Presentation in honour of Catherine Waddams

UEA, 16th September 2019

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Network utilities- a very brief history

- The earliest were **water and sewage**, and amongst the earliest examples are those in Rome.
- Kings and emperors of Rome built elaborate aqueducts and also a more rudimentary and limited sewer (the Cloaca Maxima), both in operation BCE.
- These were essentially public works, built to serve only a small minority of (paying) private clients or solely for public use (the sewers).
- After the decline of the Roman Empire, these largely fell into disuse.
- It was not until the 19th Century, as cities grew due to industrialisation, that water supply again became a problem, largely due to the growth of outbreaks of Cholera, as a result of water supply through wells and aquifers becoming polluted by sewage.
- Many major cities, including New York, Paris and London (Bazalgette), developed initiatives for the limited supply of water to the public, and in some cases (as in Paris) the construction of public sewers.

The development of gas- the second major utility

- Gas as a fuel was developed in Britain and also in Germany in the early years of the 19th Century
- This was first produced by burning coal, and was a local network
- Gas, unlike water, was commonly supplied by private companies which saw the opportunity to make a profit
- This led to problems, in terms of high prices and sometimes competition between networks
- In Birmingham, Chamberlain not only bought out the local water company, but also bought both competing gas companies for the Corporation.
- This led in turn to the development of public gas networks and, with economies of scale, a national network
- Electricity followed suit, with some differences, also telecoms.

Refining the concept of natural monopoly

- A natural monopoly is "an industry whose cost function is such that no combination of several firms can produce an industry output vector as cheaply as it can be provided by a single supplier" (Baumol, Panzar, Willig, 1977). *Normative* definition
- Formally, the cost function is subadditive:

$$C(Y) < \sum_i C(y_i); \quad \sum y_i = Y; \quad i = 1, 2, 3, \ldots, k; \quad k \geq 2$$

- So this is a welfare standard for natural monopoly (appropriate for considering the *ideal* industry structure)
- It is also potentially a multiproduct concept
- An important step in avoiding sloppy ideas of network industries

How to deal with the particular features of natural monopoly?

- There is unfortunately no good solution for technical monopoly. There is only a choice among three evils: private unregulated monopoly, private monopoly regulated by the state, and government operation. (Milton Friedman, *Capitalism and Freedom*, 1962)

- Many people, Catherine amongst them, have grappled with this issue
- So to a new conceptual framework

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Competition where possible, regulation where necessary (Littlechild paper on telecoms, 1983)

- Competition in parts of the industry which were not, or were no longer, part of the network proper
- Regulation that was "light touch"- based on price, not costs, non-judicial framework- "until the cavalry arrives"
- Regulation of price normally gives benefits to consumers (if based on "RPI – X")

- and gives incentives to firms to become more efficient over time- if they make cost savings they retain these as profits (until the next review period).
- "High-powered" incentives (in Laffont-Tirole terms)
- It also moves prices towards Ramsey prices

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However, the first two points have been challenging -Why?

- Networks are still very much with us- even in telecoms as a result of the development of Broadband; Mercury turned out to have little impact
- Formulae need revision; this is where lawyers and “judges” get involved, employing economists, to find fault with regulatory judgements- big money is at stake
- Markets actually need help to develop- introducing competition in non-network areas has been problematic in some cases
- Consumers fail to get interested in significant numbers in competition amongst suppliers, and there are usually significant income effects
- Politicians still find themselves coming under the spotlight, and so intervene, even prompting re-regulation- energy retail
- I personally don’t see signs of things changing rapidly