

Future Applications of Dynamic Delivery Cost Model

Introduction

Last year, the Postal Service announced plans to discontinue the delivery of letter and flat mail on Saturdays, while retaining Saturday delivery of parcels. To better understand the potential effects of this change, the Commission requested proposals to analyze the resultant effects on the Postal Service's operations and finances. The Postal Service subsequently postponed changes in delivery frequency until a later date. However, one of the proposals the Commission received, the Swiss Economics proposal, presented a new method of modeling delivery costs that would provide an analytical tool to support a variety of Commission legal responsibilities.

One of the benefits of this new approach is that the Swiss Economics model is flexible; it can be adapted for use in a variety of applications to provide insight into the likely effects of various factors on carrier street times. Because the model appears useful in carrying out several of the Commission's responsibilities, it merits closer examination despite the Postal Service's decision to maintain Saturday mail delivery at this time.

For example, the model has the potential to improve the Commission's annual estimate of the cost of the universal service obligation (USO) and the value of the monopoly. Section 3651(b) of title 39 requires an estimate of the costs incurred by the Postal Service for, among other things, other public services or activities which would not otherwise have been provided by the Postal Service but for the requirements of law. The Commission interprets this requirement to include the estimated cost of delivering six days a week. The delivery model provides a new method for evaluating the impact of delivery frequency on costs and may prove useful in refining the Commission's annual estimate of these costs.

Second, the model could improve the Commission's estimates of the value of the letter and mailbox monopolies. The current method of determining the value of the two monopolies estimates the potential loss of contribution from volume lost to "cream skimming" by a hypothetical competitor. The determination of the cost of delivering to different geographic areas, for purposes of this estimate, can be substantially improved using the Swiss Economics model, by utilizing data specific to each route and each delivery day.

Thirdly, the model and underlying data may also be used to evaluate economies of scale, density and scope in delivery, both for current and forecast circumstances.

Finally, the model may be useful in evaluating the fixity (volume variability) of delivery costs across a range of potential volumes and cost structures. Understanding this key aspect of the behavior of delivery costs could facilitate development of estimates of both long-run and short-run marginal costs, both of which are critical inputs into pricing and network design decisions.

This remainder of this document provides background on current cost methodologies, explains how the Swiss Economics model differs from the existing methodology of attributing carrier costs to postal products and how those differences may lead to an improved understanding of how carrier costs are likely to respond to changed operational circumstances, and identifies other applications of the model.

Background

The Postal Reorganization Act (PRA) of 1970 established the requirement that each subclass of mail bear the direct and indirect costs attributable to that subclass of mail. The Postal Service produces annually its Cost and Revenue Analysis Report (CRA), which shows whether the revenue from each type of mail is greater than the costs directly and indirectly attributable to that type of mail during a given fiscal year. Since 1970, the methodologies for calculating postal costs have evolved, but the primary purpose continues to be the attribution of costs to mail classes and products. Most of the cost methodologies currently in use were developed or refined with public input during PRA-type omnibus rate cases.

In FY 2006, the Postal Accountability and Enhancement Act (PAEA) replaced the PRA. The PAEA fundamentally changed the way the Postal Service sets rates by imposing an inflation-based cap on the price of market dominant products and attributable cost floor on the prices of each competitive product. The PAEA also mandated that the Commission conduct an annual compliance determination to assess, among other things, whether rates complied with applicable postal law and whether service standards were met in the previous fiscal year. By imposing a 90-day review period for the compliance determination, the PAEA limits the opportunity to develop or refine cost methodologies during these reviews. The PAEA also shifted the responsibility for prescribing cost methodologies from the Postal Service to the Commission.¹

Participants in Commission proceedings have raised questions about how costing

¹See 39 U.S.C. § 3652(a)(1) and (e)(2).

information can serve new purposes and how cost distribution methodologies can be improved. The methodologies developed over the past 45 years have been focused on assigning costs to products based on causal relationships. Where there has been a need to develop forecasts of costs, a “roll-forward” process was used.²

In adjusting its network to respond to mail volume declines, the Postal Service has undertaken aggressive operational changes aimed at reducing costs. Consequently, there is an increased need for costing methodologies that can analyze not just what costs have been, but how costs will be affected by these changes in volume and operations. The dynamic delivery model detailed in the report by Swiss Economics will be useful to postal stakeholders and the Commission in understanding the true impact of Postal Service network and operational changes.

As detailed below, this delivery costing model can be used to help evaluate the attributable costs generated using the current accepted and approved methodology. The delivery costing model, which follows methods similar to those used by the Postal Service to design delivery routes,³ can also be adapted to estimate the impact of potential delivery operational changes, including frequency of delivery and method of delivery.

By comparing the current delivery costing methodology with some of the analytically advanced and operationally flexible costing methodologies developed by a wide section of postal stakeholders,⁴ this document provides context for the potential applications of the Swiss Economics model.

Current City Delivery Cost Methodology

As discussed above, the Postal Service produces the CRA each fiscal year. To support the CRA, the Postal Service produces an annual Cost Segments and Component Report. That report shows the total operating costs of the Postal Service divided into 18 segments. These segments reflect separate types of employees like postmasters and clerks, and non-employee expenses like transportation and other supplies and services. The Postal Service uses its general account ledger to determine the total amount of costs for each segment that

² In some instances, adjustments were made to account for operational changes between the base year and the year being forecast, but these adjustments were typically developed outside of the models used to attribute costs rather than by modifying the models to reflect the operational changes.

³ This was most recently done using the JARAP model/method.

⁴ *E.g.*, Mail Processing Network Rationalization and Delivery Unit Optimization were informed to some degree by advanced costing models, which help managers make efficient operational decisions by minimizing costs of network locations or route structures.

accrue in each fiscal year.

For City Delivery there are two cost segments, Segment 6, in office carrier costs, and Segment 7, city carrier street delivery costs. While Segment 6 costs are almost entirely driven by volume, Segment 7 costs exhibit a substantial degree of fixity. The behavior of carrier street costs are influenced by many factors, and given the geographic diversity among routes, daily and seasonal fluctuations in delivery volumes, and the continuous daily route adjustments and less-frequent route redesigns, estimating the effect of volume on these costs requires substantial effort.

The existing model relies upon a two-week sample of time spent by the carrier performing various activities. The time study was completed in 2004. While the results from the time study have not been updated in the past ten years, the annual cost allocation model reflects actual city carrier volume delivered each year. This model has been vetted and refined through input from postal stakeholders and approved by the Postal Regulatory Commission for use in determining the attributable cost by product.⁵ It relies on an assumption that the relationship between volume and cost is fixed at the level of variability determined by regression analysis of the data from the sample.

The model provides a reasonable means of attributing carrier street costs to mail shapes, but it is somewhat limited in its application beyond this purpose. It reflects the operational reality of the time when the data were collected and since collecting all of the data necessary to update the inputs is costly and time consuming, rapid changes in operations can potentially outpace the updates.⁶ Moreover, the model is not designed to analyze the potential impact of alternative assumptions about possible changes in operations such as changing the location of delivery points or the current six-day delivery structure.

Opportunity to Apply Modern Techniques

The Postal Service and stakeholders have increasingly looked to data driven solutions to postal issues. To date, these data driven techniques have primarily been applied to facility location issues. The Postal Service used its LogicNet Plus Mail Processing facility location

⁵ The econometric model estimates mail variability by shape, which is used to determine attributable costs by shape. Volume-based distribution keys, then allocate attributable shape costs to products.

⁶ The Postal Service is currently developing an update to the FY 2004 input data. By utilizing data that are already collected for other purposes, the time and expense of future updates would be reduced. Nevertheless, there remain at least two required inputs that would still require separate data collection efforts (parcel delivery, and collection of mail at delivery points). Docket No. RM2011-3, Priorities for Future Data Collection and Analytical Work Relating to Periodic Reporting, November 18, 2010.

model as a starting point to identify potential savings for the recent Mail Processing Network Rationalization Initiative.⁷ That model represented an evolutionary step forward from an earlier Postal Service model,⁸ as well as a white paper greenfield model developed by the USPS OIG.⁹ To rationalize the delivery facility network, the Postal Service implemented Delivery Unit Optimization, which followed modeling work by the USPS OIG.¹⁰

The delivery model developed by Swiss Economics follows in the framework of previous data-driven models. A major difference is that it is an operational model, rather than a facility model. Facility models start with the current network, and evaluate the potential for efficiency improvements by rationalizing or optimizing the number and location of facilities. In contrast, this delivery model focuses on changes in operations, and not changes in facility location. This approach matches the methods used by the Postal Service to design city carrier routes.¹¹

Potential Applications

The structure of the Swiss Economics model allows for cost-driving inputs to be altered to reflect alternative scenarios to estimate the financial impact of the changes. In this way, it can be used for “what-if” analysis that can provide insight into other potential changes to delivery operations. Potential changes such as reducing delivery frequency or converting deliveries from residents’ doors into curblines or clusterbox deliveries lend themselves to this type of analysis. In addition, the value of the letter and mailbox monopolies is estimated based on analysis of the volume that could be profitably captured by a hypothetical competitor to the Postal Service. Analysis of each of these issues requires an estimate of what the cost of delivery would be if the number of and distance between delivery points were different from the status quo.

Given input data on how much volume is to be delivered, and to which addresses, the model determines the shortest route and estimates its cost. For example, to estimate the potential savings from converting a route to clusterbox delivery (where each box serves 20 addresses) the model could be modified to assume that the volume destined for each group

⁷ Docket No. N2012-1, Mail Processing Network Rationalization Service Changes, 22011, Responses of the United States Postal Service to City of New Orleans Interrogatory CNO/USPS-2, March 15, 2012.

⁸ Docket No. N2006-1, Evolutionary Network Development Services Changes, Advisory Opinion Concerning a Proposed Change in the Nature of Postal Services, December 19, 2006, at 16-17.

⁹ OIG USPS White Paper, Report No. RARC-WP-14-005, Greenfield Costing Methodology: An Opportunity to Deliver Transformative Change, January 7, 2014.

¹⁰ OIG USPS, Delivery Unit Optimization Initiative Audit Report, Report No. MS-AR-13-001, December 6, 2012; A Framework for Delivery Network Optimization RARC-WP-12-015, September 10, 2012.

¹¹ Foundation for the Future, 2010 Performance Report and 2011 Performance Plan, at 30.

of 20 addresses (1-20, 21-30, etc.) is delivered to the first address in the group.

Similarly, the model may be applicable to refining the methodology used to estimate the value of the Postal Service's monopolies. The value of the monopoly is estimated based on contribution that would be lost by the Postal Service if a hypothetical competitor captured mail volume on routes where it could profitably deliver mail at prices less than or equal to the Postal Service's prices. This requires assumptions about the fixed and variable cost of delivery for each route. Currently, in the absence of route-specific costs, it is assumed that the total cost of each route is the same, as is the average variable cost per piece.¹² The Swiss Economics model may allow improvement on these assumptions in two ways: the total delivery costs are specific for each individual route; and, because contestable volume may not be sent to all addresses on a route, the model can reflect the potential for an entrant to incur fewer fixed costs as a result of lower coverage.

Commission Invites Comments on the Swiss Economics Model

The Commission is hopeful that thoughtful consideration of this model will encourage postal stakeholders and innovators to suggest improvements and develop additional uses for this model.

¹² The analysis does distinguish between the average total cost of business and residential routes, and also between the average variable cost for different categories of mail. Nevertheless, these averages are applied to all routes of a type and all pieces of a category.