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METHODOLOGICAL ISSUES IN THE ASSESSMENT MARKET SHARE EFFECTS OF AIRLINE COMPUTER RESERVATIONS SYSTEMS

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The business value of airline firm investments in computerized reservation systems (**CRSs**) has been documented in the business press, government litigation and in case studies, but just a couple studies offer empirical results. This research extends what we know about the dynamics of airline market share creation as a result of travel agency automation. ("Market share" is commonly understood to mean the portion of total revenue passenger miles captured by an individual carrier from an origin to a destination city-pair.) At another more general level, it aims to deliver modeling and methodological insights that bear on contemporary settings in which information technology (**IT**) is employed in the marketing mix. In electronic commerce, for example, these include the use of point-of-sale debit systems or electronic money as ways-to-pay, web-based versus traditional corporate advertising, and participation in electronic markets for the sale of physical goods.

Banker and Johnston (1995) and Duliba, Kauffman and Lucas (1995) estimated the business value created by the deployment of CRSs by United States carriers. Banker and Johnston examined national level performance, and employed a multiplicative competitive interaction (**MCI**) market share model (Cooper and Nakanishi 1988). Their modeling choices enabled them to illustrate the significant impacts of CRS on market shares, and the role that CRS deployment plays in achieving cost efficiency. Our work employed a multinomial logit (**MNL**) market share model. It features a curvilinear market share elasticity; this parallels our argument that understanding "critical mass" in IT deployment is crucial in marketing mix applications. (MCI models, by contrast, model linear elasticity of market share effects.) Our results showed significant impacts on three different performance indicators at the national level (profitability, revenue passenger miles, and load factors), as well as on local market shares at nine hub airports and 72 origin-destination city-pairs.

The *differential effects analysis* in these papers focuses on understanding the relative competitive strengths of American's and United Airlines' CRSs, among others, in leveraging firm performance. Neither paper, however, sought to explore the source of the market share gains, or the manner in which deployment by one carrier affects another. To explore these issues, this research employs *cross-competitive effects analysis* – how the market share of one competitor may change at the expense of another specific competitor. To do this, we utilize estimates of the market share elasticity for CRS deployment that can be calculated from the estimated coefficients of an MNL model, and then decomposed into *own*, *other*, and *cross-competitive* components. We also show how an MNL model can yield realistic information on the *threshold effects* of critical mass deployment of technology in the marketing mix, which is critical to understanding value in the context of the adoption and diffusion.

Finally, we discuss defects in the data and the modeling scenario that the application of a *fully extended market share model* (Cooper and Nakanishi 1988) brings into focus. Developed for use with supermarket scanner data, fully extended market share models rely on readily available data, and incorporate coefficients for estimation that enable the analyst to uncover much finer-grained effects than in traditional models. Along the way, however, most analysts are likely to run into such problems as model-induced multicollinearity, mismeasured and missing data, heterogeneity and autocorrelation, and specification biases that will make the results either hard to obtain, or subject to incorrect interpretation. Just about all of these methodological problems had to be sorted out for our cross-competitive analysis. The approaches we have implemented ought to find ready application in studies of the emerging world of electronic commerce, where information technology is at the very heart of a firm's marketing mix.

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