1. Introduction

The traditional economic justification for the state regulation of an industry is based upon its technological cost structure. To put the matter simply, if a single firm can produce the industry’s output(s) more cheaply than two or more firms, then duplicating the effort must necessarily be wasteful. In such cases, therefore, the state may wish to permit or even protect the monopoly, yet regulate the price of its services to prevent abuses. It is possible in some industries, on the other hand, that the mere threat of entry will exercise sufficient gravitational pull to prevent prices from exceeding costs. In others, there may be obstructions of various kinds which prevent competitive forces from playing this socially useful role. Such obstructions include “natural” barriers to entry of sundry types, or obstructions may be deliberately erected as a matter of social policy. It may be felt that universal service carries such a positive external benefit that entry into the natural monopolist’s more vulnerable products should be prohibited. Both arguments have been raised in support of restricting entry into postal services.2

Thus, a complete economic justification of entry restrictions would go beyond cost considerations to include an examination of demand and other issues. Be that as it may, cost subadditivity remains the fundamental necessary condition for the justification of entry restrictions.3 In this paper, our primary purpose is to report the results of quantitative research on the cost characteristics of delivery services. We present a specific functional form for postal delivery that is strongly grounded

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1 The views expressed in this paper are those of the authors and do not necessarily represent the opinions of the United States Postal Service.
2 See Estrin and de Meza (1991, 95). Also see Dobbs and Richards (1991, 80) for a discussion of sunk costs in postal services.
3 For a general discussion of natural monopoly in the context of the regulation of postal services, see Crew and Kleindorfer (1992, 15-20).
in statistical theory and operational reality. We then show that under positive marginal cost, this function generates subadditivity. Finally, we estimate the function and present empirical measures of economies of scope. The data strongly suggest that delivery services are subadditive; and, as discussed below, this finding has some important policy implications.

2. The Role of Delivery Costs in Postal Economics

Events of the most recent half decade have placed postal costs, and the analysis of postal costs, under a bright spotlight. Postal privatization debates have raged in major industrial countries, several countries have actually privatized all or part of their postal services, and in 1992 the EC Commission issued the Postal Green Paper as part of an effort to confront the many issues raised by the growth of competition in the provision of delivery services. All of this has taken place within a charged political environment, concerning utility regulation in general, in which alternatives to traditional regulation have gone beyond debate to actual implementation. These alternatives have ranged from outright privatization to price level regulation. Thus, the question of the cost justification for regulation has been placed and remains squarely on the table.

Several studies have indicated the presence of scale and scope economies in postal services. But this is not true of all studies of postal costs, and the matter is far from settled. Early cost studies of overall operations did not show unambiguous scale or scope economies. Merewitz’s 1971 cross sectional study of US. Postal facilities found increasing returns in small and medium offices, but decreasing returns for large facilities. Stevenson’s time series study showed decreasing returns. Norsworthy, Jang, and Shi (1991) found fixed costs associated with the postal network and declining marginal costs of delivery. Christensen, Christensen, Guy, and O’Hara (1993) found constant returns to proportionate changes in volume and delivery points, but a .788 elasticity of cost with respect to volume changes alone, indicating increasing returns “from delivering additional mail to a fixed set of delivery points.” Bradley and Baron found evidence of increasing returns to scale in their 1993 study of mail processing facilities.

Although extremely useful for a variety of purposes, it is difficult for studies of

4 The author of a recent principles text concludes that “careful statistical analysis of the postal service’s costs has not been conclusive. Some studies support the Postal Service’s claim of substantial economies of scope, while other studies find little or no evidence of economies of scope” Tresch (1994).

5 Merewitz (1979, 504-509).

6 Stevenson (1973). Gupta’s 1982 update showed similar results. The data employed in these studies are quite old by now, and some postal technologies have changed. Moreover, Futz (1983) has criticized the functional forms employed in these studies (Cobb-Douglas and CES) as too restrictive to provide definitive information about the underlying cost structure.

7 Christensen (1993, 249).