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BULK MAIL REVENUE, PIECES AND WEIGHT SYSTEM (BRPW)

VARIANCE ESTIMATION PROGRAM DOCUMENTATION

United States Postal Service

Bulk Revenue, Pieces and Weight System (BRPW)  
Variance Estimation Program Documentation

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## Preface

This is a Category 1 library reference. It updates the BRPW variance estimation program documentation previously provided in USPS-LR-I-28/R2000-1. The BRPW is the subject of the testimony of RPW System witness Hunter, USPS-T-4.

```

//NNNNNV JOB (ALA03), 'NNNNNNN NNN NN', CLASS=H, MSGCLASS=H
/*ROUTE PRINT U5704
//*****
//*          JOB NAME:  PDS.SASRPW(RPWJOBVCV)
//*****
//*
//*
//SO1      EXEC SAS, REGION=6000K, TIME=60
//WORK     DD SPACE=(CYL,(4000)), UNIT=(SYSDA,3)
//SYSOUT   DD DUMMY
//*  \\\//
//*  \\\//  ENTER JOB-3 OUTPUT FOR SINGLE AP OR PQ.
//*NFLATE  DD DSN=HSQRAN.BRPWD01.INFLATE1.FY2000Q1.EOY, DISP=SHR
//*NFLATE  DD DSN=HSQRAN.BRPWD01.INFLATE1.FY2000Q2, DISP=SHR
//*NFLATE  DD DSN=HSQRAN.BRPWD01.INFLATE1.FY2000Q3.EOY, DISP=SHR
//INFLATE  DD DSN=HSQRAN.BRPWD01.INFLATE1.FY2000Q4, DISP=SHR
//MNUALFRM DD DSN=HSQRAN.BRPWD01.MANUALS.FRMQ199, DISP=SHR
//*  \\\//
//*  \\\//  ENTER RPW CODE AND 2-PAGE TITLE FILES.
//RPWLABEL DD DSN=HSISMN.RPW.FY2000.CATEGORY.DIR, DISP=SHR
//TWOPAGE  DD DSN=HSQRAN.BRPWD01.TPLABEL.FY2000.WTOTALS, DISP=SHR
//*WOPAGE  DD DSN=HSISMN.RPW.ADJ.CNTL2000(SUMDIR), DISP=SHR
//*WOPAGE  DD DSN=HSQRAN.BRPWD01.TPLABEL.OCT97.WTOTALS, DISP=SHR
//*PWLABEL DD DSN=HSQRAN.BRPWD01.RPWLABEL.JAN99, DISP=SHR
//*
//*AMPERRS DD DSN=NNNNNN.BRPWD01.SAMPERRS.FY2000Q5, DISP=SHR
//SAMPERRS DD DSN=NNNNNN.BRPWD01.SAMPERRS.FY2000Q5,
//         DISP=(NEW,CATLG), DCB=(RECFM=FB, LRECL=120, BLKSIZE=4800),
//         UNIT=SYSDA, SPACE=(CYL,(20,20),RLSE)
//*
//*
//SYSIN   DD *
*****
*  \\\//  \\\//  \\\//  UPDATE PARAMETERS  \\\//  \\\//  \\\//  \\\//
%LET      PQ = 5          ; * 0,1,2,3,4,5 (0,5 FOR GFY 1,4)
%LET      FY = 00
%LET      VER = 'GFY Q5-00' ; * VERSION OF BRPW RUN (EOY, UPDT01,ETC) *; 00260000
%LET      NAPP = 0        ; * P-POST,BPM:  NZERO/NAUTO COUNT PQ1-00 *; 00260000
%LET      NABPM = 0       ; * P-POST,BPM:  RUN PDS.SAS4C (NAUTONEW) *; 00260000

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AIC =131; PQ =5; F4 =&F4Q5\_131; OUTPUT;  
AIC =132; PQ =5; F4 =&F4Q5\_132; OUTPUT;  
AIC =135; PQ =5; F4 =&F4Q5\_135; OUTPUT;  
AIC =223; PQ =5; F4 =&F4Q5\_223; OUTPUT;  
AIC =237; PQ =5; F4 =&F4Q5\_237; OUTPUT;  
AIC =999; PQ =5; F4 =&F4Q5\_999; OUTPUT;  
AIC =. ; PQ =5; F4 =&F4Q5\_999; OUTPUT;

\*\*\*\*\*  
\* READ INFLATED DATA \*  
\*\*\*\*\*  
DATA RPW0; INFILE INFLATE;  
INPUT @3 CLASS \$2.  
@5 SYS \$6.  
@11 AP 2.  
@13 PQ 1.  
@16 RDATE 6.  
@22 FINNO 6.  
@28 VIP \$5. @29 VIP2 \$1. @30 VIP3 \$1. @32 VIP5 \$1.  
@28 VIP1 \$1.

@33 RPWCODE 5.  
@38 RP 12.2  
@50 RW 12.2  
@62 P 12.  
@86 W 14.2  
@100 NRESP 1.  
@101 MIGRATE 1.  
@102 EFLAG 4.  
/\* @106 DISCOUNT \$1. /\* /\* PRDCL DISCOUNT \*/  
@106 OVERWRIT \$1.  
@107 STRATUM 3.1  
@110 BLOWUP 8.3  
@118 AIC 3.  
@121 F1 10.8  
@131 F2 15.8  
@146 F3 15.8  
@161 RPHAT 12.2  
@173 RWHTAT 12.2  
@185 PHAT 12.2  
@209 WHAT 14.2 ;

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\* PFY-GFY \*  
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ELSE IF RPWCODE=2006 THEN DO; /* CLASSRM */
XR=1.008186733; XP=1.008587506; XW=1.004239163;
RP= RP*XR; RPHAT=RPHAT*XR; RW=RW*XR; RWHAT=RWHAT*XR;
P = P *XP; PHAT= PHAT*XP;
W = W *XW; WHAT= WHAT*XW;
END;

*****
* OTHER *
*****;
IF SYS='PRDCL' & &FY=99 & (&PQ=4 OR &PQ=5) THEN DO;
IF RPWCODE=2004 THEN DO; /* REGULAR */
XR=0.96528903; XP=0.94498066; XW=0.96744665;
RP= RP*XR; RPHAT=RPHAT*XR; RW=RW*XR; RWHAT=RWHAT*XR;
P = P *XP; PHAT= PHAT*XP;
W = W *XW; WHAT= WHAT*XW;
END;
ELSE IF RPWCODE=2005 THEN DO; /* NPROFIT */
XR=1.22868900; XP=1.26459476; XW=1.26339487;
RP= RP*XR; RPHAT=RPHAT*XR; RW=RW*XR; RWHAT=RWHAT*XR;
P = P *XP; PHAT= PHAT*XP;
W = W *XW; WHAT= WHAT*XW;
END;
ELSE IF RPWCODE=2006 THEN DO; /* CLASSRM */
XR=1.02031965; XP=1.01629464; XW=1.01589358;
RP= RP*XR; RPHAT=RPHAT*XR; RW=RW*XR; RWHAT=RWHAT*XR;
P = P *XP; PHAT= PHAT*XP;
W = W *XW; WHAT= WHAT*XW;
END;
END;
IF SYS='PI-SB' THEN DO;
IF AIC=. OR AIC=999 THEN AIC=.; /* STANDARDIZE */
IF &FY=98 OR (&FY=99 & PQ<=2) THEN BLOWUP=&XAIC223;
END;

*****
P=0; PHAT=0;
END;
*****

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*;

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* F1 ADJUSTMENT *
*****;
XAICI=RPHAT+RWHAT;
RI=(RP+RW)*F1;
PI=P*F1;
WI=W*F1;
KEEP PQ SYS CLASS AIC STRATUM FINNO RPWCODE BLOWUP F2
XAICI RI PI WI VIP VIP2 MIGRATE;
*****
* CREATE 0-VOL SITES *
*****;
DATA MNUALFRM; INFILE MNUALFRM;
INPUT @1 FINNO 6.
      @8 SYS $6.
      @14 STRATUM 3.
      @93 BLOWUP 8.
      @101 PNR $1. ; /* PERM NEG-RPT = ' ' */
PROC SORT DATA=RPW0; BY SYS STRATUM FINNO;
PROC SORT DATA=MNUALFRM; BY SYS STRATUM FINNO;
DATA RPW0; MERGE RPW0 (IN=A) MNUALFRM (IN=B); BY SYS STRATUM FINNO;
IF FIRST.STRATUM THEN DO;
  HOLDCLAS=CLASS;
  HOLDAIC =AIC;
  HOLDF2 =F2;
END;
IF A=1 THEN OUTPUT;
ELSE IF A=0 THEN DO;
  CLASS=HOLDCLAS; AIC=HOLDAIC; F2=HOLDF2;
  PQ=&PQ;
  XAICI=0; RI=0; PI=0; WI=0;
  OUTPUT;
END;
RETAIN PQ HOLDCLAS HOLDAIC HOLDF2;
DROP HOLDCLAS HOLDAIC HOLDF2;
*****
* GFY M4 FAC * * FOR PQ 0,5;
*****;
PROC SORT DATA=RPW0; BY PQ AIC;
PROC SORT DATA=F4; BY PQ AIC;
DATA RPW0; MERGE RPW0 (IN=A) F4 (IN=B); BY PQ AIC;
IF A=1;

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IF 1<=PQ<=4 THEN F4=1;
IF F4=. THEN ABORT;
RI =RI*F4;
PI =PI*F4;
WI =WI*F4;
XAICI=XAICI*F4;
KEEP PQ SYS CLASS AIC STRATUM FINNO RPWCODE BLOWUP F2
      XAICI RI PI WI VIP MIGRATE;
PROC DELETE DATA=F4;
*****
* MERGE LINE NOS *
*****
DATA TITLE1; INFILE TWOPAGE;
INPUT @1 LINENO 4.1
      @5 LNAME $35.;
IF LINENO^=.;
INPUT @1 RPWCODE 5.
      @9 LINENO 3.;
PROC SORT DATA=TITLE1;
PROC SORT DATA=TITLE2;
DATA TITLES; MERGE TITLE1(IN=A) TITLE2(IN=B); BY LINENO;
IF A=1;
IF RPWCODE^=.;
PROC SORT DATA=RPW0;
PROC SORT DATA=TITLES;
DATA RPW0; MERGE RPW0(IN=A) TITLES; BY RPWCODE;
IF A=1;
*****
* FILTER * /* REMOVE SINGLE PIECE */
*****;
IF LINENO=5 OR LINENO=25 OR LINENO=95 THEN DELETE;
*****
* PRINT TITLE1 *
*****;
PROC PRINT DATA=TITLE1;
      ID LINENO; VAR LNAME;
TITLE1 "*** BRPW - BULK MAIL RPW SYSTEM *** PQ&PQ-&FY &VER";
TITLE3 'RCV-050: TWO-PAGE REPORT KEY';
TITLE4 ' ';
PROC DELETE DATA=TITLE2;

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PROC DELETE DATA=TITLES;
DATA RPWO; SET RPWO;
*****
* APPLY F2 * * BY PQ;
*****;
RJ=RI*F2;
PJ=PI*F2;
WJ=WI*F2;
*****
* COMBINE APS * * DESCENDING AIC AND LINENO SORTS (TO RID '.');
*****;
PROC SORT DATA=RPWO;
  BY SYS CLASS DESCENDING AIC STRATUM FINNO DESCENDING LINENO;
PROC SUMMARY DATA=RPWO;
  BY SYS CLASS DESCENDING AIC STRATUM FINNO DESCENDING LINENO;
  ID BLOWUP F2 LNAME PQ MIGRATE;
  VAR RJ PJ WJ XAICI;
  OUTPUT OUT=RPW1 SUM=;
PROC DELETE DATA=RPWO;
*****
* CREATE ZERO RECS * /* FOR VIP=44444 & EMPTY LINENO BY SITE */
*****;
PROC SORT DATA=RPW1; /* DESCENDING SORTS TO RID EMPTY VALUES */
  BY SYS CLASS DESCENDING LINENO DESCENDING AIC;
DATA LINE; SET RPW1;
  BY SYS CLASS DESCENDING LINENO;
  IF FIRST.LINENO;
  IF LINENO^=.; /* ALL LINENOS (NON-ZERO - ANY STRATUM) */
  A=SYS;
  B=CLASS;
  HOLDAIC=AIC;
  KEEP A B LINENO LNAME HOLDAIC;
PROC SORT DATA=RPW1; BY SYS CLASS FINNO;
DATA SITE; SET RPW1; BY SYS CLASS FINNO;
  IF FIRST.FINNO;
  KEEP SYS CLASS FINNO STRATUM BLOWUP F2 PQ;
DATA LINESITE; SET SITE; BY SYS CLASS FINNO;
  DO K=1 TO N;
    SET LINE NOBS=N POINT=K;
    IF SYS=A & CLASS=B THEN OUTPUT;
  END;

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DROP A B;
PROC SORT DATA=RPW1; BY SYS CLASS FINNO LINENO;
PROC SORT DATA=LINESITE; BY SYS CLASS FINNO LINENO;
DATA RPW1; MERGE RPW1(IN=A) LINESITE(IN=B);
BY SYS CLASS FINNO LINENO;
IF AIC=. THEN AIC=HOLDAIC;
IF LINENO^=.;
IF A=0 THEN DO;
  RJ=0;
  PJ=0;
  WJ=0;
  XAICI=0;
  END;
*****
* CREATE TOTS * *VAR(TOT) - DO NOT SUM DOMAIN LINENO VARIANCES;
*****
DATA RPWT;
  SET RPW1; AUXVAR=' ';
  *LIEV-1; IF 010<=LINENO<=015 THEN DO;
    LINENO=015.5; OUTPUT; END;
  IF 030<=LINENO<=035 THEN DO;
    LINENO=035.5; OUTPUT; END;
  IF 075<=LINENO<=085 THEN DO;
    LINENO=085.5; OUTPUT; END;
  IF 100<=LINENO<=105 THEN DO;
    LINENO=105.5; OUTPUT; END;
  IF 115<=LINENO<=120 THEN DO;
    LINENO=120.5; OUTPUT; END;
  SET RPW1; AUXVAR=' ';
  *LIEV-2; IF 095<=LINENO<=110 THEN DO;
    LINENO=110.5; OUTPUT; END;
  IF 115<=LINENO<=125 THEN DO;
    LINENO=125.5; OUTPUT; END;
  SET RPW1; AUXVAR='Y';
  *LIEV-3; IF 005<=LINENO<=045 THEN DO;
    LINENO=045.5; OUTPUT;
  END;
  IF 050<=LINENO<=055 THEN DO;
    LINENO=055.5; OUTPUT;
  END;
  IF 070<=LINENO<=090 THEN DO;

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LINENO=090.5; OUTPUT;
END;
IF 095<=LINENO<=130 THEN DO;
  LINENO=130.5; OUTPUT;
END;
IF 135<=LINENO<=155 THEN DO;
  LINENO=155.5; OUTPUT;
END;
IF 180<=LINENO<=180 THEN DO;
  LINENO=220.5; OUTPUT;
END;

SET RPW1; AUXVAR=' ';
*LEV-4; IF 005<=LINENO<=165 THEN DO;
  LINENO=165.5; OUTPUT;
END;

SET RPW1; AUXVAR=' ';
*LEV-5; IF 005<=LINENO<=220 THEN DO;
  LINENO=220.6; OUTPUT;
  LINENO=268.7; OUTPUT;
  LINENO=270.5; OUTPUT;
END;

IF LINENO=. THEN DO;
  LINENO=000.5; OUTPUT;
END;

*****
* OVERWRITE JOINT * /* FOR JOINT AIC 125/130 TOTAL */
*****
IF LINENO=130.5 & SYS='PI-SA' THEN AIC=125130;
DROP LNAME;
PROC SORT DATA=RPWT; BY SYS CLASS AIC STRATUM FINNO LINENO;
PROC SUMMARY DATA=RPWT; BY SYS CLASS AIC STRATUM FINNO LINENO;
ID BLOWUP F2 PQ MIGRATE AUXVAR;
VAR RJ PJ WJ XAICI;
OUTPUT OUT=RPWT SUM=;
PROC SORT DATA=RPWT; BY LINENO;
DATA RPWT; MERGE RPWT(IN=A) TITLE1; BY LINENO;
IF A=1;
PROC DELETE DATA=TITLE1;

*****
* RECONSTRUCT $AIC * * STEP REQUIRED FOR MORE THAN 1 PQ PERIOD;
*****

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DATA AUXVAR; SET RPWT;
  IF AUXVAR='Y';
PROC SORT DATA=AUXVAR; BY SYS CLASS AIC STRATUM;
PROC SUMMARY DATA=AUXVAR; BY SYS CLASS AIC STRATUM;
  VAR XAICI; OUTPUT OUT=XAICH SUM=XAICH;
*****
* ASSIGN NUM: Y =VAR OF INTEREST (R-P-W BY LINENO) *
* COMPUTE DOM: X =TOT REVENUE VAR (ACROSS LINENOS) *
* ADD TOTALS: MAIL CAT TOTALS (AFTER DOM COMPUTED). *
*****
PROC SORT DATA=AUXVAR; BY SYS CLASS AIC STRATUM FINNO;
PROC SUMMARY DATA=AUXVAR; BY SYS CLASS AIC STRATUM FINNO;
  ID BLOWUP F2 MIGRATE;
  VAR RJ;
  OUTPUT OUT=DOM SUM=XI;
PROC DELETE DATA=AUXVAR;
DATA RPWL; SET RPWL RPWT; * ADDED HERE AFTER DOM COMPUTED;
PROC DELETE DATA=RPWT;
PROC SORT DATA=RPWL; BY SYS CLASS AIC STRATUM FINNO;
DATA RPWL; MERGE RPWL DOM; BY SYS CLASS AIC STRATUM FINNO;
  YIR=RJ; XYIR=RJ**2; XYIP=XI*RJ;
  YIP=PJ; XYIP=PJ**2; XYIW=XI*PJ;
  YIW=WJ; XYIW=WJ**2; XYIW=XI*WJ;
  DROP XI;
*****
* H SUMS: YH YXH XYH *
*****
PROC SORT DATA=RPWL; BY SYS CLASS AIC STRATUM LINENO;
PROC SUMMARY DATA=RPWL; BY SYS CLASS AIC STRATUM LINENO;
  ID LNAME BLOWUP PQ;
  VAR YIR XYIR YIP XYIP
  YIW XYIW YH YXH YH_R YXH_R
  YH_P YXH_P YH_W YXH_W ;
*****
* 1. STRATUM SUMS: XH XXH *
* 2. STRATUM SAMP SIZE (ACTUAL RESP ONLY) *
* 3. STRATUM POP SIZE *
*****

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DATA XHSUMS; SET DOM; BY SYS CLASS AIC STRATUM FINNO;
IF FIRST.STRATUM THEN DO;
  XH=0; XXH=0;
END;
IF FIRST.FINNO THEN DO;
  XH=XH+XI;
  XXH=XXH+XI*XI;
END;
IF LAST.STRATUM THEN OUTPUT;
RETAIN XH XXH;
KEEP SYS CLASS AIC STRATUM XH XXH;
PROC SORT DATA=DOM; BY SYS STRATUM FINNO;
DATA XHKOUNTS; SET DOM; BY SYS STRATUM FINNO;
IF FIRST.STRATUM THEN NHSAMPX=0;
IF FIRST.FINNO & ^ (FINNO= . OR FINNO=0)
  THEN NHSAMPX=NHSAMPX+1;
IF LAST.STRATUM THEN OUTPUT; /* ORIG POP SIZE */
RETAIN NHSAMPX;
KEEP SYS STRATUM BLOWUP NHSAMPX F2;
*****
* ADJ STRATUM-1 * /* COUNT AUTO SITES (LESS MIGRATES) */
*****
PROC SORT DATA=DOM; BY STRATUM FINNO;
DATA AUTO; SET DOM; BY STRATUM FINNO;
IF STRATUM=1 & FIRST.FINNO;
  AUTO=1;
PROC SUMMARY;
  VAR AUTO; OUTPUT OUT=AUTO SUM=;
PROC SORT DATA=DOM; BY SYS FINNO;
DATA MIGS; SET DOM; BY SYS FINNO;
IF FIRST.FINNO;
  MIGS=0;
IF STRATUM>1 & MIGRATE=1 THEN MIGS=1;
PROC SUMMARY; BY SYS;
  VAR MIGS; OUTPUT OUT=MIGS SUM=;
DATA SIADJ; SET MIGS;
DO K=1 TO N;
  SET AUTO NOBS=N POINT=K;
  OUTPUT;
END;
KEEP SYS AUTO MIGS;

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DATA XHKOUNTS; MERGE XHKOUNTS SLADJ; BY SYS;
IF STRATUM=1 THEN NHSAMPX=AUTO-MIGS; /* OVERLAY */
NHPOP=INT(0.5 + BLOWUP*F2*NHSAMPX);
*****
* ADD NAUTO COUNT *
*****
IF SYS='PI-SB' THEN NHPOP=INT(0.5+F2*NHSAMPX+&NAPP);
IF SYS='PI-BPM' THEN NHPOP=INT(0.5+F2*NHSAMPX+&NABPM);
KEEP SYS STRATUM BLOWUP NHSAMPX NHPOP;

PROC DELETE DATA=DOM;
PROC SORT DATA=XHSUMS; BY SYS STRATUM;
DATA XH; MERGE XHKOUNTS XHSUMS; BY SYS STRATUM;
PROC DELETE DATA=XHKOUNTS;
PROC DELETE DATA=XHSUMS;
*****
* COMPUTE VAR FOR COMBINED RATIO ESTIMATOR OF TOTAL *
* *
*****
PROC SORT DATA=XH; BY SYS CLASS AIC STRATUM;
DATA RPWH; MERGE YH XH XAICH; BY SYS CLASS AIC STRATUM;
IF SYS=&SRS1 THEN DESIGN='SRS';00
ELSE IF SYS=&SRS2 & (&FY=99 & &PQ<=2 OR &FY=98) THEN DESIGN='SRS';00
ELSE DESIGN='CR';00
IF NHPOP^=0 THEN F =NHSAMPX/NHPOP; /* ACTUAL (RESPONDENTS) */
XHATH =XH *BLOWUP;
YHATH_R =YH_R*BLOWUP;
YHATH_P =YH_P*BLOWUP;
YHATH_W =YH_W*BLOWUP;
S2XH =0; VARXH =0;
S2YH_R =0; VARYH_R =0; SXYH_R =0; COVXYH_R =0;
S2YH_P =0; VARYH_P =0; SXYH_P =0; COVXYH_P =0;
S2YH_W =0; VARYH_W =0; SXYH_W =0; COVXYH_W =0;
IF (NHSAMPX-1) ^=0 THEN DO;
S2XH =(XXH - XH*XH/NHSAMPX)/(NHSAMPX-1);
S2YH_R =(YYH_R - YH_R**2/NHSAMPX)/(NHSAMPX-1);
S2YH_P =(YYH_P - YH_P**2/NHSAMPX)/(NHSAMPX-1);
S2YH_W =(YYH_W - YH_W**2/NHSAMPX)/(NHSAMPX-1);
SXYH_R =(XYH_R - XH*YH_R/NHSAMPX)/(NHSAMPX-1);
SXYH_P =(XYH_P - XH*YH_P/NHSAMPX)/(NHSAMPX-1);
SXYH_W =(XYH_W - XH*YH_W/NHSAMPX)/(NHSAMPX-1);
VARXH =(NHPOP**2)*(1-F)*S2XH/NHSAMPX;

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VARYH_R = (NHPOP**2) * (1-F) * S2YH_R / NHSAMPX;
VARYH_P = (NHPOP**2) * (1-F) * S2YH_P / NHSAMPX;
VARYH_W = (NHPOP**2) * (1-F) * S2YH_W / NHSAMPX;
COVKYH_R = (NHPOP**2) * (1-F) * SXYH_R / NHSAMPX;
COVKYH_P = (NHPOP**2) * (1-F) * SXYH_P / NHSAMPX;
COVKYH_W = (NHPOP**2) * (1-F) * SXYH_W / NHSAMPX;
END;
IF (S2XH*S2YH_R)^=0 THEN RHOH_R=SXYH_R / (S2XH*S2YH_R)**0.5;
IF (S2XH*S2YH_P)^=0 THEN RHOH_P=SXYH_P / (S2XH*S2YH_P)**0.5;
IF (S2XH*S2YH_W)^=0 THEN RHOH_W=SXYH_W / (S2XH*S2YH_W)**0.5;
*****
* FILTER *
*****;
IF LINENO ^= .;
PROC DELETE DATA=YH;
PROC DELETE DATA=XH;
PROC DELETE DATA=XAICH;
*****
* COLLAPSE STRATA *
*****;
PROC SORT DATA=RPWH; BY SYS CLASS AIC LINENO;
PROC SUMMARY DATA=RPWH; BY SYS CLASS AIC LINENO;
ID DESIGN LNAME PQ;
VAR YHATH_R XHATH_XAICH VARXH VARYH_R COVKYH_R
    YHATH_P VARYH_P COVKYH_P
    YHATH_W VARYH_W COVKYH_W;
OUTPUT OUT=FIN
SUM=YHATH_R XHATH_XAICH VARX VARY_R COVKY_R
    YHATH_P VARY_P COVKY_P
    YHATH_W VARY_W COVKY_W ;
DATA FIN; SET FIN;
IF DESIGN='CR' THEN DO;
IF XHATH ^=0 THEN DO;
RATIO_R =YHATH_R/XHATH;
RATIO_P =YHATH_P/XHATH;
RATIO_W =YHATH_W/XHATH;
CVX =VARX**0.5/XHATH;
END;
_R =XAIC*RATIO_R;
_P =XAIC*RATIO_P;
_W =XAIC*RATIO_W;

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IF (YHAT_R*XHAT) ^=0 THEN DO;
  VAR_R = R**2*(VARY_R/YHAT_R**2 +
    VARX/XHAT**2 - 2*COVXY_R/(YHAT_R*XHAT));
  IF COVXY_R>=0 THEN CVXY_R=(COVXY_R/(YHAT_R*XHAT))**0.5;
END;
IF (YHAT_P*XHAT) ^=0 THEN DO;
  VAR_P = P**2*(VARY_P/YHAT_P**2 +
    VARX/XHAT**2 - 2*COVXY_P/(YHAT_P*XHAT));
  IF COVXY_P>=0 THEN CVXY_P=(COVXY_P/(YHAT_P*XHAT))**0.5;
END;
IF (YHAT_W*XHAT) ^=0 THEN DO;
  VAR_W = W**2*(VARY_W/YHAT_W**2 +
    VARX/XHAT**2 - 2*COVXY_W/(YHAT_W*XHAT));
  IF COVXY_W>=0 THEN CVXY_W=(COVXY_W/(YHAT_W*XHAT))**0.5;
END;
*****
* VAR LO-BND *
*****
IF VAR_R ^=. THEN VAR_R =MAX(0,VAR_R);
IF VAR_P ^=. THEN VAR_P =MAX(0,VAR_P);
IF VAR_W ^=. THEN VAR_W =MAX(0,VAR_W);
SE_R =VAR_R**0.5;
SE_P =VAR_P**0.5;
SE_W =VAR_W**0.5;
IF R ^=0 THEN CV_R =SE_R/R;
IF P ^=0 THEN CV_P =SE_P/P;
IF W ^=0 THEN CV_W =SE_W/W;
IF YHAT_R ^=0 THEN CVY_R =VARY_R**0.5/YHAT_R;
IF YHAT_P ^=0 THEN CVY_P =VARY_P**0.5/YHAT_P;
IF YHAT_W ^=0 THEN CVY_W =VARY_W**0.5/YHAT_W;
END;
*****
* SRS ONLY *
*****
ELSE IF DESIGN='SRS' THEN DO;
  RATIO_R =.; CVXY_R=.; CVXHAT =.;
  RATIO_P =.; CVXY_P=.;
  RATIO_W =.; CVXY_W=.;
  _R =YHAT_R; VAR_R =VARY_R; SE_R =VAR_R**0.5;
  _P =YHAT_P; VAR_P =VARY_P; SE_P =VAR_P**0.5;
  _W =YHAT_W; VAR_W =VARY_W; SE_W =VAR_W**0.5;

```

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IF _R ^=0 THEN DO;
  CV_R =SE_R/_R;   CVY_R =VARY_R**0.5/_R;  END;
IF _P ^=0 THEN DO;
  CV_P =SE_P/_P;   CVY_P =VARY_P**0.5/_P;  END;
IF _R ^=0 THEN DO;
  CV_W =SE_W/_W;   CVY_W =VARY_W**0.5/_W;  END;

```

END;

```

*****
* PFY SUMMARY RPT *
*****

```

```

PROC PRINT D LABEL DATA=FIN; BY SYS CLASS AIC; PAGEBY AIC;

```

```

  ID LINENO; VAR LNAME _R CV_R _P CV_P _W CV_W;
  LABEL LNAME = 'CATEGORY'

```

```

  _R = 'REV'
  _P = 'VOL'
  _W = 'LBS'
  CV_R = 'CV_R'
  CV_P = 'CV_P'
  CV_W = 'CV_W' ;

```

```

FORMAT _R _P _W COMMA14. CV_R CV_P CV_W 7.4;
TITLE3 'RCV-200: COMB-RATIO ESTIMATE OF TOTAL AND SAMP-ERROR';
TITLE4 '(STRATIFIED R-SAMPLE DESIGN IF NO AIC CONTROL)';
TITLE6 '*** PANEL SUMMARY ***';

```

```

TITLE8 ' ';
*****
* OUTPUT *
*****

```

```

PROC SORT DATA=FIN; BY LINENO SYS;

```

```

DATA _NULL_ ; SET FIN;
FILE SAMPERRS;

```

```

PUT @1 PQ 1.
   @2 LINENO 5.1
   @7 SYS $6.
   @15 _R 14.
   @30 SE_R 14.
   @45 _P 14.
   @60 SE_P 14.
   @75 _W 14.
   @90 SE_W 14. ;

```

```

* ;
* ;

```

```

* ;
*****
* 2-PG SUMMARY RPT *
*****
PROC SORT DATA=FIN; BY LINENO;
PROC SUMMARY DATA=FIN; BY LINENO;
ID LNAME; VAR R_P W VAR_R VAR_P VAR_W;
OUTPUT OUT=TPG SUM=;
DATA TPG; SET TPG;
IF R^=0 THEN CV_R=(VAR_R**0.5)/R;
IF P^=0 THEN CV_P=(VAR_P**0.5)/P;
IF W^=0 THEN CV_W=(VAR_W**0.5)/W;
PROC PRINT LABEL DATA=TPG; BY LINENO;
ID LINENO; VAR LNAME R CV_R P CV_P W CV_W;
LABEL LNAME = 'CATEGORY'
      R = 'REV'
      P = 'VOL'
      W = 'LBS'
      CV_R = 'CV_R'
      CV_P = 'CV_P'
      CV_W = 'CV_W' ;
FORMAT R_P W COMMA14. CV_R CV_P CV_W 7.4;
TITLE3 'RCV-200T: COMB-RATIO ESTIMATE OF TOTAL AND SAMP-ERROR';
TITLE4 '(STRATIFIED R-SAMPLE DESIGN IF NO AIC CONTROL)';
TITLE6 '*** 2-PAGE SUMMARY ***';
TITLE7 ' ';
PROC DELETE DATA=TPG;
/*

```