

Chapter 5

**Revenue/Cost Model
and Results**

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Revenue/Cost Model and Results

Introduction

This chapter describes the revenue/cost model used by OTA to project the impact of U.S. Postal Service (USPS) involvement in electronic mail and message systems (EMS) on its finances and outlines the results of the analysis. OTA originally intended to prepare projections of USPS revenues and costs for all classes of mail under the four alternatives considered for the years 1985, 1990, 1995, and 2000. However, the USPS revenue and cost

structure proved to be too complex, and the available baseline data too ambiguous, to make complete projections. Instead, OTA has focused on the financial impacts for first-class mail which, according to the results of the market penetration analysis discussed in chapter 4, will be affected most by EMS. The revenue/cost model for conventional mail is described first, followed by the model for electronic mail.

USPS Revenue/Cost Model for First-Class Conventional Mail

USPS revenue and cost relationships are unusually complex for several reasons. First, postal costs vary not only with the volume and weight of mail delivered, but also according to class of mail, number of route stops, speed of service standards, size and shape of mail, and whether (and how) the mail is ZIP-coded and presorted. Costs also may vary between urban, suburban, and rural routes, although USPS does not collect cost data based on mail destination.

Second, cost analysis is complicated by the problem of how to assign joint and common costs properly to the different services they support; for example, allocation of delivery route costs by class of mail.

Third, there is a problem in determining what costs are variable with volume changes over various time periods. Thus, some costs that appear fixed in the short run (e.g., 1 to 3 years) may be variable (i.e. adjustable to meet volume requirements) over a 10- or 20-year period.

On the revenue side, postal revenues depend on the volume of mail sent by customers in each of the many service categories estab-

lished by USPS, and on the rates in each category. Revenue projections are further complicated by the need to consider the impact of inflation and public subsidies on rates, and in turn the impact of rates on mail volumes in each service category. There is a feedback process, but its exact nature is unknown. That is, changes in rates may have a significant effect on mail volume, which in turn affects mail rates 1, 2, or 3 years later (in the next rate-setting cycle).

In order to simplify the revenue/cost analysis for the purposes of this study, OTA developed a USPS revenue and cost model based on the following assumptions:

- *Percentage Fixed v. Variable Costs.* To the extent that a significant fraction of USPS costs are fixed, declining volumes would cause an increase in the average cost per piece of mail. This higher cost would have to be recovered by increases in rates or postal subsidies or offset by cost reductions through service cutbacks. OTA assumed a USPS fixed cost of about 36 percent based on the revenue and cost analysis used in the 1980 rate case before

the Postal Rate Commission (PRC). The primary fixed costs were estimated by PRC to be \$5.8 billion for USPS institutional costs (e.g., headquarters, postmasters, inspection service) and \$1.8 billion for service-related fixed costs that could be assigned to various mail classes.¹

- *Revenue and Cost Per Piece.* The 1980 PRC rate case was also used as the basis for determining revenue and variable cost per piece. For first-class mail, the per piece revenue and variable costs were 20¢ and 13¢, respectively.² The 20¢/piece revenue estimate assumed an 18¢ first-class stamp.
- *Economies of Scale.* OTA assumed that USPS is still operating with economies of scale, so that mail volume reductions would tend to increase the per piece cost of the remaining mail. If mail volumes reached or exceeded the optimal capacity of the system, then volume reductions might actually reduce rather than increase the per piece cost.
- *Inflation.* Clearly, inflation will cause postal costs to rise, and presumably rate increases will be necessary to keep up with inflation (to the extent that increased costs are not offset by improved productivity). For the purposes of this analysis, future revenues and costs are expressed

in “constant dollars.” Changes, too, are expressed in so-called “real” revenues or “real” costs—net of changes due to inflation.

- *Public Service Subsidy.* For the purposes of this analysis, the postal public service subsidy level was held constant at the \$692 million level assumed by PRC in the 1980 rate case.³ At the present time, there are no proposals to increase the subsidy; in fact, the Omnibus Budget and Reconciliation Act of 1981 has reduced the authority for such appropriations to zero by fiscal year 1984.
- *Productivity.* In terms of costs, any overall productivity improvements with respect to conventional mail were assumed to be offset by increases in the cost of capital and increases in real wages. Productivity gains due to the introduction of EMS were considered as part of the revenue/cost model for electronic mail.
- *Use of the Model* By using the 1980 estimates of per piece first-class mail cost and applying this to future projections of USPS volumes for conventional first-class mail, future costs were calculated in 1980 dollars. Likewise, by using the 1980 estimate of per piece first-class revenue and applying this to projected mail volumes, future revenues were calculated in 1980 dollars.

¹Postal Rate Commission, Opinion and Recommended Decision, docket No. R-80-1, p. 222.

²Ibid., app. G, schedule 1, p. 1.

³Ibid.

USPS Revenue/Cost Model for First-Class Electronic Mail

In addition to a projected volume of conventional mail, USPS will deliver some volume of electronic mail (defined as Generation II EMS hardcopy). Thus, it was also necessary to develop revenue and cost assumptions for USPS electronic mail services. The cost consists of two parts: the cost for the USPS electronic portion of the system (including printing and enveloping), and the USPS mainstream cost of delivering the hardcopy.

For the mainstream portion, OTA assumed a cost displacement of 5¢/first-class piece, based on 1980 PRC estimates of the cost displacement for Mailgram.⁴ That is, the mainstream cost of Generation II would be 8¢,

⁴Ibid; according to Frank Heselton, USPS Manager of Revenue and Cost Analysis, the 8¢/piece Mailgram cost includes only delivery and administrative costs. When the cost of operating Mailgram teleprinters is included, the per piece cost increases to about 24¢.

5¢/piece less than the mainstream cost of conventional mail. The 5¢/piece cost displacement is also reasonably consistent with estimates made by RCA for a USPS electronic system (specifically the electronic message service system (EMSS) concept).⁷

For the electronic portion, OTA did not independently verify either the RCA estimates for EMSS or the USPS estimates for electronic computer-originated mail (E-COM). Therefore, cost estimates were developed only for

⁷RCA Government Communications Systems Division, *EMSS System Analysis Task AB, VOL II, Cost and Service Impact of System Decentralization*, October 1977.

USPS delivery of Generation II first-class hardcopy output.

For average revenue per piece of Generation II EMS hardcopy output delivered, OTA assumed that the “markup” of per piece revenue over the per piece cost for EMS must be the same as the markup for the corresponding classes of conventional mail. Analysis of the 1980 PRC rate case indicated that the average per piece revenue level for first-class mail was roughly 50 percent higher than the per piece variable cost. This 1.50 factor was used to estimate a 12¢/piece revenue for USPS delivery of Generation II EMS hardcopy output.

Results of the Revenue/Cost Analysis for First-Class Mail

Given the first-class mail volume projections from chapter 4 and using the revenue and cost models (for both conventional and USPS delivery of Generation II developed above), the financial impacts on USPS for first-class mail can be projected.

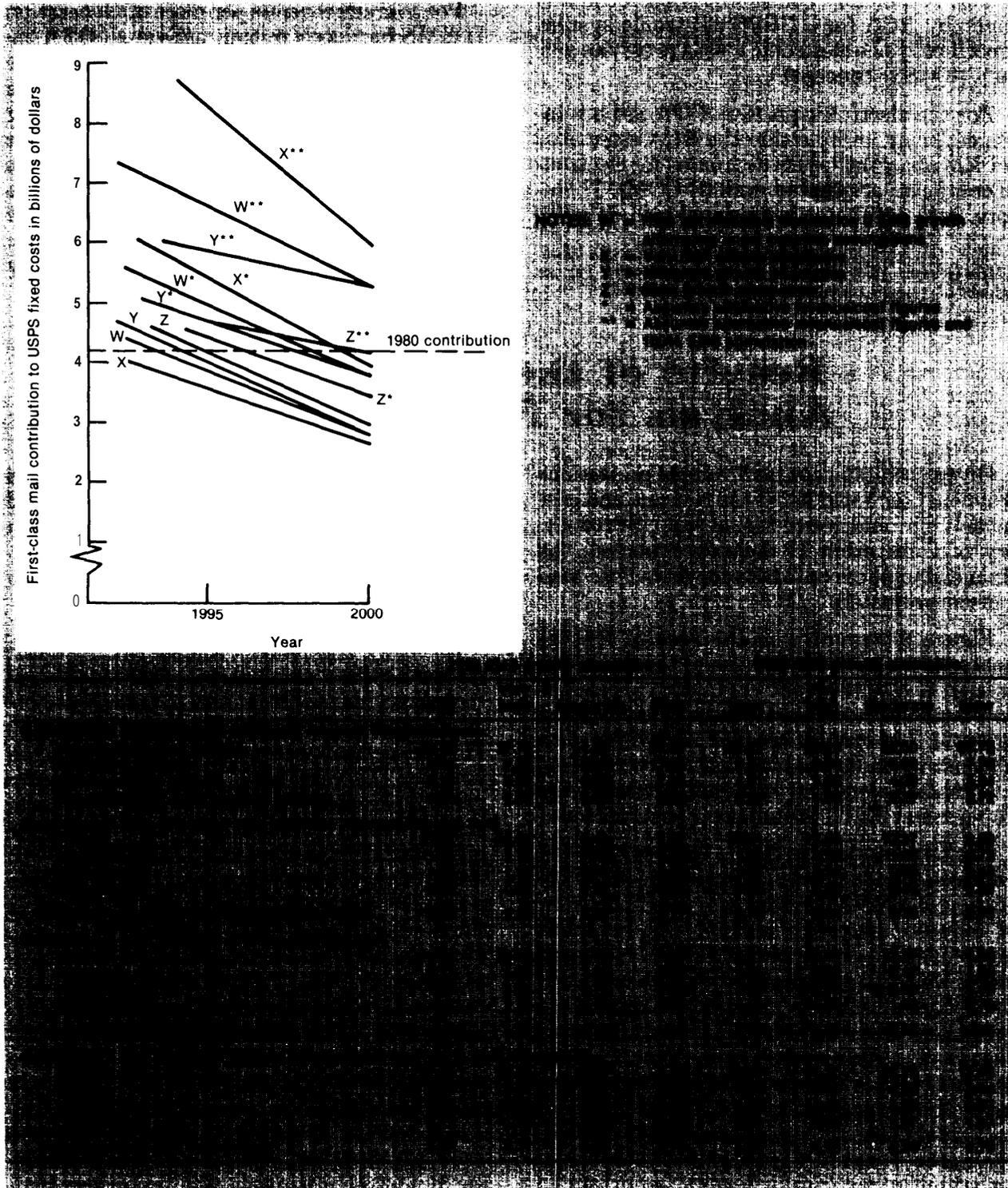
Figure 9 summarizes the results for the years 1995 and 2000 for each of the four Generation II EMS alternatives under the baseline assumptions (2-percent underlying mainstream growth). The results are also shown for each alternative under the alternative revenue/cost assumption alone and in combination with the 100-percent EMS stimulation assumption.

The tabular data in figure 9 gives the mail volumes for conventional first-class and Generation II EMS first-class with USPS delivery of industry hardcopy output. The revenues and costs for these volumes are indicated along with the contribution of each to USPS fixed costs. USPS is not allowed to make a profit overall, but individual classes and subclasses of mail do make varying contributions to fixed costs. First-class mail historically has made the largest contribution of any class of mail, and thus the continuing ability of first-class mail volumes to generate a substantial contribution appears to be very important to

overall USPS financial stability. In fiscal year 1980, the first-class mail contribution to USPS fixed costs was about \$4.2 billion, based on an actual volume of 60 billion pieces and assuming 20¢/piece revenue and 13¢/piece variable cost.

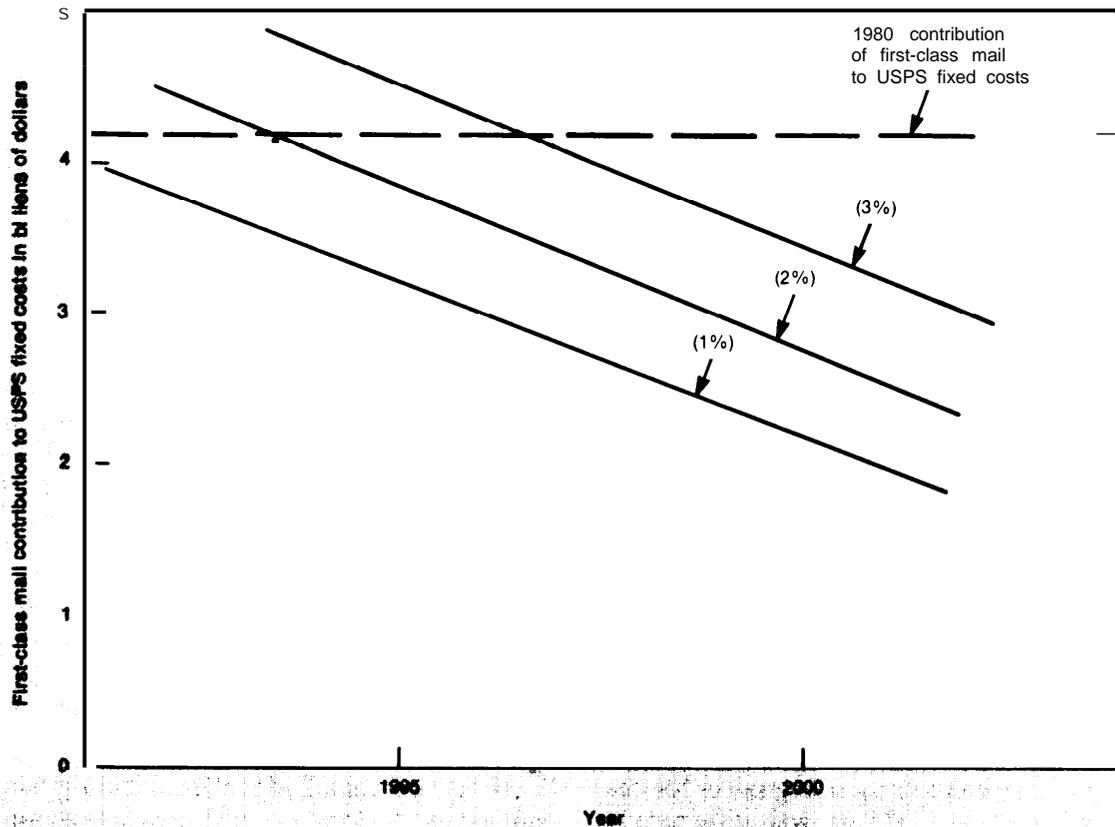
Basically, the results indicate that by 2000, for the baseline assumptions, USPS-delivered first-class mail is projected to contribute between \$1.25 billion (for the slow Generation II EMS growth alternative) to about \$1.5 billion (for the very high, high, and moderate growth alternatives) less to USPS fixed costs than in fiscal year 1980. Thus, in 2000, for the high but plausible Generation II EMS growth alternative, the first-class mail contribution is projected to be about \$2.76 billion, which is \$1.44 billion less than the contribution in 1980. If a 3-percent underlying mainstream rate is assumed, in 2000 the net reduction in first-class mail contribution for the high but plausible growth alternative would be less but still significant. As shown in figure 10, under the 3-percent growth assumption, the first-class mail contribution is projected at \$3.46 billion, which is about \$750 million below the 1980 contribution. With a 1-percent underlying mainstream growth, the first class mail

Figure 9.—Contribution of USPS-Delivered First-Class Mail (conventional plus Generation II EMS) to USPS Fixed Costs (assuming 2% underlying mainstream growth)



SOURCE: Office of Technology Assessment.

Figure 10.—Contribution of USPS-Delivered First. Class Mail to USPS Fixed Costs for High But Plausible Generation II Growth Alternative (assuming 1%, 2%, and 3% underlying mainstream growth)



		1995			2000		
		1%	2%	3%	1%	2%	3%
Conventional first-class with 20¢/piece revenue, 13¢/piece cost							
Volume (billions of pieces)	39.49	47.15	56.20	25.81	32.37	40.51	
Revenue (\$ billions)	7.90	9.43	11.24	5.16	6.47	8.10	
Variable cost (\$ billions)	5.13	6.13	7.31	3.36	4.21	5.27	
Contribution to fixed costs (\$ billions)	2.77	3.30	3.93	1.80	2.26	2.83	
Generation II EMS first-class with 12¢/piece revenue, 8¢/piece cost							
Volume	11.42	13.64	14.78	9.98	12.51	15.65	
Revenue	1.37	1.64	1.77	1.20	1.50	1.88	
Variable cost	0.91	1.09	1.18	0.80	1.00	1.25	
Contribution	0.46	0.55	0.59	0.40	0.50	0.63	
Total first-class contribution to fixed costs	3.23	3.85	4.52	2.20	2.76	3.46	

SOURCE: Office of Technology Assessment.

contribution would be \$2.2 billion, a full \$2 billion below the 1980 level.

How significant is a \$0.75 billion, \$1.25 billion, or \$1.50 billion reduction in first-class mail contribution to USPS fixed costs? It

would appear to be quite significant considering that the total public appropriation (public service subsidy plus revenue forgone) to USPS for fiscal year 1980 was about \$1.6 billion. The fiscal year 1980 revenue forgone appropriation (to offset revenue losses from mail service pro-

tided at reduced rates, primarily nonprofit second-class mail, nonprofit bulk rate third-class mail, library materials, and free mail for the blind and handicapped) alone was \$0.782 billion. And the incremental cost of delivery 6 days per week compared to 5 has been estimated by USPS to be about \$0.65 billion.

In other words, the projected reduction in first-class mail contribution in 2000 is roughly equivalent, under the baseline assumptions, to the combined 1980 public service and revenue forgone appropriation, or to the revenue forgone appropriation plus the cost of Saturday delivery, or the equivalent. Under the 3-percent mainstream growth assumption, the reduction in first-class mail contribution is roughly equivalent to the 1980 public service subsidy, or the revenue forgone appropriation, or the cost of Saturday delivery.

In general, as long as Generation II first class costs less per piece than conventional first class but has the same markup of revenue over cost per piece (50 percent), the first-class mail contribution to USPS fixed costs will decline as Generation II volume increases (assuming Generation II EMS costs USPS less than conventional.) Thus, as indicated in figure 9, the first-class contribution is greater for the slow Generation II EMS growth alternative than for the high or very high growth alternatives.

The financial contribution of Generation II EMS could be increased if the rate for USPS delivery of EMS hardcopy output were the same as the rate for conventional mail delivery. Up to this point in the analysis, OTA assumed that all cost savings from EMS would be passed on directly to the EMS user (i.e., whoever is paying the postage). Thus, the relationship between EMS first-class mail per piece revenue and cost was assumed to be the same as for conventional first-class mail. In other words, cost savings from EMS were reflected in lower EMS rates rather than in lower rates for other classes of mail or the mainstream as a whole. As a result, USPS could not obtain any greater return ("markup" or

contribution to fixed costs) from EMS than from conventional mail.

Under the alternative revenue/cost assumption tested by OTA, EMS first-class rates were assumed to be the same as conventional first-class mail rates. In this scenario, USPS would, in effect, be pricing Generation II EMS first-class mail to contribute a higher percentage (or markup) to fixed costs than would conventional mail. Thus, a revenue per piece of 20¢ was used for EMS instead of 12¢. As shown in figure 9, when using the alternative revenue/cost assumption, the high, very high, or moderate growth alternatives would result in an additional first-class mail contribution of roughly \$1 billion in 2000 (compared to the projected contribution under the baseline assumptions). This level would still be a few hundred million dollars below the current first-class mail contribution to fixed costs. Note that the analysis also assumed no loss in EMS volume due to the higher USPS rates. If EMS users were sensitive to the increase from 12 to 20¢/piece (for USPS delivery of Generation II hardcopy output), then the increased revenue from higher rates might be offset by reduced revenue from lower volume.

If 100-percent EMS stimulation is also assumed (each Generation II message stimulates an additional new message), the first-class mail contribution to fixed costs in 2000 would be significantly higher than the 1980 contribution, by as much as \$1 billion for the high and moderate growth alternatives and \$1.5 billion for the very high growth alternative. These projections are included in figure 9. This scenario would enable USPS to use net revenues from Generation II EMS to help keep down overall rates for conventional mail, even in the face of the declining conventional mail volumes projected for 2000. However, as noted in chapter 5, the 100-percent EMS stimulation assumption is considered speculative at this time.

Under current USPS pricing policies, to the extent that private firms transmit Generation II messages and present them to USPS for

local delivery, these messages will be delivered as first-class mail at the same rates as for conventional mail. Thus, the alternative revenue/cost assumption would apply, and the contribution to USPS fixed costs would be 12¢/piece rather than 4¢. To the extent that USPS provides electronic services (e.g., printing, en-

veloping, and/or transmission) as well as physical processing and delivery, USPS would establish rates to cover the costs of electronic services plus some markup over costs. This would provide an additional contribution to fixed costs. OTA has not estimated or analyzed this contribution.