 < \alpha < 1$$

then the incumbent's market share will fall to:

$$Q_i = (1 - \alpha) \left(\frac{a - c - r}{b} \right)$$

Specification 3

Substituting this new expression for Q_i into * gives us the incumbent's average cost:

$$AC_i = c + \frac{r}{(1-\alpha)}$$

which tends to infinity as α tends to 1.

The incumbent's average cost increases as its market share falls, due to the need to pay for existing capacity.

The entrant has an even less incentive to exploit efficiencies.

Conclusion



Advocates of terminal competition argue that it can replace regulation as a driver of pricing restraint

However, simple Bertrand price-competition specifications do not seem to support this assertion

An entrant may be induced to match, and slightly undercut, the incumbent's price, but no more than that

The funding of the incumbent's legacy capacity makes matters worse

Further Research

Perhaps unbundling changes the welfare implications.

The presence at an airport of >1 separately-owned terminals has further implications:

- anticompetitive behaviour by an integrated terminal-runway operator (raising its rivals' costs)
- stifling investment (or at least raising the risks)
- transactions costs associated with coordinating traffic from different terminals

Thank you for your attention

