

Special Issue on Network Economics: Business Conduct and Market Structure

Nicholas Economides, David Encaoua

This special issue of *IJO* on Network Economics focuses on issues of competition, business conduct, and market structure in network industries as well as industries where standardization is important. Despite the abundance of such industries, a systematic framework for their analysis was lacking until the middle 1980s. A survey and critical evaluation of the extensive literature on this subject that has arisen since is given in 'The Economics of Networks,' by Nicholas Economides in this issue.

An important feature of networks (and of services provided over networks) is that they are typically composed of various complementary components that are combined to create composite goods (or systems) that are substitutes to each other. Thus, traditional approaches that dealt exclusively with substitutes or complements fail, and new theoretical and empirical analysis are required. The articles of this special issue accomplish this with remarkable success.

A crucial feature of network goods is the fact that their value increases in the (expected) size of the network, i.e. they exhibit network externalities. This feature is also present in virtual networks comprised of products that conform to the same technical 'standard,' and are therefore 'compatible'. Three papers in this special issue by Encaoua et al., McAndrews and Rob, and Desruelle et al. discuss how network externalities arise in specific industries and analyze the resulting effects on conduct and market structure.¹

In 'Compatibility and Competition in Airlines: Demand Side Network Effect,' David Encaoua, Michel Moreaux, and Anne Perrot, analyse the design of departure and pricing schedules in hub-and-spoke airline networks. The results of the traditional mix-and-match model² do not directly apply since, in transportation networks each leg of a trip is a final good for some consumers, while it is a

¹ This is the 'micro approach' as defined in Economides (1996).

² Matutes and Regibeau (1988), Economides (1988, 1989).

complementary component for others. The authors study the extent of time coordination in departure schedules of competing airlines, which can be also interpreted as the degree of product differentiation as well as the degree of compatibility.

In 'Shared Ownership and Pricing in a Network Switch,' James McAndrews and Rafael Rob discuss the current ownership structure in ATM networks. They note that joint ownership of the 'upstream' network switch by downstream competitors increases the degree of utilization of the switch and can better internalize the network externalities. However, joint ownership may lead to monopoly pricing and raise antitrust concerns.

In 'Complementarity, Coordination and Compatibility: The Role of Fixed Costs in the Economics of Systems,' Dominique Desruelle, Gerard Gaudet, and Yves Richelle describe a general model of demand complementarities across pairs of industries. They pay particular attention on the effect of fixed costs and preference for variety on the features of the equilibria.

Five papers in this special issue assume the existence of network externalities and discuss their effects on conduct, pricing, market structure, and innovations.³ In 'R and D in Markets with Network Externalities, Eirik Kristiansen examines the investment choice in R and D projects in the presence of network externalities. An incumbent faces an entrant who introduces an incompatible technology. Since both incumbent and entrant disregard the effect of their actions on the welfare of old buyers, Kristiansen finds that the entrant will invest in R and D project that is less risky than is socially optimal while the incumbent will choose a more risky than optimal project.

In 'Technology Revolutions in the Presence of Network Externalities,' Oz Shy discusses the timing and frequency of introduction of new partially compatible technologies in the presence of network externalities. He shows that, when consumers consider the inherent quality of the good more closely substitutable with the value of network externalities, new technologies are adopted more frequently. This is because, when inherent quality is closely substitutable with network-generated value, new higher inherent quality goods do not require wide (and time-consuming) adoption to deliver higher utility to consumers.

In 'The Timing of Product Introduction and the Credibility of Incompatibility Decisions,' Pierre, Regibeau and Katharine Rockett address three issues. The first one is on the effect of the degree of compatibility choice on the timing of introduction of successive generation of products. The second issue is the credibility of the firms compatibility choices, and in particular whether standardization can be achieved unilaterally. The third issue discusses the factors affecting international standard-setting negotiations.

In 'Do Converters Facilitate the Transition to a New Incompatible Technology?: A Dynamic Analysis of Converters,' Jay Pil Choi discusses the transition to a new

³This is the 'Macro' approach.

incompatible technology in the presence of converters. He finds that existence of two-way converters may, blockade the introduction of a new technology since their existence weakens then threat of being 'stranded' to the users of the old technology.

In 'Dynamic Monopoly Pricing with Network Externalities,' Bernard Bensaid and Jean Philippe Lesne discuss the validity of the Coase conjecture in the presence of networks externalities. They find that, in the presence of strong network externalities, a monopolist can credibly commit to increase price over time, and therefore the Coase conjecture is invalid. The time inconsistency problem of the monopolist pricing strategy is also examined.

Finally, in 'A Binary Conflict Ascending Price (Bicap) Mechanism for the Decentralized Allocation of the Right to Use Railroad Tracks,' Paul Brewer and Charles Plott, inspired by the attempt to decentralize Swedish railroads, design a mechanism for allocating the right to use railroad tracks and establish its efficiency properties through laboratory experiments.

Despite the flurry of research, our understanding of the economics of network industries is far from complete. However, the papers of this issue represent significant progress in modelling interactions in network industries and define pathways for further research.