

On Negative Externalities and Modeling Demand in Communication Networks

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Communication networks offer two distinct services - the ability to send messages and the ability to receive messages. These two services are often modeled as if they were one bundled service in the literature of telecommunications demand. In this paper, the two services are treated separately in order to explore issues in networks where negative externalities are present and/or where incoming and outgoing services are unbundled.

The model presented in the paper is a three-stage game where a perfectly price discriminating monopoly (or a benevolent planner) chooses access and usage prices at stage one, consumers make access decisions at stage two, and consumers make usage decisions at stage three. I discuss optimal access and usage pricing. I identify and discuss the parameter restrictions for the ten network structures possible in a model with two consumer types.

Negative externalities exist because subscribers cannot control the use of the incoming service and therefore have to receive unwanted messages in order to receive wanted messages. The presence of negative externalities has implications on both the optimal pricing and the optimal network structure. For example, the optimal usage fee for a call that is a source of a negative externality is above marginal cost and consumers who are subject to negative externalities are charged an access fee that is lower than in the absence of these externalities. The supplier may choose to offer unlisted telephone numbers to consumers who are subject to the negative externality or to price the source of the externality out of the market to eliminate this access subsidy.

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