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POSTAL RATE COMMISSION
WASHINGTON, D.C. 20268-0001

Postal Rate and Fee Changes) Docket No. R2005-1

OFFICE OF THE CONSUMER ADVOCATE
INTERROGATORY TO UNITED STATES POSTAL SERVICE
WITNESS MICHAEL D. BRADLEY (OCA/USPS-T14-28-37)
June 10, 2005

Pursuant to Rules 25 through 28 of the Rules of Practice of the Postal Rate Commission, the Office of the Consumer Advocate hereby submits interrogatories and requests for production of documents. Instructions included with OCA interrogatory OCA/USPS-T1-1, dated April 12, 2005, are hereby incorporated by reference.

Respectfully submitted,

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OCA/USPS-T14-28. This question references the Timepool data set and the SAS program "Estimating the Delivery Equations". The SAS program is found in USPS-LR-K-81 – Econometric Analysis of City Carrier Street Time. A small number of observations have non-numeric route ids (please see lines 23-32 of the "Attachment to Interrogatory OCA/USPS-T14-28"). Please explain why the route ids are non-numeric and the significance of the designation.

(a) Why are the routes recoded as 11.1?

(b) Do the recoded routes ever match any data in the volume data sets? If so, please provide information on which data items match.

OCA/USPS-T14-29. This question references the Timepool data set. How was the delivery mode variable assigned a value (C,D,F,O,P,X) for a route if the route used more than one delivery method?

OCA/USPS-T14-30. In the Letters/Flats volume data there are 686 observations for Sundays or Memorial Day. Please explain why these observations are included. In addition, approximately 650 observations appear to have inconsistently coded dates (i.e. 4-Jun rather than 06/04/02).

(a) Is it correct that these observations were dropped in your analysis?

(b) Can these observations be used in the analysis if the date codes are corrected? Please explain in detail.

OCA/USPS-T14-31. In the Parcels/Accountables volume data there are 9639 observations for Sundays and holidays. Most, but not all, data values are zero.

(a) What is the purpose/cause of origination of these observations?

(b) Can/should the observations be dropped from the analysis?

OCA/USPS-T14-32. There appears to be inconsistency in the route codes between the Letters/Flats and Parcels/Accountables data sets. Approximately 6,000 out of 42,000 route/date observations only appear in one of the output data sets. For example, ZIP 275455 has 43 routes in common, 2 routes that are unique in the PA data set and 17 that are unique in the LF data set. What are the reasons for the discrepancies? Please explain in detail.

OCA/USPS-T14-33. In the parcels delivery equation, an observation is only kept if the number of large parcels (PCL) and accountables (ACT) are both >0. (Please refer to lines 389, 390 in "Attachment to Interrogatory OCA/USPS-T14-28"). Why don't you use observations where only one of these is positive?

OCA/USPS-T14-34. When the Letters/Flats and Parcels/Accountables volume data sets are merged, only the ZIP/route/date observations that are present in both volume data sets are kept. Since no data from the Letters/Flats volume data set is used to estimate the "parcel delivery" equations, why are these data points eliminated when estimating the parcel delivery equation? Please explain in detail why this occurs.

OCA/USPS-T14-35**.** In constructing the data to estimate the equation for parcels, route/date observations with (time=0 and volume>0) or (time>0 and volume=0) were deleted before aggregation to the ZIP code level**.** (Lines 370, 371 in “Attachment to Interrogatory OCA/USPS-T14-28”).

(a) Was a similar requirement placed on the data used in the regular delivery equation? If so, please explain and identify the SAS code**.**

(b) If not, please identify how many route/date observations were included where delt=0 and volume>0 or where delt>0 and volume=0.

OCA/USPS-T14-36. There is a group of ZIP codes (1660939, 8365476, 3341404,8885626, 3333330, 6617639) that is dropped because of data problems. Please explain for each ZIP Code what the problems were and why the ZIP Codes were dropped.

OCA/USPS-T14-37. In the SAS program “Estimating the Delivery Equation.sas” provided in LR-K-81 a variable “pdelt” is constructed on lines 294 and 337 and then used in the calculation of the volume elasticities. The formula for pdelt has a term "spr2*mspr". The SAS log file provided in response to ADVO-USPS-T14-2 instead contains the term "spr2*mspr*mspr" in this formula.

(a) Please state whether the formula in the program or the log file is correct.

(b) Which formula was used to construct the elasticity estimates reported in the output file “Estimating the Delivery Equation.lst” provided in LR-K-81? If the incorrect formula was used, please provide corrected output.

ATTACHMENT TO INTERROGATORY OCA/USPS-T14-28.

```
NOTE: Copyright (c) 1999-2000 by SAS Institute Inc., Cary, NC, USA.
NOTE: SAS (r) Proprietary Software Release 8.1 (TS1M0)
      Licensed to POSTAL RATE COMMISSION, Site 0038843028.
NOTE: This session is executing on the WIN_PRO  platform.



NOTE: SAS initialization used:
      real time           3.14 seconds
      cpu time            2.28 seconds

NOTE: One or more library startup assignments were not restored.
1    options linesize=80;
2    options nocenter;
3    options nodate;
4    options nonumber;
5    filename timedat 'c:\bradley2005\lrk81\Timepool MData.prn';
6    filename lfvol 'c:\bradley2005\lrk81\LFVolume MData.prn';
7    filename pavol 'c:\bradley2005\lrk81\PAvolume MData.prn';
8    filename dense 'c:\bradley2005\lrk81\Density MData.prn';
9
10   ******************************;
11   *** Read in Time Data ********;
12   ******************************;
13   DATA time1; infile timedat;
14   Input  date $ ZIP rt $  bud bed bnd bod rud red rnd rod mode $
15          lfdt cudt ncdt vmdt cedt dmdt nst prt ttft ntt ddtt trvlt
16          rlt gct ect pdt adt padt oct nat;
17
18   ******************************************************************** ;
19   *** This section of the program converts alphabetic route numbers*** ;
20   *** and constructs a unique ZIP-Route ID for each route**************;
21   *********************************************************************;
22

NOTE: The infile TIMEDAT is:
      File Name=c:\bradley2005\lrk81\Timepool MData.prn,
      RECFM=V,LRECL=256

NOTE: 36655 records were read from the infile TIMEDAT.
      The minimum record length was 76.
      The maximum record length was 133.
NOTE: The data set WORK.TIME1 has 36655 observations and 32 variables.
NOTE: DATA statement used:
      real time           1.16 seconds
      cpu time            0.76 seconds


23   Data time2; set time1;
24   if rt = 'XX' then rt=99.9;
25   if rt = '0A' or rt = '0B' or rt = '0D' or rt = '0E' or rt = '0W'
26   or rt = '1A'  or rt = '4A'  or rt = '4B'  or rt = 'A7'  or rt = 'C2'
27   or rt = 'C3'  or rt = 'CA'  or rt = 'CK'  or rt = 'CT'  or rt = 'CV'
28   or rt = 'ES'  or rt = 'EV'  or rt = 'F1'  or rt = 'G5'  or rt = 'HK'
29   or rt = 'IT'  or rt = 'L1'  or rt = 'L3'  or rt = 'L7'  or rt = 'MD'
30   or rt = 'MF'  or rt = 'O1'  or rt = 'O2'  or rt = 'O5'  or rt = 'O7'
31   or rt = 'OL'  or rt = 'P1'  or rt = 'P2'  or rt = 'RE'  or rt = 'UX'
32   or rt = 'VY'  or rt = 'W8'  then nrt=11.1;
33   else nrt=rt;
34   rtind=nrt/100;
35   ZIPrt=ZIP+rtind;
36
37   ******************************************************************** ;
38   *** This section of the program eliminates             *************** ;
39   *** any duplicate ZIP-route, day observations in the time data*******;
40   *********************************************************************;

NOTE: Numeric values have been converted to character
      values at the places given by: (Line):(Column).
      24:22
NOTE: Character values have been converted to numeric
      values at the places given by: (Line):(Column).
      33:10
NOTE: There were 36655 observations read from the data set WORK.TIME1.
NOTE: The data set WORK.TIME2 has 36655 observations and 35 variables.
```

```
NOTE: DATA statement used:
      real time           0.24 seconds
      cpu time            0.23 seconds


41   proc sort; by ZIPrt date;

NOTE: There were 36655 observations read from the data set WORK.TIME2.
NOTE: The data set WORK.TIME2 has 36655 observations and 35 variables.
NOTE: PROCEDURE SORT used:
      real time           6.85 seconds
      cpu time            0.48 seconds


42   proc means noprint; by ZIPrt date; id ZIP mode;
43   var   bud bed bnd bod rud red rnd rod
44          lfdt cudt ncdt vmdt cedt dmdt nst prt ttft ntt ddtt trvlt
45          rlt gct ect pdt adt padt oct nat;;
46   output out=time3 mean=bud bed bnd bod rud red rnd rod
47          lfdt cudt ncdt vmdt cedt dmdt nst prt ttft ntt ddtt trvlt
48          rlt gct ect pdt adt padt oct nat  n=sobs;
49
50
51   ******************************;
52   ** Read in LF Volume Data *******;
53   ******************************;

NOTE: There were 36655 observations read from the data set WORK.TIME2.
NOTE: The data set WORK.TIME3 has 36647 observations and 35 variables.
NOTE: PROCEDURE MEANS used:
      real time           1.10 seconds
      cpu time            0.96 seconds


54   DATA lfvol1; infile lfvol;
55   input  ZIP  date $ rteno  dpsl cal cnl cf seq ;
56
57
58   ******************************************************************** ;
59   *** This section of the program converts alphabetic route numbers*** ;
60   *** and constructs a unique ZIP-Route ID for each route**************;
61   ********************************************************************;
62

NOTE: The infile LFVOL is:
      File Name=c:\bradley2005\lrk81\LFVolume MData.prn,
      RECFM=V,LRECL=256

NOTE: 40668 records were read from the infile LFVOL.
      The minimum record length was 27.
      The maximum record length was 42.
NOTE: The data set WORK.LFVOL1 has 40668 observations and 8 variables.
NOTE: DATA statement used:
      real time           0.43 seconds
      cpu time            0.18 seconds


63   data lfvol2; set lfvol1;
64   cl=cal+cnl;
65   nrteno=1*rteno;
66   rtind=nrteno/100;
67   ZIPrt=ZIP+rtind;
68
69   ******************************************************************** ;
70   *** This section of the program eliminates any duplicate************ ;
71   ***  ZIP-route, day observations in the LF Volume data        *******;
72   ********************************************************************;
73
74

NOTE: There were 40668 observations read from the data set WORK.LFVOL1.
NOTE: The data set WORK.LFVOL2 has 40668 observations and 12 variables.
NOTE: DATA statement used:
      real time           0.10 seconds
      cpu time            0.10 seconds


75   proc sort; by ZIPrt date;

NOTE: There were 40668 observations read from the data set WORK.LFVOL2.
NOTE: The data set WORK.LFVOL2 has 40668 observations and 12 variables.
```

```
NOTE: PROCEDURE SORT used:
      real time           0.26 seconds
      cpu time            0.23 seconds


76   proc means noprint; by ZIPrt date; id ZIP;
77   var dpsl cl cf seq ;
78   output out=lfvol3  mean=dpsl cl cf seq n=vobs;
79
80
81   ******************************;
82   ** Read in PA Volume Data *******;
83   ******************************;

NOTE: There were 40668 observations read from the data set WORK.LFVOL2.
NOTE: The data set WORK.LFVOL3 has 40653 observations and 10 variables.
NOTE: PROCEDURE MEANS used:
      real time           0.49 seconds
      cpu time            0.48 seconds


84   DATA pavol1; infile pavol;
85   input  ZIP rteno $ date $ pcl sprs act blk slf sli mlf mli sff sfi mff mfi
85 ! exp pri othp;
86
87   ******************************************************************** ;
88   *** This section of the program converts alphabetic route numbers*** ;
89   *** and constructs a unique ZIP-Route ID for each route**************;
90   ********************************************************************;
91

NOTE: The infile PAVOL is:
      File Name=c:\bradley2005\lrk81\PAvolume MData.prn,
      RECFM=V,LRECL=256

NOTE: 47531 records were read from the infile PAVOL.
      The minimum record length was 47.
      The maximum record length was 65.
NOTE: The data set WORK.PAVOL1 has 47531 observations and 18 variables.
NOTE: DATA statement used:
      real time           0.35 seconds
      cpu time            0.28 seconds


92   data pavol2; set pavol1;
93   if rteno = "XX" then nrteno=99.9; else
94   nrteno=1*rteno;
95   if nrteno="." then nrteno=11.1;
96   rtind=nrteno/100;
97   ****************************************************;
98   ** Convert the collection mail volume from ********;
99   ** feet and inches into piecess            *******;
100  ****************************************************;
101  ZIPrt=ZIP+rtind;
102  slfi=slf*12;
103  mlfi=mlf*12;
104  sffi=sff*12;
105  mffi=mff*12;
106  sl=slfi+sli;
107  ml=mlfi+mli;
108  sf=sffi+sfi;
109  mf=mffi+mfi;
110  sl=19*sl;
111  sf=10*sf;
112  ml=19*ml;
113  mf=10*mf;
114
115  ******************************************************************** ;
116  *** This section of the program eliminates any duplicate************ ;
117  ***  ZIP-route, day observations in the PA Volume data        *******;
118  ********************************************************************;

NOTE: Character values have been converted to numeric
      values at the places given by: (Line):(Column).
      94:10   95:11
NOTE: There were 47531 observations read from the data set WORK.PAVOL1.
NOTE: The data set WORK.PAVOL2 has 47531 observations and 29 variables.
NOTE: DATA statement used:
      real time           3.38 seconds
      cpu time            0.24 seconds
```

```
119  proc sort; by ZIPrt date;

NOTE: There were 47531 observations read from the data set WORK.PAVOL2.
NOTE: The data set WORK.PAVOL2 has 47531 observations and 29 variables.
NOTE: PROCEDURE SORT used:
      real time           2.69 seconds
      cpu time            0.40 seconds


120  proc means noprint; by ZIPrt date;  id ZIP;
121  var pcl sprs act blk sl ml sf mf exp pri othp;
122  output out=pavol3 mean=pcl sprs act blk sl ml sf mf exp pri othp;
123
124
125  ******************************;
126  ** Read in Density Data *******;
127  ******************************;

NOTE: There were 47531 observations read from the data set WORK.PAVOL2.
NOTE: The data set WORK.PAVOL3 has 47531 observations and 16 variables.
NOTE: PROCEDURE MEANS used:
      real time           0.98 seconds
      cpu time            0.81 seconds


128  DATA dense1; infile dense;
129  input  ZIP  pop units land water;
130

NOTE: The infile DENSE is:
      File Name=c:\bradley2005\lrk81\Density MData.prn,
      RECFM=V,LRECL=256

NOTE: 31913 records were read from the infile DENSE.
      The minimum record length was 14.
      The maximum record length was 33.
NOTE: The data set WORK.DENSE1 has 31913 observations and 5 variables.
NOTE: DATA statement used:
      real time           0.18 seconds
      cpu time            0.14 seconds


131  proc sort data=dense1; by ZIP;
132

NOTE: There were 31913 observations read from the data set WORK.DENSE1.
NOTE: The data set WORK.DENSE1 has 31913 observations and 5 variables.
NOTE: PROCEDURE SORT used:
      real time           0.15 seconds
      cpu time            0.15 seconds


133  data dense1; set dense1;
134  if units= 0 then delete;
135  if land=0 then delete;
136
137
138  ************************************;
139  *Combine Volume & Time Data ********;
140  ************************************;

NOTE: There were 31913 observations read from the data set WORK.DENSE1.
NOTE: The data set WORK.DENSE1 has 31827 observations and 5 variables.
NOTE: DATA statement used:
      real time           0.12 seconds
      cpu time            0.06 seconds


141  proc sort data=time3;  by ZIPrt date;

NOTE: There were 36647 observations read from the data set WORK.TIME3.
NOTE: The data set WORK.TIME3 has 36647 observations and 35 variables.
NOTE: PROCEDURE SORT used:
      real time           0.99 seconds
      cpu time            0.40 seconds


142  proc sort data=pavol3; by ZIPrt date;

NOTE: There were 47531 observations read from the data set WORK.PAVOL3.
```

```
NOTE: The data set WORK.PAVOL3 has 47531 observations and 16 variables.
NOTE: PROCEDURE SORT used:
      real time           0.81 seconds
      cpu time            0.31 seconds


143  proc sort data=lfvol3; by ZIPrt date;

NOTE: There were 40653 observations read from the data set WORK.LFVOL3.
NOTE: The data set WORK.LFVOL3 has 40653 observations and 10 variables.
NOTE: PROCEDURE SORT used:
      real time           1.62 seconds
      cpu time            0.24 seconds


144  data comb; merge pavol3(in=p) lfvol3(in=v) time3(in=s); by ZIPrt date;
145  if p=1 and v=1 and s=1 then source='all';
146

NOTE: There were 47531 observations read from the data set WORK.PAVOL3.
NOTE: There were 40653 observations read from the data set WORK.LFVOL3.
NOTE: There were 36647 observations read from the data set WORK.TIME3.
NOTE: The data set WORK.COMB has 53907 observations and 52 variables.
NOTE: DATA statement used:
      real time           2.44 seconds
      cpu time            0.59 seconds


147  data all3; set comb;
148  if source='all';
149

NOTE: There were 53907 observations read from the data set WORK.COMB.
NOTE: The data set WORK.ALL3 has 31255 observations and 52 variables.
NOTE: DATA statement used:
      real time           0.27 seconds
      cpu time            0.24 seconds


150  proc sort data=all3; by ZIP;
151
152
153  *@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@;
154  *This Section of the Program Estimates the Regular Delivery Equation ;
155  *@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@;
156
157
158  ************************************************;
159  *Combine Volume, Time, and Density Data ********;
160  ************************************************;
161

NOTE: There were 31255 observations read from the data set WORK.ALL3.
NOTE: The data set WORK.ALL3 has 31255 observations and 52 variables.
NOTE: PROCEDURE SORT used:
      real time           3.18 seconds
      cpu time            0.46 seconds


162  data allchk; merge all3 (in=m) dense1 (in=d); by ZIP;
163  if m=1 and d=1 then source = 'mat';
164

NOTE: There were 31255 observations read from the data set WORK.ALL3.
NOTE: There were 31827 observations read from the data set WORK.DENSE1.
NOTE: The data set WORK.ALLCHK has 62932 observations and 56 variables.
NOTE: DATA statement used:
      real time           2.27 seconds
      cpu time            0.45 seconds


165  data allsee; set allchk;
166  if source='mat';
167

NOTE: There were 62932 observations read from the data set WORK.ALLCHK.
NOTE: The data set WORK.ALLSEE has 31041 observations and 56 variables.
NOTE: DATA statement used:
      real time           2.27 seconds
      cpu time            0.34 seconds
```

```
168  data all; set allsee;
169
170  ****************************************************;
171  ** Eliminate any negative volumes ****************;
172  ** Create the shape volumes   ********************;
173  ****************************************************;
174

NOTE: There were 31041 observations read from the data set WORK.ALLSEE.
NOTE: The data set WORK.ALL has 31041 observations and 56 variables.
NOTE: DATA statement used:
      real time           0.28 seconds
      cpu time            0.28 seconds


175  data all; set all;
176  if cl < 0 then cl = .;
177  if cf < 0 then cf = .;
178  if dpsl < 0 then dpsl=.;
179  if seq<0 then seq=.;
180  if sprs<0 then sprs=.;
181  if delt < 0 then delt=.;
182  if dp < 0 then dep=.;
183  if cv < 0 then cv = .;
184  delt=lfdt+cudt+ncdt+vmdt+cedt+dmdt ;
185  dp= bud+bed+bnd+bod+rud+red+rnd+rod;
186  let=cl+dpsl;
187  spr=sprs;
188  cv=sl+ml+sf+mf+exp+pri+othp;
189
190

NOTE: Missing values were generated as a result of performing an operation on
      missing values.
      Each place is given by: (Number of times) at (Line):(Column).
      15 at 186:7
NOTE: There were 31041 observations read from the data set WORK.ALL.
NOTE: The data set WORK.ALL has 31041 observations and 62 variables.
NOTE: DATA statement used:
      real time           4.25 seconds
      cpu time            0.37 seconds


191  proc sort; by ZIP date;
192
193
194  ****************************************************;
195  ** Elinate ZIP Codes with data problems    ********;
196  ****************************************************;

NOTE: There were 31041 observations read from the data set WORK.ALL.
NOTE: The data set WORK.ALL has 31041 observations and 62 variables.
NOTE: PROCEDURE SORT used:
      real time           3.81 seconds
      cpu time            0.62 seconds


197  data all; set all;
198  if ZIP eq 1660939 then delete;
199  if ZIP eq 8365476 then delete;

200  if ZIP eq 3341404 then delete;
201  if ZIP eq 8885626 then delete;
202  if ZIP eq 3333330 then delete;
203  if ZIP eq 6617639 then delete;
204  if ZIP eq 7408660 and date eq '05/18/02' then delete;
205
206
207  ******************************************************;
208  ** Create ZIP Code - Day Data Set for Estimation****;
209  ******************************************************;

NOTE: There were 31041 observations read from the data set WORK.ALL.
NOTE: The data set WORK.ALL has 30087 observations and 62 variables.
NOTE: DATA statement used:
      real time           0.26 seconds
      cpu time            0.26 seconds


210  proc means noprint; by ZIP date;
```

```
211  var delt let cf seq spr cv blk dp units water land;
212  output out=poolr sum = delt let cf seq spr scv blk dp units water land
213                  mean = adelt alet acf aseq aspr acv ablk adp aunits awater
213! aland n=nrts;
214
215
216
217  ***************************************************;
218  **Construct Higher Order Terms                    **;
219  ***************************************************;
220

NOTE: There were 30087 observations read from the data set WORK.ALL.
NOTE: The data set WORK.POOLR has 1545 observations and 27 variables.
NOTE: PROCEDURE MEANS used:
      real time           0.15 seconds
      cpu time            0.15 seconds


221  data poolr; set poolr;
222  cv=scv;
223  let2=let**2;
224  cf2=cf**2;
225  seq2=seq**2;
226  spr2=spr**2;
227  cv2=cv**2;
228  dp2 = dp**2;
229  blk2=blk**2;
230
231  lf=let*cf;
232  lse=let*seq;
233  lcv=let*cv;
234  lspr=let*spr;
235  ldp=let*dp;
236  fse=cf*seq;
237  fcv=cf*cv;
238  fspr=cf*spr;
239  fdp=cf*dp;
240  scv=seq*cv;
241  sspr=seq*spr;
242  sdp=seq*dp;
243  cspr=cv*spr;
244  cdp=cv*dp;
245  spdp=spr*dp;
246  sqm=land;
247
248  dens=dp/sqm;
249  dens2=dens**2;
250  ldns=let*dens;
251  fdns=cf*dens;
252  sdns=seq*dens;
253  cdns=cv*dens;
254  spdns=spr*dens;
255  dpdns=dp*dens;
256
257

NOTE: There were 1545 observations read from the data set WORK.POOLR.
NOTE: The data set WORK.POOLR has 1545 observations and 58 variables.
NOTE: DATA statement used:
      real time           0.06 seconds
      cpu time            0.06 seconds


258  proc means;
259  var delt let cf seq cv spr dp dens;
260  output out=regmean mean=mdelt mlet mcf mseq mcv mspr mdp mdens;
261
262
263  ***************************************************;
264  **Estimate the Pooled Regular Delivery Model     **;
265  **Full Quadratic Specification                   **;
266  ***************************************************;
267

NOTE: There were 1545 observations read from the data set WORK.POOLR.
NOTE: The data set WORK.REGMEAN has 1 observations and 10 variables.
NOTE: PROCEDURE MEANS used:
      real time           1.04 seconds
      cpu time            0.15 seconds
```

```
268  proc reg data=poolr outest=coef1;
269  model delt= let let2 cf cf2 seq seq2 cv cv2 spr spr2 dp dp2 dens dens2
270              lf lse lcv lspr ldp fse fcv fspr fdp scv sspr sdp cspr cdp spdp

271              ldns fdns sdns cdns spdns dpdns/vif tol acov ;
272
273
274
275  ***************************************************;
276  **Estimate the Pooled Regular Delivery Model    **;
277  **Restricted Quadratic Specification            **;
278  ***************************************************;
279
280

WARNING: The variable _NAME_ or _TYPE_ exists in a data set that is not
         TYPE=CORR, COV, SSCP, etc.
NOTE: 1545 observations read.
NOTE: 1545 observations used in computations.
NOTE: There were 1545 observations read from the data set WORK.POOLR.
NOTE: The data set WORK.COEF1 has 1 observations and 41 variables.
NOTE: PROCEDURE REG used:
      real time           0.87 seconds
      cpu time            0.20 seconds


281  proc reg data =poolr outest=coef2;
282
283  model delt= let let2 cf cf2 seq seq2 cv cv2 spr spr2 dp dp2 dens dens2/vif
283! tol acov;
284
285
286  ***********************************************************;
287  **Calculate Variabilities for Regular Delivery Model    **;
288  **Full Quadratic Specification                          **;
289  ***********************************************************;
290

WARNING: The variable _NAME_ or _TYPE_ exists in a data set that is not
         TYPE=CORR, COV, SSCP, etc.
NOTE: 1545 observations read.
NOTE: 1545 observations used in computations.
NOTE: There were 1545 observations read from the data set WORK.POOLR.
NOTE: The data set WORK.COEF2 has 1 observations and 20 variables.
NOTE: PROCEDURE REG used:
      real time           0.18 seconds
      cpu time            0.09 seconds


291  proc print data=coef1;
292

NOTE: There were 1 observations read from the data set WORK.COEF1.
NOTE: PROCEDURE PRINT used:
      real time           0.09 seconds
      cpu time            0.01 seconds


293  data elascal1; merge coef1 regmean (drop=_TYPE_);
294  pdelt=intercept+let*mlet+let2*mlet*mlet+cf*mcf+cf2*mcf*mcf+seq*mseq+seq2*ms
294! eq*mseq
295       +spr*mspr+spr2*mspr+cv*mcv+cv2*mcv*mcv+dp*mdp+dp2*mdp*mdp+dens*mdens+d
295! ens2*mdens*mdens
296       +lf*mlet*mcf+lse*mlet*mseq+lcv*mlet*mcv+lspr*mlet*mspr+ldp*mlet*mdp
297       +fse*mcf*mseq+fcv*mcf*mcv+fspr*mcf*mspr+fdp*mcf*mdp
298       +scv*mseq*mcv+sspr*mseq*mspr+sdp*mseq*mdp+cspr*mcv*mspr+cdp*mcv*mdp+sp
298! dp*mspr*mdp
299       +ldns*mlet*mdens+fdns*mcf*mdens+sdns*mseq*mdens+cdns*mcv*mdens+spdns*m
299! spr*mdens+dpdns*mdp*mdens
300  ;
301
302  elasl=(let*mlet +2*let2*mlet*mlet
302! +lf*mlet*mcf+lse*mlet*mseq+lcv*mlet*mcv+lspr*mlet*mspr
303                                     +ldp*mlet*mdp+ldns*mlet*mdens)/pdelt;
304
305  elasf=(cf*mcf   +2*cf2*mcf*mcf
305! +lf*mlet*mcf+fse*mcf*mseq+fcv*mcf*mcv+fspr*mcf*mspr
306                                     +fdp*mcf*mdp+fdns*mcf*mdens)/pdelt;
307
308  elass=(seq*mseq +2*seq2*mseq*mseq
```

```
308! +lse*mlet*mseq+fse*mcf*mseq+scv*mseq*mcv+sspr*mseq*mspr
309                                     +sdp*mseq*mdp+sdns*mseq*mdens)/pdelt;
310
311  elasc=(cv*mcv   +2*cv2*mcv*mcv
311! +lcv*mlet*mcv+fcv*mcf*mcv+scv*mseq*mcv+cspr*mcv*mspr
312                                     +cdp*mcv*mdp+cdns*mcv*mdens)/pdelt;
313
314  elasp=(spr*mspr +2*spr2*mspr*mspr
314! +lspr*mlet*mspr+fspr*mcf*mspr+sspr*mseq*mspr+cspr*mcv*mspr
315                                     +spdp*mspr*mdp+spdns*mspr*mdens)/pdelt;

316
317  elasd=(dp*mdp   +2*dp2*mdp*mdp
317! +ldp*mlet*mdp+fdp*mcf*mdp+sdp*mseq*mdp+cdp*mcv*mdp+spdp*mspr*mdp
318                                     +dpdns*mdp*mdens )/pdelt;
319
320  elasdns=(dens*mdens +2*dens2*mdens*mdens
320! +ldns*mlet*mdens+fdns*mcf*mdens+sdns*mseq*mdens+cdns*mcv*mdens+spdns*mspr*m
320! dens
321                                     +dpdns*mdp*mdens )/pdelt;
322
323

NOTE: There were 1 observations read from the data set WORK.COEF1.
NOTE: There were 1 observations read from the data set WORK.REGMEAN.
NOTE: The data set WORK.ELASCAL1 has 1 observations and 58 variables.
NOTE: DATA statement used:
      real time           0.04 seconds
      cpu time            0.04 seconds


324  proc print data=elascal1;
325  var mdelt pdelt elasl elasf elass elasc elasp elasd elasdns ;
326
327
328
329
330  ************************************************************;
331  **Calculate Variabilities for Regular Delivery Model    **;
332  **Restricted Quadratic Specification                    **;
333  ************************************************************;
334

NOTE: There were 1 observations read from the data set WORK.ELASCAL1.
NOTE: PROCEDURE PRINT used:
      real time           0.01 seconds
      cpu time            0.01 seconds


335  proc print data=coef2;

NOTE: There were 1 observations read from the data set WORK.COEF2.
NOTE: PROCEDURE PRINT used:
      real time           0.01 seconds
      cpu time            0.01 seconds


336  data elascal2; merge coef2 regmean (drop=_TYPE_);
337  pdelt=intercept+let*mlet+let2*mlet*mlet+cf*mcf+cf2*mcf*mcf+seq*mseq+seq2*ms
337! eq*mseq
338       +spr*mspr+spr2*mspr+cv*mcv+cv2*mcv*mcv+dp*mdp+dp2*mdp*mdp+dens*mdens+d
338! ens2*mdens*mdens
339       ;
340
341  elasl=(let*mlet +2*let2*mlet*mlet)/pdelt;
342  elasf=(cf*mcf   +2*cf2*mcf*mcf)/pdelt;
343  elass=(seq*mseq +2*seq2*mseq*mseq)/pdelt;
344  elasc=(cv*mcv   +2*cv2*mcv*mcv)/pdelt;
345  elasp=(spr*mspr +2*spr2*mspr*mspr)/pdelt;
346  elasd=(dp*mdp   +2*dp2*mdp*mdp)/pdelt;
347  elasdns=(dens*mdens   +2*dens2*mdens*mdens)/pdelt;
348
349
350

NOTE: There were 1 observations read from the data set WORK.COEF2.
NOTE: There were 1 observations read from the data set WORK.REGMEAN.
NOTE: The data set WORK.ELASCAL2 has 1 observations and 37 variables.
NOTE: DATA statement used:
      real time           0.03 seconds
      cpu time            0.03 seconds
```

```
351  proc print data=elascal2;
352  var mdelt pdelt elasl elasf elass elasc elasp elasd elasdns;
353
354
355
356
357  *@@@
```

```
NOTE: DATA statement used:
      real time           0.03 seconds
      cpu time            0.03 seconds


396  data poolz; set poolr;
397  dp2 = dp**2;
398  pcl2=pcl**2;
399  act2=act**2;
400  pact=pcl*act;
401  padp=pcl*dp;
402  acdp=act*dp;
403
404
405

NOTE: There were 1535 observations read from the data set WORK.POOLR.
NOTE: The data set WORK.POOLZ has 1535 observations and 18 variables.
NOTE: DATA statement used:
      real time           0.03 seconds
      cpu time            0.03 seconds


406  proc means;
407  var  padelt pcl act dp;
408  output out=pregmean mean=mpadelt mpcl mact mdp;
409
410
411  ****************************************;
412  **Estimate the Pooled PA Delivery Model**;
413  ****************************************;
414

NOTE: There were 1535 observations read from the data set WORK.POOLZ.
NOTE: The data set WORK.PREGMEAN has 1 observations and 6 variables.
NOTE: PROCEDURE MEANS used:
      real time           0.04 seconds
      cpu time            0.04 seconds


415  proc reg  data=poolz outest=coefp1;
416  model padelt= pcl pcl2 act act2 dp dp2 pact padp acdp/vif tol acov ;
417

WARNING: The variable _NAME_ or _TYPE_ exists in a data set that is not
         TYPE=CORR, COV, SSCP, etc.
NOTE: 1535 observations read.
NOTE: 1535 observations used in computations.
NOTE: There were 1535 observations read from the data set WORK.POOLZ.
NOTE: The data set WORK.COEFP1 has 1 observations and 15 variables.
NOTE: PROCEDURE REG used:
      real time           0.09 seconds
      cpu time            0.09 seconds


418  proc print data=coefp1;
419
420  ***********************************************************;
421  **Calculate Variabilities for P/A Delivery Model        **;
422  **Full Quadratic Specification                          **;
423  ***********************************************************;
424

NOTE: There were 1 observations read from the data set WORK.COEFP1.
NOTE: PROCEDURE PRINT used:
      real time           0.01 seconds
      cpu time            0.01 seconds


425  data elasp1; merge coefp1 pregmean (drop=_TYPE_);
426  ppadelt=intercept+pcl*mpcl+pcl2*mpcl*mpcl+act*mact+act2*mact*mact+dp*mdp+dp
426! 2*mdp*mdp
427                  +pact*mpcl*mact+padp*mpcl*mdp+acdp*mact*mdp ;
428
429  elasp=(pcl*mpcl +2*pcl2*mpcl*mpcl+pact*mpcl*mact+padp*mpcl*mdp)/ppadelt;
430  elasa=(act*mact +2*act2*mact*mact+pact*mpcl*mact+acdp*mact*mdp)/ppadelt;
431  elasd=(dp*mdp   +2*dp2*mdp*mdp   +padp*mpcl*mdp+acdp*mact*mdp)/ppadelt;
432
433

NOTE: There were 1 observations read from the data set WORK.COEFP1.
```

```
NOTE: There were 1 observations read from the data set WORK.PREGMEAN.
NOTE: The data set WORK.ELASP1 has 1 observations and 24 variables.
NOTE: DATA statement used:
      real time           0.04 seconds
      cpu time            0.04 seconds


434  proc print data=elasp1;
435  var  mpadelt ppadelt elasp elasa elasd;
436
437
438
439  run;

NOTE: There were 1 observations read from the data set WORK.ELASP1.
NOTE: PROCEDURE PRINT used:
      real time           0.09 seconds
      cpu time            0.01 seconds
```