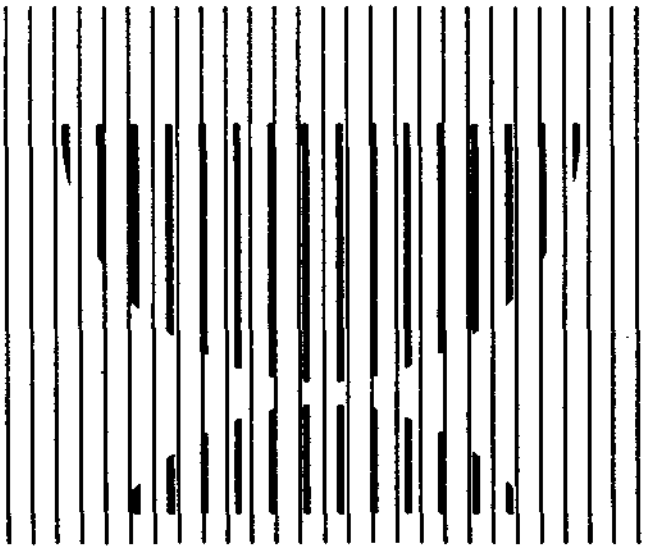
CBO STAFF MEMORANDUM

ESTIMATING OUTLAYS FOR U.S. POSTAL SERVICE CAPITAL INVESTMENT

JULY 1990



THE CONGRESS OF THE UNITED STATES
CONGRESSIONAL BUDGET OFFICE
SECOND AND D STREETS, S.W.
WASHINGTON, D.C. 20515

This Congressional Budget Office Staff Memorandum presents a methodology for estimating budget outlays from the capital investment program of the U.S. Postal Service (USPS). The presentation offers two estimating techniques: (a) a shortcut route based on generalized spendout rates; and (b) a longer formulation using a regression analysis, based on experience since the 1971 Postal Reorganization, that considers the levels and types of investments. The information in the memorandum will be used in other CBO work on the USPS capital investment program, including an evaluation of the possible need for a further increase in statutory limits on the Postal Service's debt. (Last December the Congress authorized an increase to about half the total borrowing authority sought by the Postal Service.) The analysis in the memorandum also offers alternatives for CBO baseline estimating of USPS outlays. Model results are compared to the most recent five-year estimates prepared for CBO by the USPS. This memorandum contains one editorial change from the memorandum prepared in June 1990.

This memorandum was prepared by Stephen Celio of CBO's Office of Intergovernmental Relations, under the supervision of Stanley L. Greigg and Earl Armbrust. Mary V. Braxton typed the drafts and prepared the final product.

The model presented in this memorandum draws on preliminary work that was produced by Daniel Coffey, formerly of CBO, and that was discussed with staff members of the U.S. Postal Service. Helpful comments on the memorandum were provided by Mitchell Rosenfeld of CBO's Budget Analysis Division. The information in the memorandum is subject to revision upon further review by the Postal Service or upon the availability, after October 30, 1990, of additional data. Questions about the analysis should be addressed to the author at (202) 226-2616.

NOTE:

Unless otherwise indicated, all years referred to in this memorandum are government fiscal years that currently run from October 1 through September 30. Prior to 1977 government fiscal years covered the period July 1 through June 30.

INTRODUCTION

Estimated U.S. Postal Service (USPS) outlays for capital investment during the 1991-1995 period exceed $12.0 billion dollars. This amount represents only about 5 percent of total cash disbursements projected by USPS. But estimating capital outlays is important because it can affect the timing and scope of future legislative proposals to further increase USPS borrowing authority. Capital outlays are an area where the Congressional Budget Office (CBO) may wish to enhance its capacity to evaluate projections prepared by USPS for budget baseline estimates. The USPS has, as in past years, substantially revised its capital outlay estimates that were incorporated in CBO's January baseline. This time the revisions reduce 1990 outlays by $154 million and 1991 outlays by $595 million. The revised estimates are reasonably close to results generated by a CBO model for these two years: differing by $12 million and $162 million respectively.

The five-year estimates of capital investment outlays--produced by the model described below--average about 3.5 percent or $84 million per year higher than the revised estimates prepared by USPS and to be incorporated in the updated baseline. As shown in Table 1, the net five-year difference of $0.42 billion reflects plus and minus variations ranging from -$0.11 billion in 1992 to +$0.19 billion in 1993. The two sets of estimates are based on the same stream of annual capital commitments (see Appendix Table A). The outlay estimates derive from a model (GG model) that explains 97 percent of the yearly changes in capital outlays for the period 1972-1989. As shown in Figure 1, the model results closely track actual experience.

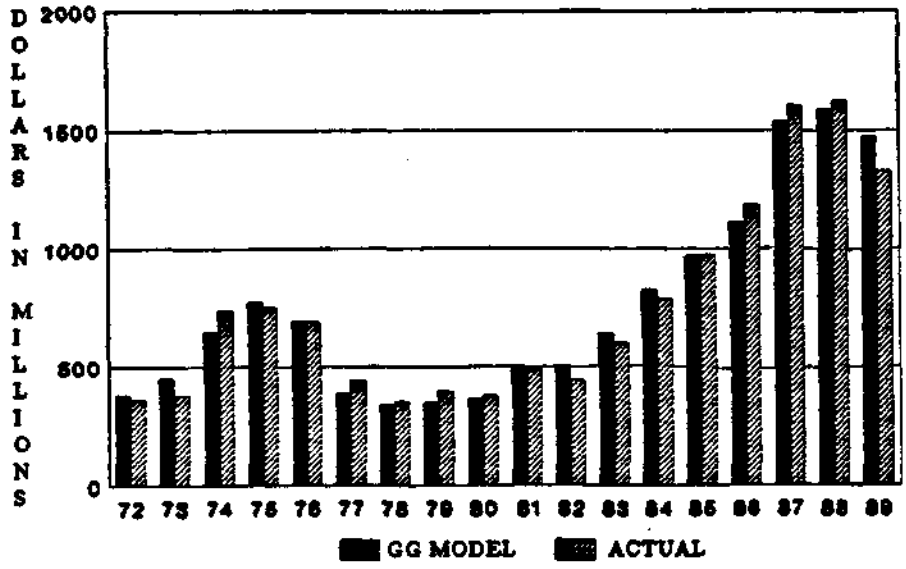
THE GG MODEL

The GG model considers both the level and the type of capital investment. It estimates outlays based on a two-tiered spendout for each of three subclasses of capital investment commitments (obligations): mail processing equipment, building construction, and all other. The first tier of spendout rates for each subclass applies to aggregate investment up to a specified threshold, and the second tier of rates applies to any remaining amount. Second-tier rates reflect a more protracted spending for investment obligations in excess of the specified thresholds. (Table 2 identifies the thresholds and rates for each subclass.)

The two-tiered spendout rates produce proxy outlay streams for each of the three investment subclasses. Because the sum of the proxy streams does not equal the total amount of actual capital disbursements in any given year, as shown in Table 3, a regression model was prepared. It uses each proxy stream (from 1972 through 1989) as an independent variable in order to produce total estimated capital outlays. Actual total capital outlays are the dependent variable. The formula-produced results are then adjusted to include outlays for unique investments in long-life vehicles (LLVs). The statistical analysis, based on 18 observations for the period 1972-1989 and having an acceptable Durbin-Watson statistic, explains 97 percent of the year-to-year changes in capital outlays. The formula has the following form:

Outlays yr(n) = -204.5 + 1.30 * (mail processing(n) outlay stream) + 0.52 * (buildings(n) outlay stream) + 2.17 * (other(n) outlay stream)

FIGURE 1. COMPARISON OF MODEL-PRODUCED AND ACTUAL CAPITAL OUTLAYS 1972-1989



SOURCE: Congressional Budget Office.
NOTE: Outlays exclude amounts for purchase of long-life vehicles.

TABLE 1. CAPITAL OUTLAYS PROJECTED BY GG MODEL AND BY USPS (By fiscal year, in billions of dollars)

	Actual	Current	Projections					1991-95
	1989	1990	1991	1992	1993	1994	1995	Total
GG Model[a/]	1.47	1.75	2.23	2.59	2.68	2.57	2.38	12.45
USPS[b/]	1.33	1.76	2.07	2.70	2.49	2.40	2.37	12.03
Difference from USPS	+0.14	-0.01	+0.16	-0.11	+0.19	+0.17	+0.01	+0.42
Percent Difference	10.8	-0.7	7.9	-4.1	7.6	7.1	1.0	3.5

SOURCE: Congressional Budget Office.

a. Model results adjusted to include outlays for long-life vehicles.
b. Most recent capital outlay estimates for 1990 through 1995 were prepared by USPS for CBO's June update of baseline projections.

Assuming a continuation of historical relationships, the GG model should provide estimates that--95 percent of the time--are within $127 million of the actual values. During the sample period only one estimate exceeded this level--the difference of $142 million in 1989. (Further investigation was unable to show why such a large divergence might have occurred.)

TABLE 2. TWO-TIERED GG SPENDOUT RATES BY TYPE AND LEVEL OF CAPITAL INVESTMENT (Rates expressed as percentages)

	Year 1	Year 2	Year 3	Year 4	Year 5	All Years
Mail Processing Equipment						
First $200 M of investment	5	25	45	25	0	100
Any Excess	0	15	30	35	20	100
Buildings						
First $250 M of investment	25	60	15	0	0	100
Any Excess	15	40	40	5	0	100
Other[a/]						
First $200 M of investment	100	0	0	0	0	100
Any Excess	35	50	15	0	0	100

SOURCE: The specific spendout rates and thresholds adopted for each tier were developed by the Congressional Budget Office as best fits after trial and error refinement of values based on intuitive judgments and USPS data.

a. This category covers remaining investments that include vehicles (other than those custom-built for extended life), customer service and support equipment, and building improvements.

TABLE 3. PROXY CAPITAL OUTLAYS FOR SELECTED INVESTMENT CATEGORIES COMPARED TO PREDICTED AND ACTUAL TOTAL CAPITAL OUTLAYS (By fiscal year, in millions of dollars)

Year	Mail Processing Equipment	Building Construction	Other[a]	Proxy Total[a,b]	Predicted Total[c]	Actual Total[d]
1972	62	125	204	391	382	361
1973	113	250	175	538	451	381
1974	182	292	214	688	647	738
1975	191	262	274	727	773	752
1976	132	252	275	658	693	689
1977	87	242	161	491	384	438
1978	68	189	164	421	337	352
1979	55	150	186	390	347	393
1980	49	160	195	403	364	378
1981	54	212	242	509	500	494
1982	95	175	226	495	498	444
1983	132	176	267	576	638	601
1984	120	266	338	724	822	786
1985	119	370	382	870	969	970
1986	164	504	387	1055	1112	1183
1987	172	698	453	1323	1534	1600
1988	160	832	427	1420	1587	1621
1989	181	768	387	1337	1472	1329
1990	250	719	486	1455	1751	1763[e]
1991	446	1035	514	1995	2228	n.a.
1992	755	1139	471	2365	2590	n.a.
1993	1010	1061	428	2499	2683	n.a.
1994	1070	998	383	2451	2567	n.a.
1995	1015	907	352	2274	2381	n.a.

SOURCE: Data on proxy outlays by type of investment were prepared by the Congressional Budget Office, applying spendout rates in Table 2 to commitment levels contained in Appendix Table A.

NOTE: n.a. = not applicable.

a. Excludes outlays for procurement of long-life vehicles.
b. Because of rounding, the proxy totals do not always equal the sum of the three investment categories.
c. Proxy total spending adjusted to align with historical relationships used by the GG model and to include outlays for long-life vehicles.
d. Actual amounts also include outlays for long-life vehicles.
e. Most recent estimate of current year prepared by USPS.

SHORTCUT ESTIMATING

The GG model results can be translated into generalized spendout rates that can be used for shortcut estimating. The spendout rates can be prepared either as marginal rates for estimating the outlay effects of incremental changes in the level of capital investment or as zero-based rates for estimating spending for the entire capital program. Table 4 identifies marginal and zero-based GG spendout rates. (To account for variation in the level and mix of capital investment, the spendout rates are based on three-year averages of model-produced spending from new commitments for 1989, 1990, and 1991.)

Table 4 also shows relevant statistics for assessing the predictive value of the GG model and the zero-based shortcut method. Although the zero-based spendout rates are easier to use than the GG model, they have a lower predictive value because they explain less of the year-to-year changes, fall slightly short of an acceptable Durbin-Watson statistic, and have nearly twice as large a standard error. (The quality of the shortcut method may be assessed by a regression analysis that treats the stream of outlays produced by the shortcut estimating technique as the independent variable and actual outlays as the dependent variable. In this analysis the constant coefficient is 1.0130. See Appendix Table B.)

TABLE 4. GENERALIZED SPENDOUT RATES FOR ESTIMATING USPS CAPITAL INVESTMENT OUTLAYS (Rates expressed as percentages)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
GG Marginal	17	33	26	16	8	100
GG Zero-based	25	30	25	15	5	100

Statistics for Evaluating Predictive Value of Estimating Methods

	Adjusted R-Squared	2-Tail Significance	Durbin-Watson	Standard Error (millions of dollars)
GG Zero-based spendout rates	.89	.000	1.41	121.7
GG Proxy Model	.97	.010	1.60	63.3

SOURCE: Congressional Budget Office.

APPENDIX TABLE A. USPS CAPITAL COMMITMENTS BY FISCAL YEAR AND BY TYPE OF INVESTMENT
(In millions of dollars)

Year	Mail Processing Equipment	Building Construction	Other	Total Non-LLV	LLVs[a/]	Grand Total
1972	258	257	210	725		725
1973	231	402	170	803		803
1974	64	165	235	464		464
1975	112	263	360	735		735
1976	44	260	190	494		494
1977	71	181	137	389		389
1978	42	152	164	358		358
1979	33	122	186	341		341
1980	79	258	195	532		532
1981	179	163	320	662		662
1982	118	144	166	428		428
1983	48	266	341	655		655
1984	267	420	394	1081		1081
1985	154	551	383	1088		1088
1986	76	684	389	1149	1281	2430
1987	330	1219	575	2124	61	2185
1988	92	289	233	614	10	624
1989	554	873	528	1955		1955
1990	1136	1287	536	2959		2959
1991	1203	1047	476	2726		2726
1992	938	1078	434	2450	235	2685
1993	937	977	399	2313		2313
1994	1098	829	337	2264		2264
1995[b/]	1153	870	354	2377		2377

SOURCE: Data derived by the Congressional Budget Office from annual reports on the U.S. Postal Service five-year capital investment program and from related data. Data covering the historical period 1972-1989 are based on postal fiscal years which have 364 days.

a. LLV refers to investments in specially designed long-life vehicles that were mainly contracted for in 1986. An additional LLV investment slated for 1992 is assumed to total $235 million.

b. The $2,377 million of capital commitments for 1995 is distributed among the three types of investment according to the proportions planned by USPS for the preceding year.

APPENDIX TABLE B. ESTIMATED ZERO-BASED, ADJUSTED ZERO-BASED, AND ACTUAL OUTLAYS 1972-1989
(In millions of dollars)

Year	Estimated Zero-Based Outlays[a/]	Adjusted Zero-Based Outlays[b/]	Actual Outlays
1972	360	365	361
1973	526	533	381
1974	586	594	738
1975	644	652	752
1976	617	625	689
1977	539	546	438
1978	463	469	352
1979	401	406	393
1980	408	413	378
1981	483	489	494
1982	508	515	444
1983	554	561	601
1984	699	708	786
1985	857	868	970
1986	1003	1016	1179
1987	1342	1360	1428
1988	1295	1312	1394
1989	1431	1450	1124

SOURCE: Congressional Budget Office.

NOTE: Outlays exclude amounts for purchase of long-life vehicles. In some years the outlay amounts are derived from data that report on the basis of postal fiscal years which have 364 days.

a. Zero-based outlays derived by applying shortcut spendout rates (see Table 4) to total capital commitments that exclude purchase of long-life vehicles (see Appendix Table A).

b. Zero-based adjusted outlays derived by applying a regression-generated coefficient to zero-based outlays. See Table 4 for certain regression statistics.