Postal Rate Commission
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BEFORE THE
POSTAL RATE COMMISSION
WASHINGTON, D.C. 20268–0001

POSTAL RATE AND FEE CHANGES PURSUANT TO PUBLIC LAW 108-18	Docket No. R2005–1

RESPONSE OF POSTAL SERVICE WITNESS BRADLEY
TO INTERROGATORY OF ADVO (ADVO/USPS-T14-2)
(May 6, 2005)

The United States Postal Service hereby provides the response of witness Bradley to the following interrogatories of Advo, filed on April 22, 2005: Advo/USPS-T14-2.

Each interrogatory is stated verbatim and is followed by the response.

Respectfully submitted,

UNITED STATES POSTAL SERVICE

By its attorneys:

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Chief Counsel, Ratemaking

_____
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May 6, 2005

Response of Postal Service Witness Michael D. Bradley
To Interrogatories Posed by ADVO

ADVO-USPS-T14-2. Please provide a copy, downloadable in Word, Word Perfect, or PDF, of the SAS log for your program "Estimating Delivery Equations" described in LR K-81.

ADVO-USPS-T14-2. Response

The requested log is provided below:

```
1793  ******************************;
1794  *** Read in Time Data ********;
1795  ******************************;
1796  DATA time1; infile timedat;
1797  Input  date $ zip rt $  bud bed bnd bod rud red rnd rod mode $
1798         lfdt cudt ncdt vmdt cedt dmdt nst prt ttft ntt ddtt trvlt
1799         rlt gct ect pdt adt padt oct nat;
1800
1801
1802
1803  ******************************************************************** ;
1804  *** This section of the program converts alphabetic route numbers*** ;
1805  *** and constructs a unique Zip-Route ID for each route**************;
1806  ********************************************************************;
1807

NOTE: The infile TIMEDAT is:

      File Name=c:\Timepool Mask.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           0.50 seconds
      cpu time            0.34 seconds


1808  Data time2; set time1;
1809  if rt = 'XX' then rt=99.9;
1810  if rt = '0A' or rt = '0B' or rt = '0D' or rt = '0E' or rt = '0W'
1811  or rt = '1A'  or rt = '4A'  or rt = '4B'  or rt = 'A7'  or rt = 'C2'
1812  or rt = 'C3'  or rt = 'CA'  or rt = 'CK'  or rt = 'CT'  or rt = 'CV'
1813  or rt = 'ES'  or rt = 'EV'  or rt = 'F1'  or rt = 'G5'  or rt = 'HK'
1814  or rt = 'IT'  or rt = 'L1'  or rt = 'L3'  or rt = 'L7'  or rt = 'MD'
1815  or rt = 'MF'  or rt = 'O1'  or rt = 'O2'  or rt = 'O5'  or rt = 'O7'
1816  or rt = 'OL'  or rt = 'P1'  or rt = 'P2'  or rt = 'RE'  or rt = 'UX'
1817  or rt = 'VY'  or rt = 'W8'  then nrt=11.1;
1818  else nrt=rt;
1819  rtind=nrt/100;
1820  ziprt=zip+rtind;
1821
1822
1823
```

```
1824  ******************************************************************** ;
1825  *** This section of the program eliminates             ************** ;
1826  *** any duplicate Zip-route, day observations in the time data*******;
1827  ********************************************************************;

NOTE: Numeric values have been converted to character
      values at the places given by: (Line):(Column).
      1809:22
NOTE: Character values have been converted to numeric
      values at the places given by: (Line):(Column).
      1818:10
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           0.10 seconds
      cpu time            0.10 seconds


1828  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           5.17 seconds
      cpu time            0.18 seconds


1829  proc means noprint; by ziprt date; id zip mode;
1830  var   bud bed bnd bod rud red rnd rod
1831         lfdt cudt ncdt vmdt cedt dmdt nst prt ttft ntt ddtt trvlt
1832         rlt gct ect pdt adt padt oct nat;;
1833  output out=time3 mean=bud bed bnd bod rud red rnd rod
1834         lfdt cudt ncdt vmdt cedt dmdt nst prt ttft ntt ddtt trvlt
1835         rlt gct ect pdt adt padt oct nat  n=sobs;
1836
1837
1838  ******************************;
1839  ** Read in LF Volume Data *******;
1840  ******************************;

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           0.78 seconds
      cpu time            0.62 seconds


1841  DATA lfvol1; infile lfvol;
1842  input  zip  date $ rteno  dpsl cal cnl cf seq ;
1843
1844
1845
1846  ******************************************************************** ;
1847  *** This section of the program converts alphabetic route numbers*** ;
1848  *** and constructs a unique Zip-Route ID for each route**************;
1849  ********************************************************************;
1850

NOTE: The infile LFVOL is:

      File Name=c:\LFVolume Mask.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           0.21 seconds
      cpu time            0.14 seconds


1851  data lfvol2; set lfvol1;
1852  cl=cal+cnl;
1853  nrteno=1*rteno;
1854  rtind=nrteno/100;
1855  ziprt=zip+rtind;
1856
1857  ******************************************************************** ;
1858  *** This section of the program eliminates any duplicate************ ;
1859  ***  Zip-route, day observations in the LF Volume data        *******;
1860  *********************************************************************;
1861
1862

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           0.06 seconds
      cpu time            0.06 seconds


1863  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           0.15 seconds
      cpu time            0.15 seconds


1864  proc means noprint; by ziprt date; id zip;
1865  var dpsl cl cf seq ;
1866  output out=lfvol3  mean=dpsl cl cf seq n=vobs;
1867
1868
1869  ******************************;
1870  ** Read in PA Volume Data *******;
1871  ******************************;

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           1.34 seconds
      cpu time            0.32 seconds


1872  DATA pavol1; infile pavol;
1873  input  zip rteno $ date $ pcl sprs act blk slf sli mlf mli sff sfi mff mfi
1873!  exp pri othp;
1874
1875  ******************************************************************** ;
1876  *** This section of the program converts alphabetic route numbers*** ;
1877  *** and constructs a unique Zip-Route ID for each route**************;
```

```
1878  ******************************************************************;
1879

NOTE: The infile PAVOL is:

      File Name=c:\PAvolume Mask.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           0.29 seconds
      cpu time            0.21 seconds


1880  data pavol2; set pavol1;
1881  if rteno = "XX" then nrteno=99.9; else
1882  nrteno=1*rteno;
1883  if nrteno="." then nrteno=11.1;
1884  rtind=nrteno/100;
1885  ***************************************************;
1886  ** Convert the collection mail volume from ********;
1887  ** feet and inches into piecess            *******;
1888  ***************************************************;
1889  ziprt=zip+rtind;
1890  slfi=slf*12;
1891  mlfi=mlf*12;
1892  sffi=sff*12;
1893  mffi=mff*12;
1894  sl=slfi+sli;
1895  ml=mlfi+mli;
1896  sf=sffi+sfi;
1897  mf=mffi+mfi;
1898  sl=19*sl;
1899  sf=10*sf;
1900  ml=19*ml;
1901  mf=10*mf;
1902
1903  ***************************************************************** ;
1904  *** This section of the program eliminates any duplicate************ ;
1905  ***  Zip-route, day observations in the PA Volume data        *******;
1906  ******************************************************************;

NOTE: Character values have been converted to numeric
      values at the places given by: (Line):(Column).
      1882:10   1883:11
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           0.12 seconds
      cpu time            0.12 seconds


1907  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           2.89 seconds
      cpu time            0.18 seconds
```

```
1908  proc means noprint; by ziprt date;  id zip;
1909  var pcl sprs act blk sl ml sf mf exp pri othp;
1910  output out=pavol3 mean=pcl sprs act blk sl ml sf mf exp pri othp;
1911
1912
1913  ******************************;
1914  ** Read in Density Data *******;
1915  ******************************;

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           0.82 seconds
      cpu time            0.53 seconds


1916  DATA dense1; infile dense;
1917  input  zip  pop units land water;
1918

NOTE: The infile DENSE is:

      File Name=c:\density Mask.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           0.09 seconds
      cpu time            0.09 seconds


1919  proc sort data=dense1; by zip;
1920

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           0.09 seconds
      cpu time            0.09 seconds


1921  data dense1; set dense1;
1922  if units= 0 then delete;
1923  if land=0 then delete;
1924
1925
1926  ************************************;
1927  *Combine Volume & Time Data ********;
1928  ************************************;

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           0.03 seconds
      cpu time            0.03 seconds
```

```
1929  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           0.93 seconds
      cpu time            0.18 seconds


1930  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           1.46 seconds
      cpu time            0.14 seconds


1931  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           0.12 seconds
      cpu time            0.10 seconds


1932  data comb; merge pavol3(in=p) lfvol3(in=v) time3(in=s); by ziprt date;
1933  if p=1 and v=1 and s=1 then source='all';
1934

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           1.43 seconds
      cpu time            0.28 seconds


1935  data all3; set comb;
1936  if source='all';
1937

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           0.11 seconds
      cpu time            0.10 seconds


1938  proc sort data=all3; by zip;
1939
1940
1941  *@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@;
1942  *This Section of the Program Estimates the Regular Delivery Equation ;
1943  *@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@;
1944
1945
1946  ************************************************;
1947  *Combine Volume, Time, and Density Data ********;
1948  ************************************************;
```

```
1949

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           1.59 seconds
      cpu time            0.20 seconds


1950  data allchk; merge all3 (in=m) dense1 (in=d); by zip;
1951  if m=1 and d=1 then source = 'mat';
1952

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           2.21 seconds
      cpu time            0.24 seconds


1953  data allsee; set allchk;
1954  if source='mat';
1955

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           0.12 seconds
      cpu time            0.12 seconds


1956  data all; set allsee;
1957
1958  ***************************************************;
1959  ** Eliminate any negative volumes ****************;
1960  ** Create the shape volumes   ********************;
1961  ***************************************************;
1962

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           1.07 seconds
      cpu time            0.10 seconds


1963  data all; set all;
1964  if cl < 0 then cl = .;
1965  if cf < 0 then cf = .;
1966  if dpsl < 0 then dpsl=.;
1967  if seq<0 then seq=.;
1968  if sprs<0 then sprs=.;
1969  if delt < 0 then delt=.;
1970  if dp < 0 then dep=.;
1971  if cv < 0 then cv = .;
1972  delt=lfdt+cudt+ncdt+vmdt+cedt+dmdt ;
1973  dp= bud+bed+bnd+bod+rud+red+rnd+rod;
1974  let=cl+dpsl;
1975  spr=sprs;
1976  cv=sl+ml+sf+mf+exp+pri+othp;
1977
```

```
1978

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 1974:7
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           0.15 seconds
      cpu time            0.12 seconds


1979  proc sort; by zip date;
1980
1981
1982  ****************************************************;
1983  ** Elinate Zip Codes with data problems    ********;
1984  ****************************************************;

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           2.68 seconds
      cpu time            0.28 seconds


1985  data all; set all;
1986  if zip eq 1660939 then delete;
1987  if zip eq 8365476 then delete;
1988  if zip eq 3341404 then delete;
1989  if zip eq 8885626 then delete;
1990  if zip eq 3333330 then delete;
1991  if zip eq 6617639 then delete;
1992  if zip eq 7408660 and date eq '05/18/02' then delete;
1993
1994
1995  ****************************************************;
1996  ** Create Zip Code - Day Data Set for Estimation****;
1997  ****************************************************;

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           1.28 seconds
      cpu time            0.09 seconds


1998  proc means noprint; by zip date;
1999  var delt let cf seq spr cv blk dp units water land;
2000  output out=poolr sum = delt let cf seq spr scv blk dp units water land
2001                  mean = adelt alet acf aseq aspr acv ablk adp aunits awater
2001!  aland n=nrts;
2002
2003
2004
2005  ****************************************************;
2006  **Construct Higher Order Terms                    **;
2007  ****************************************************;
2008

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           0.07 seconds
      cpu time            0.07 seconds


2009  data poolr; set poolr;
2010  cv=scv;
2011  let2=let**2;
2012  cf2=cf**2;
2013  seq2=seq**2;
2014  spr2=spr**2;
2015  cv2=cv**2;
2016  dp2 = dp**2;
2017  blk2=blk**2;
2018
2019  lf=let*cf;
2020  lse=let*seq;
2021  lcv=let*cv;
2022  lspr=let*spr;
2023  ldp=let*dp;
2024  fse=cf*seq;
2025  fcv=cf*cv;
2026  fspr=cf*spr;
2027  fdp=cf*dp;
2028  scv=seq*cv;
2029  sspr=seq*spr;
2030  sdp=seq*dp;
2031  cspr=cv*spr;
2032  cdp=cv*dp;
2033  spdp=spr*dp;
2034  sqm=land;
2035
2036  dens=dp/sqm;
2037  dens2=dens**2;
2038  ldns=let*dens;
2039  fdns=cf*dens;
2040  sdns=seq*dens;
2041  cdns=cv*dens;
2042  spdns=spr*dens;
2043  dpdns=dp*dens;
2044
2045

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           0.03 seconds
      cpu time            0.03 seconds


2046  proc means;
2047  var delt let cf seq cv spr dp dens;
2048  output out=regmean mean=mdelt mlet mcf mseq mcv mspr mdp mdens;
2049
2050
2051  ************************************************;
2052  **Estimate the Pooled Regular Delivery Model    **;
2053  **Full Quadratic Specification                  **;
2054  ************************************************;
2055
```

```
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           0.03 seconds
      cpu time            0.03 seconds


2056  proc reg data=poolr outest=coef1;
2057  model delt= let let2 cf cf2 seq seq2 cv cv2 spr spr2 dp dp2 dens dens2
2058              lf lse lcv lspr ldp fse fcv fspr fdp scv sspr sdp cspr cdp
2058! spdp
2059              ldns fdns sdns cdns spdns dpdns/vif tol acov ;
2060
2061
2062
2063  ***************************************************;
2064  **Estimate the Pooled Regular Delivery Model    **;
2065  **Restricted Quadratic Specification            **;
2066  ***************************************************;
2067
2068

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           1.00 seconds
      cpu time            0.13 seconds


2069  proc reg data =poolr outest=coef2;
2070
2071  model delt= let let2 cf cf2 seq seq2 cv cv2 spr spr2 dp dp2 dens dens2/vif
2071!  tol acov;
2072
2073
2074  *********************************************************;
2075  **Calculate Variabilities for Regular Delivery Model    **;
2076  **Full Quadratic Specification                          **;
2077  *********************************************************;
2078

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           0.14 seconds
      cpu time            0.06 seconds


2079  proc print data=coef1;
2080

NOTE: There were 1 observations read from the data set WORK.COEF1.
NOTE: PROCEDURE PRINT used:
      real time           0.04 seconds
```

```
      cpu time            0.03 seconds


2081  data elascal1; merge coef1 regmean (drop=_TYPE_);
2082  pdelt=intercept+let*mlet+let2*mlet*mlet+cf*mcf+cf2*mcf*mcf+seq*mseq+seq2*m
2082! seq*mseq
2083       +spr*mspr+spr2*mspr*mspr+cv*mcv+cv2*mcv*mcv+dp*mdp+dp2*mdp*mdp+dens*m
2083! dens+dens2*mdens*mdens
2084       +lf*mlet*mcf+lse*mlet*mseq+lcv*mlet*mcv+lspr*mlet*mspr+ldp*mlet*mdp
2085       +fse*mcf*mseq+fcv*mcf*mcv+fspr*mcf*mspr+fdp*mcf*mdp
2086       +scv*mseq*mcv+sspr*mseq*mspr+sdp*mseq*mdp+cspr*mcv*mspr+cdp*mcv*mdp+s
2086! pdp*mspr*mdp
2087       +ldns*mlet*mdens+fdns*mcf*mdens+sdns*mseq*mdens+cdns*mcv*mdens+spdns*
2087! mspr*mdens+dpdns*mdp*mdens
2088  ;
2089
2090  elasl=(let*mlet +2*let2*mlet*mlet
2090! +lf*mlet*mcf+lse*mlet*mseq+lcv*mlet*mcv+lspr*mlet*mspr
2091                                      +ldp*mlet*mdp+ldns*mlet*mdens)/pdelt;
2092
2093  elasf=(cf*mcf   +2*cf2*mcf*mcf
2093! +lf*mlet*mcf+fse*mcf*mseq+fcv*mcf*mcv+fspr*mcf*mspr
2094                                      +fdp*mcf*mdp+fdns*mcf*mdens)/pdelt;
2095
2096  elass=(seq*mseq +2*seq2*mseq*mseq
2096! +lse*mlet*mseq+fse*mcf*mseq+scv*mseq*mcv+sspr*mseq*mspr
2097                                      +sdp*mseq*mdp+sdns*mseq*mdens)/pdelt;
2098
2099  elasc=(cv*mcv   +2*cv2*mcv*mcv
2099! +lcv*mlet*mcv+fcv*mcf*mcv+scv*mseq*mcv+cspr*mcv*mspr
2100                                      +cdp*mcv*mdp+cdns*mcv*mdens)/pdelt;
2101
2102  elasp=(spr*mspr +2*spr2*mspr*mspr
2102! +lspr*mlet*mspr+fspr*mcf*mspr+sspr*mseq*mspr+cspr*mcv*mspr
2103                                      +spdp*mspr*mdp+spdns*mspr*mdens)/pdelt
2103! ;
2104
2105  elasd=(dp*mdp   +2*dp2*mdp*mdp
2105! +ldp*mlet*mdp+fdp*mcf*mdp+sdp*mseq*mdp+cdp*mcv*mdp+spdp*mspr*mdp
2106                                      +dpdns*mdp*mdens )/pdelt;
2107
2108  elasdns=(dens*mdens +2*dens2*mdens*mdens
2108! +ldns*mlet*mdens+fdns*mcf*mdens+sdns*mseq*mdens+cdns*mcv*mdens+spdns*mspr*
2108! mdens
2109                                      +dpdns*mdp*mdens )/pdelt;
2110
2111

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            0.03 seconds


2112  proc print data=elascal1;
2113  var mdelt pdelt elasl elasf elass elasc elasp elasd elasdns ;
2114
2115
2116
2117
```

```
2118  *******************************************************;
2119  **Calculate Variabilities for Regular Delivery Model    **;
2120  **Restricted Quadratic Specification                    **;
2121  *******************************************************;
2122

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


2123  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


2124  data elascal2; merge coef2 regmean (drop=_TYPE_);
2125  pdelt=intercept+let*mlet+let2*mlet*mlet+cf*mcf+cf2*mcf*mcf+seq*mseq+seq2*m
2125! seq*mseq
2126       +spr*mspr+spr2*mspr*mspr+cv*mcv+cv2*mcv*mcv+dp*mdp+dp2*mdp*mdp+dens*m
2126! dens+dens2*mdens*mdens
2127       ;
2128
2129  elasl=(let*mlet +2*let2*mlet*mlet)/pdelt;
2130  elasf=(cf*mcf   +2*cf2*mcf*mcf)/pdelt;
2131  elass=(seq*mseq +2*seq2*mseq*mseq)/pdelt;
2132  elasc=(cv*mcv   +2*cv2*mcv*mcv)/pdelt;
2133  elasp=(spr*mspr +2*spr2*mspr*mspr)/pdelt;
2134  elasd=(dp*mdp   +2*dp2*mdp*mdp)/pdelt;
2135  elasdns=(dens*mdens   +2*dens2*mdens*mdens)/pdelt;
2136
2137
2138

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


2139  proc print data=elascal2;
2140  var mdelt pdelt elasl elasf elass elasc elasp elasd elasdns;
2141
2142
2143
2144
2145  *@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@;
2146  *This Section of the Program Estimates the P/A Delivery Equation ;
2147  *@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@;
2148
2149
2150  *******************************************************;
2151  **Eliminate Observations Without Time or Volume        **;
2152  *******************************************************;
2153
```

```
NOTE: There were 1 observations read from the data set WORK.ELASCAL2.
NOTE: PROCEDURE PRINT used:
      real time           0.06 seconds
      cpu time            0.01 seconds


2154  data allpa; set all3;
2155  padelt=pdt+adt+padt+ddtt;
2156  dp= bud+bed+bnd+bod+rud+red+rnd+rod;
2157  vol=pcl+act;
2158  if padelt=0 and vol>0 then delete;
2159  if padelt>0 and vol=0 then delete;
2160

NOTE: There were 31255 observations read from the data set WORK.ALL3.
NOTE: The data set WORK.ALLPA has 26072 observations and 55 variables.
NOTE: DATA statement used:
      real time           0.09 seconds
      cpu time            0.09 seconds


2161  proc sort; by zip date;
2162
2163  ****************************************************;
2164  ** Create Zip Code - Day Data Set for Estimation****;
2165  ****************************************************;

NOTE: There were 26072 observations read from the data set WORK.ALLPA.
NOTE: The data set WORK.ALLPA has 26072 observations and 55 variables.
NOTE: PROCEDURE SORT used:
      real time           1.81 seconds
      cpu time            0.21 seconds


2166  proc means noprint; by zip date;
2167  var padelt pcl act dp;
2168  output out=poolr sum = padelt pcl act dp mean = apadelt apcl aact adp;
2169
2170  ************************************************************;
2171  **Eliminate Zip Codes with No Parcels, No Accountables or **
2172  ** No Parcel/Accountable Delivery Time                    **;
2173  ************************************************************;
2174

NOTE: There were 26072 observations read from the data set WORK.ALLPA.
NOTE: The data set WORK.POOLR has 1629 observations and 12 variables.
NOTE: PROCEDURE MEANS used:
      real time           0.06 seconds
      cpu time            0.06 seconds


2175  data poolr; set poolr;
2176  if padelt=0 then delete;
2177  if pcl=0 then delete;
2178  if act=0 then delete;
2179  if dp =0 then delete;
2180
2181  ************************************************;
2182  **Construct Higher Order Terms                  **;
2183  ************************************************;

NOTE: There were 1629 observations read from the data set WORK.POOLR.
```

```
NOTE: The data set WORK.POOLR has 1535 observations and 12 variables.
NOTE: DATA statement used:
      real time           0.01 seconds
      cpu time            0.01 seconds


2184  data poolz; set poolr;
2185  dp2 = dp**2;
2186  pcl2=pcl**2;
2187  act2=act**2;
2188  pact=pcl*act;
2189  padp=pcl*dp;
2190  acdp=act*dp;
2191
2192
2193
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


2194  proc means;
2195  var  padelt pcl act dp;
2196  output out=pregmean mean=mpadelt mpcl mact mdp;
2197
2198
2199  ****************************************;
2200  **Estimate the Pooled PA Delivery Model**;
2201  ****************************************;
2202

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           0.03 seconds
      cpu time            0.03 seconds


2203  proc reg  data=poolz outest=coefp1;
2204  model padelt= pcl pcl2 act act2 dp dp2 pact padp acdp/vif tol acov ;
2205
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           0.04 seconds
      cpu time            0.04 seconds


2206  proc print data=coefp1;
2207
2208  ********************************************************;
2209  **Calculate Variabilities for P/A Delivery Model        **;
2210  **Full Quadratic Specification                          **;
2211  ********************************************************;
2212
```

```
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


2213  data elasp1; merge coefp1 pregmean (drop=_TYPE_);
2214  ppadelt=intercept+pcl*mpcl+pcl2*mpcl*mpcl+act*mact+act2*mact*mact+dp*mdp+d
2214! p2*mdp*mdp
2215                  +pact*mpcl*mact+padp*mpcl*mdp+acdp*mact*mdp ;
2216
2217  elasp=(pcl*mpcl +2*pcl2*mpcl*mpcl+pact*mpcl*mact+padp*mpcl*mdp)/ppadelt;
2218  elasa=(act*mact +2*act2*mact*mact+pact*mpcl*mact+acdp*mact*mdp)/ppadelt;
2219  elasd=(dp*mdp   +2*dp2*mdp*mdp   +padp*mpcl*mdp+acdp*mact*mdp)/ppadelt;
2220
2221

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           0.03 seconds
      cpu time            0.03 seconds

2222  proc print data=elasp1;
2223  var  mpadelt ppadelt elasp elasa elasd;
2224
2225
2226
2227  run;

NOTE: There were 1 observations read from the data set WORK.ELASP1.
NOTE: PROCEDURE PRINT used:
      real time           0.07 seconds
      cpu time            0.01 seconds
```

CERTIFICATE OF SERVICE

I hereby certify that I have this date served the foregoing document in accordance with Section 12 of the Rules of Practice and Procedure.

_____
Eric P. Koetting

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