Appendix C
IVEWare Programs Used for Imputation

GROUP 1. Respondent's Total Income Components (Own or Joint Income)

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                                Imput2012_Total Group1
/*******************************************************/
/* PROGRAM NAME  : Imput2012_group1_core_help.SAS      */
/* PROGRAMMED BY : DONG ZHANG                          */
/* LAST UPDATEED : 08/31/2015                          */
/* Impute missing value on core and proxy questionnaire */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter nodate; run;

/*
proc contents data=input.sect_g_j_k_sa_2012; run;       *** not imputed N=10,427,
var=680;
*/

data aa; set input.sect_g_j_k_sa_2012;                                  *** core
and proxy questionnaire N=10,427;
        proc sort out=temp nodupkey; by cunicah subhog_12; run;  *** no duplicate;

***** Core questionnaire N=9,696;
data aa1; set aa;
        keep cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
        g17_12
         g18_1_12 g19_1_1_12 g19_1_2_12 g19_1_monthly_12 g20_1_12 g21_1_12
         g18_2_12 g19_2_1_12 g19_2_2_12 g19_2_monthly_12 g20_2_12 g21_2_12
         g18_3_12 g19_3_1_12 g19_3_2_12 g19_3_monthly_12 g20_3_12 g21_3_12
         g18_4_12 g19_4_1_12 g19_4_2_12 g19_4_monthly_12 g20_4_12 g21_4_12
         g18_5_12 g19_5_1_12 g19_5_2_12 g19_5_monthly_12 g20_5_12 g21_5_12
         g18_6_12 g19_6_1_12 g19_6_2_12 g19_6_monthly_12 g20_6_12 g21_6_12
         g18_7_12 g19_7_1_12 g19_7_2_12 g19_7_monthly_12 g20_7_12 g21_7_12;
if tipentg_12=1; run;
/* proc freq; table g18_1_12 g18_2_12 g18_3_12 g18_4_12 g18_5_12 g18_6_12 g18_7_12;
run;
proc freq; table g18_1_12 g18_2_12 g18_3_12 g18_4_12 g18_5_12 g18_6_12 g18_7_12;
where g18_1_12 ne .; run; */

/* proc freq; table g17_12 /missing; run;
        proc freq; table g19_1_1_12  g19_2_1_12 g19_3_1_12 g19_4_1_12 g19_5_1_12
g19_6_1_12 g19_7_1_12 /missing; run;
proc freq; table g19_1_2_12; run;
/*
                                  Cumulative    Cumulative
g17_12    Frequency     Percent     Frequency      Percent
-------------------------------------------------------------
     .         572        5.90           572         5.90
     1        3256       33.58          3828        39.48
```

```
                              Imput2012_Total Group1
     2        5846       60.29          9674        99.77
     8          17        0.18          9691        99.95
     9           5        0.05          9696       100.00

                                      Cumulative    Cumulative
g19_2_1_12    Frequency     Percent     Frequency      Percent
-----------------------------------------------------------------
         1         439       24.31           439        24.31
         2         867       48.01          1306        72.31
         3         264       14.62          1570        86.93
         4          84        4.65          1654        91.58
         8          17        0.94          1671        92.52
         9         135        7.48          1806       100.00

                  Frequency Missing = 7890

                                      Cumulative    Cumulative
g19_3_1_12    Frequency     Percent     Frequency      Percent
-----------------------------------------------------------------
         1         203       24.20           203        24.20
         2         400       47.68           603        71.87
         3         122       14.54           725        86.41
         4          38        4.53           763        90.94
         8           8        0.95           771        91.90
         9          68        8.10           839       100.00

                  Frequency Missing = 8857

                                      Cumulative    Cumulative
g19_4_1_12    Frequency     Percent     Frequency      Percent
-----------------------------------------------------------------
         1          81       22.69            81        22.69
         2         171       47.90           252        70.59
         3          53       14.85           305        85.43
         4          15        4.20           320        89.64
         8           6        1.68           326        91.32
         9          31        8.68           357       100.00

                  Frequency Missing = 9339
*/

data aa2; set aa1;
        imamg19_1_12=g19_1_monthly_12;
        if g17_12 =2 and g19_1_monthly_12=. then imamg19_1_12=0;
        if g17_12 =. and g19_1_monthly_12=. then imamg19_1_12=0;
        if g17_12 in (8,9) and g19_1_monthly_12=. then imamg19_1_12=.;
                if g19_1_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamg19_1_12=.;
```

```
                if imamg19_1_12=. and g20_1_12=. then g20_1_12=9;
**** Amputation N=304;
        imamg19_2_12=g19_2_monthly_12;
         if g19_2_2_12 = . and g19_2_monthly_12=. then imamg19_2_12=0;
                if g19_2_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamg19_2_12=.;
                if imamg19_2_12=. and g20_2_12=. then g20_2_12=9;
**** Amputation N=156;
        imamg19_3_12=g19_3_monthly_12;
         if g19_3_2_12 = . and g19_3_monthly_12=. then imamg19_3_12=0;
                if g19_3_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamg19_3_12=.;
                if imamg19_3_12=. and g20_3_12=. then g20_3_12=9;
**** Amputation N=79;
        imamg19_4_12=g19_4_monthly_12;
         if g19_4_2_12 = . and g19_4_monthly_12=. then imamg19_4_12=0;
                if g19_4_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamg19_4_12=.;
                if imamg19_4_12=. and g20_4_12=. then g20_4_12=9;
**** Amputation N=37;
        imamg19_5_12=g19_5_monthly_12;
         if g19_5_2_12 = . and g19_5_monthly_12=. then imamg19_5_12=0;
                if g19_5_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamg19_5_12=.;
                if imamg19_5_12=. and g20_5_12=. then g20_5_12=9;
**** Amputation N=15;
        imamg19_6_12=g19_6_monthly_12;
         if g19_6_2_12 = . and g19_6_monthly_12=. then imamg19_6_12=0;
                if g19_6_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamg19_6_12=.;
                if imamg19_6_12=. and g20_6_12=. then g20_6_12=9;
**** Amputation N=11;
        imamg19_7_12=g19_7_monthly_12;
         if g19_7_2_12 = . and g19_7_monthly_12=. then imamg19_7_12=0;
                if g19_7_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamg19_7_12=.;
                if imamg19_7_12=. and g20_7_12=. then g20_7_12=9;
**** Amputation N=6;
                dumg19_1_12=1*(imamg19_1_12=.);    ***imputation indicator;
                dumg19_2_12=1*(imamg19_2_12=.);
                dumg19_3_12=1*(imamg19_3_12=.);
                dumg19_4_12=1*(imamg19_4_12=.);
                dumg19_5_12=1*(imamg19_5_12=.);
```

```
                              Imput2012_Total Group1
                dumg19_6_12=1*(imamg19_6_12=.);
                dumg19_7_12=1*(imamg19_7_12=.);
 label  imamg19_1_12="MonthlyReceived 1"
                imamg19_2_12="MonthlyReceived 2"
                imamg19_3_12="MonthlyReceived 3"
                imamg19_4_12="MonthlyReceived 4"
                imamg19_5_12="MonthlyReceived 5"
                imamg19_6_12="MonthlyReceived 6"
                imamg19_7_12="MonthlyReceived 7"; run;

/* proc means data=aa2 n mean std min max nmiss;
variable imamg19_1_12 imamg19_2_12 imamg19_3_12 imamg19_4_12 imamg19_5_12
imamg19_6_12 imamg19_7_12; run;
        proc freq; table dumg19_1_12 dumg19_2_12 dumg19_3_12 dumg19_4_12
dumg19_5_12 dumg19_6_12 dumg19_7_12; run; */

***** define range of imputation;
data aa3; set aa2;
        lowg191=1; upg191=20000 ;                          ** Max=20,000 ;
                if g20_1_12=1 and g21_1_12=1 then do;   lowg191=150;
upg191=20000;   end;
                if g20_1_12=1 and g21_1_12=2 then do;   lowg191=150;    upg191=300;
end;
                if g20_1_12=1 and g21_1_12=9 then do;   lowg191=150;
upg191=20000;   end;
                if g20_1_12=2  then do; lowg191=1;      upg191=150;     end;
                if g20_1_12=9  then do; lowg191=1;      upg191=20000;   end;
                        if g17_12 in (8,9) then lowg191=0;
                        if imamg19_1_12 >=0 then lowg191=imamg19_1_12;
                        if imamg19_1_12 >=0 then upg191=imamg19_1_12;
        lowg192=1; upg192=14000 ;                                ** Max=14,000 ;
                if g20_2_12=1 and g21_2_12=1 then do;   lowg192=150;
upg192=14000;   end;
                if g20_2_12=1 and g21_2_12=2 then do;   lowg192=150;    upg192=300;
end;
                if g20_2_12=1 and g21_2_12=9 then do;   lowg192=150;
upg192=14000;   end;
                if g20_2_12=2  then do; lowg192=1;      upg192=150;     end;
                if g20_2_12=9  then do; lowg192=1;      upg192=14000;   end;
                        if imamg19_2_12 >=0 then lowg192=imamg19_2_12;
                        if imamg19_2_12 >=0 then upg192=imamg19_2_12;
        lowg193=1; upg193=7200 ;                                  ** Max=7,200 ;
                if g20_3_12=1 and g21_3_12=1 then do;   lowg193=150;
upg193=7200;    end;
                if g20_3_12=1 and g21_3_12=2 then do;   lowg193=150;    upg193=300;
end;
                if g20_3_12=1 and g21_3_12=9 then do;   lowg193=150;
upg193=7200;    end;
                if g20_3_12=2  then do; lowg193=1;      upg193=150;     end;
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```
                if g20_3_12=9  then do; lowg193=1;      upg193=7200;    end;
                        if imamg19_3_12 >=0 then lowg193=imamg19_3_12;
                        if imamg19_3_12 >=0 then upg193=imamg19_3_12;
        lowg194=1; upg194=10000 ;                               ** Max=10,000 ;
                if g20_4_12=1 and g21_4_12=1 then do;   lowg194=150;
upg194=10000;   end;
                if g20_4_12=1 and g21_4_12=2 then do;   lowg194=150;    upg194=300;
end;
                if g20_4_12=1 and g21_4_12=9 then do;   lowg194=150;
upg194=10000;   end;
                if g20_4_12=2  then do; lowg194=1;      upg194=150;     end;
                if g20_4_12=9  then do; lowg194=1;      upg194=10000;   end;
                        if imamg19_4_12 >=0 then lowg194=imamg19_4_12;
                        if imamg19_4_12 >=0 then upg194=imamg19_4_12;
        lowg195=1; upg195=4000 ;                                        **
Max=4,000 ;
                if g20_5_12=1 and g21_5_12=1 then do;   lowg195=150;
upg195=4000;    end;
                if g20_5_12=1 and g21_5_12=2 then do;   lowg195=150;    upg195=300;
end;
                if g20_5_12=1 and g21_5_12=9 then do;   lowg195=150;
upg195=4000;    end;
                if g20_5_12=2  then do; lowg195=1;      upg195=150;     end;
                if g20_5_12=9  then do; lowg195=1;      upg195=4000;    end;
                        if imamg19_5_12 >=0 then lowg195=imamg19_5_12;
                        if imamg19_5_12 >=0 then upg195=imamg19_5_12;
        lowg196=1; upg196=2600 ;                                        **
Max=2,600 ;
                if g20_6_12=1 and g21_6_12=1 then do;   lowg196=150;
upg196=2600;    end;
                if g20_6_12=1 and g21_6_12=2 then do;   lowg196=150;    upg196=300;
end;
                if g20_6_12=1 and g21_6_12=9 then do;   lowg196=150;
upg196=2600;    end;
                if g20_6_12=2  then do; lowg196=1;      upg196=150;     end;
                if g20_6_12=9  then do; lowg196=1;      upg196=2600;    end;
                        if imamg19_6_12 >=0 then lowg196=imamg19_6_12;
                        if imamg19_6_12 >=0 then upg196=imamg19_6_12;
        lowg197=1; upg197=16000 ;                                       **
Max=16,000 ;
                if g20_7_12=1 and g21_7_12=1 then do;   lowg197=150;
upg197=16000;   end;
                if g20_7_12=1 and g21_7_12=2 then do;   lowg197=150;    upg197=300;
end;
                if g20_7_12=1 and g21_7_12=9 then do;   lowg197=150;
upg197=16000;   end;
                if g20_7_12=2  then do; lowg197=1;      upg197=150;     end;
                if g20_7_12=9  then do; lowg197=1;      upg197=16000;   end;
                        if imamg19_7_12 >=0 then lowg197=imamg19_7_12;
```

```
                              Imput2012_Total Group1
                        if imamg19_7_12 >=0 then upg197=imamg19_7_12;
run;
/*      proc freq; table lowg191--upg197; run;  */

data output2.group1_core_help; set aa3;
        keep cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
                imamg19_1_12 imamg19_2_12 imamg19_3_12 imamg19_4_12 imamg19_5_12
imamg19_6_12 imamg19_7_12
                lowg191--upg197 dumg19_1_12 dumg19_2_12 dumg19_3_12 dumg19_4_12
dumg19_5_12 dumg19_6_12 dumg19_7_12;  run;

/*  proc means data=output2.group1_core_help n mean std min max nmiss; variable
imamg19_1_12 imamg19_2_12
                imamg19_3_12 imamg19_4_12 imamg19_5_12 imamg19_6_12 imamg19_7_12;
run; */


data dd1; set output2.group1_core_help;     **** Core nonproxy N=9,696 var=34;
run;


***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max ;

mixed  imamg19_1_12 imamg19_2_12 imamg19_3_12  imamg19_4_12 imamg19_5_12
imamg19_6_12 imamg19_7_12 yrschool;

transfer cunicah subhog_12 tipentg_12
        lowg191 upg191 lowg192 upg192 lowg193 upg193
        lowg194 upg194 lowg195 upg195 lowg196 upg196  lowg197 upg197
        dumg19_1_12 dumg19_2_12 dumg19_3_12 dumg19_4_12 dumg19_5_12 dumg19_6_12
dumg19_7_12;
```

```
                              Imput2012_Total Group1
  bounds        imamg19_1_12(<=upg191,>=lowg191)
                        imamg19_2_12(<=upg192,>=lowg192)
                        imamg19_3_12(<=upg193,>=lowg193)
                        imamg19_4_12(<=upg194,>=lowg194)
                        imamg19_5_12(<=upg195,>=lowg195)
                        imamg19_6_12(<=upg196,>=lowg196)
                        imamg19_7_12(<=upg197,>=lowg197)
                        yrschool(<=22, >=0);

 INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

   /* ITERATIONS 2; */
   multiples 2 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group1_core_help_imputed; set dd_1; drop lowg191--upg197 _mult_;
run; *** dd_1 = imputation1;


*** check imputed amount;
/* proc freq data=dd_1; table imamg19_1_12; where upg191 ne lowg191; run; */
proc freq data=imp2.group1_core_help_imputed; table imamg19_1_12; where
dumg19_1_12=1; run;
proc freq data=imp2.group1_core_help_imputed; table imamg19_2_12; where
dumg19_2_12=1; run;
proc freq data=imp2.group1_core_help_imputed; table imamg19_3_12; where
dumg19_3_12=1; run;
proc freq data=imp2.group1_core_help_imputed; table imamg19_4_12; where
dumg19_4_12=1; run;
proc freq data=imp2.group1_core_help_imputed; table imamg19_5_12; where
dumg19_5_12=1; run;
proc freq data=imp2.group1_core_help_imputed; table imamg19_6_12; where
dumg19_6_12=1; run;
proc freq data=imp2.group1_core_help_imputed; table imamg19_7_12; where
dumg19_7_12=1; run;


*** print output: prior imputation/ without zero;
data group1; set output2.group1_core_help;
    if imamg19_1_12=0 then imamg19_1_12=.;
    if imamg19_2_12=0 then imamg19_2_12=.;
    if imamg19_3_12=0 then imamg19_3_12=.;
    if imamg19_4_12=0 then imamg19_4_12=.;
    if imamg19_5_12=0 then imamg19_5_12=.;
```

```
    if imamg19_6_12=0 then imamg19_6_12=.;
    if imamg19_7_12=0 then imamg19_7_12=.;  run;
Title "Group1 core help - before imputation (mean without zero)";
proc means data=group1 mean std min max n ;
        variable imamg19_1_12 imamg19_2_12 imamg19_3_12 imamg19_4_12 imamg19_5_12
imamg19_6_12 imamg19_7_12; run;

*** print output: prior imputation/ with zero;
Title "Group1 core help - before imputation (mean with zero)";
proc means data=output2.group1_core_help mean std min max n nmiss;
        variable imamg19_1_12 imamg19_2_12 imamg19_3_12 imamg19_4_12 imamg19_5_12
imamg19_6_12 imamg19_7_12; run;


*** print output-imputed: mean with zero;
Title "Group1 core help - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group1_core_help_imputed;
        var imamg19_1_12 imamg19_2_12 imamg19_3_12 imamg19_4_12 imamg19_5_12
imamg19_6_12 imamg19_7_12;
run;

*** print output-imputed: mean without zero;
data group2; set imp2.group1_core_help_imputed;
    if imamg19_1_12=0 then imamg19_1_12=.;
    if imamg19_2_12=0 then imamg19_2_12=.;
    if imamg19_3_12=0 then imamg19_3_12=.;
    if imamg19_4_12=0 then imamg19_4_12=.;
    if imamg19_5_12=0 then imamg19_5_12=.;
    if imamg19_6_12=0 then imamg19_6_12=.;
    if imamg19_7_12=0 then imamg19_7_12=.;  run;
Title "Group1 core help - imputed (mean without zero)";
proc means data=group2 mean std min max n ;
        var imamg19_1_12 imamg19_2_12 imamg19_3_12 imamg19_4_12 imamg19_5_12
imamg19_6_12 imamg19_7_12;
run;



/*******************************************************/
/* PROGRAM NAME  : Imput2012_group1_core_pension.SAS    */
/* PROGRAMMED BY : DONG ZHANG                           */
/* LAST UPDATEED : 06/30/2015                           */
/* Impute missing value on core and proxy questionnaire */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
```

```
                                Imput2012_Total Group1
options ps=65 ls=120 nocenter; run;

/*
proc contents data=input.sect_g_j_k_sa_2012; run;       *** not imputed N=10,427,
var=680;
*/

data aa; set input.sect_g_j_k_sa_2012;                                  *** core
and proxy questionnaire N=10,427;
        proc sort  nodupkey; by cunicah subhog_12; run;  *** no duplicate;

***** Core questionnaire N=9,696;
data bb1; set aa;
        keep cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
        k1_12 k1a_12
        k10_1_12 k11_1_12 k12a1_12 k12b1_12 k12c1_12
                         k13_1_12 k14a1_12 k14b1_12 k14c1_12
                         k15_1_12 k16a1_12 k16b1_12 k16c1_12
        K10_2_12 k11_2_12 k12a2_12 k12b2_12 k12c2_12
                         k13_2_12 k14a2_12 k14b2_12 k14c2_12
                         k15_2_12 k16a2_12 k16b2_12 k16c2_12
        k26_1_12
         k27_1_12 k28a1_12 k28b1_12 k28c1_12
        k26_2_12
         k27_2_12 k28a2_12 k28b2_12 k28c2_12
        k17_12 k17a_12
         k29_1_12 k30a1_12 k30b1_12 k30c1_12
         k29_2_12 k30a2_12 k30b2_12 k30c2_12
         k31a_12 k35_1_12 k36_1_12 k37a1_12 k37b1_12 k37c1_12
         k31b_12 k35_2_12 k36_2_12 k37a2_12 k37b2_12 k37c2_12
         k31c_12 k35_3_12 k36_3_12 k37a3_12 k37b3_12 k37c3_12
         k47_12 k47a_12 k47b1_12 k47b2_12 k47b3_12
         k48_12 k48a_12 k48b1_12 k48b2_12 k48b3_12      k48a_monthly_12
         k50_12 k50a_12 k50b1_12 k50b2_12 k50b3_12
         k51_12 k51a_12 k51b1_12 k51b2_12 k51b3_12      k51a_monthly_12
         k58a_12 k61_1_12 k62a1_12 k62b1_12 k62c1_12
         k58b_12 k61_2_12 k62a2_12 k62b2_12 k62c2_12
         k58c_12 k61_3_12 k62a3_12 k62b3_12 k62c3_12
         k58d_12 k61_4_12 k62a4_12 k62b4_12 k62c4_12

         k80_1_12 k80_2_12 k80_3_12 k79a_12 k79b_12 k79c_12;
if tipentg_12=1; run;
/*      proc freq; table k1_12; run;
           Respondent/spouse are business owners
                                    Cumulative    Cumulative
k1_12    Frequency     Percent     Frequency      Percent
-----------------------------------------------------------
    1        1335       13.77          1335        13.77
    2        8331       85.92          9666        99.69
```

```
                                Imput2012_Total Group1
    8          16        0.17          9682        99.86
    9          14        0.14          9696       100.00
 proc freq; table  k10_1_12; run;
        proc freq; table k1a_12; run;
  proc freq; table k15_2_12; run;  */


****************** 1 *********;
data bb2; set bb1;
        imamk11_1_12=k11_1_12;          **** Amputation N=253;
        if k1_12 =2 and k11_1_12=. then imamk11_1_12=0;
        if k1_12 in (8,9) and k11_1_12=. then imamk11_1_12=.;
        if k1_12 =1 and k11_1_12=. then imamk11_1_12=.;
                        if k10_1_12 =2 and k11_1_12=. then imamk11_1_12=0;
                        if k10_1_12 in (8,9) and k11_1_12=. then imamk11_1_12=.;
                        if k10_1_12 =1 and k11_1_12=. then imamk11_1_12=.;
                if k11_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk11_1_12=.;
                if imamk11_1_12=. and k12a1_12=. then k12a1_12=9;
        imamk11_2_12=k11_2_12;          **** Amputation N=11;
        if k1_12 in(2,8,9) and k11_2_12=. then imamk11_2_12=0;
                if k10_2_12 =2 and k11_2_12=. then imamk11_2_12=0;
                if k10_2_12 in (8,9) and k11_2_12=. then imamk11_2_12=.;
                if k10_2_12 =1 and k11_2_12=. then imamk11_2_12=.;
                if k10_2_12 = . and k11_2_12=. then imamk11_2_12=0;
                        if k11_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk11_2_12=.;
                if imamk11_2_12=. and k12a2_12=. then k12a2_12=9;
        imamk13_1_12=k13_1_12;          **** Amputation N=278;
        if k1_12 =2 and k13_1_12=. then imamk13_1_12=0;
        if k1_12 in (8,9) and k13_1_12=. then imamk13_1_12=.;
        if k1_12 =1 and k13_1_12=. then imamk13_1_12=.;
                if k13_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk13_1_12=.;
                if imamk13_1_12=. and k14a1_12=. then k14a1_12=9;
        imamk13_2_12=k13_2_12;          **** Amputation N=16;
        if k1_12 in (2,8,9) and k13_2_12=. then imamk13_2_12=0;
        if k1a_12 =2 and k13_2_12=. then imamk13_2_12=0;
        if k1a_12 =. and k13_2_12=. then imamk13_2_12=0;
                if k13_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk13_2_12=.;
                if imamk13_2_12=. and k14a2_12=. then k14a2_12=9;
        imamk15_1_12=k15_1_12;          **** Amputation N=268;
        if k1_12 =2 and k15_1_12=. then imamk15_1_12=0;
        if k1_12 in (8,9) and k15_1_12=. then imamk15_1_12=.;
```

```
        if k1_12 =1 and k15_1_12=. then imamk15_1_12=.;
                if k15_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk15_1_12=.;
                if imamk15_1_12=. and k16a1_12=. then k16a1_12=9;
        imamk15_2_12=k15_2_12;          **** Amputation N=17;
        if k1_12 in (2,8,9) and k15_2_12=. then imamk15_2_12=0;
                if k1a_12 = 2 and k15_2_12=. then imamk15_2_12=0;
                if k1a_12 =. and k15_2_12=. then imamk15_2_12=0;
                if k15_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk15_2_12=.;
                if imamk15_2_12=. and k16a2_12=. then k16a2_12=9;
                dumk11_1_12=1*(imamk11_1_12=.);
                dumk11_2_12=1*(imamk11_2_12=.);
                dumk13_1_12=1*(imamk13_1_12=.);
                dumk13_2_12=1*(imamk13_2_12=.);
                dumk15_1_12=1*(imamk15_1_12=.);
                dumk15_2_12=1*(imamk15_2_12=.);                 run;

***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname
        (keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
imam&vname dum&vname low&vname up&vname &mix1 &mix2 );
        set bb2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
                if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
%mend range;

%range(k11_1_12,k12a1_12,k12b1_12,k12c1_12,700000,45000,150000,15000,k1_12,k10_1_12
);  run;
%range(k11_2_12,k12a2_12,k12b2_12,k12c2_12,100000,45000,150000,15000,k10_2_12);
```

```
run;
%range(k13_1_12,k14a1_12,k14b1_12,k14c1_12,400000,45000,150000,15000,k1_12,k14a1_12
);  run;  ****k13_1,2, k151,2 range 0-max if missing;
%range(k13_2_12,k14a2_12,k14b2_12,k14c2_12, 65000,45000,150000,15000,k14a2_12);
run;
%range(k15_1_12,k16a1_12,k16b1_12,k16c1_12,600000,15000,45000,6000,k1_12,k16a1_12);
 run;
%range(k15_2_12,k16a2_12,k16b2_12,k16c2_12, 30000,15000,45000,6000,k16a2_12);  run;

data output2.group1_core_pension1;
        merge datak11_1_12(drop=k1_12 k10_1_12)
        datak11_2_12(drop=k10_2_12)
        datak13_1_12(drop=k1_12 k14a1_12)
        datak13_2_12(drop= k14a2_12)
        datak15_1_12(drop=k1_12 k16a1_12)
        datak15_2_12 (drop=k16a2_12) ; run;

data dd1; set output2.group1_core_pension1;  run;   **** Core nonproxy N=9,696
var=30;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12  yrschool;

transfer cunicah subhog_12 tipentg_12
        lowk11_1_12 upk11_1_12
    lowk11_2_12  upk11_2_12
    lowk13_1_12  upk13_1_12
    lowk13_2_12  upk13_2_12
    lowk15_1_12  upk15_1_12
```

```
                                Imput2012_Total Group1
    lowk15_2_12  upk15_2_12
                dumk11_1_12
                dumk11_2_12
                dumk13_1_12
                dumk13_2_12
                dumk15_1_12
                dumk15_2_12
        ;
 bounds
  imamk11_1_12 (>=lowk11_1_12 ,<=upk11_1_12)
  imamk11_2_12 (>=lowk11_2_12 ,<=upk11_2_12)
  imamk13_1_12 (>=lowk13_1_12 ,<=upk13_1_12)
  imamk13_2_12 (>=lowk13_2_12 ,<=upk13_2_12)
  imamk15_1_12 (>=lowk15_1_12 ,<=upk15_1_12)
  imamk15_2_12 (>=lowk15_2_12 ,<=upk15_2_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 2 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group1_core_pension1_imputed; set dd_1;
        drop lowk11_1_12 upk11_1_12
    lowk11_2_12  upk11_2_12
    lowk13_1_12  upk13_1_12
    lowk13_2_12  upk13_2_12
    lowk15_1_12  upk15_1_12
    lowk15_2_12  upk15_2_12   _mult_; run;

/* proc freq; table imamk11_1_12 ; where dumk11_1_12=1;  run;
proc freq; table imamk11_2_12; where dumk11_2_12=1; run;
proc freq; table imamk13_1_12; where dumk13_1_12 =1;  run;
proc freq; table imamk13_2_12; where dumk13_2_12 =1;  run;
proc freq; table imamk15_1_12; where dumk15_1_12 =1;  run;
proc freq; table imamk15_2_12; where dumk15_2_12 =1;  run;
*/

**************** 2 ***********;
data bb2; set bb1;
        imamk27_1_12=k27_1_12;          **** Amputation N=68;
        if k17_12=2 and k27_1_12=. then imamk27_1_12=0;
```

```
                              Imput2012_Total Group1
        if k17_12 in (8,9) and  k27_1_12=. then imamk27_1_12=.;
        if k17_12 =1 and k27_1_12=. then imamk27_1_12=.;
                if k26_1_12 =2 and k27_1_12=. then imamk27_1_12=0;
                if k26_1_12 = 1 and k27_1_12=. then imamk27_1_12=.;
                if k26_1_12 in (8,9) and k27_1_12=. then imamk27_1_12=.;
                if k27_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk27_1_12=.;
                if imamk27_1_12=. and k28a1_12=. then k28a1_12=9;
        imamk27_2_12=k27_2_12;          **** Amputation N=7     ;
        if k17_12 in (2,8,9) and k27_2_12=. then imamk27_2_12=0;
                if k26_2_12 =2 and k27_2_12=. then imamk27_2_12=0;
                if k26_2_12 =1 and k27_2_12=. then imamk27_2_12=.;
                if k26_2_12 in (8,9) and k27_2_12=. then imamk27_2_12=.;
                if k26_2_12 =. and k27_2_12=. then imamk27_2_12=0;
                if k27_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk27_2_12=.;
                if imamk27_2_12=. and k28a2_12=. then k28a2_12=9;

        imamk29_1_12=k29_1_12;          **** Amputation N=108;
                if k17_12=2 and k29_1_12=. then imamk29_1_12=0;
                if k17_12 = 1 and k29_1_12=. then imamk29_1_12=.;
                if k17_12 in (8,9) and k29_1_12=. then imamk29_1_12=.;
                if k29_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk29_1_12=.;
                if imamk29_1_12=. and k30a1_12=. then k30a1_12=9;
        imamk29_2_12=k29_2_12;          **** Amputation N=7;
                if k17_12 = in (2,8,9) and k29_2_12=. then imamk29_2_12=0;
                if k17a_12=2 and k29_2_12=. then imamk29_2_12=0;
                if k29_2_12 =. then imamk29_2_12=0;
                if k29_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk29_2_12=.;
                if imamk29_2_12=. and k30a2_12=. then k30a2_12=9;
         dumk27_1_12=1*(imamk27_1_12=.);
         dumk27_2_12=1*(imamk27_2_12=.);
         dumk29_1_12=1*(imamk29_1_12=.);
         dumk29_2_12=1*(imamk29_2_12=.);               run;

%range(k27_1_12,k28a1_12,k28b1_12,k28c1_12,700000,4500,14000,1500,k17_12,k26_1_12);
 run;
%range(k27_2_12,k28a2_12,k28b2_12,k28c2_12, 10000,4500,14000,1500,k26_2_12);  run;
%range(k29_1_12,k30a1_12,k30b1_12,k30c1_12,100000,600,2000,150,k17_12,k30a1_12);
run;
%range(k29_2_12,k30a2_12,k30b2_12,k30c2_12,  3000,600,2000,150,k30a2_12);  run;

data output2.group1_core_pension2;
```

```
        merge
        datak27_1_12(drop=k17_12 k26_1_12)
        datak27_2_12(drop=k26_2_12)
        datak29_1_12(drop=k17_12 k30a1_12)
        datak29_2_12(drop=k30a2_12); run;

data dd1; set output2.group1_core_pension2;  run;   **** Core nonproxy N=9,696
var=22;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk27_1_12 imamk27_2_12 imamk29_1_12 imamk29_2_12
                         yrschool;

transfer cunicah subhog_12 tipentg_12

    lowk27_1_12  upk27_1_12
    lowk27_2_12  upk27_2_12
    lowk29_1_12  upk29_1_12
    lowk29_2_12  upk29_2_12
         dumk27_1_12
         dumk27_2_12
         dumk29_1_12
         dumk29_2_12
        ;
 bounds

  imamk27_1_12 (>=lowk27_1_12 ,<=upk27_1_12)
  imamk27_2_12 (>=lowk27_2_12 ,<=upk27_2_12)

  imamk29_1_12 (>=lowk29_1_12 ,<=upk29_1_12)
```

```
                                Imput2012_Total Group1
  imamk29_2_12 (>=lowk29_2_12 ,<=upk29_2_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 2 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group1_core_pension2_imputed; set dd_1;
        drop   lowk27_1_12  upk27_1_12
    lowk27_2_12  upk27_2_12
    lowk29_1_12  upk29_1_12
    lowk29_2_12  upk29_2_12      _mult_; run;

/*
proc freq; table imamk27_1_12; where dumk27_1_12 =1; run; **** imputed;
proc freq; table imamk27_2_12; where dumk27_2_12 =1; run; **** imputed;
proc freq; table imamk29_1_12; where dumk29_1_12 =1; run; **** imputed;
proc freq; table imamk29_2_12; where dumk29_2_12 =1; run; **** imputed; */


********** 3 **********;
data bb2; set bb1;
        imamk36_1_12=k36_1_12;          **** Amputation N=166;
        if k31a_12=2 and k36_1_12=. then imamk36_1_12=0;
        **** n=9,066 n=568(1);
        if k31a_12 in (8,9) and k36_1_12=. then imamk36_1_12=.;
**** n=62;
                if k35_1_12 = 2 and k36_1_12=. then imamk36_1_12=0;
        **** n=372;
                if k35_1_12 = 1 and k36_1_12=. then imamk36_1_12=.;
        **** n=170;
                if k35_1_12 in (8,9) and k36_1_12=. then imamk36_1_12=.;
**** n=26;
                if k36_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk36_1_12=.;
                if imamk36_1_12=. and k37a1_12=. then k37a1_12=9;
        imamk36_2_12=k36_2_12;          **** Amputation N=58;
        if k31b_12=2 and k36_2_12=. then imamk36_2_12=0;
        **** n=9,577 n=64(1);
        if k31b_12 in (8,9) and k36_2_12=. then imamk36_2_12=.;
```

```
                                Imput2012_Total Group1
**** n=55;
                if k35_2_12 = 2 and k36_2_12=. then imamk36_2_12=0;
        **** n=50;
                if k35_2_12 = 1 and k36_2_12=. then imamk36_2_12=.;
        **** n=14;
                if k35_2_12 in (8,9) and k36_2_12=. then imamk36_2_12=0;
**** n=0;
                if k36_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk36_2_12=.;
                if imamk36_2_12=. and k37a2_12=. then k37a2_12=9;
        imamk36_3_12=k36_3_12;          **** Amputation N=54;
        if k31c_12=2 and k36_3_12=. then imamk36_3_12=0;
        **** n=9,631 n=16(1);
        if k31c_12 in (8,9) and k36_3_12=. then imamk36_3_12=.;
**** n=49;
                if k35_3_12 =2 and k36_3_12=. then imamk36_3_12=0;
        **** n=6;
                if k35_3_12 =1 and k36_3_12=. then imamk36_3_12=.;
        **** n=9;
                if k35_3_12 in (8,9) and k36_3_12=. then imamk36_3_12=.;
**** n=1;
                if k36_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk36_3_12=.;
                if imamk36_3_12=. and k37a3_12=. then k37a3_12=9;
                dumk36_1_12=1*(imamk36_1_12=.);
                dumk36_2_12=1*(imamk36_2_12=.);
                dumk36_3_12=1*(imamk36_3_12=.);                 run;

%range(k36_1_12,k37a1_12,k37b1_12,k37c1_12,70000,300,1500,150,k31a_12,k35_1_12);
run;
%range(k36_2_12,k37a2_12,k37b2_12,k37c2_12, 6000,300,1500,150,k31b_12,k35_2_12);
run;
%range(k36_3_12,k37a3_12,k37b3_12,k37c3_12, 6000,300,1500,150,k31c_12,k35_3_12);
run;

proc freq data=bb2; table k31a_12  k35_1_12  k36_1_12; run;
proc freq data=bb2; table k31b_12  k35_2_12  k36_2_12; run;
proc freq data=bb2; table k31c_12  k35_3_12  k36_3_12; run;

data output2.group1_core_pension3;
        merge datak36_1_12      datak36_2_12 datak36_3_12 ; run; **** Core nonproxy
N=9,696 var=24;
/*      datak36_1_12(drop=k31a_12 k35_1_12)
        datak36_2_12(drop=k31b_12 k35_2_12)
        datak36_3_12(drop=k31c_12 k35_3_12) ; run; */

data dd1; set output2.group1_core_pension3;     **** Core nonproxy N=9,696 var=24;
```

```
                              Imput2012_Total Group1
keep cunicah subhog_12  tipentg_12
    lowk36_1_12  upk36_1_12
        dumk36_1_12
        imamk36_1_12
        yrschool sex_12_max age_12_max; /* if k31a_12 in (1,8,9);*/  run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk36_1_12
               yrschool;

transfer cunicah subhog_12 tipentg_12
    lowk36_1_12  upk36_1_12
        dumk36_1_12
   ;
 bounds
        imamk36_1_12 (>=lowk36_1_12 ,<=upk36_1_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 ITERATIONS 5;
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

proc print; where dumk36_1_12=1; run;
```

Imput2012_Total Group1

```
proc freq data=bb2; table k31b_12; run;

data dd1; set output2.group1_core_pension3;/* where k31b_12 in (1,8,9);*/
        keep cunicah subhog_12 tipentg_12  sex_12_max age_12_max  yrschool

    lowk36_2_12  upk36_2_12  dumk36_2_12 imamk36_2_12;  run;   ***n=119;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;

mixed   imamk36_2_12
                         yrschool;

transfer cunicah subhog_12 tipentg_12
    lowk36_2_12  upk36_2_12
                dumk36_2_12
   ;
 bounds
   imamk36_2_12 (>=lowk36_2_12 ,<=upk36_2_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 /*  ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

proc print data=dd_2;  where dumk36_2_12 =1; run;


proc freq data=bb2; table k31c_12; run;
```

```
                                Imput2012_Total Group1
data dd1; set output2.group1_core_pension3;/* where k31b_12 in (1,8,9);*/
        keep cunicah subhog_12 tipentg_12  sex_12_max age_12_max  yrschool

    lowk36_3_12  upk36_3_12  dumk36_3_12 imamk36_3_12;  run;   ***n=119;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_3;

categorical sex_12_max ;

count age_12_max;

mixed   imamk36_3_12
                          yrschool;

transfer cunicah subhog_12 tipentg_12
    lowk36_3_12  upk36_3_12
                dumk36_3_12
   ;
 bounds
   imamk36_3_12 (>=lowk36_3_12 ,<=upk36_3_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 /*  ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

proc print data=dd_3;  where dumk36_3_12 =1; run;

data data imp2.group1_core_pension3_imputed; merge dd_1 dd_2 dd_3; by cunicah
subhog_12;
        drop     lowk36_1_12  upk36_1_12
    lowk36_2_12  upk36_2_12
    lowk36_3_12  upk36_3_12       ; run;
```

Imput2012_Total Group1

```
data temp; set imp2.group1_core_pension3_imputed; run;
proc freq; table imamk36_1_12; where dumk36_1_12 =1; run; ****  imputed;
proc freq; table imamk36_2_12; where dumk36_2_12 =1; run; **** not imputed;
proc freq; table imamk36_3_12; where dumk36_3_12 =1; run; **** not imputed;


****************** 4 ********************;
data bb2; set bb1;
        imamk47_12=k47a_12;             **** Amputation N=87;
        if k47_12 = 2 and k47a_12=. then imamk47_12=0;                  **** n=571;
        if k47_12 = . and k47a_12=. then imamk47_12=0;                  ****
n=7,961;
        if k47_12 = 1 and k47a_12=. then imamk47_12=.;                  ****
n=1,158;
        if k47_12 in (8,9) and k47a_12=. then imamk47_12=.;             **** n=6;
                if k47a_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk47_12=.;
                if imamk47_12=. and k47b1_12=. then k47b1_12=9;
        imamk48_12=k48a_monthly_12;             **** Amputation N=115;
        if k48_12 = 2 and k48a_monthly_12=. then imamk48_12=0;
**** n=742;
        if k48_12 = . and k48a_monthly_12=. then imamk48_12=0;
**** n=7,961;
        if k48_12 = 1 and k48a_monthly_12=. then imamk48_12=.;
**** n=979;
        if k48_12 in (8,9) and k48a_monthly_12=. then imamk48_12=.;
**** n=14;
                if k48a_monthly_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk48_12=.;
                if imamk48_12=. and k48b1_12=. then k48b1_12=9;
        imamk50_12=k50a_12;             **** Amputation N=3;
        if k50_12 = 2 and k50a_12=. then imamk50_12=0;
**** n=33;
        if k50_12 = . and k50a_12=. then imamk50_12=0;
**** n=9,606;
        if k50_12 = 1 and k50a_12=. then imamk50_12=.;
**** n=57;
        if k50_12 in (8,9) and k50a_12=. then imamk50_12=.;             **** n=0;
                if k50a_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk50_12=.;
                if imamk50_12=. and k50b1_12=. then k50b1_12=9;
        imamk51_12=k51a_monthly_12;             **** Amputation N=5;
        if k51_12 =2 and k51a_monthly_12=. then imamk51_12=0;
**** n=65;
        if k51_12 =. and k51a_monthly_12=. then imamk51_12=0;
```

```
                                Imput2012_Total Group1
**** n=9,606;
        if k51_12 =1 and k51a_monthly_12=. then imamk51_12=.;
**** n=25;
        if k51_12 in (8,9) and k51a_monthly_12=. then imamk51_12=.;
**** n=0;
                if k51a_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk51_12=.;
                if imamk51_12=. and k51b1_12=. then k51b1_12=9;
        dumk47_12=1*(imamk47_12=.);
        dumk48_12=1*(imamk48_12=.);
        dumk50_12=1*(imamk50_12=.);
        dumk51_12=1*(imamk51_12=.);             run;

%range(k47_12,k47b1_12,k47b2_12,k47b3_12,500000,6000,12000,1500,k47_12);  run;
%range(k48_12,k48b1_12,k48b2_12,k48b3_12, 83333,6000,12000,1500,k48_12);  run;
%range(k50_12,k50b1_12,k50b2_12,k50b3_12, 12000,6000,12000,1500,k50_12);  run;
%range(k51_12,k51b1_12,k51b2_12,k51b3_12,  8333,6000,12000,1500,k51_12);  run;

data output2.group1_core_pension4;
        merge
        datak47_12(drop=k47_12)
        datak48_12(drop=k48_12)
        datak50_12(drop=k50_12)
        datak51_12(drop=k51_12);
        by cunicah subhog_12; run;

data dd1; set output2.group1_core_pension4;  run;   **** Core nonproxy N=9,696
var=78;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;
```

```
                                Imput2012_Total Group1

mixed           imamk47_12 imamk48_12 imamk50_12 imamk51_12 yrschool;

transfer cunicah subhog_12 tipentg_12

    lowk47_12  upk47_12
    lowk48_12  upk48_12
    lowk50_12  upk50_12
    lowk51_12  upk51_12
        dumk47_12
        dumk48_12
        dumk50_12
        dumk51_12
        ;
 bounds

  imamk47_12 (>=lowk47_12 ,<=upk47_12)
  imamk48_12 (>=lowk48_12 ,<=upk48_12)
  imamk50_12 (>=lowk50_12 ,<=upk50_12)
  imamk51_12 (>=lowk51_12 ,<=upk51_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
/* multiples 5 ; */
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group1_core_pension4_imputed; set dd_1;
        drop        lowk47_12  upk47_12
    lowk48_12  upk48_12
    lowk50_12  upk50_12
    lowk51_12  upk51_12       ; run;

/* data temp; set imp2.group1_core_pension4_imputed; run;
proc freq; table imamk47_12; where dumk47_12 =1 ; run; *** imputed;
proc freq; table imamk48_12; where dumk48_12 =1; run; *** imputed;
proc freq; table imamk50_12; where dumk50_12 =1; run; *** imputed;
proc freq; table imamk51_12; where dumk51_12 =1; run; *** imputed; */

********* 5 *********;
data bb2; set bb1;
        imamk61_1_12=k61_1_12;          **** Amputation N=141;
```

```
        if k58a_12 =2 and k61_1_12=. then imamk61_1_12=0;
**** n=8,030;
        if k58a_12 =1 and k61_1_12=. then imamk61_1_12=.;
**** n=1,636(1);
        if k58a_12 in (8,9) and k61_1_12=. then imamk61_1_12=.;
**** n=30;
                if k61_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk61_1_12=.;
                if imamk61_1_12=. and k62a1_12=. then k62a1_12=9;
        imamk61_2_12=k61_2_12;          **** Amputation N=54;
        if k58b_12 =2 and k61_2_12=. then imamk61_2_12=0;
**** n=9,085;
        if k58b_12 =1 and k61_2_12=. then imamk61_2_12=.;
**** n=582(1);
        if k58b_12 in (8,9) and k61_2_12=. then imamk61_2_12=.;
**** n=29;
                if k61_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk61_2_12=.;
                if imamk61_2_12=. and k62a2_12=. then k62a2_12=9;
        imamk61_3_12=k61_3_12;          **** Amputation N=36;
        if k58c_12 =2 and k61_3_12=. then imamk61_3_12=0;
**** n=9,584;
        if k58c_12 =1 and k61_3_12=. then imamk61_3_12=.;
**** n=77(1);
        if k58c_12 in (8,9) and k61_3_12=. then imamk61_3_12=.;
**** n=35;
                if k61_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk61_3_12=.;
                if imamk61_3_12=. and k62a3_12=. then k62a3_12=9;
        imamk61_4_12=k61_4_12;          **** Amputation N=44;
        if k58d_12 = 2 and k61_4_12=. then imamk61_4_12=0;
**** 9,366;
        if k58d_12 = 1 and k61_4_12=. then imamk61_4_12=.;
**** 295(1);
        if k58d_12 in (8,9) and k61_4_12=. then imamk61_4_12=.;
**** 35;
                if k61_4_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk61_4_12=.;
                if imamk61_4_12=. and k62a4_12=. then k62a4_12=9;
        dumk61_1_12=1*(imamk61_1_12=.);
        dumk61_2_12=1*(imamk61_2_12=.);
        dumk61_3_12=1*(imamk61_3_12=.);
        dumk61_4_12=1*(imamk61_4_12=.);         run;

%range(k61_1_12,k62a1_12,k62b1_12,k62c1_12, 200000,1500,6000,750,k58a_12);  run;
```

```
                                Imput2012_Total Group1
%range(k61_2_12,k62a2_12,k62b2_12,k62c2_12,  25000,1500,6000,750,k58b_12);  run;
%range(k61_3_12,k62a3_12,k62b3_12,k62c3_12,  20000,1500,6000,750,k58c_12);  run;
%range(k61_4_12,k62a4_12,k62b4_12,k62c4_12,  15000,1500,6000,750,k58d_12);  run;

data output2.group1_core_pension5;
        merge
        datak61_1_12(drop=k58a_12)
        datak61_2_12(drop=k58b_12)
        datak61_3_12(drop=k58c_12)
        datak61_4_12(drop=k58d_12);
by cunicah subhog_12; run;

data dd1; set output2.group1_core_pension5;  run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed           imamk61_1_12 imamk61_2_12 imamk61_3_12 imamk61_4_12
                         yrschool;

transfer cunicah subhog_12 tipentg_12

    lowk61_1_12  upk61_1_12
    lowk61_2_12  upk61_2_12
    lowk61_3_12  upk61_3_12
    lowk61_4_12  upk61_4_12
        dumk61_1_12
        dumk61_2_12
        dumk61_3_12
        dumk61_4_12
        ;
 bounds
```

```
  imamk61_1_12 (>=lowk61_1_12 ,<=upk61_1_12)
  imamk61_2_12 (>=lowk61_2_12 ,<=upk61_2_12)
  imamk61_3_12 (>=lowk61_3_12 ,<=upk61_3_12)
  imamk61_4_12 (>=lowk61_4_12 ,<=upk61_4_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 ITERATIONS 5;
 multiples 2 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group1_core_pension5_imputed; set dd_1;
        drop      lowk61_1_12  upk61_1_12
    lowk61_2_12  upk61_2_12
    lowk61_3_12  upk61_3_12
    lowk61_4_12  upk61_4_12    _mult_    ; run;

/*  data temp;set imp2.group1_core_pension5_imputed; run;
proc freq; table imamk61_1_12; where dumk61_1_12 =1; run; *** imputed;
proc freq; table imamk61_2_12; where dumk61_2_12 =1; run; *** imputed;
proc freq; table imamk61_3_12; where dumk61_3_12 =1; run; *** imputed n=36/ 35=0;
proc freq; table imamk61_4_12; where dumk61_4_12 =1; run; *** imputed;  */

********** 6 ********************;
data bb2; set bb1;
        imamk80_1_12=k80_1_12;          **** Amputation N=66;
                if k79a_12 =2 and k80_1_12=. then imamk80_1_12=0;
**** n=8,113;
                if k79a_12 =1 and k80_1_12=. then imamk80_1_12=.;
**** n=1,551(1);
                if k79a_12 in (8,9) and k80_1_12=. then imamk80_1_12=.;
**** n=32;
                if k80_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk80_1_12=.;
        imamk80_2_12=k80_2_12;          **** Amputation N=44;
                if k79b_12 =2 and k80_2_12=. then imamk80_2_12=0;
**** n=9,614;
                if k79b_12 =1 and k80_2_12=. then imamk80_2_12=.;
**** n=45(1);
                if k79b_12 in (8,9) and k80_2_12=. then imamk80_2_12=.;
```

```
                                Imput2012_Total Group1
**** n=37;
                if k80_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk80_2_12=.;
        imamk80_3_12=k80_3_12;          **** Amputation N=48;
                if k79c_12 =2 and k80_3_12=. then imamk80_3_12=0;
**** n=9,579;
                if k79c_12 =1 and k80_3_12=. then imamk80_3_12=.;
**** n=82(1);
                if k79c_12 in (8,9) and k80_3_12=. then imamk80_3_12=.;
**** n=35;
                if k80_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999,99999
98) then imamk80_3_12=.;
        dumk80_1_12=1*(imamk80_1_12=.);
        dumk80_2_12=1*(imamk80_2_12=.);
        dumk80_3_12=1*(imamk80_3_12=.);         run;

data datak80; set bb2
(keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max imamk80_1_12
imamk80_2_12 imamk80_3_12
        k79a_12 k79b_12 k79c_12 dumk80_1_12 dumk80_2_12 dumk80_3_12);
         lowk80_1_12=1; upk80_1_12=42000;
         if k79a_12 in (8,9) then lowk80_1_12=0;
         lowk80_2_12=1; upk80_2_12=9000;
         if k79b_12 in (8,9) then lowk80_2_12=0;
         lowk80_3_12=1; upk80_3_12=500000;
         if k79c_12 in (8,9) then lowk80_3_12=0;
                if imamk80_1_12 >=0 then do; lowk80_1_12=imamk80_1_12; end;
                if imamk80_1_12 >=0 then do;  upk80_1_12=imamk80_1_12; end;
                if imamk80_2_12 >=0 then do; lowk80_2_12=imamk80_2_12; end;
                if imamk80_2_12 >=0 then do;  upk80_2_12=imamk80_2_12; end;
                if imamk80_3_12 >=0 then do; lowk80_3_12=imamk80_3_12; end;
                if imamk80_3_12 >=0 then do;  upk80_3_12=imamk80_3_12; end;  run;

data output2.group1_core_pension6;
        set     datak80(drop=k79a_12 k79b_12 k79c_12);
 run;

data dd1; set output2.group1_core_pension6;    **** Core nonproxy N=9,696 var=78;
keep cunicah subhog_12 tipentg_12
        sex_12_max age_12_max  yrschool
        imamk80_1_12 lowk80_1_12 upk80_1_12 dumk80_1_12
        imamk80_2_12 lowk80_2_12 upk80_2_12 dumk80_2_12; run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;
```

Imput2012_Total Group1

```
data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed           imamk80_1_12 imamk80_2_12  yrschool;

transfer cunicah subhog_12 tipentg_12
        lowk80_1_12 upk80_1_12
        lowk80_2_12 upk80_2_12
        dumk80_1_12 dumk80_2_12
        ;
 bounds
        imamk80_1_12 (>=lowk80_1_12 ,<=upk80_1_12)
        imamk80_2_12 (>=lowk80_2_12 ,<=upk80_2_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);


/* data temp; set imp2.group1_core_pension6_imputed;
proc freq; table imamk80_1_12; where dumk80_1_12 =1; run; *** imputed;
proc freq; table imamk80_2_12; where dumk80_2_12 =1; run; *** imputed;
proc freq; table imamk80_3_12; where dumk80_3_12 =1; run; */  *** not imputed with
1 and 2;


data dd1; set output2.group1_core_pension6;     **** Core nonproxy N=9,696 var=78;
```

```
                                Imput2012_Total Group1
keep cunicah subhog_12 tipentg_12
sex_12_max age_12_max  yrschool imamk80_3_12 lowk80_3_12 upk80_3_12
        dumk80_3_12 ; run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;

mixed           imamk80_3_12 yrschool;

transfer cunicah subhog_12 tipentg_12
        lowk80_3_12 upk80_3_12
        dumk80_3_12
        ;
 bounds
        imamk80_3_12 (>=lowk80_3_12 ,<=upk80_3_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

proc freq; table imamk80_3_12; where dumk80_3_12 =1; run;

data data imp2.group1_core_pension6_imputed; merge dd_1 dd_2; by cunicah subhog_12;
```

```
                              Imput2012_Total Group1
        drop    lowk80_1_12 upk80_1_12
        lowk80_2_12 upk80_2_12
        lowk80_3_12 upk80_3_12   ; run;




*** print putput: prior imputation;
Title "Group1 core pension - before imputation (mean with zero)";
proc means data=output2.group1_core_pension  mean std min max n nmiss;
        variable imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12 imamk29_1_12 imamk29_2_12 imamk36_1_12
imamk36_2_12 imamk36_3_12
                        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12
imamk61_2_12 imamk61_3_12 imamk61_4_12; run;

*** print putput: mean with zero;
Title "Group1 core pension - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group1_core_pension_imputed;
        var imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12 imamk29_1_12 imamk29_2_12 imamk36_1_12
imamk36_2_12 imamk36_3_12
                        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12
imamk61_2_12 imamk61_3_12 imamk61_4_12;
run;

*** print output: mean without zero;
data group1; set imp2.group1_core_pension_imputed;
  if imamk11_1_12  =0 then imamk11_1_12 =.;
  if imamk11_2_12  =0 then imamk11_2_12 =.;
  if imamk13_1_12  =0 then imamk13_1_12 =.;
  if imamk13_2_12  =0 then imamk13_2_12  =.;

  if imamk15_1_12  =0 then imamk15_1_12 =.;
  if imamk15_2_12  =0 then imamk15_2_12 =.;

  if imamk27_1_12  =0 then imamk27_1_12 =.;
  if imamk27_2_12  =0 then imamk27_2_12 =.;

  if imamk29_1_12  =0 then imamk29_1_12 =.;
  if imamk29_2_12  =0 then imamk29_2_12 =.;

  if imamk36_1_12  =0 then imamk36_1_12 =.;
  if imamk36_2_12  =0 then imamk36_2_12 =.;
```

```
  if imamk36_3_12  =0 then imamk36_3_12 =.;

  if imamk47_12  =0 then imamk47_12 =.;
  if imamk48_12  =0 then imamk48_12 =.;
  if imamk50_12  =0 then imamk50_12 =.;
  if imamk51_12  =0 then imamk51_12 =.;

  if imamk61_1_12  =0 then imamk61_1_12 =.;
  if imamk61_2_12  =0 then imamk61_2_12 =.;
  if imamk61_3_12  =0 then imamk61_3_12 =.;
  if imamk61_4_12  =0 then imamk61_4_12 =.;   run;

Title "Group1 core pension - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12 imamk29_1_12 imamk29_2_12 imamk36_1_12
imamk36_2_12 imamk36_3_12
                        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12
imamk61_2_12 imamk61_3_12 imamk61_4_12;
run;


proc means data=output2.group1_core_pension n nmiss mean std min max ;
                variable imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12
imamk15_1_12 imamk15_2_12 imamk27_1_12 imamk27_2_12 imamk29_1_12 imamk29_2_12
imamk36_1_12 imamk36_2_12 imamk36_3_12
                        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12
imamk61_2_12 imamk61_3_12 imamk61_4_12
                        imamk80_1_12 imamk80_2_12 imamk80_3_12; run;
```

```
/*******************************************************/
/* PROGRAM NAME  : Imput2012_group1_core_pension.SAS    */
/* PROGRAMMED BY : DONG ZHANG                           */
/* LAST UPDATEED : 06/30/2015                           */
/* Impute missing value on core and proxy questionnaire */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter; run;
```

```
                                Imput2012_Total Group1
/*
proc contents data=input.sect_g_j_k_sa_2012; run;       *** not imputed N=10,427,
var=680;
*/

data aa; set input.sect_g_j_k_sa_2012;                                    *** core
and proxy questionnaire N=10,427;
        proc sort  nodupkey; by cunicah subhog_12; run;  *** no duplicate;

***** Core questionnaire N=9,696;
data bb1; set aa;
        keep cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
        k1_12 k1a_12
        k10_1_12 k11_1_12 k12a1_12 k12b1_12 k12c1_12
                         k13_1_12 k14a1_12 k14b1_12 k14c1_12
                         k15_1_12 k16a1_12 k16b1_12 k16c1_12
        K10_2_12 k11_2_12 k12a2_12 k12b2_12 k12c2_12
                         k13_2_12 k14a2_12 k14b2_12 k14c2_12
                         k15_2_12 k16a2_12 k16b2_12 k16c2_12
        k26_1_12
         k27_1_12 k28a1_12 k28b1_12 k28c1_12
        k26_2_12
         k27_2_12 k28a2_12 k28b2_12 k28c2_12
        k17_12 k17a_12
         k29_1_12 k30a1_12 k30b1_12 k30c1_12
         k29_2_12 k30a2_12 k30b2_12 k30c2_12
         k31a_12 k35_1_12 k36_1_12 k37a1_12 k37b1_12 k37c1_12
         k31b_12 k35_2_12 k36_2_12 k37a2_12 k37b2_12 k37c2_12
         k31c_12 k35_3_12 k36_3_12 k37a3_12 k37b3_12 k37c3_12
         k47_12 k47a_12 k47b1_12 k47b2_12 k47b3_12
         k48_12 k48a_12 k48b1_12 k48b2_12 k48b3_12      k48a_monthly_12
         k50_12 k50a_12 k50b1_12 k50b2_12 k50b3_12
         k51_12 k51a_12 k51b1_12 k51b2_12 k51b3_12      k51a_monthly_12
         k58a_12 k61_1_12 k62a1_12 k62b1_12 k62c1_12
         k58b_12 k61_2_12 k62a2_12 k62b2_12 k62c2_12
         k58c_12 k61_3_12 k62a3_12 k62b3_12 k62c3_12
         k58d_12 k61_4_12 k62a4_12 k62b4_12 k62c4_12

         k80_1_12 k80_2_12 k80_3_12 k79a_12 k79b_12 k79c_12;
if tipentg_12=1; run;
/*      proc freq; table k1_12; run;
           Respondent/spouse are business owners
                                    Cumulative    Cumulative
k1_12    Frequency     Percent     Frequency      Percent
-----------------------------------------------------------
    1        1335       13.77          1335        13.77
    2        8331       85.92          9666        99.69
    8          16        0.17          9682        99.86
    9          14        0.14          9696       100.00
```

```
                              Imput2012_Total Group1
 proc freq; table  k10_1_12; run;
        proc freq; table k1a_12; run;
  proc freq; table k15_2_12; run;  */


****************** 1 *********;
data bb2; set bb1;
        imamk11_1_12=k11_1_12;          **** Amputation N=253;
        if k1_12 =2 and k11_1_12=. then imamk11_1_12=0;
        if k1_12 in (8,9) and k11_1_12=. then imamk11_1_12=.;
        if k1_12 =1 and k11_1_12=. then imamk11_1_12=.;
                        if k10_1_12 =2 and k11_1_12=. then imamk11_1_12=0;
                        if k10_1_12 in (8,9) and k11_1_12=. then imamk11_1_12=.;
                        if k10_1_12 =1 and k11_1_12=. then imamk11_1_12=.;
                if k11_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk11_1_12=.;
                if imamk11_1_12=. and k12a1_12=. then k12a1_12=9;
        imamk11_2_12=k11_2_12;          **** Amputation N=11;
        if k1_12 in(2,8,9) and k11_2_12=. then imamk11_2_12=0;
                if k10_2_12 =2 and k11_2_12=. then imamk11_2_12=0;
                if k10_2_12 in (8,9) and k11_2_12=. then imamk11_2_12=.;
                if k10_2_12 =1 and k11_2_12=. then imamk11_2_12=.;
                if k10_2_12 = . and k11_2_12=. then imamk11_2_12=0;
                        if k11_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk11_2_12=.;
                if imamk11_2_12=. and k12a2_12=. then k12a2_12=9;
        imamk13_1_12=k13_1_12;          **** Amputation N=278;
        if k1_12 =2 and k13_1_12=. then imamk13_1_12=0;
        if k1_12 in (8,9) and k13_1_12=. then imamk13_1_12=.;
        if k1_12 =1 and k13_1_12=. then imamk13_1_12=.;
                if k13_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk13_1_12=.;
                if imamk13_1_12=. and k14a1_12=. then k14a1_12=9;
        imamk13_2_12=k13_2_12;          **** Amputation N=16;
        if k1_12 in (2,8,9) and k13_2_12=. then imamk13_2_12=0;
        if k1a_12 =2 and k13_2_12=. then imamk13_2_12=0;
        if k1a_12 =. and k13_2_12=. then imamk13_2_12=0;
                if k13_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk13_2_12=.;
                if imamk13_2_12=. and k14a2_12=. then k14a2_12=9;
        imamk15_1_12=k15_1_12;          **** Amputation N=268;
        if k1_12 =2 and k15_1_12=. then imamk15_1_12=0;
        if k1_12 in (8,9) and k15_1_12=. then imamk15_1_12=.;
        if k1_12 =1 and k15_1_12=. then imamk15_1_12=.;
                if k15_1_12 in
```

```
                                Imput2012_Total Group1
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk15_1_12=.;
                if imamk15_1_12=. and k16a1_12=. then k16a1_12=9;
        imamk15_2_12=k15_2_12;          **** Amputation N=17;
        if k1_12 in (2,8,9) and k15_2_12=. then imamk15_2_12=0;
                if k1a_12 = 2 and k15_2_12=. then imamk15_2_12=0;
                if k1a_12 =. and k15_2_12=. then imamk15_2_12=0;
                if k15_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk15_2_12=.;
                if imamk15_2_12=. and k16a2_12=. then k16a2_12=9;
                dumk11_1_12=1*(imamk11_1_12=.);
                dumk11_2_12=1*(imamk11_2_12=.);
                dumk13_1_12=1*(imamk13_1_12=.);
                dumk13_2_12=1*(imamk13_2_12=.);
                dumk15_1_12=1*(imamk15_1_12=.);
                dumk15_2_12=1*(imamk15_2_12=.);                 run;

***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname
        (keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
imam&vname dum&vname low&vname up&vname &mix1 &mix2 );
        set bb2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
                if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
%mend range;

%range(k11_1_12,k12a1_12,k12b1_12,k12c1_12,700000,45000,150000,15000,k1_12,k10_1_12
);  run;
%range(k11_2_12,k12a2_12,k12b2_12,k12c2_12,100000,45000,150000,15000,k10_2_12);
run;
%range(k13_1_12,k14a1_12,k14b1_12,k14c1_12,400000,45000,150000,15000,k1_12,k14a1_12
```

```
);  run;  ****k13_1,2, k151,2 range 0-max if missing;
%range(k13_2_12,k14a2_12,k14b2_12,k14c2_12, 65000,45000,150000,15000,k14a2_12);
run;
%range(k15_1_12,k16a1_12,k16b1_12,k16c1_12,600000,15000,45000,6000,k1_12,k16a1_12);
 run;
%range(k15_2_12,k16a2_12,k16b2_12,k16c2_12, 30000,15000,45000,6000,k16a2_12);  run;

data output2.group1_core_pension1;
        merge datak11_1_12(drop=k1_12 k10_1_12)
        datak11_2_12(drop=k10_2_12)
        datak13_1_12(drop=k1_12 k14a1_12)
        datak13_2_12(drop= k14a2_12)
        datak15_1_12(drop=k1_12 k16a1_12)
        datak15_2_12 (drop=k16a2_12) ; run;

data dd1; set output2.group1_core_pension1;  run;   **** Core nonproxy N=9,696
var=30;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12  yrschool;

transfer cunicah subhog_12 tipentg_12
        lowk11_1_12 upk11_1_12
    lowk11_2_12  upk11_2_12
    lowk13_1_12  upk13_1_12
    lowk13_2_12  upk13_2_12
    lowk15_1_12  upk15_1_12
    lowk15_2_12  upk15_2_12
                dumk11_1_12
```

```
                                Imput2012_Total Group1
                dumk11_2_12
                dumk13_1_12
                dumk13_2_12
                dumk15_1_12
                dumk15_2_12
        ;
 bounds
  imamk11_1_12 (>=lowk11_1_12 ,<=upk11_1_12)
  imamk11_2_12 (>=lowk11_2_12 ,<=upk11_2_12)
  imamk13_1_12 (>=lowk13_1_12 ,<=upk13_1_12)
  imamk13_2_12 (>=lowk13_2_12 ,<=upk13_2_12)
  imamk15_1_12 (>=lowk15_1_12 ,<=upk15_1_12)
  imamk15_2_12 (>=lowk15_2_12 ,<=upk15_2_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 2 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group1_core_pension1_imputed; set dd_1;
        drop lowk11_1_12 upk11_1_12
    lowk11_2_12  upk11_2_12
    lowk13_1_12  upk13_1_12
    lowk13_2_12  upk13_2_12
    lowk15_1_12  upk15_1_12
    lowk15_2_12  upk15_2_12   _mult_; run;

/* proc freq; table imamk11_1_12 ; where dumk11_1_12=1;  run;
proc freq; table imamk11_2_12; where dumk11_2_12=1; run;
proc freq; table imamk13_1_12; where dumk13_1_12 =1;  run;
proc freq; table imamk13_2_12; where dumk13_2_12 =1;  run;
proc freq; table imamk15_1_12; where dumk15_1_12 =1;  run;
proc freq; table imamk15_2_12; where dumk15_2_12 =1;  run;
*/

**************** 2 ***********;
data bb2; set bb1;
        imamk27_1_12=k27_1_12;          **** Amputation N=68;
        if k17_12=2 and k27_1_12=. then imamk27_1_12=0;
        if k17_12 in (8,9) and  k27_1_12=. then imamk27_1_12=.;
        if k17_12 =1 and k27_1_12=. then imamk27_1_12=.;
```

```
                              Imput2012_Total Group1
                if k26_1_12 =2 and k27_1_12=. then imamk27_1_12=0;
                if k26_1_12 = 1 and k27_1_12=. then imamk27_1_12=.;
                if k26_1_12 in (8,9) and k27_1_12=. then imamk27_1_12=.;
                if k27_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk27_1_12=.;
                if imamk27_1_12=. and k28a1_12=. then k28a1_12=9;
        imamk27_2_12=k27_2_12;          **** Amputation N=7     ;
        if k17_12 in (2,8,9) and k27_2_12=. then imamk27_2_12=0;
                if k26_2_12 =2 and k27_2_12=. then imamk27_2_12=0;
                if k26_2_12 =1 and k27_2_12=. then imamk27_2_12=.;
                if k26_2_12 in (8,9) and k27_2_12=. then imamk27_2_12=.;
                if k26_2_12 =. and k27_2_12=. then imamk27_2_12=0;
                if k27_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk27_2_12=.;
                if imamk27_2_12=. and k28a2_12=. then k28a2_12=9;

        imamk29_1_12=k29_1_12;          **** Amputation N=108;
                if k17_12=2 and k29_1_12=. then imamk29_1_12=0;
                if k17_12 = 1 and k29_1_12=. then imamk29_1_12=.;
                if k17_12 in (8,9) and k29_1_12=. then imamk29_1_12=.;
                if k29_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk29_1_12=.;
                if imamk29_1_12=. and k30a1_12=. then k30a1_12=9;
        imamk29_2_12=k29_2_12;          **** Amputation N=7;
                if k17_12 = in (2,8,9) and k29_2_12=. then imamk29_2_12=0;
                if k17a_12=2 and k29_2_12=. then imamk29_2_12=0;
                if k29_2_12 =. then imamk29_2_12=0;
                if k29_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk29_2_12=.;
                if imamk29_2_12=. and k30a2_12=. then k30a2_12=9;
         dumk27_1_12=1*(imamk27_1_12=.);
         dumk27_2_12=1*(imamk27_2_12=.);
         dumk29_1_12=1*(imamk29_1_12=.);
         dumk29_2_12=1*(imamk29_2_12=.);               run;

%range(k27_1_12,k28a1_12,k28b1_12,k28c1_12,700000,4500,14000,1500,k17_12,k26_1_12);
 run;
%range(k27_2_12,k28a2_12,k28b2_12,k28c2_12, 10000,4500,14000,1500,k26_2_12);  run;
%range(k29_1_12,k30a1_12,k30b1_12,k30c1_12,100000,600,2000,150,k17_12,k30a1_12);
run;
%range(k29_2_12,k30a2_12,k30b2_12,k30c2_12,  3000,600,2000,150,k30a2_12);  run;

data output2.group1_core_pension2;
        merge
        datak27_1_12(drop=k17_12 k26_1_12)
```

```
                              Imput2012_Total Group1
        datak27_2_12(drop=k26_2_12)
        datak29_1_12(drop=k17_12 k30a1_12)
        datak29_2_12(drop=k30a2_12); run;

data dd1; set output2.group1_core_pension2;  run;   **** Core nonproxy N=9,696
var=22;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk27_1_12 imamk27_2_12 imamk29_1_12 imamk29_2_12
                         yrschool;

transfer cunicah subhog_12 tipentg_12

    lowk27_1_12  upk27_1_12
    lowk27_2_12  upk27_2_12
    lowk29_1_12  upk29_1_12
    lowk29_2_12  upk29_2_12
         dumk27_1_12
         dumk27_2_12
         dumk29_1_12
         dumk29_2_12
        ;
 bounds

  imamk27_1_12 (>=lowk27_1_12 ,<=upk27_1_12)
  imamk27_2_12 (>=lowk27_2_12 ,<=upk27_2_12)

  imamk29_1_12 (>=lowk29_1_12 ,<=upk29_1_12)
  imamk29_2_12 (>=lowk29_2_12 ,<=upk29_2_12)
```

```
                                Imput2012_Total Group1
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 2 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group1_core_pension2_imputed; set dd_1;
        drop   lowk27_1_12  upk27_1_12
    lowk27_2_12  upk27_2_12
    lowk29_1_12  upk29_1_12
    lowk29_2_12  upk29_2_12      _mult_; run;

/*
proc freq; table imamk27_1_12; where dumk27_1_12 =1; run; **** imputed;
proc freq; table imamk27_2_12; where dumk27_2_12 =1; run; **** imputed;
proc freq; table imamk29_1_12; where dumk29_1_12 =1; run; **** imputed;
proc freq; table imamk29_2_12; where dumk29_2_12 =1; run; **** imputed; */


**************** 3 ***********;
data bb2; set bb1;
        imamk36_1_12=k36_1_12;          **** Amputation N=166;
        if k31a_12=2 and k36_1_12=. then imamk36_1_12=0;
        **** n=9,066 n=568(1);
        if k31a_12 in (8,9) and k36_1_12=. then imamk36_1_12=.;
**** n=62;
                if k35_1_12 = 2 and k36_1_12=. then imamk36_1_12=0;
        **** n=372;
                if k35_1_12 = 1 and k36_1_12=. then imamk36_1_12=.;
        **** n=170;
                if k35_1_12 in (8,9) and k36_1_12=. then imamk36_1_12=.;
**** n=26;
                if k36_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk36_1_12=.;
                if imamk36_1_12=. and k37a1_12=. then k37a1_12=9;
        imamk36_2_12=k36_2_12;          **** Amputation N=58;
        if k31b_12=2 and k36_2_12=. then imamk36_2_12=0;
        **** n=9,577 n=64(1);
        if k31b_12 in (8,9) and k36_2_12=. then imamk36_2_12=.;
**** n=55;
                if k35_2_12 = 2 and k36_2_12=. then imamk36_2_12=0;
```

```
        **** n=50;
                if k35_2_12 = 1 and k36_2_12=. then imamk36_2_12=.;
        **** n=14;
                if k35_2_12 in (8,9) and k36_2_12=. then imamk36_2_12=0;
**** n=0;
                if k36_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk36_2_12=.;
                if imamk36_2_12=. and k37a2_12=. then k37a2_12=9;
        imamk36_3_12=k36_3_12;          **** Amputation N=54;
        if k31c_12=2 and k36_3_12=. then imamk36_3_12=0;
        **** n=9,631 n=16(1);
        if k31c_12 in (8,9) and k36_3_12=. then imamk36_3_12=.;
**** n=49;
                if k35_3_12 =2 and k36_3_12=. then imamk36_3_12=0;
        **** n=6;
                if k35_3_12 =1 and k36_3_12=. then imamk36_3_12=.;
        **** n=9;
                if k35_3_12 in (8,9) and k36_3_12=. then imamk36_3_12=.;
**** n=1;
                if k36_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk36_3_12=.;
                if imamk36_3_12=. and k37a3_12=. then k37a3_12=9;
                dumk36_1_12=1*(imamk36_1_12=.);
                dumk36_2_12=1*(imamk36_2_12=.);
                dumk36_3_12=1*(imamk36_3_12=.);                 run;

%range(k36_1_12,k37a1_12,k37b1_12,k37c1_12,70000,300,1500,150,k31a_12,k35_1_12);
run;
%range(k36_2_12,k37a2_12,k37b2_12,k37c2_12, 6000,300,1500,150,k31b_12,k35_2_12);
run;
%range(k36_3_12,k37a3_12,k37b3_12,k37c3_12, 6000,300,1500,150,k31c_12,k35_3_12);
run;

proc freq data=bb2; table k31a_12  k35_1_12  k36_1_12; run;
proc freq data=bb2; table k31b_12  k35_2_12  k36_2_12; run;
proc freq data=bb2; table k31c_12  k35_3_12  k36_3_12; run;

data output2.group1_core_pension3;
        merge datak36_1_12      datak36_2_12 datak36_3_12 ; run; **** Core nonproxy
N=9,696 var=24;
/*      datak36_1_12(drop=k31a_12 k35_1_12)
        datak36_2_12(drop=k31b_12 k35_2_12)
        datak36_3_12(drop=k31c_12 k35_3_12) ; run; */

data dd1; set output2.group1_core_pension3;     **** Core nonproxy N=9,696 var=24;
keep cunicah subhog_12  tipentg_12
    lowk36_1_12  upk36_1_12
```

```
        dumk36_1_12
        imamk36_1_12
        yrschool sex_12_max age_12_max; /* if k31a_12 in (1,8,9);*/  run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk36_1_12
               yrschool;

transfer cunicah subhog_12 tipentg_12
    lowk36_1_12  upk36_1_12
        dumk36_1_12
   ;
 bounds
        imamk36_1_12 (>=lowk36_1_12 ,<=upk36_1_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 ITERATIONS 5;
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

proc print; where dumk36_1_12=1; run;

proc freq data=bb2; table k31b_12; run;
```

Imput2012_Total Group1

```
data dd1; set output2.group1_core_pension3;/* where k31b_12 in (1,8,9);*/
        keep cunicah subhog_12 tipentg_12  sex_12_max age_12_max  yrschool

    lowk36_2_12  upk36_2_12  dumk36_2_12 imamk36_2_12;  run;   ***n=119;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;

mixed   imamk36_2_12
                         yrschool;

transfer cunicah subhog_12 tipentg_12
    lowk36_2_12  upk36_2_12
                dumk36_2_12
   ;
 bounds
   imamk36_2_12 (>=lowk36_2_12 ,<=upk36_2_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 /*  ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

proc print data=dd_2;  where dumk36_2_12 =1; run;


proc freq data=bb2; table k31c_12; run;
data dd1; set output2.group1_core_pension3;/* where k31b_12 in (1,8,9);*/
        keep cunicah subhog_12 tipentg_12  sex_12_max age_12_max  yrschool
```

```
    lowk36_3_12  upk36_3_12  dumk36_3_12 imamk36_3_12;  run;   ***n=119;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_3;

categorical sex_12_max ;

count age_12_max;

mixed   imamk36_3_12
                        yrschool;

transfer cunicah subhog_12 tipentg_12
    lowk36_3_12  upk36_3_12
                dumk36_3_12
   ;
 bounds
   imamk36_3_12 (>=lowk36_3_12 ,<=upk36_3_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 /*  ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

proc print data=dd_3;  where dumk36_3_12 =1; run;

data data imp2.group1_core_pension3_imputed; merge dd_1 dd_2 dd_3; by cunicah
subhog_12;
        drop     lowk36_1_12  upk36_1_12
    lowk36_2_12  upk36_2_12
    lowk36_3_12  upk36_3_12       ; run;

data temp; set imp2.group1_core_pension3_imputed; run;
```

```
                                Imput2012_Total Group1
proc freq; table imamk36_1_12; where dumk36_1_12 =1; run; ****  imputed;
proc freq; table imamk36_2_12; where dumk36_2_12 =1; run; **** not imputed;
proc freq; table imamk36_3_12; where dumk36_3_12 =1; run; **** not imputed;


****************** 4 ********************;
data bb2; set bb1;
        imamk47_12=k47a_12;             **** Amputation N=87;
        if k47_12 = 2 and k47a_12=. then imamk47_12=0;                  **** n=571;
        if k47_12 = . and k47a_12=. then imamk47_12=0;                  ****
n=7,961;
        if k47_12 = 1 and k47a_12=. then imamk47_12=.;                  ****
n=1,158;
        if k47_12 in (8,9) and k47a_12=. then imamk47_12=.;             **** n=6;
                if k47a_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk47_12=.;
                if imamk47_12=. and k47b1_12=. then k47b1_12=9;
        imamk48_12=k48a_monthly_12;             **** Amputation N=115;
        if k48_12 = 2 and k48a_monthly_12=. then imamk48_12=0;
**** n=742;
        if k48_12 = . and k48a_monthly_12=. then imamk48_12=0;
**** n=7,961;
        if k48_12 = 1 and k48a_monthly_12=. then imamk48_12=.;
**** n=979;
        if k48_12 in (8,9) and k48a_monthly_12=. then imamk48_12=.;
**** n=14;
                if k48a_monthly_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk48_12=.;
                if imamk48_12=. and k48b1_12=. then k48b1_12=9;
        imamk50_12=k50a_12;             **** Amputation N=3;
        if k50_12 = 2 and k50a_12=. then imamk50_12=0;
**** n=33;
        if k50_12 = . and k50a_12=. then imamk50_12=0;
**** n=9,606;
        if k50_12 = 1 and k50a_12=. then imamk50_12=.;
**** n=57;
        if k50_12 in (8,9) and k50a_12=. then imamk50_12=.;             **** n=0;
                if k50a_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk50_12=.;
                if imamk50_12=. and k50b1_12=. then k50b1_12=9;
        imamk51_12=k51a_monthly_12;             **** Amputation N=5;
        if k51_12 =2 and k51a_monthly_12=. then imamk51_12=0;
**** n=65;
        if k51_12 =. and k51a_monthly_12=. then imamk51_12=0;
**** n=9,606;
        if k51_12 =1 and k51a_monthly_12=. then imamk51_12=.;
```

```
                                Imput2012_Total Group1
**** n=25;
        if k51_12 in (8,9) and k51a_monthly_12=. then imamk51_12=.;
**** n=0;
                if k51a_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk51_12=.;
                if imamk51_12=. and k51b1_12=. then k51b1_12=9;
        dumk47_12=1*(imamk47_12=.);
        dumk48_12=1*(imamk48_12=.);
        dumk50_12=1*(imamk50_12=.);
        dumk51_12=1*(imamk51_12=.);             run;

%range(k47_12,k47b1_12,k47b2_12,k47b3_12,500000,6000,12000,1500,k47_12);  run;
%range(k48_12,k48b1_12,k48b2_12,k48b3_12, 83333,6000,12000,1500,k48_12);  run;
%range(k50_12,k50b1_12,k50b2_12,k50b3_12, 12000,6000,12000,1500,k50_12);  run;
%range(k51_12,k51b1_12,k51b2_12,k51b3_12,  8333,6000,12000,1500,k51_12);  run;

data output2.group1_core_pension4;
        merge
        datak47_12(drop=k47_12)
        datak48_12(drop=k48_12)
        datak50_12(drop=k50_12)
        datak51_12(drop=k51_12);
        by cunicah subhog_12; run;

data dd1; set output2.group1_core_pension4;  run;   **** Core nonproxy N=9,696
var=78;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed           imamk47_12 imamk48_12 imamk50_12 imamk51_12 yrschool;
```

```
transfer cunicah subhog_12 tipentg_12

    lowk47_12  upk47_12
    lowk48_12  upk48_12
    lowk50_12  upk50_12
    lowk51_12  upk51_12
        dumk47_12
        dumk48_12
        dumk50_12
        dumk51_12
        ;
 bounds

  imamk47_12 (>=lowk47_12 ,<=upk47_12)
  imamk48_12 (>=lowk48_12 ,<=upk48_12)
  imamk50_12 (>=lowk50_12 ,<=upk50_12)
  imamk51_12 (>=lowk51_12 ,<=upk51_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
/* multiples 5 ; */
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group1_core_pension4_imputed; set dd_1;
        drop        lowk47_12  upk47_12
    lowk48_12  upk48_12
    lowk50_12  upk50_12
    lowk51_12  upk51_12       ; run;

/* data temp; set imp2.group1_core_pension4_imputed; run;
proc freq; table imamk47_12; where dumk47_12 =1 ; run; *** imputed;
proc freq; table imamk48_12; where dumk48_12 =1; run; *** imputed;
proc freq; table imamk50_12; where dumk50_12 =1; run; *** imputed;
proc freq; table imamk51_12; where dumk51_12 =1; run; *** imputed; */

********* 5 *********;
data bb2; set bb1;
        imamk61_1_12=k61_1_12;          **** Amputation N=141;
        if k58a_12 =2 and k61_1_12=. then imamk61_1_12=0;
**** n=8,030;
```

```
        if k58a_12 =1 and k61_1_12=. then imamk61_1_12=.;
**** n=1,636(1);
        if k58a_12 in (8,9) and k61_1_12=. then imamk61_1_12=.;
**** n=30;
                if k61_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk61_1_12=.;
                if imamk61_1_12=. and k62a1_12=. then k62a1_12=9;
        imamk61_2_12=k61_2_12;          **** Amputation N=54;
        if k58b_12 =2 and k61_2_12=. then imamk61_2_12=0;
**** n=9,085;
        if k58b_12 =1 and k61_2_12=. then imamk61_2_12=.;
**** n=582(1);
        if k58b_12 in (8,9) and k61_2_12=. then imamk61_2_12=.;
**** n=29;
                if k61_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk61_2_12=.;
                if imamk61_2_12=. and k62a2_12=. then k62a2_12=9;
        imamk61_3_12=k61_3_12;          **** Amputation N=36;
        if k58c_12 =2 and k61_3_12=. then imamk61_3_12=0;
**** n=9,584;
        if k58c_12 =1 and k61_3_12=. then imamk61_3_12=.;
**** n=77(1);
        if k58c_12 in (8,9) and k61_3_12=. then imamk61_3_12=.;
**** n=35;
                if k61_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk61_3_12=.;
                if imamk61_3_12=. and k62a3_12=. then k62a3_12=9;
        imamk61_4_12=k61_4_12;          **** Amputation N=44;
        if k58d_12 = 2 and k61_4_12=. then imamk61_4_12=0;
**** 9,366;
        if k58d_12 = 1 and k61_4_12=. then imamk61_4_12=.;
**** 295(1);
        if k58d_12 in (8,9) and k61_4_12=. then imamk61_4_12=.;
**** 35;
                if k61_4_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk61_4_12=.;
                if imamk61_4_12=. and k62a4_12=. then k62a4_12=9;
        dumk61_1_12=1*(imamk61_1_12=.);
        dumk61_2_12=1*(imamk61_2_12=.);
        dumk61_3_12=1*(imamk61_3_12=.);
        dumk61_4_12=1*(imamk61_4_12=.);         run;

%range(k61_1_12,k62a1_12,k62b1_12,k62c1_12, 200000,1500,6000,750,k58a_12);  run;
%range(k61_2_12,k62a2_12,k62b2_12,k62c2_12,  25000,1500,6000,750,k58b_12);  run;
%range(k61_3_12,k62a3_12,k62b3_12,k62c3_12,  20000,1500,6000,750,k58c_12);  run;
```

```
                                Imput2012_Total Group1
%range(k61_4_12,k62a4_12,k62b4_12,k62c4_12,  15000,1500,6000,750,k58d_12);  run;

data output2.group1_core_pension5;
        merge
        datak61_1_12(drop=k58a_12)
        datak61_2_12(drop=k58b_12)
        datak61_3_12(drop=k58c_12)
        datak61_4_12(drop=k58d_12);
by cunicah subhog_12; run;

data dd1; set output2.group1_core_pension5;  run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed           imamk61_1_12 imamk61_2_12 imamk61_3_12 imamk61_4_12
                         yrschool;

transfer cunicah subhog_12 tipentg_12

    lowk61_1_12  upk61_1_12
    lowk61_2_12  upk61_2_12
    lowk61_3_12  upk61_3_12
    lowk61_4_12  upk61_4_12
        dumk61_1_12
        dumk61_2_12
        dumk61_3_12
        dumk61_4_12
        ;
 bounds

  imamk61_1_12 (>=lowk61_1_12 ,<=upk61_1_12)
```

```
                                Imput2012_Total Group1
  imamk61_2_12 (>=lowk61_2_12 ,<=upk61_2_12)
  imamk61_3_12 (>=lowk61_3_12 ,<=upk61_3_12)
  imamk61_4_12 (>=lowk61_4_12 ,<=upk61_4_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 ITERATIONS 5;
 multiples 2 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group1_core_pension5_imputed; set dd_1;
        drop      lowk61_1_12  upk61_1_12
    lowk61_2_12  upk61_2_12
    lowk61_3_12  upk61_3_12
    lowk61_4_12  upk61_4_12    _mult_    ; run;

/*  data temp;set imp2.group1_core_pension5_imputed; run;
proc freq; table imamk61_1_12; where dumk61_1_12 =1; run; *** imputed;
proc freq; table imamk61_2_12; where dumk61_2_12 =1; run; *** imputed;
proc freq; table imamk61_3_12; where dumk61_3_12 =1; run; *** imputed n=36/ 35=0;
proc freq; table imamk61_4_12; where dumk61_4_12 =1; run; *** imputed;  */

********** 6 ********************;
data bb2; set bb1;
        imamk80_1_12=k80_1_12;          **** Amputation N=66;
                if k79a_12 =2 and k80_1_12=. then imamk80_1_12=0;
**** n=8,113;
                if k79a_12 =1 and k80_1_12=. then imamk80_1_12=.;
**** n=1,551(1);
                if k79a_12 in (8,9) and k80_1_12=. then imamk80_1_12=.;
**** n=32;
                if k80_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk80_1_12=.;
        imamk80_2_12=k80_2_12;          **** Amputation N=44;
                if k79b_12 =2 and k80_2_12=. then imamk80_2_12=0;
**** n=9,614;
                if k79b_12 =1 and k80_2_12=. then imamk80_2_12=.;
**** n=45(1);
                if k79b_12 in (8,9) and k80_2_12=. then imamk80_2_12=.;
**** n=37;
                if k80_2_12 in
```

```
                                Imput2012_Total Group1
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk80_2_12=.;
        imamk80_3_12=k80_3_12;          **** Amputation N=48;
                if k79c_12 =2 and k80_3_12=. then imamk80_3_12=0;
**** n=9,579;
                if k79c_12 =1 and k80_3_12=. then imamk80_3_12=.;
**** n=82(1);
                if k79c_12 in (8,9) and k80_3_12=. then imamk80_3_12=.;
**** n=35;
                if k80_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999,99999
98) then imamk80_3_12=.;
        dumk80_1_12=1*(imamk80_1_12=.);
        dumk80_2_12=1*(imamk80_2_12=.);
        dumk80_3_12=1*(imamk80_3_12=.);         run;

data datak80; set bb2
(keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max imamk80_1_12
imamk80_2_12 imamk80_3_12
        k79a_12 k79b_12 k79c_12 dumk80_1_12 dumk80_2_12 dumk80_3_12);
         lowk80_1_12=1; upk80_1_12=42000;
         if k79a_12 in (8,9) then lowk80_1_12=0;
         lowk80_2_12=1; upk80_2_12=9000;
         if k79b_12 in (8,9) then lowk80_2_12=0;
         lowk80_3_12=1; upk80_3_12=500000;
         if k79c_12 in (8,9) then lowk80_3_12=0;
                if imamk80_1_12 >=0 then do; lowk80_1_12=imamk80_1_12; end;
                if imamk80_1_12 >=0 then do;  upk80_1_12=imamk80_1_12; end;
                if imamk80_2_12 >=0 then do; lowk80_2_12=imamk80_2_12; end;
                if imamk80_2_12 >=0 then do;  upk80_2_12=imamk80_2_12; end;
                if imamk80_3_12 >=0 then do; lowk80_3_12=imamk80_3_12; end;
                if imamk80_3_12 >=0 then do;  upk80_3_12=imamk80_3_12; end;  run;

data output2.group1_core_pension6;
        set     datak80(drop=k79a_12 k79b_12 k79c_12);
 run;

data dd1; set output2.group1_core_pension6;    **** Core nonproxy N=9,696 var=78;
keep cunicah subhog_12 tipentg_12
        sex_12_max age_12_max  yrschool
        imamk80_1_12 lowk80_1_12 upk80_1_12 dumk80_1_12
        imamk80_2_12 lowk80_2_12 upk80_2_12 dumk80_2_12; run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
```

```
                                Imput2012_Total Group1
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed           imamk80_1_12 imamk80_2_12  yrschool;

transfer cunicah subhog_12 tipentg_12
        lowk80_1_12 upk80_1_12
        lowk80_2_12 upk80_2_12
        dumk80_1_12 dumk80_2_12
        ;
 bounds
        imamk80_1_12 (>=lowk80_1_12 ,<=upk80_1_12)
        imamk80_2_12 (>=lowk80_2_12 ,<=upk80_2_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);


/* data temp; set imp2.group1_core_pension6_imputed;
proc freq; table imamk80_1_12; where dumk80_1_12 =1; run; *** imputed;
proc freq; table imamk80_2_12; where dumk80_2_12 =1; run; *** imputed;
proc freq; table imamk80_3_12; where dumk80_3_12 =1; run; */  *** not imputed with
1 and 2;


data dd1; set output2.group1_core_pension6;     **** Core nonproxy N=9,696 var=78;
keep cunicah subhog_12 tipentg_12
sex_12_max age_12_max  yrschool imamk80_3_12 lowk80_3_12 upk80_3_12
```

```
        dumk80_3_12 ; run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;

mixed           imamk80_3_12 yrschool;

transfer cunicah subhog_12 tipentg_12
        lowk80_3_12 upk80_3_12
        dumk80_3_12
        ;
 bounds
        imamk80_3_12 (>=lowk80_3_12 ,<=upk80_3_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

proc freq; table imamk80_3_12; where dumk80_3_12 =1; run;

data data imp2.group1_core_pension6_imputed; merge dd_1 dd_2; by cunicah subhog_12;

        drop    lowk80_1_12 upk80_1_12
        lowk80_2_12 upk80_2_12
```

```
                              Imput2012_Total Group1
        lowk80_3_12 upk80_3_12   ; run;




*** print putput: prior imputation;
Title "Group1 core pension - before imputation (mean with zero)";
proc means data=output2.group1_core_pension  mean std min max n nmiss;
        variable imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12 imamk29_1_12 imamk29_2_12 imamk36_1_12
imamk36_2_12 imamk36_3_12
                        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12
imamk61_2_12 imamk61_3_12 imamk61_4_12; run;

*** print putput: mean with zero;
Title "Group1 core pension - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group1_core_pension_imputed;
        var imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12 imamk29_1_12 imamk29_2_12 imamk36_1_12
imamk36_2_12 imamk36_3_12
                        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12
imamk61_2_12 imamk61_3_12 imamk61_4_12;
run;

*** print output: mean without zero;
data group1; set imp2.group1_core_pension_imputed;
  if imamk11_1_12  =0 then imamk11_1_12 =.;
  if imamk11_2_12  =0 then imamk11_2_12 =.;
  if imamk13_1_12  =0 then imamk13_1_12 =.;
  if imamk13_2_12  =0 then imamk13_2_12  =.;

  if imamk15_1_12  =0 then imamk15_1_12 =.;
  if imamk15_2_12  =0 then imamk15_2_12 =.;

  if imamk27_1_12  =0 then imamk27_1_12 =.;
  if imamk27_2_12  =0 then imamk27_2_12 =.;

  if imamk29_1_12  =0 then imamk29_1_12 =.;
  if imamk29_2_12  =0 then imamk29_2_12 =.;

  if imamk36_1_12  =0 then imamk36_1_12 =.;
  if imamk36_2_12  =0 then imamk36_2_12 =.;
  if imamk36_3_12  =0 then imamk36_3_12 =.;
```

```
  if imamk47_12  =0 then imamk47_12 =.;
  if imamk48_12  =0 then imamk48_12 =.;
  if imamk50_12  =0 then imamk50_12 =.;
  if imamk51_12  =0 then imamk51_12 =.;

  if imamk61_1_12  =0 then imamk61_1_12 =.;
  if imamk61_2_12  =0 then imamk61_2_12 =.;
  if imamk61_3_12  =0 then imamk61_3_12 =.;
  if imamk61_4_12  =0 then imamk61_4_12 =.;   run;

Title "Group1 core pension - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12 imamk29_1_12 imamk29_2_12 imamk36_1_12
imamk36_2_12 imamk36_3_12
                        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12
imamk61_2_12 imamk61_3_12 imamk61_4_12;
run;


proc means data=output2.group1_core_pension n nmiss mean std min max ;
                variable imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12
imamk15_1_12 imamk15_2_12 imamk27_1_12 imamk27_2_12 imamk29_1_12 imamk29_2_12
imamk36_1_12 imamk36_2_12 imamk36_3_12
                        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12
imamk61_2_12 imamk61_3_12 imamk61_4_12
                        imamk80_1_12 imamk80_2_12 imamk80_3_12; run;




/*******************************************************/
/* PROGRAM NAME  : Imput2012_group1_proxy_pension.SAS   */
/* PROGRAMMED BY : DONG ZHANG                           */
/* LAST UPDATEED : 06/30/2015                           */
/* Impute missing value on proxy and proxy questionnaire        */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter; run;

/*
proc contents data=input.sect_g_j_k_sa_2012; run;       *** not imputed N=10,427,
var=680;
```

```
                                Imput2012_Total Group1
*/

data aa; set input.sect_g_j_k_sa_2012;                                    *** proxy
and proxy questionnaire N=10,427;
        proc sort  nodupkey; by cunicah subhog_12; run;  *** no duplicate;

***** Proxy questionnaire N=731;
data bb1; set aa;
        keep cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
        k1_12  k1a_12
        k10_1_12 k11_1_12 k12a1_12 k12b1_12 k12c1_12
                         k13_1_12 k14a1_12 k14b1_12 k14c1_12
                         k15_1_12 k16a1_12 k16b1_12 k16c1_12
        K10_2_12 k11_2_12 k12a2_12 k12b2_12 k12c2_12
                         k13_2_12 k14a2_12 k14b2_12 k14c2_12
                         k15_2_12 k16a2_12 k16b2_12 k16c2_12
        k26_1_12
         k27_1_12 k28a1_12 k28b1_12 k28c1_12
        k26_2_12
         k27_2_12 k28a2_12 k28b2_12 k28c2_12
        k17_12 k17a_12
         k29_1_12 k30a1_12 k30b1_12 k30c1_12
         k29_2_12 k30a2_12 k30b2_12 k30c2_12
         k35_1_12 k36_1_12 k37a1_12 k37b1_12 k37c1_12
         k35_2_12 k36_2_12 k37a2_12 k37b2_12 k37c2_12
         k35_3_12 k36_3_12 k37a3_12 k37b3_12 k37c3_12
         k47_12 k47a_12 k47b1_12 k47b2_12 k47b3_12
         k48_12 k48a_12 k48b1_12 k48b2_12 k48b3_12      k48a_monthly_12
         k50_12 k50a_12 k50b1_12 k50b2_12 k50b3_12
         k51_12 k51a_12 k51b1_12 k51b2_12 k51b3_12      k51a_monthly_12
         k58a_12 k61_1_12 k62a1_12 k62b1_12 k62c1_12
         k58b_12 k61_2_12 k62a2_12 k62b2_12 k62c2_12
         k58c_12 k61_3_12 k62a3_12 k62b3_12 k62c3_12
         k58d_12 k61_4_12 k62a4_12 k62b4_12 k62c4_12
         k31a_12 k31b_12 k31c_12
         k80_1_12 k80_2_12 k80_3_12 k79a_12 k79b_12 k79c_12;
if tipentg_12=2; run;
        /* proc freq; table k1_12; run;  */

****************** 1 *********;
data bb2; set bb1;
        imamk11_1_12=k11_1_12;          **** Amputation N=23;
        if k1_12 =2 and k11_1_12=. then imamk11_1_12=0;
        if k1_12 in (8,9) and k11_1_12=. then imamk11_1_12=.;
        if k1_12 =1 and k11_1_12=. then imamk11_1_12=.;
                        if k10_1_12 =2 and k11_1_12=. then imamk11_1_12=0;
                        if k10_1_12 in (8,9) and k11_1_12=. then imamk11_1_12=.;
                        if k10_1_12 =1 and k11_1_12=. then imamk11_1_12=.;
                if k11_1_12 in
```

```
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk11_1_12=.;
                if imamk11_1_12=. and k12a1_12=. then k12a1_12=9;
        imamk11_2_12=k11_2_12;          **** Amputation N=1;
        if k1_12 in(2,8,9) and k11_2_12=. then imamk11_2_12=0;
                if k10_2_12 =2 and k11_2_12=. then imamk11_2_12=0;
                if k10_2_12 in (8,9) and k11_2_12=. then imamk11_2_12=.;
                if k10_2_12 =1 and k11_2_12=. then imamk11_2_12=.;
                if k10_2_12 = . and k11_2_12=. then imamk11_2_12=0;
                        if k11_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk11_2_12=.;
                if imamk11_2_12=. and k12a2_12=. then k12a2_12=9;
        imamk13_1_12=k13_1_12;          **** Amputation N=26;
        if k1_12 =2 and k13_1_12=. then imamk13_1_12=0;
        if k1_12 in (8,9) and k13_1_12=. then imamk13_1_12=.;
        if k1_12 =1 and k13_1_12=. then imamk13_1_12=.;
                if k13_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk13_1_12=.;
                if imamk13_1_12=. and k14a1_12=. then k14a1_12=9;
        imamk13_2_12=k13_2_12;          **** Amputation N=0;
        if k1_12 in (2,8,9) and k13_2_12=. then imamk13_2_12=0;
        if k1a_12 =2 and k13_2_12=. then imamk13_2_12=0;
        if k1a_12 =. and k13_2_12=. then imamk13_2_12=0;
                if k13_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk13_2_12=.;
                if imamk13_2_12=. and k14a2_12=. then k14a2_12=9;
        imamk15_1_12=k15_1_12;          **** Amputation N=25;
        if k1_12 =2 and k15_1_12=. then imamk15_1_12=0;
        if k1_12 in (8,9) and k15_1_12=. then imamk15_1_12=.;
        if k1_12 =1 and k15_1_12=. then imamk15_1_12=.;
                if k15_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk15_1_12=.;
                if imamk15_1_12=. and k16a1_12=. then k16a1_12=9;
        imamk15_2_12=k15_2_12;          **** Amputation N=0;
        if k1_12 in (2,8,9) and k15_2_12=. then imamk15_2_12=0;
                if k1a_12 = 2 and k15_2_12=. then imamk15_2_12=0;
                if k1a_12 =. and k15_2_12=. then imamk15_2_12=0;
                if k15_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk15_2_12=.;
                if imamk15_2_12=. and k16a2_12=. then k16a2_12=9;
                dumk11_1_12=1*(imamk11_1_12=.);
                dumk11_2_12=1*(imamk11_2_12=.);
                dumk13_1_12=1*(imamk13_1_12=.);
                dumk13_2_12=1*(imamk13_2_12=.);
```

```
                                Imput2012_Total Group1
                dumk15_1_12=1*(imamk15_1_12=.);
                dumk15_2_12=1*(imamk15_2_12=.);                  run;
        /* proc freq; table dumk11_1_12 dumk11_2_12 dumk13_1_12 dumk13_2_12
dumk15_1_12 dumk15_2_12; run; */

***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname
        (keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
imam&vname dum&vname low&vname up&vname &mix1 &mix2 );
        set bb2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
                if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
%mend range;

%range(k11_1_12,k12a1_12,k12b1_12,k12c1_12,700000,45000,150000,15000,k1_12,k10_1_12
);  run;
%range(k11_2_12,k12a2_12,k12b2_12,k12c2_12,100000,45000,150000,15000,k10_2_12);
run;
%range(k13_1_12,k14a1_12,k14b1_12,k14c1_12,400000,45000,150000,15000,k1_12,k14a1_12
);  run;  ****k13_1,2, k151,2 range 0-max if missing;
%range(k13_2_12,k14a2_12,k14b2_12,k14c2_12, 65000,45000,150000,15000,k14a2_12);
run;
%range(k15_1_12,k16a1_12,k16b1_12,k16c1_12,600000,15000,45000,6000,k1_12,k16a1_12);
 run;
%range(k15_2_12,k16a2_12,k16b2_12,k16c2_12, 30000,15000,45000,6000,k16a2_12);  run;

data output2.group1_proxy_pension1;
        merge datak11_1_12(drop=k1_12 k10_1_12)
        datak11_2_12(drop=k10_2_12)
        datak13_1_12(drop=k1_12 k14a1_12)
        datak13_2_12(drop= k14a2_12)
        datak15_1_12(drop=k1_12 k16a1_12)
```

```
        datak15_2_12 (drop=k16a2_12) ; run;

data dd1; set output2.group1_proxy_pension1;
keep cunicah subhog_12 tipentg_12  sex_12_max age_12_max  yrschool

    imamk11_1_12  imamk13_1_12  imamk15_1_12
        dumk11_1_12     dumk13_1_12     dumk15_1_12
        lowk11_1_12 upk11_1_12   lowk13_1_12 upk13_1_12   lowk15_1_12 upk15_1_12
;  run;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk11_1_12 imamk13_1_12 imamk15_1_12  yrschool;

transfer cunicah subhog_12 tipentg_12
        lowk11_1_12 upk11_1_12
    lowk13_1_12  upk13_1_12
    lowk15_1_12  upk15_1_12
                dumk11_1_12
                dumk13_1_12
                dumk15_1_12
        ;
 bounds
  imamk11_1_12 (>=lowk11_1_12 ,<=upk11_1_12)
  imamk13_1_12 (>=lowk13_1_12 ,<=upk13_1_12)
  imamk15_1_12 (>=lowk15_1_12 ,<=upk15_1_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;
```

```
                                Imput2012_Total Group1
/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data dd1; set output2.group1_proxy_pension1;
keep cunicah subhog_12 tipentg_12  sex_12_max age_12_max  yrschool

    imamk11_2_12  imamk13_2_12  imamk15_2_12
        dumk11_2_12     dumk13_2_12     dumk15_2_12
        lowk11_2_12 upk11_2_12   lowk13_2_12 upk13_2_12   lowk15_2_12 upk15_2_12
;  run;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;

mixed  imamk11_2_12 imamk13_2_12 imamk15_2_12  yrschool;

transfer cunicah subhog_12 tipentg_12
        lowk11_2_12 upk11_2_12
    lowk13_2_12  upk13_2_12
    lowk15_2_12  upk15_2_12
                dumk11_2_12
                dumk13_2_12
                dumk15_2_12
        ;
 bounds
  imamk11_2_12 (>=lowk11_2_12 ,<=upk11_2_12)
  imamk13_2_12 (>=lowk13_2_12 ,<=upk13_2_12)
```

```
                                Imput2012_Total Group1
  imamk15_2_12 (>=lowk15_2_12 ,<=upk15_2_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data imp2.group1_proxy_pension1_imputed; merge dd_1 dd_2; by cunicah subhog_12;
        drop lowk11_1_12 upk11_1_12
    lowk11_2_12  upk11_2_12
    lowk13_1_12  upk13_1_12
    lowk13_2_12  upk13_2_12
    lowk15_1_12  upk15_1_12
    lowk15_2_12  upk15_2_12   ; run;

/* data temp; set imp2.group1_proxy_pension1_imputed; run;
proc freq; table imamk11_1_12; where dumk11_1_12=1;  run;
proc freq; table imamk11_2_12; where dumk11_2_12=1; run;
proc freq; table imamk13_1_12; where dumk13_1_12 =1;  run;
proc freq; table imamk13_2_12; where dumk13_2_12 =1;  run; ***n=1;
proc freq; table imamk15_1_12; where dumk15_1_12 =1;  run; ***n=0;
proc freq; table imamk15_2_12; where dumk15_2_12 =1;  run; ***n=0;
*/


********** 2 **********;
data bb2; set bb1;
        imamk27_1_12=k27_1_12;          **** Amputation N=9;
        if k17_12=2 and k27_1_12=. then imamk27_1_12=0;
        if k17_12 in (8,9) and  k27_1_12=. then imamk27_1_12=.;
        if k17_12 =1 and k27_1_12=. then imamk27_1_12=.;
                if k26_1_12 =2 and k27_1_12=. then imamk27_1_12=0;
                if k26_1_12 = 1 and k27_1_12=. then imamk27_1_12=.;
                if k26_1_12 in (8,9) and k27_1_12=. then imamk27_1_12=.;
                if k27_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk27_1_12=.;
                if imamk27_1_12=. and k28a1_12=. then k28a1_12=9;
        imamk27_2_12=k27_2_12;          **** Amputation N=1     ;
        if k17_12 in (2,8,9) and k27_2_12=. then imamk27_2_12=0;
                if k26_2_12 =2 and k27_2_12=. then imamk27_2_12=0;
                if k26_2_12 =1 and k27_2_12=. then imamk27_2_12=.;
```

```
                                Imput2012_Total Group1
                if k26_2_12 in (8,9) and k27_2_12=. then imamk27_2_12=.;
                if k26_2_12 =. and k27_2_12=. then imamk27_2_12=0;
                if k27_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk27_2_12=.;
                if imamk27_2_12=. and k28a2_12=. then k28a2_12=9;

        imamk29_1_12=k29_1_12;          **** Amputation N=13;
                if k17_12=2 and k29_1_12=. then imamk29_1_12=0;
                if k17_12 = 1 and k29_1_12=. then imamk29_1_12=.;
                if k17_12 in (8,9) and k29_1_12=. then imamk29_1_12=.;
                if k29_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk29_1_12=.;
                if imamk29_1_12=. and k30a1_12=. then k30a1_12=9;
        imamk29_2_12=k29_2_12;          **** Amputation N=1;
                if k17_12 = in (2,8,9) and k29_2_12=. then imamk29_2_12=0;
                if k17a_12=2 and k29_2_12=. then imamk29_2_12=0;
                if k29_2_12 =. then imamk29_2_12=0;
                if k29_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk29_2_12=.;
                if imamk29_2_12=. and k30a2_12=. then k30a2_12=9;
         dumk27_1_12=1*(imamk27_1_12=.);
         dumk27_2_12=1*(imamk27_2_12=.);
         dumk29_1_12=1*(imamk29_1_12=.);
         dumk29_2_12=1*(imamk29_2_12=.);                run;
/* proc freq data=bb2; table dumk27_1_12 dumk27_2_12 dumk29_1_12 dumk29_2_12; run;
*/

%range(k27_1_12,k28a1_12,k28b1_12,k28c1_12,700000,4500,14000,1500,k17_12,k26_1_12);
 run;
%range(k27_2_12,k28a2_12,k28b2_12,k28c2_12, 10000,4500,14000,1500,k26_2_12);  run;
%range(k29_1_12,k30a1_12,k30b1_12,k30c1_12,100000,600,2000,150,k17_12,k30a1_12);
run;
%range(k29_2_12,k30a2_12,k30b2_12,k30c2_12,  3000,600,2000,150,k30a2_12);  run;

data output2.group1_proxy_pension2;
        merge
        datak27_1_12(drop=k17_12 k26_1_12)
        datak27_2_12(drop=k26_2_12)
        datak29_1_12(drop=k17_12 k30a1_12)
        datak29_2_12(drop=k30a2_12); run;

data dd1; set output2.group1_proxy_pension2;  run;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
```

```
                                Imput2012_Total Group1
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk27_1_12 imamk27_2_12 imamk29_1_12 imamk29_2_12
                         yrschool;

transfer cunicah subhog_12 tipentg_12

    lowk27_1_12  upk27_1_12
    lowk27_2_12  upk27_2_12
    lowk29_1_12  upk29_1_12
    lowk29_2_12  upk29_2_12
         dumk27_1_12
         dumk27_2_12
         dumk29_1_12
         dumk29_2_12
        ;
 bounds

  imamk27_1_12 (>=lowk27_1_12 ,<=upk27_1_12)
  imamk27_2_12 (>=lowk27_2_12 ,<=upk27_2_12)

  imamk29_1_12 (>=lowk29_1_12 ,<=upk29_1_12)
  imamk29_2_12 (>=lowk29_2_12 ,<=upk29_2_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
```

```
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group1_proxy_pension2_imputed; set dd_1;
        drop   lowk27_1_12  upk27_1_12
    lowk27_2_12  upk27_2_12
    lowk29_1_12  upk29_1_12
    lowk29_2_12  upk29_2_12      ; run;

/*
proc freq; table imamk27_1_12; where dumk27_1_12 =1; run; ****not imputed/no
degrees of freedom left for perturbations;
proc freq; table imamk27_2_12; where dumk27_2_12 =1; run; ****not imputed/no
variance, imputing constant 3500;
proc freq; table imamk29_1_12; where dumk29_1_12 =1; run; ****not imputed/no
degrees of freedom left for perturbations;
proc freq; table imamk29_2_12; where dumk29_2_12 =1; run; ****not imputedno
variance, imputing constant 350; */



********** 3 **********;
data bb2; set bb1;
        imamk36_1_12=k36_1_12;          **** Amputation N=22;
        if k31a_12=2 and k36_1_12=. then imamk36_1_12=0;

        if k31a_12 in (8,9) and k36_1_12=. then imamk36_1_12=.;

                if k35_1_12 = 2 and k36_1_12=. then imamk36_1_12=0;

                if k35_1_12 = 1 and k36_1_12=. then imamk36_1_12=.;

                if k35_1_12 in (8,9) and k36_1_12=. then imamk36_1_12=.;

                if k36_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk36_1_12=.;
                if imamk36_1_12=. and k37a1_12=. then k37a1_12=9;
        imamk36_2_12=k36_2_12;          **** Amputation N=7;
        if k31b_12=2 and k36_2_12=. then imamk36_2_12=0;

        if k31b_12 in (8,9) and k36_2_12=. then imamk36_2_12=.;

                if k35_2_12 = 2 and k36_2_12=. then imamk36_2_12=0;

                if k35_2_12 = 1 and k36_2_12=. then imamk36_2_12=.;

                if k35_2_12 in (8,9) and k36_2_12=. then imamk36_2_12=0;
```

```
                                Imput2012_Total Group1
                if k36_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk36_2_12=.;
                if imamk36_2_12=. and k37a2_12=. then k37a2_12=9;
        imamk36_3_12=k36_3_12;          **** Amputation N=7;
        if k31c_12=2 and k36_3_12=. then imamk36_3_12=0;

        if k31c_12 in (8,9) and k36_3_12=. then imamk36_3_12=.;

                if k35_3_12 =2 and k36_3_12=. then imamk36_3_12=0;

                if k35_3_12 =1 and k36_3_12=. then imamk36_3_12=.;

                if k35_3_12 in (8,9) and k36_3_12=. then imamk36_3_12=.;

                if k36_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk36_3_12=.;
                if imamk36_3_12=. and k37a3_12=. then k37a3_12=9;
                dumk36_1_12=1*(imamk36_1_12=.);
                dumk36_2_12=1*(imamk36_2_12=.);
                dumk36_3_12=1*(imamk36_3_12=.);                 run;

%range(k36_1_12,k37a1_12,k37b1_12,k37c1_12,70000,300,1500,150,k31a_12,k35_1_12);
run;
%range(k36_2_12,k37a2_12,k37b2_12,k37c2_12, 6000,300,1500,150,k31b_12,k35_2_12);
run;
%range(k36_3_12,k37a3_12,k37b3_12,k37c3_12, 6000,300,1500,150,k31c_12,k35_3_12);
run;

data output2.group1_proxy_pension3;
        merge
        datak36_1_12(drop=k31a_12 k35_1_12)
        datak36_2_12(drop=k31b_12 k35_2_12)
        datak36_3_12(drop=k31c_12 k35_3_12) ; run;

data dd1; set output2.group1_proxy_pension3;  run;   **** proxy N=731 var=18;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
```

```
                                Imput2012_Total Group1
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk36_1_12 imamk36_2_12 imamk36_3_12
                         yrschool;

transfer cunicah subhog_12 tipentg_12
    lowk36_1_12  upk36_1_12
    lowk36_2_12  upk36_2_12
    lowk36_3_12  upk36_3_12
                dumk36_1_12
                dumk36_2_12
                dumk36_3_12   ;
 bounds
  imamk36_1_12 (>=lowk36_1_12 ,<=upk36_1_12)
  imamk36_2_12 (>=lowk36_2_12 ,<=upk36_2_12)
  imamk36_3_12 (>=lowk36_3_12 ,<=upk36_3_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group1_proxy_pension3_imputed; set dd_1;
        drop     lowk36_1_12  upk36_1_12
    lowk36_2_12  upk36_2_12
    lowk36_3_12  upk36_3_12       ; run;

/*
data temp; set imp2.group1_proxy_pension3_imputed; run;
proc freq; table imamk36_1_12; where dumk36_1_12 =1; run; **** imputed;
proc freq; table imamk36_2_12; where dumk36_2_12 =1; run; **** not imputed;
proc freq; table imamk36_3_12; where dumk36_3_12 =1; run; **** not imputed; */
```

```
                                Imput2012_Total Group1
****************** 4 ********************;
data bb2; set bb1;
        imamk47_12=k47a_12;             **** Amputation N=10;
        if k47_12 = 2 and k47a_12=. then imamk47_12=0;
        if k47_12 = . and k47a_12=. then imamk47_12=0;
        if k47_12 = 1 and k47a_12=. then imamk47_12=.;
        if k47_12 in (8,9) and k47a_12=. then imamk47_12=.;
                if k47a_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk47_12=.;
                if imamk47_12=. and k47b1_12=. then k47b1_12=9;
        imamk48_12=k48a_monthly_12;             **** Amputation N=7;
        if k48_12 = 2 and k48a_monthly_12=. then imamk48_12=0;
        if k48_12 = . and k48a_monthly_12=. then imamk48_12=0;
        if k48_12 = 1 and k48a_monthly_12=. then imamk48_12=.;
        if k48_12 in (8,9) and k48a_monthly_12=. then imamk48_12=.;
                if k48a_monthly_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk48_12=.;
                if imamk48_12=. and k48b1_12=. then k48b1_12=9;
        imamk50_12=k50a_12;                                     **** Amputation
N=1;
        if k50_12 = 2 and k50a_12=. then imamk50_12=0;

        if k50_12 = . and k50a_12=. then imamk50_12=0;

        if k50_12 = 1 and k50a_12=. then imamk50_12=.;

        if k50_12 in (8,9) and k50a_12=. then imamk50_12=.;
                if k50a_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk50_12=.;
                if imamk50_12=. and k50b1_12=. then k50b1_12=9;
        imamk51_12=k51a_monthly_12;             **** Amputation N=1;
        if k51_12 =2 and k51a_monthly_12=. then imamk51_12=0;
        if k51_12 =. and k51a_monthly_12=. then imamk51_12=0;
        if k51_12 =1 and k51a_monthly_12=. then imamk51_12=.;
        if k51_12 in (8,9) and k51a_monthly_12=. then imamk51_12=.;
                if k51a_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk51_12=.;
                if imamk51_12=. and k51b1_12=. then k51b1_12=9;
        dumk47_12=1*(imamk47_12=.);
        dumk48_12=1*(imamk48_12=.);
        dumk50_12=1*(imamk50_12=.);
        dumk51_12=1*(imamk51_12=.);             run;

%range(k47_12,k47b1_12,k47b2_12,k47b3_12,500000,6000,12000,1500,k47_12);  run;
%range(k48_12,k48b1_12,k48b2_12,k48b3_12, 83333,6000,12000,1500,k48_12);  run;
```

```
                                Imput2012_Total Group1
%range(k50_12,k50b1_12,k50b2_12,k50b3_12, 12000,6000,12000,1500,k50_12);  run;
%range(k51_12,k51b1_12,k51b2_12,k51b3_12,  8333,6000,12000,1500,k51_12);  run;

data output2.group1_proxy_pension4;
        merge
        datak47_12(drop=k47_12)
        datak48_12(drop=k48_12)
        datak50_12(drop=k50_12)
        datak51_12(drop=k51_12);
        by cunicah subhog_12; run;

data dd1; set output2.group1_proxy_pension4;  run;   **** proxy nonproxy N=9,696
var=78;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed           imamk47_12 imamk48_12 imamk50_12 imamk51_12 yrschool;

transfer cunicah subhog_12 tipentg_12

    lowk47_12  upk47_12
    lowk48_12  upk48_12
    lowk50_12  upk50_12
    lowk51_12  upk51_12
        dumk47_12
        dumk48_12
        dumk50_12
        dumk51_12
        ;
 bounds
```

```
  imamk47_12 (>=lowk47_12 ,<=upk47_12)
  imamk48_12 (>=lowk48_12 ,<=upk48_12)
  imamk50_12 (>=lowk50_12 ,<=upk50_12)
  imamk51_12 (>=lowk51_12 ,<=upk51_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
/* multiples 5 ; */
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group1_proxy_pension4_imputed; set dd_1;
        drop        lowk47_12  upk47_12
    lowk48_12  upk48_12
    lowk50_12  upk50_12
    lowk51_12  upk51_12       ; run;
/*
data temp; set imp2.group1_proxy_pension4_imputed;
proc freq; table imamk47_12; where dumk47_12 =1 ; run; *** imputed;
proc freq; table imamk48_12; where dumk48_12 =1; run; *** imputed;
proc freq; table imamk50_12; where dumk50_12 =1; run; *** imputed;
proc freq; table imamk51_12; where dumk51_12 =1; run; *** imputed; */

********* 5 *********;
data bb2; set bb1;
        imamk61_1_12=k61_1_12;          **** Amputation N=23;
        if k58a_12 =2 and k61_1_12=. then imamk61_1_12=0;

        if k58a_12 =1 and k61_1_12=. then imamk61_1_12=.;

        if k58a_12 in (8,9) and k61_1_12=. then imamk61_1_12=.;
                if k61_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk61_1_12=.;
                if imamk61_1_12=. and k62a1_12=. then k62a1_12=9;
        imamk61_2_12=k61_2_12;          **** Amputation N=10;
        if k58b_12 =2 and k61_2_12=. then imamk61_2_12=0;

        if k58b_12 =1 and k61_2_12=. then imamk61_2_12=.;

        if k58b_12 in (8,9) and k61_2_12=. then imamk61_2_12=.;
                if k61_2_12 in
```

```
                                Imput2012_Total Group1
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk61_2_12=.;
                if imamk61_2_12=. and k62a2_12=. then k62a2_12=9;
        imamk61_3_12=k61_3_12;          **** Amputation N=6;
        if k58c_12 =2 and k61_3_12=. then imamk61_3_12=0;

        if k58c_12 =1 and k61_3_12=. then imamk61_3_12=.;

        if k58c_12 in (8,9) and k61_3_12=. then imamk61_3_12=.;
                if k61_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk61_3_12=.;
                if imamk61_3_12=. and k62a3_12=. then k62a3_12=9;
        imamk61_4_12=k61_4_12;          **** Amputation N=5;
        if k58d_12 = 2 and k61_4_12=. then imamk61_4_12=0;

        if k58d_12 = 1 and k61_4_12=. then imamk61_4_12=.;

        if k58d_12 in (8,9) and k61_4_12=. then imamk61_4_12=.;
                if k61_4_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk61_4_12=.;
                if imamk61_4_12=. and k62a4_12=. then k62a4_12=9;
        dumk61_1_12=1*(imamk61_1_12=.);
        dumk61_2_12=1*(imamk61_2_12=.);
        dumk61_3_12=1*(imamk61_3_12=.);
        dumk61_4_12=1*(imamk61_4_12=.);         run;

%range(k61_1_12,k62a1_12,k62b1_12,k62c1_12, 200000,1500,6000,750,k58a_12);  run;
%range(k61_2_12,k62a2_12,k62b2_12,k62c2_12,  25000,1500,6000,750,k58b_12);  run;
%range(k61_3_12,k62a3_12,k62b3_12,k62c3_12,  20000,1500,6000,750,k58c_12);  run;
%range(k61_4_12,k62a4_12,k62b4_12,k62c4_12,  15000,1500,6000,750,k58d_12);  run;

data output2.group1_proxy_pension5;
        merge
        datak61_1_12(drop=k58a_12)
        datak61_2_12(drop=k58b_12)
        datak61_3_12(drop=k58c_12)
        datak61_4_12(drop=k58d_12);
by cunicah subhog_12; run;

*** seperate impute each variables;
data dd1; set output2.group1_proxy_pension5;
keep cunicah subhog_12 tipentg_12  sex_12_max age_12_max  yrschool

   imamk61_1_12 lowk61_1_12  upk61_1_12         dumk61_1_12; run;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
```

```
                              Imput2012_Total Group1
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed           imamk61_1_12
                         yrschool;

transfer cunicah subhog_12 tipentg_12
    lowk61_1_12  upk61_1_12
        dumk61_1_12
        ;
 bounds
  imamk61_1_12 (>=lowk61_1_12 ,<=upk61_1_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 ITERATIONS 5;
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);


data dd1; set output2.group1_proxy_pension5;
keep cunicah subhog_12 tipentg_12  sex_12_max age_12_max  yrschool

   imamk61_2_12 lowk61_2_12  upk61_2_12 dumk61_2_12; run;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
```

```
                                Imput2012_Total Group1
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;

mixed           imamk61_2_12
                         yrschool;

transfer cunicah subhog_12 tipentg_12
    lowk61_2_12  upk61_2_12
        dumk61_2_12
        ;
 bounds
  imamk61_2_12 (>=lowk61_2_12 ,<=upk61_2_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 ITERATIONS 5;
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);


data dd1; set output2.group1_proxy_pension5;
keep cunicah subhog_12 tipentg_12  sex_12_max age_12_max  yrschool

   imamk61_3_12 lowk61_3_12  upk61_3_12 dumk61_3_12; run;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;
```

Imput2012_Total Group1

```
data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_3;

categorical sex_12_max ;

count age_12_max;

mixed           imamk61_3_12
                         yrschool;

transfer cunicah subhog_12 tipentg_12
    lowk61_3_12  upk61_3_12
        dumk61_3_12
        ;
 bounds
  imamk61_3_12 (>=lowk61_3_12 ,<=upk61_3_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 ITERATIONS 5;
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);


data dd1; set output2.group1_proxy_pension5;
keep cunicah subhog_12 tipentg_12  sex_12_max age_12_max  yrschool

   imamk61_4_12 lowk61_4_12  upk61_4_12 dumk61_4_12; run;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;
```

```
                                Imput2012_Total Group1
data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_4;

categorical sex_12_max ;

count age_12_max;

mixed           imamk61_4_12
                         yrschool;

transfer cunicah subhog_12 tipentg_12
    lowk61_4_12  upk61_4_12
        dumk61_4_12
        ;
 bounds
  imamk61_4_12 (>=lowk61_4_12 ,<=upk61_4_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 ITERATIONS 5;
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group1_proxy_pension5_imputed; merge dd_1 dd_2 dd_3 dd_4; by cunicah
subhog_12;
        drop      lowk61_1_12  upk61_1_12
    lowk61_2_12  upk61_2_12
    lowk61_3_12  upk61_3_12
    lowk61_4_12  upk61_4_12     ; run;
/*
data temp; set imp2.group1_proxy_pension5_imputed; run;
proc freq; table imamk61_1_12; where dumk61_1_12 =1; run; *** imputed;
proc freq; table imamk61_2_12; where dumk61_2_12 =1; run; *** not imputed;
proc freq; table imamk61_3_12; where dumk61_3_12 =1; run; *** not imputed/no
degrees of freedom left for perturbations;
```

```
                                Imput2012_Total Group1
proc freq; table imamk61_4_12; where dumk61_4_12 =1; run; *** imputed;  */


********** 6 ********************;
data bb2; set bb1;
        imamk80_1_12=k80_1_12;          **** Amputation N=15;
                if k79a_12 =2 and k80_1_12=. then imamk80_1_12=0;

                if k79a_12 =1 and k80_1_12=. then imamk80_1_12=.;

                if k79a_12 in (8,9) and k80_1_12=. then imamk80_1_12=.;
                if k80_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk80_1_12=.;
        imamk80_2_12=k80_2_12;          **** Amputation N=5;
                if k79b_12 =2 and k80_2_12=. then imamk80_2_12=0;

                if k79b_12 =1 and k80_2_12=. then imamk80_2_12=.;

                if k79b_12 in (8,9) and k80_2_12=. then imamk80_2_12=.;
                if k80_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk80_2_12=.;
        imamk80_3_12=k80_3_12;          **** Amputation N=4;
                if k79c_12 =2 and k80_3_12=. then imamk80_3_12=0;

                if k79c_12 =1 and k80_3_12=. then imamk80_3_12=.;

                if k79c_12 in (8,9) and k80_3_12=. then imamk80_3_12=.;
                if k80_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999,99999
98) then imamk80_3_12=.;
        dumk80_1_12=1*(imamk80_1_12=.);
        dumk80_2_12=1*(imamk80_2_12=.);
        dumk80_3_12=1*(imamk80_3_12=.);         run;

data datak80; set bb2
(keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max imamk80_1_12
imamk80_2_12 imamk80_3_12
        k79a_12 k79b_12 k79c_12 dumk80_1_12 dumk80_2_12 dumk80_3_12);
         lowk80_1_12=1; upk80_1_12=42000;
         if k79a_12 in (8,9) then lowk80_1_12=0;
         lowk80_2_12=1; upk80_2_12=9000;
         if k79b_12 in (8,9) then lowk80_2_12=0;
         lowk80_3_12=1; upk80_3_12=500000;
         if k79c_12 in (8,9) then lowk80_3_12=0;
                if imamk80_1_12 >=0 then do; lowk80_1_12=imamk80_1_12; end;
                if imamk80_1_12 >=0 then do;  upk80_1_12=imamk80_1_12; end;
                if imamk80_2_12 >=0 then do; lowk80_2_12=imamk80_2_12; end;
```

```
                                Imput2012_Total Group1
                if imamk80_2_12 >=0 then do;  upk80_2_12=imamk80_2_12; end;
                if imamk80_3_12 >=0 then do; lowk80_3_12=imamk80_3_12; end;
                if imamk80_3_12 >=0 then do;  upk80_3_12=imamk80_3_12; end;  run;

data output2.group1_proxy_pension6;
        set     datak80(drop=k79a_12 k79b_12 k79c_12);
 run;

data dd1; set output2.group1_proxy_pension6;  run;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed           imamk80_1_12 imamk80_2_12 imamk80_3_12 yrschool;

transfer cunicah subhog_12 tipentg_12

        lowk80_1_12 upk80_1_12
        lowk80_2_12 upk80_2_12
        lowk80_3_12 upk80_3_12
        dumk80_1_12 dumk80_2_12 dumk80_3_12
        ;
 bounds
        imamk80_1_12 (>=lowk80_1_12 ,<=upk80_1_12)
        imamk80_2_12 (>=lowk80_2_12 ,<=upk80_2_12)
        imamk80_3_12 (>=lowk80_3_12 ,<=upk80_3_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;
```

Imput2012_Total Group1

```
/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data imp2.group1_proxy_pension6_imputed; set dd_1;
        drop    lowk80_1_12 upk80_1_12
        lowk80_2_12 upk80_2_12
        lowk80_3_12 upk80_3_12   ; run;

/* data temp; set imp2.group1_proxy_pension6_imputed; run;
proc freq; table imamk80_1_12; where dumk80_1_12 =1; run; *** imputed;
proc freq; table imamk80_2_12; where dumk80_2_12 =1; run; *** not imputed/no valid
cases, imputing restricted value 0;
proc freq; table imamk80_3_12; where dumk80_3_12 =1; run; *** not imputed/no valid
cases, imputing restricted value 0;
*/
```

```
***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname
        (keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
imam&vname low&vname up&vname &mix1 &mix2);
        set bb2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
```

```
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
                if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
%mend range;

%range(k11_1_12,k12a1_12,k12b1_12,k12c1_12,700000,45000,150000,15000,k1_12,k10_1_12
);  run;
%range(k11_2_12,k12a2_12,k12b2_12,k12c2_12,100000,45000,150000,15000,k10_2_12);
run;

%range(k13_1_12,k14a1_12,k14b1_12,k14c1_12,400000,45000,150000,15000,k1_12);  run;
%range(k13_2_12,k14a2_12,k14b2_12,k14c2_12, 65000,45000,150000,15000,k10_2_12);
run;

%range(k15_1_12,k16a1_12,k16b1_12,k16c1_12,600000,15000,45000,6000,k1_12);  run;
%range(k15_2_12,k16a2_12,k16b2_12,k16c2_12, 30000,15000,45000,6000,k10_2_12);  run;

%range(k27_1_12,k28a1_12,k28b1_12,k28c1_12,700000,4500,14000,1500,k17_12,k26_1_12);
 run;
%range(k27_2_12,k28a2_12,k28b2_12,k28c2_12, 10000,4500,14000,1500,k26_2_12);  run;

%range(k29_1_12,k30a1_12,k30b1_12,k30c1_12,100000,600,2000,150,k17_12);  run;
%range(k29_2_12,k30a2_12,k30b2_12,k30c2_12,  3000,600,2000,150);  run;

%range(k36_1_12,k37a1_12,k37b1_12,k37c1_12,70000,300,1500,150,k31a_12,k35_1_12);
run;
%range(k36_2_12,k37a2_12,k37b2_12,k37c2_12, 6000,300,1500,150,k31b_12,k35_2_12);
run;
%range(k36_3_12,k37a3_12,k37b3_12,k37c3_12, 6000,300,1500,150,k31c_12,k35_3_12);
run;

%range(k47_12,k47b1_12,k47b2_12,k47b3_12,500000,6000,12000,1500,k47_12);  run;
%range(k48_12,k48b1_12,k48b2_12,k48b3_12, 83333,6000,12000,1500,k48_12);  run;
%range(k50_12,k50b1_12,k50b2_12,k50b3_12, 12000,6000,12000,1500,k50_12);  run;
%range(k51_12,k51b1_12,k51b2_12,k51b3_12,  8333,6000,12000,1500,k51_12);  run;

%range(k61_1_12,k62a1_12,k62b1_12,k62c1_12, 200000,1500,6000,750,k58a_12);  run;
%range(k61_2_12,k62a2_12,k62b2_12,k62c2_12,  25000,1500,6000,750,k58b_12);  run;
%range(k61_3_12,k62a3_12,k62b3_12,k62c3_12,  20000,1500,6000,750,k58c_12);  run;
%range(k61_4_12,k62a4_12,k62b4_12,k62c4_12,  15000,1500,6000,750,k58d_12);  run;

data datak80; set bb2
```

```
                                Imput2012_Total Group1
(keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max imamk80_1_12
imamk80_2_12 imamk80_3_12
        k79a_12 k79b_12 k79c_12);
         lowk80_1_12=1; upk80_1_12=80000;
         if k79a_12 in (8,9) then lowk80_1_12=0;
         lowk80_2_12=1; upk80_2_12=18000;
         if k79b_12 in (8,9) then lowk80_2_12=0;
         lowk80_3_12=1; upk80_3_12=1400000;
         if k79c_12 in (8,9) then lowk80_3_12=0;
run;
data output2.group1_proxy_pension;
        merge datak11_1_12(drop=k1_12 k10_1_12)
        datak11_2_12(drop=k10_2_12)
        datak13_1_12(drop=k1_12)
        datak13_2_12(drop=k10_2_12)
        datak15_1_12(drop=k1_12)
        datak15_2_12(drop=k10_2_12)
        datak27_1_12(drop=k17_12 k26_1_12)
        datak27_2_12(drop=k26_2_12)
        datak29_1_12(drop=k17_12)
        datak29_2_12
        datak36_1_12(drop=k31a_12 k35_1_12)
        datak36_2_12(drop=k31b_12 k35_2_12)
        datak36_3_12(drop=k31c_12 k35_3_12)
        datak47_12(drop=k47_12)
        datak48_12(drop=k48_12)
        datak50_12(drop=k50_12)
        datak51_12(drop=k51_12)
        datak61_1_12(drop=k58a_12)
        datak61_2_12(drop=k58b_12)
        datak61_3_12(drop=k58c_12)
        datak61_4_12(drop=k58d_12)
        datak80(drop=k79a_12 k79b_12 k79c_12);
by cunicah subhog_12; run;

proc means data=output2.group1_proxy_pension n nmiss mean std min max ;
                variable imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12
imamk15_1_12 imamk15_2_12 imamk27_1_12 imamk27_2_12 imamk29_1_12 imamk29_2_12
imamk36_1_12 imamk36_2_12 imamk36_3_12
                        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12
imamk61_2_12 imamk61_3_12 imamk61_4_12
                        imamk80_1_12 imamk80_2_12 imamk80_3_12; run;


libname imp 'd:\piname\wong\year2012\IMPfiles';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
data dd1; set output2.group1_proxy_pension;  run;   **** proxy N=731 var=78;
```

```
                                Imput2012_Total Group1
***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12 imamk29_1_12 imamk29_2_12 imamk36_1_12
imamk36_2_12 imamk36_3_12
                         imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12
imamk61_2_12 imamk61_3_12 imamk61_4_12
                         imamk80_1_12 imamk80_2_12 imamk80_3_12 yrschool;

transfer cunicah subhog_12 tipentg_12
        lowk11_1_12 upk11_1_12
    lowk11_2_12  upk11_2_12
    lowk13_1_12  upk13_1_12
    lowk13_2_12  upk13_2_12
    lowk15_1_12  upk15_1_12
    lowk15_2_12  upk15_2_12
    lowk27_1_12  upk27_1_12
    lowk27_2_12  upk27_2_12
    lowk29_1_12  upk29_1_12
    lowk29_2_12  upk29_2_12
    lowk36_1_12  upk36_1_12
    lowk36_2_12  upk36_2_12
    lowk36_3_12  upk36_3_12
    lowk47_12  upk47_12
    lowk48_12  upk48_12
    lowk50_12  upk50_12
    lowk51_12  upk51_12
    lowk61_1_12  upk61_1_12
    lowk61_2_12  upk61_2_12
    lowk61_3_12  upk61_3_12
    lowk61_4_12  upk61_4_12
```

```
                              Imput2012_Total Group1
        lowk80_1_12 upk80_1_12
        lowk80_2_12 upk80_2_12
        lowk80_3_12 upk80_3_12
        ;
 bounds
  imamk11_1_12 (>=lowk11_1_12 ,<=upk11_1_12)
  imamk11_2_12 (>=lowk11_2_12 ,<=upk11_2_12)
  imamk13_1_12 (>=lowk13_1_12 ,<=upk13_1_12)
  imamk13_2_12 (>=lowk13_2_12 ,<=upk13_2_12)

  imamk15_1_12 (>=lowk15_1_12 ,<=upk15_1_12)
  imamk15_2_12 (>=lowk15_2_12 ,<=upk15_2_12)

  imamk27_1_12 (>=lowk27_1_12 ,<=upk27_1_12)
  imamk27_2_12 (>=lowk27_2_12 ,<=upk27_2_12)

  imamk29_1_12 (>=lowk29_1_12 ,<=upk29_1_12)
  imamk29_2_12 (>=lowk29_2_12 ,<=upk29_2_12)

  imamk36_1_12 (>=lowk36_1_12 ,<=upk36_1_12)
  imamk36_2_12 (>=lowk36_2_12 ,<=upk36_2_12)
  imamk36_3_12 (>=lowk36_3_12 ,<=upk36_3_12)

  imamk47_12 (>=lowk47_12 ,<=upk47_12)
  imamk48_12 (>=lowk48_12 ,<=upk48_12)
  imamk50_12 (>=lowk50_12 ,<=upk50_12)
  imamk51_12 (>=lowk51_12 ,<=upk51_12)

  imamk61_1_12 (>=lowk61_1_12 ,<=upk61_1_12)
  imamk61_2_12 (>=lowk61_2_12 ,<=upk61_2_12)
  imamk61_3_12 (>=lowk61_3_12 ,<=upk61_3_12)
  imamk61_4_12 (>=lowk61_4_12 ,<=upk61_4_12)

        imamk80_1_12 (>=lowk80_1_12 ,<=upk80_1_12)
        imamk80_2_12 (>=lowk80_2_12 ,<=upk80_2_12)
        imamk80_3_12 (>=lowk80_3_12 ,<=upk80_3_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
/* multiples 5 ; */
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);
```

Imput2012_Total Group1

```
data data imp2.group1_proxy_pension_imputed; set dd_1;
        drop
        lowk11_1_12 upk11_1_12
    lowk11_2_12  upk11_2_12
    lowk13_1_12  upk13_1_12
    lowk13_2_12  upk13_2_12
    lowk15_1_12  upk15_1_12
    lowk15_2_12  upk15_2_12
    lowk27_1_12  upk27_1_12
    lowk27_2_12  upk27_2_12
    lowk29_1_12  upk29_1_12
    lowk29_2_12  upk29_2_12
    lowk36_1_12  upk36_1_12
    lowk36_2_12  upk36_2_12
    lowk36_3_12  upk36_3_12
    lowk47_12  upk47_12
    lowk48_12  upk48_12
    lowk50_12  upk50_12
    lowk51_12  upk51_12
    lowk61_1_12  upk61_1_12
    lowk61_2_12  upk61_2_12
    lowk61_3_12  upk61_3_12
    lowk61_4_12  upk61_4_12
        lowk80_1_12 upk80_1_12
        lowk80_2_12 upk80_2_12
        lowk80_3_12 upk80_3_12
 ; run;

*** print putput: prior imputation;
Title "Group1 proxy pension - before imputation (mean with zero)";
proc means data=output2.group1_proxy_pension  mean std min max n nmiss;
        variable imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12 imamk29_1_12 imamk29_2_12 imamk36_1_12
imamk36_2_12 imamk36_3_12
                        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12
imamk61_2_12 imamk61_3_12 imamk61_4_12; run;

*** print putput: mean with zero;
Title "Group1 proxy pension - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group1_proxy_pension_imputed;
        var imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12 imamk29_1_12 imamk29_2_12 imamk36_1_12
imamk36_2_12 imamk36_3_12
                        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12
imamk61_2_12 imamk61_3_12 imamk61_4_12;
```

```
run;

*** print output: mean without zero;
data group1; set imp2.group1_proxy_pension_imputed;
  if imamk11_1_12  =0 then imamk11_1_12 =.;
  if imamk11_2_12  =0 then imamk11_2_12 =.;
  if imamk13_1_12  =0 then imamk13_1_12 =.;
  if imamk13_2_12  =0 then imamk13_2_12  =.;

  if imamk15_1_12  =0 then imamk15_1_12 =.;
  if imamk15_2_12  =0 then imamk15_2_12 =.;

  if imamk27_1_12  =0 then imamk27_1_12 =.;
  if imamk27_2_12  =0 then imamk27_2_12 =.;

  if imamk29_1_12  =0 then imamk29_1_12 =.;
  if imamk29_2_12  =0 then imamk29_2_12 =.;

  if imamk36_1_12  =0 then imamk36_1_12 =.;
  if imamk36_2_12  =0 then imamk36_2_12 =.;
  if imamk36_3_12  =0 then imamk36_3_12 =.;

  if imamk47_12  =0 then imamk47_12 =.;
  if imamk48_12  =0 then imamk48_12 =.;
  if imamk50_12  =0 then imamk50_12 =.;
  if imamk51_12  =0 then imamk51_12 =.;

  if imamk61_1_12  =0 then imamk61_1_12 =.;
  if imamk61_2_12  =0 then imamk61_2_12 =.;
  if imamk61_3_12  =0 then imamk61_3_12 =.;
  if imamk61_4_12  =0 then imamk61_4_12 =.;   run;

Title "Group1 proxy pension - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12 imamk29_1_12 imamk29_2_12 imamk36_1_12
imamk36_2_12 imamk36_3_12
                        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12
imamk61_2_12 imamk61_3_12 imamk61_4_12;
run;




/*********************************************************/
/* PROGRAM NAME  : Imput2012_group1_report.SAS           */
/* PROGRAMMED BY : DONG ZHANG                            */
```

```
                              Imput2012_Total Group1
/* LAST UPDATEED : 02/12/2016                              */
/*
                         */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter nodate; run;

******************** core/help ************************;
*** print output: prior imputation/ with zero;
Title "Group1 core help - before imputation (mean with zero)";
proc means data=output2.group1_core_help mean std min max n nmiss;
        variable imamg19_1_12 imamg19_2_12 imamg19_3_12 imamg19_4_12 imamg19_5_12
imamg19_6_12 imamg19_7_12; run;

*** print output: prior imputation/ without zero;
data group1; set output2.group1_core_help;
    if imamg19_1_12=0 then imamg19_1_12=.;
    if imamg19_2_12=0 then imamg19_2_12=.;
    if imamg19_3_12=0 then imamg19_3_12=.;
    if imamg19_4_12=0 then imamg19_4_12=.;
    if imamg19_5_12=0 then imamg19_5_12=.;
    if imamg19_6_12=0 then imamg19_6_12=.;
    if imamg19_7_12=0 then imamg19_7_12=.;  run;
Title "Group1 core help - before imputation (mean without zero)";
proc means data=group1 mean std min max n ;
        variable imamg19_1_12 imamg19_2_12 imamg19_3_12 imamg19_4_12 imamg19_5_12
imamg19_6_12 imamg19_7_12; run;

*** print output-imputed: mean with zero;
Title "Group1 core help - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group1_core_help_imputed;
        var imamg19_1_12 imamg19_2_12 imamg19_3_12 imamg19_4_12 imamg19_5_12
imamg19_6_12 imamg19_7_12;
run;

*** print output-imputed: mean without zero;
data group2; set imp2.group1_core_help_imputed;
    if imamg19_1_12=0 then imamg19_1_12=.;
    if imamg19_2_12=0 then imamg19_2_12=.;
    if imamg19_3_12=0 then imamg19_3_12=.;
    if imamg19_4_12=0 then imamg19_4_12=.;
    if imamg19_5_12=0 then imamg19_5_12=.;
    if imamg19_6_12=0 then imamg19_6_12=.;
    if imamg19_7_12=0 then imamg19_7_12=.;  run;
Title "Group1 core help - imputed (mean without zero)";
```

```
                                Imput2012_Total Group1
proc means data=group2 mean std min max n ;
        var imamg19_1_12 imamg19_2_12 imamg19_3_12 imamg19_4_12 imamg19_5_12
imamg19_6_12 imamg19_7_12;
run;

************ core/pension ************************;
data out1;
        merge output2.group1_core_pension1 output2.group1_core_pension2
        output2.group1_core_pension3 output2.group1_core_pension4
        output2.group1_core_pension5 output2.group1_core_pension6 ;
by cunicah subhog_12; run;
data imp1;
        merge imp2.group1_core_pension1_imputed imp2.group1_core_pension2_imputed
        imp2.group1_core_pension3_imputed imp2.group1_core_pension4_imputed
        imp2.group1_core_pension5_imputed imp2.group1_core_pension6_imputed;
by cunicah subhog_12; run;

*** print putput: prior imputation;
Title "Group1 core pension - before imputation (mean with zero)";
proc means data=out1  mean std min max n nmiss;
        variable imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12
        imamk29_1_12 imamk29_2_12 imamk36_1_12 imamk36_2_12 imamk36_3_12
        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12 imamk61_2_12
imamk61_3_12 imamk61_4_12
        imamk80_1_12 imamk80_2_12 imamk80_3_12; run;

Title "Group1 core pension - before imputation (mean without zero)";
data out2; set out1;
  if imamk11_1_12  =0 then imamk11_1_12 =.;
  if imamk11_2_12  =0 then imamk11_2_12 =.;
  if imamk13_1_12  =0 then imamk13_1_12 =.;
  if imamk13_2_12  =0 then imamk13_2_12  =.;
  if imamk15_1_12  =0 then imamk15_1_12 =.;
  if imamk15_2_12  =0 then imamk15_2_12 =.;
  if imamk27_1_12  =0 then imamk27_1_12 =.;
  if imamk27_2_12  =0 then imamk27_2_12 =.;
  if imamk29_1_12  =0 then imamk29_1_12 =.;
  if imamk29_2_12  =0 then imamk29_2_12 =.;
  if imamk36_1_12  =0 then imamk36_1_12 =.;
  if imamk36_2_12  =0 then imamk36_2_12 =.;
  if imamk36_3_12  =0 then imamk36_3_12 =.;
  if imamk47_12  =0 then imamk47_12 =.;
  if imamk48_12  =0 then imamk48_12 =.;
  if imamk50_12  =0 then imamk50_12 =.;
  if imamk51_12  =0 then imamk51_12 =.;
  if imamk61_1_12  =0 then imamk61_1_12 =.;
  if imamk61_2_12  =0 then imamk61_2_12 =.;
  if imamk61_3_12  =0 then imamk61_3_12 =.;
```

```
  if imamk61_4_12  =0 then imamk61_4_12 =.;
        if imamk80_1_12 =0 then imamk80_1_12=.;
        if imamk80_2_12 =0 then imamk80_2_12=.;
        if imamk80_3_12 =0 then imamk80_3_12=.;
run;
proc means data=out2  mean std min max n nmiss;
        variable imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12
        imamk29_1_12 imamk29_2_12 imamk36_1_12 imamk36_2_12 imamk36_3_12
        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12 imamk61_2_12
imamk61_3_12 imamk61_4_12
        imamk80_1_12 imamk80_2_12 imamk80_3_12; run;

*** print putput: mean with zero;
Title "Group1 core pension - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp1;
        var imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12
        imamk29_1_12 imamk29_2_12 imamk36_1_12 imamk36_2_12 imamk36_3_12
        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12 imamk61_2_12
imamk61_3_12 imamk61_4_12
        imamk80_1_12 imamk80_2_12 imamk80_3_12; run;
run;

*** print output: mean without zero;
Title "Group1 core pension - imputed (mean without zero)";
data imp2; set imp1;
  if imamk11_1_12  =0 then imamk11_1_12 =.;
  if imamk11_2_12  =0 then imamk11_2_12 =.;
  if imamk13_1_12  =0 then imamk13_1_12 =.;
  if imamk13_2_12  =0 then imamk13_2_12  =.;
  if imamk15_1_12  =0 then imamk15_1_12 =.;
  if imamk15_2_12  =0 then imamk15_2_12 =.;
  if imamk27_1_12  =0 then imamk27_1_12 =.;
  if imamk27_2_12  =0 then imamk27_2_12 =.;
  if imamk29_1_12  =0 then imamk29_1_12 =.;
  if imamk29_2_12  =0 then imamk29_2_12 =.;
  if imamk36_1_12  =0 then imamk36_1_12 =.;
  if imamk36_2_12  =0 then imamk36_2_12 =.;
  if imamk36_3_12  =0 then imamk36_3_12 =.;
  if imamk47_12  =0 then imamk47_12 =.;
  if imamk48_12  =0 then imamk48_12 =.;
  if imamk50_12  =0 then imamk50_12 =.;
  if imamk51_12  =0 then imamk51_12 =.;
  if imamk61_1_12  =0 then imamk61_1_12 =.;
  if imamk61_2_12  =0 then imamk61_2_12 =.;
  if imamk61_3_12  =0 then imamk61_3_12 =.;
  if imamk61_4_12  =0 then imamk61_4_12 =.;
        if imamk80_1_12 =0 then imamk80_1_12=.;
```

```
        if imamk80_2_12 =0 then imamk80_2_12=.;
        if imamk80_3_12 =0 then imamk80_3_12=.; run;

proc means mean std min max n nmiss data=imp2;
        var imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12
        imamk29_1_12 imamk29_2_12 imamk36_1_12 imamk36_2_12 imamk36_3_12
        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12 imamk61_2_12
imamk61_3_12 imamk61_4_12
        imamk80_1_12 imamk80_2_12 imamk80_3_12; run;
run;


************ proxy/pension ************************;
data out1;
        merge output2.group1_proxy_pension1 output2.group1_proxy_pension2
        output2.group1_proxy_pension3 output2.group1_proxy_pension4
        output2.group1_proxy_pension5 output2.group1_proxy_pension6 ;
by cunicah subhog_12; run;
data imp1;
        merge imp2.group1_proxy_pension1_imputed imp2.group1_proxy_pension2_imputed
        imp2.group1_proxy_pension3_imputed imp2.group1_proxy_pension4_imputed
        imp2.group1_proxy_pension5_imputed imp2.group1_proxy_pension6_imputed;
by cunicah subhog_12; run;

*** print putput: prior imputation;
Title "Group1 proxy pension - before imputation (mean with zero)";
proc means data=out1  mean std min max n nmiss;
        variable imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12
        imamk29_1_12 imamk29_2_12 imamk36_1_12 imamk36_2_12 imamk36_3_12
        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12 imamk61_2_12
imamk61_3_12 imamk61_4_12
        imamk80_1_12 imamk80_2_12 imamk80_3_12; run;

Title "Group1 proxy pension - before imputation (mean without zero)";
data out2; set out1;
  if imamk11_1_12  =0 then imamk11_1_12 =.;
  if imamk11_2_12  =0 then imamk11_2_12 =.;
  if imamk13_1_12  =0 then imamk13_1_12 =.;
  if imamk13_2_12  =0 then imamk13_2_12  =.;
  if imamk15_1_12  =0 then imamk15_1_12 =.;
  if imamk15_2_12  =0 then imamk15_2_12 =.;
  if imamk27_1_12  =0 then imamk27_1_12 =.;
  if imamk27_2_12  =0 then imamk27_2_12 =.;
  if imamk29_1_12  =0 then imamk29_1_12 =.;
  if imamk29_2_12  =0 then imamk29_2_12 =.;
  if imamk36_1_12  =0 then imamk36_1_12 =.;
  if imamk36_2_12  =0 then imamk36_2_12 =.;
```

```
  if imamk36_3_12  =0 then imamk36_3_12 =.;
  if imamk47_12  =0 then imamk47_12 =.;
  if imamk48_12  =0 then imamk48_12 =.;
  if imamk50_12  =0 then imamk50_12 =.;
  if imamk51_12  =0 then imamk51_12 =.;
  if imamk61_1_12  =0 then imamk61_1_12 =.;
  if imamk61_2_12  =0 then imamk61_2_12 =.;
  if imamk61_3_12  =0 then imamk61_3_12 =.;
  if imamk61_4_12  =0 then imamk61_4_12 =.;
        if imamk80_1_12 =0 then imamk80_1_12=.;
        if imamk80_2_12 =0 then imamk80_2_12=.;
        if imamk80_3_12 =0 then imamk80_3_12=.;
run;
proc means data=out2  mean std min max n nmiss;
        variable imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12
        imamk29_1_12 imamk29_2_12 imamk36_1_12 imamk36_2_12 imamk36_3_12
        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12 imamk61_2_12
imamk61_3_12 imamk61_4_12
        imamk80_1_12 imamk80_2_12 imamk80_3_12; run;

*** print putput: mean with zero;
Title "Group1 proxy pension - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp1;
        var imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12
        imamk29_1_12 imamk29_2_12 imamk36_1_12 imamk36_2_12 imamk36_3_12
        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12 imamk61_2_12
imamk61_3_12 imamk61_4_12
        imamk80_1_12 imamk80_2_12 imamk80_3_12; run;
run;

*** print output: mean without zero;
Title "Group1 proxy pension - imputed (mean without zero)";
data imp2; set imp1;
  if imamk11_1_12  =0 then imamk11_1_12 =.;
  if imamk11_2_12  =0 then imamk11_2_12 =.;
  if imamk13_1_12  =0 then imamk13_1_12 =.;
  if imamk13_2_12  =0 then imamk13_2_12  =.;
  if imamk15_1_12  =0 then imamk15_1_12 =.;
  if imamk15_2_12  =0 then imamk15_2_12 =.;
  if imamk27_1_12  =0 then imamk27_1_12 =.;
  if imamk27_2_12  =0 then imamk27_2_12 =.;
  if imamk29_1_12  =0 then imamk29_1_12 =.;
  if imamk29_2_12  =0 then imamk29_2_12 =.;
  if imamk36_1_12  =0 then imamk36_1_12 =.;
  if imamk36_2_12  =0 then imamk36_2_12 =.;
  if imamk36_3_12  =0 then imamk36_3_12 =.;
  if imamk47_12  =0 then imamk47_12 =.;
```

```
  if imamk48_12  =0 then imamk48_12 =.;
  if imamk50_12  =0 then imamk50_12 =.;
  if imamk51_12  =0 then imamk51_12 =.;
  if imamk61_1_12  =0 then imamk61_1_12 =.;
  if imamk61_2_12  =0 then imamk61_2_12 =.;
  if imamk61_3_12  =0 then imamk61_3_12 =.;
  if imamk61_4_12  =0 then imamk61_4_12 =.;
        if imamk80_1_12 =0 then imamk80_1_12=.;
        if imamk80_2_12 =0 then imamk80_2_12=.;
        if imamk80_3_12 =0 then imamk80_3_12=.; run;

proc means mean std min max n nmiss data=imp2;
        var imamk11_1_12 imamk11_2_12 imamk13_1_12 imamk13_2_12 imamk15_1_12
imamk15_2_12 imamk27_1_12 imamk27_2_12
        imamk29_1_12 imamk29_2_12 imamk36_1_12 imamk36_2_12 imamk36_3_12
        imamk47_12 imamk48_12 imamk50_12 imamk51_12 imamk61_1_12 imamk61_2_12
imamk61_3_12 imamk61_4_12
        imamk80_1_12 imamk80_2_12 imamk80_3_12; run;
run;
```

GROUP 2. Spouse's Total Income Components

```
                                Imput2012_Total Group2
/*******************************************************/
/* PROGRAM NAME  : Imput2012_group2_core_pension.SAS    */
/* PROGRAMMED BY : DONG ZHANG                           */
/* LAST UPDATEED : 06/30/2015                           */
/* Impute missing value on core and proxy questionnaire */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter; run;

/*
proc contents data=input.sect_g_j_k_sa_2012; run;       *** not imputed N=10,427,
var=680;
*/

data aa; set input.sect_g_j_k_sa_2012;                                  *** core
and proxy questionnaire N=10,427;
        proc sort out=temp nodupkey; by cunicah subhog_12; run;  *** no duplicate;

***** Core questionnaire N=9,696;
data aa1; set aa;
        keep cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
         k53_12 k53a_12 k53b1_12 k53b2_12 k53b3_12
         k54_12 k54a_12 k54b1_12 k54b2_12 k54b3_12      k54a_monthly_12
         k56_12 k56a_12 k56b1_12 k56b2_12 k56b3_12
         k57_12 k57a_12 k57b1_12 k57b2_12 k57b3_12      k57a_monthly_12
         k64c_12 k67_1_12 k68a1_12 k68b1_12 k68c1_12
         k64d_12 k67_2_12 k68a2_12 k68b2_12 k68c2_12
         k64e_12 k67_3_12 k68a3_12 k68b3_12 k68c3_12
         k64f_12 k67_4_12 k68a4_12 k68b4_12 k68c4_12
         k82c_12 k83_1_12
         k82d_12 k83_2_12
         k82e_12 k83_3_12
         k52b_12;
if tipentg_12=1 and k52b_12 ne .; run;                          ***** 5,457;
proc freq; table k52b_12 k53_12 k54_12 k56_12 k57_12 ; run;

data aa2; set aa1;
        imamk53_12=k53a_12;             **** Amputation N=203;
        if k53_12 =2 and k53a_12=. then imamk53_12=0;
        if k53_12 in (8,9) and k53a_12=. then imamk53_12=.;
        if k53_12 =1 and k53a_12=. then imamk53_12=.;
        if k53_12 =. and k53a_12=. then imamk53_12=0;
                if k53a_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk53_12=.;
```

```
                if imamk53_12=. and k53b1_12=. then k53b1_12=9;
        imamk54_12=k54a_monthly_12;              **** Amputation N=207;
        if k54_12 =2 and k54a_monthly_12=. then imamk54_12=0;
        if k54_12 in (8,9) and k54a_monthly_12=. then imamk54_12=.;
        if k54_12 =1 and k54a_monthly_12=. then imamk54_12=.;
        if k54_12 =. and k54a_monthly_12=. then imamk54_12=0;
                if k54a_monthly_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk54_12=.;
                if imamk54_12=. and k54b1_12=. then k54b1_12=9;
        imamk56_12=k56a_12;              **** Amputation N=7;
        if k56_12 ne 1 and k56a_12=. then imamk56_12=0;   ***no 8,9;
                if k56_12 =1 and k56a_12=. then imamk56_12=.;
                if k56a_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk56_12=.;
                if imamk56_12=. and k56b1_12=. then k56b1_12=9;
        imamk57_12=k57a_monthly_12;              **** Amputation N=2;
        if k57_12 ne 1 and k57a_monthly_12=. then imamk57_12=0;  *** no 8,9;
                if k57_12 =1 and k57a_monthly_12=. then imamk57_12=.;
                if k57a_monthly_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk57_12=.;
                if imamk57_12=. and k57b1_12=. then k57b1_12=9;
        dumk53_12=1*(imamk53_12=.);
        dumk54_12=1*(imamk54_12=.);
        dumk56_12=1*(imamk56_12=.);
        dumk57_12=1*(imamk57_12=.);    run;
proc freq; table k52b_12 k53_12 k54_12;
proc freq; table  k56_12 imamk56_12; run;
proc freq; table  k57_12 imamk57_12; run;


***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname
(keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max imam&vname
dum&vname low&vname up&vname &mix1 &mix2); set aa2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
```

```
                              Imput2012_Total Group2
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
                if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
%mend range;

%range(k53_12,k53b1_12,k53b2_12,k53b3_12,200000,6000,12000,1500,k53_12);  run;
%range(k54_12,k54b1_12,k54b2_12,k54b3_12, 29167,6000,12000,1500,k54_12);  run;
%range(k56_12,k56b1_12,k56b2_12,k56b3_12, 20000,6000,12000,1500,k56_12);  run;
%range(k57_12,k57b1_12,k57b2_12,k57b3_12, 12000,6000,12000,1500,k57_12);  run;

************ 1 ***************;
data output2.group2_core_pension1;
        merge datak53_12(drop=k53_12)
                  datak54_12(drop=k54_12)
                  datak56_12(drop=k56_12)
                  datak57_12(drop=k57_12) ;
 by cunicah subhog_12; run;   ****5,457 var=22;

data dd1; set output2.group2_core_pension1;  run;   **** Core nonproxy N=5,457 ;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk53_12 imamk54_12 imamk56_12 imamk57_12 yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk53_12 upk53_12
  lowk54_12 upk54_12
```

```
  lowk56_12 upk56_12
  lowk57_12 upk57_12

        dumk53_12
        dumk54_12
        dumk56_12
        dumk57_12

;
 bounds
  imamk53_12 (>=lowk53_12 ,<=upk53_12)
  imamk54_12 (>=lowk54_12 ,<=upk54_12)
  imamk56_12 (>=lowk56_12 ,<=upk56_12)
  imamk57_12 (>=lowk57_12 ,<=upk57_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 /* ITERATIONS 2;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data imp2.group2_core_pension1_imputed; set dd_1;
        drop
  lowk53_12 upk53_12
  lowk54_12 upk54_12
  lowk56_12 upk56_12
  lowk57_12 upk57_12
 ; run;

/* data temp; set imp2.group2_core_pension1_imputed; run;
        proc freq; table imamk53_12; where dumk53_12=1; run;
        proc freq; table imamk54_12; where dumk54_12=1; run;
        proc freq; table imamk56_12; where dumk56_12=1; run;    ****n=7 not imputed
        proc freq; table imamk57_12; where dumk57_12=1; run; */ ****n=2 not
imputed/no degrees of freedom left for perturbations;

********** 2 ************************;
data aa2; set aa1;
        imamk67_1_12=k67_1_12;          **** Amputation N=180;
        if k64c_12 =2 and k67_1_12=. then imamk67_1_12=0;
        if k64c_12 in (8,9) and k67_1_12=. then imamk67_1_12=.;
        if k64c_12 =1 and k67_1_12=. then imamk67_1_12=.;
```

```
        if k64c_12 =. and k67_1_12=. then imamk67_1_12=0;
                if k67_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk67_1_12=.;
                if imamk67_1_12=. and k68a1_12=. then k68a1_12=9;

        imamk67_2_12=k67_2_12;          **** Amputation N=38;
        if k64d_12 =2 and k67_2_12=. then imamk67_2_12=0;
        if k64d_12 in (8,9) and k67_2_12=. then imamk67_2_12=.;
        if k64d_12 =1 and k67_2_12=. then imamk67_2_12=.;
        if k64d_12 =. and k67_2_12=. then imamk67_2_12=0;
                if k67_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk67_2_12=.;
                if imamk67_2_12=. and k68a2_12=. then k68a2_12=9;

        imamk67_3_12=k67_3_12;          **** Amputation N=41;
        if k64e_12 =2 and k67_3_12=. then imamk67_3_12=0;
        if k64e_12 in (8,9) and k67_3_12=. then imamk67_3_12=.;
        if k64e_12 =1 and k67_3_12=. then imamk67_3_12=.;
        if k64e_12 =. and k67_3_12=. then imamk67_3_12=0;
                if k67_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk67_3_12=.;
                if imamk67_3_12=. and k68a3_12=. then k68a3_12=9;

        imamk67_4_12=k67_4_12;          **** Amputation N=42;
        if k64f_12 =2 and k67_4_12=. then imamk67_4_12=0;
        if k64f_12 in (8,9) and k67_4_12=. then imamk67_4_12=.;
        if k64f_12 = 1 and k67_4_12=. then imamk67_4_12=.;
        if k64f_12 =. and k67_4_12=. then imamk67_4_12=0;
                if k67_4_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk67_4_12=.;
                if imamk67_4_12=. and k68a4_12=. then k68a4_12=9;
        dumk67_1_12=1*(imamk67_1_12=.);
        dumk67_2_12=1*(imamk67_2_12=.);
        dumk67_3_12=1*(imamk67_3_12=.);
        dumk67_4_12=1*(imamk67_4_12=.);  run;

%range(k67_1_12,k68a1_12,k68b1_12,k68c1_12,38000,1500,6000,750,k64c_12);  run;
%range(k67_2_12,k68a2_12,k68b2_12,k68c2_12,12000,1500,6000,750,k64d_12);  run;
%range(k67_3_12,k68a3_12,k68b3_12,k68c3_12,18000,1500,6000,750,k64e_12);  run;
%range(k67_4_12,k68a4_12,k68b4_12,k68c4_12,38000,1500,6000,750,k64f_12);  run;

data output2.group2_core_pension2;
        merge datak67_1_12(drop=k64c_12)
                  datak67_2_12(drop=k64d_12)
                  datak67_3_12(drop=k64e_12)
```

```
                              Imput2012_Total Group2
                    datak67_4_12(drop=k64f_12) ;
                    by cunicah subhog_12; run;   ****5,457 var=39;

data dd1; set output2.group2_core_pension2;    **** Core nonproxy N=5,457 var=22;
keep cunicah subhog_12 tipentg_12  sex_12_max age_12_max  yrschool
        imamk67_1_12  lowk67_1_12 upk67_1_12    dumk67_1_12
        imamk67_3_12  lowk67_3_12 upk67_3_12    dumk67_3_12
; run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk67_1_12 imamk67_3_12 yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk67_1_12 upk67_1_12
  lowk67_3_12 upk67_3_12
        dumk67_1_12
        dumk67_3_12
;
 bounds
  imamk67_1_12 (>=lowk67_1_12 ,<=upk67_1_12)
  imamk67_3_12 (>=lowk67_3_12 ,<=upk67_3_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 /* ITERATIONS 2;  */
 multiples 1 ;
SEED 2012;
```

```
run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);


data dd1; set output2.group2_core_pension2;     **** Core nonproxy N=5,457 var=22;
keep cunicah subhog_12 tipentg_12  sex_12_max age_12_max  yrschool
        imamk67_2_12  lowk67_2_12 upk67_2_12    dumk67_2_12; run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;

mixed  imamk67_2_12 yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk67_2_12 upk67_2_12
        dumk67_2_12
;
 bounds
   imamk67_2_12 (>=lowk67_2_12 ,<=upk67_2_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 /* ITERATIONS 2;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
```

```
                                Imput2012_Total Group2
%impute(name=impute, dir=d:/piname/wong/year2012/);


data dd1; set output2.group2_core_pension2;     **** Core nonproxy N=5,457 var=22;
keep cunicah subhog_12 tipentg_12  sex_12_max age_12_max  yrschool
        imamk67_4_12  lowk67_4_12 upk67_4_12    dumk67_4_12; run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_4;

categorical sex_12_max ;

count age_12_max;

mixed  imamk67_4_12 yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk67_4_12 upk67_4_12
        dumk67_4_12
;
 bounds
   imamk67_4_12 (>=lowk67_4_12 ,<=upk67_4_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 /* ITERATIONS 2;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data imp2.group2_core_pension2_imputed; merge dd_1 dd_2 dd_4; by  cunicah
```

```
subhog_12;
        drop
  lowk67_1_12 upk67_1_12
  lowk67_2_12 upk67_2_12
  lowk67_3_12 upk67_3_12
  lowk67_4_12 upk67_4_12 ; run;

/* data temp; set  imp2.group2_core_pension2_imputed;
  proc freq; table imamk67_1_12; where dumk67_1_12=1; run;  **** imputed;
        proc freq; table imamk67_2_12; where dumk67_2_12=1; run;  **** not
imputed/no degrees of freedom left for perturbations;
        proc freq; table imamk67_3_12; where dumk67_3_12=1; run;  **** imputed;
        proc freq; table imamk67_4_12; where dumk67_4_12=1; run;  **** imputed; */


************** 3 *****************;
data aa2; set aa1;
        imamk83_1_12=k83_1_12;          **** Amputation N=69; **** nobrackets;
        if k82c_12 =2 and k83_1_12=. then imamk83_1_12=0;
        if k82c_12 in (8,9) and k83_1_12=. then imamk83_1_12=.;
        if k82c_12 =1 and k83_1_12=. then imamk83_1_12=.;
        if k82c_12 =. and k83_1_12=. then imamk83_1_12=0;
                if k83_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk83_1_12=.;

        imamk83_2_12=k83_2_12;          **** Amputation N=38;**** nobrackets;
        if k82d_12 =2 and k83_2_12=. then imamk83_2_12=0;
        if k82d_12 in (8,9) and k83_2_12=. then imamk83_2_12=.;
        if k82d_12 = 1 and k83_2_12=. then imamk83_2_12=.;
        if k82d_12 = . and k83_2_12=. then imamk83_2_12=0;
                if k83_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk83_2_12=.;

        imamk83_3_12=k83_3_12;          **** Amputation N=39;**** nobrackets;
        if k82e_12 =2 and k83_3_12=. then imamk83_3_12=0;
        if k82e_12 in (8,9) and k83_3_12=. then imamk83_3_12=.;
        if k82e_12 = 1 and k83_3_12=. then imamk83_3_12=.;
        if k82e_12 = . and k83_3_12=. then imamk83_3_12=0;
                if k83_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk83_3_12=.;
        dumk83_1_12=1*(imamk83_1_12=.);
        dumk83_2_12=1*(imamk83_2_12=.);
        dumk83_3_12=1*(imamk83_3_12=.);
run;
data datak83; set aa2
(keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max imamk83_1_12
```

```
imamk83_2_12 imamk83_3_12
        k82c_12 k82d_12 k82e_12 dumk83_1_12 dumk83_2_12 dumk83_3_12);
         lowk83_1_12=1; upk83_1_12=12000;
         if k82c_12 in (8,9) then lowk83_1_12=0;
         lowk83_2_12=1; upk83_2_12=1000;
         if k82d_12 in (8,9) then lowk83_2_12=0;
         lowk83_3_12=1; upk83_3_12=500000;
         if k82e_12 in (8,9) then lowk83_3_12=0;
                if imamk83_1_12 >=0 then do; lowk83_1_12=imamk83_1_12; end;
                if imamk83_1_12 >=0 then do;  upk83_1_12=imamk83_1_12; end;
                if imamk83_2_12 >=0 then do; lowk83_2_12=imamk83_2_12; end;
                if imamk83_2_12 >=0 then do;  upk83_2_12=imamk83_2_12; end;
                if imamk83_3_12 >=0 then do; lowk83_3_12=imamk83_3_12; end;
                if imamk83_3_12 >=0 then do;  upk83_3_12=imamk83_3_12; end;
run;
data output2.group2_core_pension3;
        set  datak83(drop=k82c_12 k82d_12 k82e_12); by cunicah subhog_12; run;
****5,457 var=18;

data dd1; set output2.group2_core_pension3;     **** Core nonproxy N=5,457 var=39;
   keep cunicah subhog_12 tipentg_12  sex_12_max age_12_max  yrschool
        imamk83_1_12  lowk83_1_12 upk83_1_12 dumk83_1_12; run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk83_1_12  yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk83_1_12 upk83_1_12
        dumk83_1_12
;
```

```
                                Imput2012_Total Group2
 bounds
  imamk83_1_12 (>=lowk83_1_12 ,<=upk83_1_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 /* ITERATIONS 2;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data dd1; set output2.group2_core_pension3;     **** Core nonproxy N=5,457 var=39;
   keep cunicah subhog_12 tipentg_12  sex_12_max age_12_max  yrschool
        imamk83_2_12  lowk83_2_12 upk83_2_12 dumk83_2_12; run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;

mixed  imamk83_2_12  yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk83_2_12 upk83_2_12
        dumk83_2_12
;
 bounds
  imamk83_2_12 (>=lowk83_2_12 ,<=upk83_2_12)
        yrschool(<=22, >=0);
```

```
                                Imput2012_Total Group2
INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 /* ITERATIONS 2;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data dd1; set output2.group2_core_pension3;     **** Core nonproxy N=5,457 var=10;
   keep cunicah subhog_12 tipentg_12  sex_12_max age_12_max  yrschool
        imamk83_3_12  lowk83_3_12 upk83_3_12 dumk83_3_12; run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_3;

categorical sex_12_max ;

count age_12_max;

mixed  imamk83_3_12  yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk83_3_12 upk83_3_12
        dumk83_3_12
;
 bounds
  imamk83_3_12 (>=lowk83_3_12 ,<=upk83_3_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 /* ITERATIONS 2;  */
```

Imput2012_Total Group2

```
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data imp2.group2_core_pension3_imputed; merge dd_1 dd_2 dd_3; by cunicah subhog_12;
        drop
  lowk83_1_12 upk83_1_12
  lowk83_2_12 upk83_2_12
  lowk83_3_12 upk83_3_12 ; run;

/* data temp; set imp2.group2_core_pension3_imputed; run;
        proc freq; table imamk83_1_12; where dumk83_1_12=1; run;  **** imputed;
        proc freq; table imamk83_2_12; where dumk83_2_12=1; run;  *** imputed;
    proc freq; table imamk83_3_12; where dumk83_3_12=1; run; **** not imputed; */




*** print putput: prior imputation;
Title "group2 core pension - before imputation (mean with zero)";
proc means data=output2.group2_core_pension  mean std min max n nmiss;
        variable imamk53_12 imamk54_12 imamk56_12 imamk57_12 imamk67_1_12
imamk67_2_12 imamk67_3_12 imamk67_4_12 imamk83_1_12 imamk83_2_12 imamk83_3_12; run;


*** print putput: mean with zero;
Title "group2 core pension - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group2_core_pension_imputed;
        var imamk53_12 imamk54_12 imamk56_12 imamk57_12 imamk67_1_12 imamk67_2_12
imamk67_3_12 imamk67_4_12 imamk83_1_12 imamk83_2_12 imamk83_3_12;
run;

*** print output: mean without zero;
data group2; set imp2.group2_core_pension_imputed;
if imamk53_12  =0 then imamk53_12 =.;
if imamk54_12  =0 then imamk54_12 =.;
if imamk56_12  =0 then imamk56_12 =.;
if imamk57_12  =0 then imamk57_12 =.;

if imamk67_1_12  =0 then imamk67_1_12 =.;
if imamk67_2_12  =0 then imamk67_2_12 =.;
```

```
                                Imput2012_Total Group2
if imamk67_3_12  =0 then imamk67_3_12 =.;
if imamk67_4_12  =0 then imamk67_4_12 =.;

if imamk83_1_12  =0 then imamk83_1_12 =.;
if imamk83_2_12  =0 then imamk83_2_12 =.;
if imamk83_3_12  =0 then imamk83_3_12 =.;
run;

Title "group2 core pension - imputed (mean without zero)";
proc means data=group2 mean std min max n ;
        var imamk53_12 imamk54_12 imamk56_12 imamk57_12 imamk67_1_12 imamk67_2_12
imamk67_3_12 imamk67_4_12 imamk83_1_12 imamk83_2_12 imamk83_3_12;
run;









***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname
(keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max imam&vname
dum&vname low&vname up&vname &mix1 &mix2); set aa2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
                if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
%mend range;

%range(k53_12,k53b1_12,k53b2_12,k53b3_12,200000,6000,12000,1500,k53_12);  run;
```

```
                                Imput2012_Total Group2
%range(k54_12,k54b1_12,k54b2_12,k54b3_12, 29167,6000,12000,1500,k54_12);  run;
%range(k56_12,k56b1_12,k56b2_12,k56b3_12, 20000,6000,12000,1500,k56_12);  run;
%range(k57_12,k57b1_12,k57b2_12,k57b3_12,  5833,6000,12000,1500,k57_12);  run;

%range(k67_1_12,k68a1_12,k68b1_12,k68c1_12,38000,1500,6000,750,k64c_12);  run;
%range(k67_2_12,k68a2_12,k68b2_12,k68c2_12,12000,1500,6000,750,k64d_12);  run;
%range(k67_3_12,k68a3_12,k68b3_12,k68c3_12,18000,1500,6000,750,k64e_12);  run;
%range(k67_4_12,k68a4_12,k68b4_12,k68c4_12,38000,1500,6000,750,k64f_12);  run;



/*******************************************************/
/* PROGRAM NAME  : Imput2012_group2_proxy_pension.SAS   */
/* PROGRAMMED BY : DONG ZHANG                           */
/* LAST UPDATEED : 07/01/2015                           */
/* Impute missing value on proxy and proxy questionnaire        */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter; run;

/*
proc contents data=input.sect_g_j_k_sa_2012; run;       *** not imputed N=10,427,
var=680;
*/

data aa; set input.sect_g_j_k_sa_2012;                                  *** proxy
and proxy questionnaire N=10,427;
        proc sort out=temp nodupkey; by cunicah subhog_12; run;  *** no duplicate;

***** Proxy questionnaire N=731;
data aa1; set aa;
        keep cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
         k53_12 k53a_12 k53b1_12 k53b2_12 k53b3_12
         k54_12 k54a_12 k54b1_12 k54b2_12 k54b3_12      k54a_monthly_12
         k56_12 k56a_12 k56b1_12 k56b2_12 k56b3_12
         k57_12 k57a_12 k57b1_12 k57b2_12 k57b3_12      k57a_monthly_12
         k64c_12 k67_1_12 k68a1_12 k68b1_12 k68c1_12
         k64d_12 k67_2_12 k68a2_12 k68b2_12 k68c2_12
         k64e_12 k67_3_12 k68a3_12 k68b3_12 k68c3_12
         k64f_12 k67_4_12 k68a4_12 k68b4_12 k68c4_12
         k82c_12 k83_1_12
         k82d_12 k83_2_12
         k82e_12 k83_3_12
         k52b_12;
if tipentg_12=2 and k52b_12 ne .; run;   *** N=195 not impute no spouse person;
```

```
                                Imput2012_Total Group2
        /* proc freq; table k52b_12 k53_12 k54_12 k56_12 k57_12 ; run; */

data aa2; set aa1;
        imamk53_12=k53a_12;                                          **** Amputation
N=6;
        if k53_12 =2 and k53a_12=. then imamk53_12=0;
        if k53_12 in (8,9) and k53a_12=. then imamk53_12=.;
        if k53_12 =1 and k53a_12=. then imamk53_12=.;
        if k53_12 =. and k53a_12=. then imamk53_12=0;
                if k53a_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk53_12=.;
                if imamk53_12=. and k53b1_12=. then k53b1_12=9;
        imamk54_12=k54a_monthly_12;                                  **** Amputation
N=4;
        if k54_12 =2 and k54a_monthly_12=. then imamk54_12=0;
        if k54_12 in (8,9) and k54a_monthly_12=. then imamk54_12=.;
        if k54_12 =1 and k54a_monthly_12=. then imamk54_12=.;
        if k54_12 =. and k54a_monthly_12=. then imamk54_12=0;
                if k54a_monthly_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk54_12=.;
                if imamk54_12=. and k54b1_12=. then k54b1_12=9;
        imamk56_12=k56a_12;                                          **** Amputation
N=0;
        if k56_12 ne 1 and k56a_12=. then imamk56_12=0;   ***no 8,9;
                if k56_12 =1 and k56a_12=. then imamk56_12=.;
                if k56a_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk56_12=.;
                if imamk56_12=. and k56b1_12=. then k56b1_12=9;
        imamk57_12=k57a_monthly_12;                                  **** Amputation
N=0;
        if k57_12 ne 1 and k57a_monthly_12=. then imamk57_12=0;  *** no 8,9;
                if k57_12 =1 and k57a_monthly_12=. then imamk57_12=.;
                if k57a_monthly_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk57_12=.;
                if imamk57_12=. and k57b1_12=. then k57b1_12=9;
        dumk53_12=1*(imamk53_12=.);
        dumk54_12=1*(imamk54_12=.);
        dumk56_12=1*(imamk56_12=.);
        dumk57_12=1*(imamk57_12=.);    run;
        proc freq; table dumk53_12 dumk54_12 dumk56_12 dumk57_12; run;
        proc print; var k53_12  imamk53_12; where k53_12 ne .; run;
                proc print; var k56_12  imamk56_12; where k56_12 ne .; run;


***** define range of imputation;
```

Imput2012_Total Group2

```
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname
(keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max imam&vname
dum&vname low&vname up&vname &mix1 &mix2); set aa2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
                if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
%mend range;

%range(k53_12,k53b1_12,k53b2_12,k53b3_12,200000,6000,12000,1500,k53_12);  run;
%range(k54_12,k54b1_12,k54b2_12,k54b3_12, 29167,6000,12000,1500,k54_12);  run;
%range(k56_12,k56b1_12,k56b2_12,k56b3_12, 20000,6000,12000,1500,k56_12);  run;
%range(k57_12,k57b1_12,k57b2_12,k57b3_12, 12000,6000,12000,1500,k57_12);  run;

************ 1 ***************;
data output2.group2_proxy_pension1;
        merge datak53_12(drop=k53_12)
                  datak54_12(drop=k54_12)
                  datak56_12(drop=k56_12)
                  datak57_12(drop=k57_12) ;
 by cunicah subhog_12; run;

data dd1; set output2.group2_proxy_pension1;  run;  **** proxy n=195 var=11;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
```

```
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk53_12 imamk54_12 imamk56_12 imamk57_12 yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk53_12 upk53_12
  lowk54_12 upk54_12
  lowk56_12 upk56_12
  lowk57_12 upk57_12
        dumk53_12
        dumk54_12
        dumk56_12
        dumk57_12
;
 bounds
  imamk53_12 (>=lowk53_12 ,<=upk53_12)
  imamk54_12 (>=lowk54_12 ,<=upk54_12)
  imamk56_12 (>=lowk56_12 ,<=upk56_12)
  imamk57_12 (>=lowk57_12 ,<=upk57_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 /* ITERATIONS 2;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data imp2.group2_proxy_pension1_imputed; set dd_1;
        drop
  lowk53_12 upk53_12
  lowk54_12 upk54_12
  lowk56_12 upk56_12
  lowk57_12 upk57_12
 ; run;

/* data temp; set imp2.group2_proxy_pension1_imputed; run;
```

```
        proc freq; table imamk53_12; where dumk53_12=1; run;
        proc freq; table imamk54_12; where dumk54_12=1; run;
        proc freq; table imamk56_12; where dumk56_12=1; run;    **** n= zero
        proc freq; table imamk57_12; where dumk57_12=1; run;    **** n= zero;  */

********** 2 ************************;
data aa2; set aa1;
        imamk67_1_12=k67_1_12;          **** Amputation N=3;
        if k64c_12 =2 and k67_1_12=. then imamk67_1_12=0;
        if k64c_12 in (8,9) and k67_1_12=. then imamk67_1_12=.;
        if k64c_12 =1 and k67_1_12=. then imamk67_1_12=.;
        if k64c_12 =. and k67_1_12=. then imamk67_1_12=0;
                if k67_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk67_1_12=.;
                if imamk67_1_12=. and k68a1_12=. then k68a1_12=9;

        imamk67_2_12=k67_2_12;          **** Amputation N=0;
        if k64d_12 =2 and k67_2_12=. then imamk67_2_12=0;
        if k64d_12 in (8,9) and k67_2_12=. then imamk67_2_12=.;
        if k64d_12 =1 and k67_2_12=. then imamk67_2_12=.;
        if k64d_12 =. and k67_2_12=. then imamk67_2_12=0;
                if k67_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk67_2_12=.;
                if imamk67_2_12=. and k68a2_12=. then k68a2_12=9;

        imamk67_3_12=k67_3_12;          **** Amputation N=3;
        if k64e_12 =2 and k67_3_12=. then imamk67_3_12=0;
        if k64e_12 in (8,9) and k67_3_12=. then imamk67_3_12=.;
        if k64e_12 =1 and k67_3_12=. then imamk67_3_12=.;
        if k64e_12 =. and k67_3_12=. then imamk67_3_12=0;
                if k67_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk67_3_12=.;
                if imamk67_3_12=. and k68a3_12=. then k68a3_12=9;

        imamk67_4_12=k67_4_12;          **** Amputation N=1;
        if k64f_12 =2 and k67_4_12=. then imamk67_4_12=0;
        if k64f_12 in (8,9) and k67_4_12=. then imamk67_4_12=.;
        if k64f_12 = 1 and k67_4_12=. then imamk67_4_12=.;
        if k64f_12 =. and k67_4_12=. then imamk67_4_12=0;
                if k67_4_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk67_4_12=.;
                if imamk67_4_12=. and k68a4_12=. then k68a4_12=9;
        dumk67_1_12=1*(imamk67_1_12=.);
        dumk67_2_12=1*(imamk67_2_12=.);
        dumk67_3_12=1*(imamk67_3_12=.);
```

```
        dumk67_4_12=1*(imamk67_4_12=.);  run;
        /* proc freq; table imamk67_1_12 imamk67_2_12 imamk67_3_12 imamk67_4_12;
run;   */

%range(k67_1_12,k68a1_12,k68b1_12,k68c1_12,38000,1500,6000,750,k64c_12);  run;
%range(k67_2_12,k68a2_12,k68b2_12,k68c2_12,12000,1500,6000,750,k64d_12);  run;
%range(k67_3_12,k68a3_12,k68b3_12,k68c3_12,18000,1500,6000,750,k64e_12);  run;
%range(k67_4_12,k68a4_12,k68b4_12,k68c4_12,38000,1500,6000,750,k64f_12);  run;

data output2.group2_proxy_pension2;
        merge datak67_1_12(drop=k64c_12)
                  datak67_2_12(drop=k64d_12)
                  datak67_3_12(drop=k64e_12)
                  datak67_4_12(drop=k64f_12) ;
                  by cunicah subhog_12; run;   ****195 var=39;

data dd1; set output2.group2_proxy_pension2;  run;   **** proxy N=195 var=22;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk67_1_12 imamk67_2_12 imamk67_3_12 imamk67_4_12 yrschool;

transfer cunicah subhog_12 tipentg_12

  lowk67_1_12 upk67_1_12
  lowk67_2_12 upk67_2_12
  lowk67_3_12 upk67_3_12
  lowk67_4_12 upk67_4_12

        dumk67_1_12
        dumk67_2_12
```

```
        dumk67_3_12
        dumk67_4_12

;
 bounds

  imamk67_1_12 (>=lowk67_1_12 ,<=upk67_1_12)
  imamk67_2_12 (>=lowk67_2_12 ,<=upk67_2_12)
  imamk67_3_12 (>=lowk67_3_12 ,<=upk67_3_12)
  imamk67_4_12 (>=lowk67_4_12 ,<=upk67_4_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 /* ITERATIONS 2;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data imp2.group2_proxy_pension2_imputed; set dd_1;
        drop
  lowk67_1_12 upk67_1_12
  lowk67_2_12 upk67_2_12
  lowk67_3_12 upk67_3_12
  lowk67_4_12 upk67_4_12   ; run;

/*  data temp; set imp2.group2_proxy_pension2_imputed; run;
        proc freq; table imamk67_1_12; where dumk67_1_12=1; run;
        proc freq; table imamk67_2_12; where dumk67_2_12=1; run;  **** N= zero;
        proc freq; table imamk67_3_12; where dumk67_3_12=1; run;  **** not imputed
n=3;
        proc freq; table imamk67_4_12; where dumk67_4_12=1; run;        */

************** 3 *****************;
data aa2; set aa1;
        imamk83_1_12=k83_1_12;          **** Amputation N=2; **** nobrackets;
        if k82c_12 =2 and k83_1_12=. then imamk83_1_12=0;
        if k82c_12 in (8,9) and k83_1_12=. then imamk83_1_12=.;
        if k82c_12 =1 and k83_1_12=. then imamk83_1_12=.;
        if k82c_12 =. and k83_1_12=. then imamk83_1_12=0;
                if k83_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk83_1_12=.;
```

```
                              Imput2012_Total Group2
        imamk83_2_12=k83_2_12;          **** Amputation N=0;**** nobrackets;
        if k82d_12 =2 and k83_2_12=. then imamk83_2_12=0;
        if k82d_12 in (8,9) and k83_2_12=. then imamk83_2_12=.;
        if k82d_12 = 1 and k83_2_12=. then imamk83_2_12=.;
        if k82d_12 = . and k83_2_12=. then imamk83_2_12=0;
                if k83_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk83_2_12=.;

        imamk83_3_12=k83_3_12;          **** Amputation N=0;**** nobrackets;
        if k82e_12 =2 and k83_3_12=. then imamk83_3_12=0;
        if k82e_12 in (8,9) and k83_3_12=. then imamk83_3_12=.;
        if k82e_12 = 1 and k83_3_12=. then imamk83_3_12=.;
        if k82e_12 = . and k83_3_12=. then imamk83_3_12=0;
                if k83_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk83_3_12=.;
        dumk83_1_12=1*(imamk83_1_12=.);
        dumk83_2_12=1*(imamk83_2_12=.);
        dumk83_3_12=1*(imamk83_3_12=.);run;
/* proc freq; table k82c_12 k82d_12 k82e_12; run;
        proc freq; table imamk83_1_12 imamk83_2_12 imamk83_3_12; run;  */

data datak83; set aa2
(keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max imamk83_1_12
imamk83_2_12 imamk83_3_12
        k82c_12 k82d_12 k82e_12 dumk83_1_12 dumk83_2_12 dumk83_3_12);
         lowk83_1_12=1; upk83_1_12=12000;
         if k82c_12 in (8,9) then lowk83_1_12=0;
         lowk83_2_12=1; upk83_2_12=1000;
         if k82d_12 in (8,9) then lowk83_2_12=0;
         lowk83_3_12=1; upk83_3_12=500000;
         if k82e_12 in (8,9) then lowk83_3_12=0;
                if imamk83_1_12 >=0 then do; lowk83_1_12=imamk83_1_12; end;
                if imamk83_1_12 >=0 then do;  upk83_1_12=imamk83_1_12; end;
                if imamk83_2_12 >=0 then do; lowk83_2_12=imamk83_2_12; end;
                if imamk83_2_12 >=0 then do;  upk83_2_12=imamk83_2_12; end;
                if imamk83_3_12 >=0 then do; lowk83_3_12=imamk83_3_12; end;
                if imamk83_3_12 >=0 then do;  upk83_3_12=imamk83_3_12; end;
run;
data output2.group2_proxy_pension3;
        set  datak83(drop=k82c_12 k82d_12 k82e_12); by cunicah subhog_12; run;
****5,457 var=18;

data dd1; set output2.group2_proxy_pension3;  run;   **** proxy N=195 var=18;


***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
```

```
                              Imput2012_Total Group2
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk83_1_12 imamk83_2_12 imamk83_3_12 yrschool;

transfer cunicah subhog_12 tipentg_12

  lowk83_1_12 upk83_1_12
  lowk83_2_12 upk83_2_12
  lowk83_3_12 upk83_3_12

        dumk83_1_12
        dumk83_2_12
        dumk83_3_12
;
 bounds

  imamk83_1_12 (>=lowk83_1_12 ,<=upk83_1_12)
  imamk83_2_12 (>=lowk83_2_12 ,<=upk83_2_12)
  imamk83_3_12 (>=lowk83_3_12 ,<=upk83_3_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

 /* ITERATIONS 2;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);
```

```
                              Imput2012_Total Group2
data imp2.group2_proxy_pension3_imputed; set dd_1;
        drop
  lowk83_1_12 upk83_1_12
  lowk83_2_12 upk83_2_12
  lowk83_3_12 upk83_3_12 ; run;

/*  data temp; set imp2.group2_proxy_pension3_imputed; run;
        proc freq; table imamk83_1_12; where dumk83_1_12=1; run;
        proc freq; table imamk83_2_12; where dumk83_2_12=1; run;  *** n= zero;
    proc freq; table imamk83_3_12; where dumk83_3_12=1; run; **** imputed n=1 to
zero; */









data aa2; set aa1;
        imamk53=k53a_12;                **** Amputation N=185;
        if k53_12 ne 1 and k53a_12=. then imamk53=0;
                if k53a_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk53=.;
                if imamk53=. and k53b1_12=. then k53b1_12=9;
run;

proc freq; table k52b_12 k53_12; run;









        imamk54=k54a_monthly_12;                **** Amputation N=163;
        if k54_12 ne 1 and k54a_monthly_12=. then imamk54=0;
                if k54a_monthly_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk54=.;
                if imamk54=. and k54b1_12=. then k54b1_12=9;
        imamk56=k56a_12;                **** Amputation N=7;
        if k56_12 ne 1 and k56a_12=. then imamk56=0;
                if k56a_12 in
```

```
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk56=.;
                if imamk56=. and k56b1_12=. then k56b1_12=9;
        imamk57=k57a_monthly_12;                **** Amputation N=2;
        if k57_12 ne 1 and k57a_monthly_12=. then imamk57=0;
                if k57a_monthly_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk57=.;
                if imamk57=. and k57b1_12=. then k57b1_12=9;
        imamk671=k67_1_12;              **** Amputation N=144;
        if k64c_12 ne 1 and k67_1_12=. then imamk671=0;
                if k67_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk671=.;
                if imamk671=. and k68a1_12=. then k68a1_12=9;
        imamk672=k67_2_12;              **** Amputation N=2;
        if k64d_12 ne 1 and k67_2_12=. then imamk672=0;
                if k67_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk672=.;
                if imamk672=. and k68a2_12=. then k68a2_12=9;
        imamk673=k67_3_12;              **** Amputation N=4;
        if k64e_12 ne 1 and k67_3_12=. then imamk673=0;
                if k67_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk673=.;
                if imamk673=. and k68a3_12=. then k68a3_12=9;
        imamk674=k67_4_12;              **** Amputation N=5;
        if k64f_12 ne 1 and k67_4_12=. then imamk674=0;
                if k67_4_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk674=.;
                if imamk674=. and k68a4_12=. then k68a4_12=9;
        imamk831=k83_1_12;              **** Amputation N=30;
        if k82c_12 ne 1 and k83_1_12=. then imamk831=0;
                if k83_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk831=.;
                if imamk831=.  then imamk831_12=9;  **** nobrackets;
        imamk832=k83_2_12;              **** Amputation N=1;
        if k82d_12 ne 1 and k83_2_12=. then imamk832=0;
                if k83_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk832=.;
                if imamk832=.  then imamk832_12=9;  **** nobrackets;
        imamk833=k83_3_12;              **** Amputation N=2;
        if k82e_12 ne 1 and k83_3_12=. then imamk833=0;
                if k83_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
```

```
imamk833=.;
                if imamk833=.  then imamk833_12=9;  **** nobrackets;
run;

        proc freq; table   imamk53 k53b1_12; run;
        proc freq; table   imamk54 k54b1_12; run;
        proc freq; table   imamk56 k56b1_12; run;
        proc freq; table   imamk57 k57b1_12; run;
        proc freq; table   imamk671 k68a1_12 ; run;
        proc freq; table   imamk672 k68a2_12 ; run;
    proc freq; table   imamk673 k68a3_12 ; run;
        proc freq; table   imamk674 k68a4_12; run;
        proc freq; table k82c_12 imamk831 imamk831_12; run;
        proc freq; table k82d_12 imamk832 imamk832_12; run;
        proc freq; table k82e_12 imamk833 imamk833_12; run;

***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1);
data data&vname(keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
am&vname low&vname up&vname ); set aa2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
%mend range;

%range(k53,k53b1_12,k53b2_12,k53b3_12,200000,6000,12000,1500);  run;
%range(k54,k54b1_12,k54b2_12,k54b3_12, 83333,6000,12000,1500);  run;
%range(k56,k56b1_12,k56b2_12,k56b3_12, 20000,6000,12000,1500);  run;
%range(k57,k57b1_12,k57b2_12,k57b3_12, 83333,6000,12000,1500);  run;

%range(k671,k68a1_12,k68b1_12,k68c1_12,38000,1500,6000,750);  run;
%range(k672,k68a2_12,k68b2_12,k68c2_12,12000,1500,6000,750);  run;
%range(k673,k68a3_12,k68b3_12,k68c3_12,18000,1500,6000,750);  run;
%range(k674,k68a4_12,k68b4_12,k68c4_12,38000,1500,6000,750);  run;

%range(k831,imamk831_12,imamk831_12,imamk831_12,12000,1500,6000,750);  run;   ****
nobrackets range 1-Max;
%range(k832,imamk832_12,imamk832_12,imamk832_12,1000,1500,6000,750);  run;   ****
```

```
                                Imput2012_Total Group2
nobrackets range 1-Max;
%range(k833,imamk833_12,imamk833_12,imamk833_12,500000,1500,6000,750);  run;   ****
nobrackets range 1-Max;

data output.group2_proxy_pension; merge datak53 datak54 datak56 datak57
                                  datak671 datak672 datak673 datak674 datak831
datak832 datak833; by cunicah subhog_12; run;


proc means n mean std min max nmiss; variable imamk53 lowk53 upk53; where imamk53
ne 0; run;
proc means n mean std min max nmiss; variable imamk54 lowk54 upk54; where imamk54
ne 0; run;
proc means n mean std min max nmiss; variable imamk56 lowk56 upk56; where imamk56
ne 0; run;
proc means n mean std min max nmiss; variable imamk57 lowk57 upk57; where imamk57
ne 0; run;

proc means n mean std min max nmiss; variable imamk671 lowk671 upk671; where
imamk671 ne 0; run;
proc means n mean std min max nmiss; variable imamk672 lowk672 upk672; where
imamk672 ne 0; run;
proc means n mean std min max nmiss; variable imamk673 lowk673 upk673; where
imamk673 ne 0; run;
proc means n mean std min max nmiss; variable imamk674 lowk674 upk674; where
imamk674 ne 0; run;

proc means n mean std min max nmiss; variable imamk831 lowk831 upk831; where
imamk831 ne 0; run;
proc means n mean std min max nmiss; variable imamk832 lowk832 upk832; where
imamk832 ne 0; run;
proc means n mean std min max nmiss; variable imamk833 lowk833 upk833; where
imamk833 ne 0; run;

libname imp 'd:\piname\wong\year2012\IMPfiles';  run;
data dd1; set output.group2_proxy_pension;  run;   **** proxy nonproxy N=9,696
var=39;


***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
```

```
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk53 imamk54 imamk56 imamk57 imamk671 imamk672 imamk673 imamk674 imamk831
imamk832 imamk833 yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk53 upk53
  lowk54 upk54
  lowk56 upk56
  lowk57 upk57

  lowk671 upk671
  lowk672 upk672
  lowk673 upk673
  lowk674 upk674

  lowk831 upk831
  lowk832 upk832
  lowk833 upk833       ;
 bounds
  imamk53 (>=lowk53 ,<=upk53)
  imamk54 (>=lowk54 ,<=upk54)
  imamk56 (>=lowk56 ,<=upk56)
  imamk57 (>=lowk57 ,<=upk57)

  imamk671 (>=lowk671 ,<=upk671)
  imamk672 (>=lowk672 ,<=upk672)
  imamk673 (>=lowk673 ,<=upk673)
  imamk674 (>=lowk674 ,<=upk674)

  imamk831 (>=lowk831 ,<=upk831)
  imamk832 (>=lowk832 ,<=upk832)
  imamk833 (>=lowk833 ,<=upk833)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

ITERATIONS 5;
/* multiples 5 ; */
```

```
                                Imput2012_Total Group2
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp.group2_proxy_pension_imputed; set dd_1;
        drop
  lowk53 upk53
  lowk54 upk54
  lowk56 upk56
  lowk57 upk57

  lowk671 upk671
  lowk672 upk672
  lowk673 upk673
  lowk674 upk674

  lowk831 upk831
  lowk832 upk832
  lowk833 upk833 ; run;

*** print putput: prior imputation;
Title "group2 proxy pension - before imputation (mean with zero)";
proc means data=output.group2_proxy_pension  mean std min max n nmiss;
        variable imamk53 imamk54 imamk56 imamk57 imamk671 imamk672 imamk673
imamk674 imamk831 imamk832 imamk833; run;

*** print putput: mean with zero;
Title "group2 proxy pension - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp.group2_proxy_pension_imputed;
        var imamk53 imamk54 imamk56 imamk57 imamk671 imamk672 imamk673 imamk674
imamk831 imamk832 imamk833;
run;

*** print output: mean without zero;
data group2; set imp.group2_proxy_pension_imputed;
if imamk53  =0 then imamk53 =.;
if imamk54  =0 then imamk54 =.;
if imamk56  =0 then imamk56 =.;
if imamk57  =0 then imamk57 =.;

if imamk671  =0 then imamk671 =.;
if imamk672  =0 then imamk672 =.;
if imamk673  =0 then imamk673 =.;
if imamk674  =0 then imamk674 =.;

if imamk831  =0 then imamk831 =.;
if imamk832  =0 then imamk832 =.;
```

```
                                Imput2012_Total Group2
if imamk833  =0 then imamk833 =.;
run;

Title "group2 proxy pension - imputed (mean without zero)";
proc means data=group2 mean std min max n ;
        var imamk53 imamk54 imamk56 imamk57 imamk671 imamk672 imamk673 imamk674
imamk831 imamk832 imamk833;
run;


/*******************************************************/
/* PROGRAM NAME  : Imput2012_group2_report.SAS          */
/* PROGRAMMED BY : DONG ZHANG                           */
/* LAST UPDATEED : 02/12/2016                           */
/*
                        */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter nodate; run;

************ core/pension ************************;
data out1; merge output2.group2_core_pension1 output2.group2_core_pension2
output2.group2_core_pension3;
        by cunicah subhog_12; run;

data imp1; merge imp2.group2_core_pension1_imputed
imp2.group2_core_pension2_imputed imp2.group2_core_pension3_imputed;
        by cunicah subhog_12; run;

*** print putput: prior imputation;
Title "group2 core pension - before imputation (mean with zero)";
proc means data=out1  mean std min max n nmiss;
        variable imamk53_12 imamk54_12 imamk56_12 imamk57_12 imamk67_1_12
imamk67_2_12 imamk67_3_12 imamk67_4_12
        imamk83_1_12 imamk83_2_12 imamk83_3_12; run;

Title "group2 core pension - before imputation (mean without zero)";
data out2; set out1;
if imamk53_12  =0 then imamk53_12 =.;
if imamk54_12  =0 then imamk54_12 =.;
if imamk56_12  =0 then imamk56_12 =.;
if imamk57_12  =0 then imamk57_12 =.;
if imamk67_1_12  =0 then imamk67_1_12 =.;
if imamk67_2_12  =0 then imamk67_2_12 =.;
if imamk67_3_12  =0 then imamk67_3_12 =.;
```

```
if imamk67_4_12  =0 then imamk67_4_12 =.;
if imamk83_1_12  =0 then imamk83_1_12 =.;
if imamk83_2_12  =0 then imamk83_2_12 =.;
if imamk83_3_12  =0 then imamk83_3_12 =.;
run;
proc means data=out2  mean std min max n nmiss;
        variable imamk53_12 imamk54_12 imamk56_12 imamk57_12 imamk67_1_12
imamk67_2_12 imamk67_3_12 imamk67_4_12
        imamk83_1_12 imamk83_2_12 imamk83_3_12; run;

*** print putput: mean with zero;
Title "group2 core pension - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp1;
        var imamk53_12 imamk54_12 imamk56_12 imamk57_12 imamk67_1_12 imamk67_2_12
imamk67_3_12 imamk67_4_12 imamk83_1_12 imamk83_2_12 imamk83_3_12;
run;

*** print output: mean without zero;
data imp2; set imp1;
if imamk53_12  =0 then imamk53_12 =.;
if imamk54_12  =0 then imamk54_12 =.;
if imamk56_12  =0 then imamk56_12 =.;
if imamk57_12  =0 then imamk57_12 =.;
if imamk67_1_12  =0 then imamk67_1_12 =.;
if imamk67_2_12  =0 then imamk67_2_12 =.;
if imamk67_3_12  =0 then imamk67_3_12 =.;
if imamk67_4_12  =0 then imamk67_4_12 =.;
if imamk83_1_12  =0 then imamk83_1_12 =.;
if imamk83_2_12  =0 then imamk83_2_12 =.;
if imamk83_3_12  =0 then imamk83_3_12 =.;
run;

Title "group2 core pension - imputed (mean without zero)";
proc means data=imp2 mean std min max n ;
        var imamk53_12 imamk54_12 imamk56_12 imamk57_12 imamk67_1_12 imamk67_2_12
imamk67_3_12 imamk67_4_12 imamk83_1_12 imamk83_2_12 imamk83_3_12;
run;



************* proxy/pension ************************;
data out1; merge output2.group2_proxy_pension1 output2.group2_proxy_pension2
output2.group2_proxy_pension3;
        by cunicah subhog_12; run;

data imp1; merge imp2.group2_proxy_pension1_imputed
imp2.group2_proxy_pension2_imputed imp2.group2_proxy_pension3_imputed;
        by cunicah subhog_12; run;
```

Imput2012_Total Group2

```
*** print putput: prior imputation;
Title "group2 proxy pension - before imputation (mean with zero)";
proc means data=out1  mean std min max n nmiss;
        variable imamk53_12 imamk54_12 imamk56_12 imamk57_12 imamk67_1_12
imamk67_2_12 imamk67_3_12 imamk67_4_12
        imamk83_1_12 imamk83_2_12 imamk83_3_12; run;

Title "group2 proxy pension - before imputation (mean without zero)";
data out2; set out1;
if imamk53_12  =0 then imamk53_12 =.;
if imamk54_12  =0 then imamk54_12 =.;
if imamk56_12  =0 then imamk56_12 =.;
if imamk57_12  =0 then imamk57_12 =.;
if imamk67_1_12  =0 then imamk67_1_12 =.;
if imamk67_2_12  =0 then imamk67_2_12 =.;
if imamk67_3_12  =0 then imamk67_3_12 =.;
if imamk67_4_12  =0 then imamk67_4_12 =.;
if imamk83_1_12  =0 then imamk83_1_12 =.;
if imamk83_2_12  =0 then imamk83_2_12 =.;
if imamk83_3_12  =0 then imamk83_3_12 =.;
run;
proc means data=out2  mean std min max n nmiss;
        variable imamk53_12 imamk54_12 imamk56_12 imamk57_12 imamk67_1_12
imamk67_2_12 imamk67_3_12 imamk67_4_12
        imamk83_1_12 imamk83_2_12 imamk83_3_12; run;

*** print putput: mean with zero;
Title "group2 proxy pension - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp1;
        var imamk53_12 imamk54_12 imamk56_12 imamk57_12 imamk67_1_12 imamk67_2_12
imamk67_3_12 imamk67_4_12 imamk83_1_12 imamk83_2_12 imamk83_3_12;
run;

*** print output: mean without zero;
data imp2; set imp1;
if imamk53_12  =0 then imamk53_12 =.;
if imamk54_12  =0 then imamk54_12 =.;
if imamk56_12  =0 then imamk56_12 =.;
if imamk57_12  =0 then imamk57_12 =.;
if imamk67_1_12  =0 then imamk67_1_12 =.;
if imamk67_2_12  =0 then imamk67_2_12 =.;
if imamk67_3_12  =0 then imamk67_3_12 =.;
if imamk67_4_12  =0 then imamk67_4_12 =.;
if imamk83_1_12  =0 then imamk83_1_12 =.;
if imamk83_2_12  =0 then imamk83_2_12 =.;
if imamk83_3_12  =0 then imamk83_3_12 =.;
run;

Title "group2 proxy pension - imputed (mean without zero)";
```

Imput2012_Total Group2

```
proc means data=imp2 mean std min max n ;
        var imamk53_12 imamk54_12 imamk56_12 imamk57_12 imamk67_1_12 imamk67_2_12
imamk67_3_12 imamk67_4_12 imamk83_1_12 imamk83_2_12 imamk83_3_12;
run;
```

GROUP 3. Components of Individual (or Couple) Total Net Worth and Household Consumption

```
                                Imput2012_Total Group3
/*******************************************************/
/* PROGRAM NAME  : Imput2012_group3_core_housing.SAS    */
/* PROGRAMMED BY : DONG ZHANG                           */
/* LAST UPDATEED : 01/29/2015                           */
/* Impute missing value on core and proxy questionnaire */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter; run;

/*
proc contents data=input.sect_g_j_k_sa_2012; run;       *** not imputed N=10,427,
var=680;
*/

data aa; set input.sect_g_j_k_sa_2012;                                  *** core
and proxy questionnaire N=10,427;
        proc sort out=temp nodupkey; by cunicah subhog_12; run;  *** no duplicate;

***** Core questionnaire N=9,696;
data aa1; set aa;
        keep cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
        j25_12 j26_12 j27a_12 j27b_12 J27c_12
        j26_12 j28_12 j29a_12 j29b_12 J29c_12
        j22_12 j31_12 j32a_12 j32b_12 J32c_12
        j33_12 j34_12 j35a_12 j35b_12 J35c_12
        j19_12 ;
if tipentg_12=1; run;
proc freq; table j25_12 j26_12 j19_12 j22_12; run;

data aa2; set aa1;
        imamj26_12=j26_12;
**** Amputation N=59;
        if j25_12 =1 and j26_12=. then imamj26_12=0;
        if j25_12 =. and j26_12=. then imamj26_12=0;
        if j25_12 >=2 and j26_12=. then imamj26_12=.;
        if j26_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamj26_12=.;
                if imamj26_12=. and j27a_12=. then j27a_12=9;
        dumj26_12=1*(imamj26_12=.);
        imamj28_12=j28_12;
**** Amputation N=130;
        if j25_12 =1 and j28_12=. then imamj28_12=0;
        if j25_12 =. and j28_12=. then imamj26_12=0;
        if j26_12 <=0 and j28_12=. then imamj28_12=0;
```

```
        if j28_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamj28_12=.;
                if imamj28_12=. and j29a_12=. then j29a_12=9;
                dumj28_12=1*(imamj28_12=.);
        imamj31_12=j31_12;
**** Amputation N=3,995;
        if j19_12 =1 and j31_12=. then imamj31_12=0;
        if j22_12 in (6,7) and j31_12=. then imamj31_12=0;
        if j22_12 =. and j31_12=. then imamj31_12=0;
        if j22_12 in (8,9) and j31_12=. then imamj31_12=.;
        if j22_12 in (1,2,3,4,5) and j31_12=. then imamj31_12=.;
         if j31_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999,99999
98) then imamj31_12=.; ***n>3,487;
                if imamj31_12=. and j32a_12=. then j32a_12=9;
                        dumj31_12=1*(imamj31_12=.);
        imamj34_12=j34_12;
**** Amputation N=363;
        if j33_12 ne 1 and j34_12=. then imamj34_12=0;
        if j34_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999,99999
98) then imamj34_12=.;
                if imamj34_12=. and j35a_12=. then j35a_12=9;
                dumj34_12=1*(imamj34_12=.);
run;

***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname(keep=cunicah  subhog_12 tipentg_12 yrschool sex_12_max age_12_max
imam&vname dum&vname low&vname up&vname &mix1 &mix2); set aa2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
                if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
```

```
%mend range;

%range(j26_12,j27a_12,j27b_12,J27c_12, 24000,6000,15000,1500,j27a_12);  run;
%range(j28_12,j29a_12,j29b_12,J29c_12,4200000,150000,400000,75000);  run;
%range(j31_12,j32a_12,j32b_12,J32c_12,9000000,150000,750000,75000,j22_12);  run;
%range(j34_12,j35a_12,j35b_12,J35c_12,7000000,150000,750000,75000,j33_12);  run;

data output2.group3_core_housing1; merge dataj26_12 dataj28_12 dataj31_12
dataj34_12 ;
        by cunicah subhog_12; run;

data dd1; set output2.group3_core_housing1;    **** Core nonproxy N=9,696 var=18;
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
                imamj26_12
                lowj26_12 upj26_12
        dumj26_12
                ;
run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamj26_12  yrschool;

transfer cunicah subhog_12 tipentg_12
        lowj26_12 upj26_12
                dumj26_12
;
 bounds
  imamj26_12 (>=lowj26_12 ,<=upj26_12)
        yrschool(<=22, >=0);
```

```
                                Imput2012_Total Group3
INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data dd1; set output2.group3_core_housing1;    **** Core nonproxy N=9,696 var=18;
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
                imamj28_12
                lowj28_12 upj28_12
        dumj28_12
                ;
run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;

mixed  imamj28_12  yrschool;

transfer cunicah subhog_12 tipentg_12
        lowj28_12 upj28_12
                dumj28_12
;
 bounds
  imamj28_12 (>=lowj28_12 ,<=upj28_12)
        yrschool(<=22, >=0);
```

```
                                Imput2012_Total Group3
INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);


data dd1; set output2.group3_core_housing1;    **** Core nonproxy N=9,696 var=18;
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
                imamj31_12 imamj34_12
                lowj31_12 upj31_12
        lowj34_12 upj34_12
                dumj31_12
                dumj34_12;
run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_3;

categorical sex_12_max ;

count age_12_max;

mixed  imamj31_12 imamj34_12 yrschool;

transfer cunicah subhog_12 tipentg_12
        lowj31_12 upj31_12
    lowj34_12 upj34_12
                dumj31_12
                dumj34_12
;
```

```
                                Imput2012_Total Group3
 bounds
  imamj31_12 (>=lowj31_12 ,<=upj31_12)
  imamj34_12 (>=lowj34_12 ,<=upj34_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group3_core_housing1_imputed; merge dd_1 dd_2 dd_3; by cunicah
subhog_12;
        drop
        lowj26_12 upj26_12
    lowj28_12 upj28_12
        lowj31_12 upj31_12
    lowj34_12 upj34_12   ; run;

/*
proc freq; table imamj26_12; where dumj26_12=1;  run;   *** n=59;
proc freq; table imamj28_12; where dumj28_12=1;  run;   *** n=130;
proc freq; table imamj31_12; where dumj31_12=1;  run;   *** n=3,995;
proc freq; table imamj34_12; where dumj34_12=1;  run;   *** n=363;

*/



*** print putput: prior imputation;
Title "Group3 core Housing - before imputation (mean with zero)";
proc means data=output2.group3_core_housing  mean std min max n nmiss;
        variable imamj26_12 imamj28_12 imamj31_12 imamj34_12; run;

*** print putput: mean with zero;
Title "Group3 core Housing - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group3_core_housing_imputed;
        var imamj26_12 imamj28_12 imamj31_12 imamj34_12;
run;

*** print output: mean without zero;
data group1; set imp2.group3_core_housing_imputed;
  if imamj26_12  =0 then imamj26_12 =.;
  if imamj28_12  =0 then imamj28_12 =.;
```

```
  if imamj31_12  =0 then imamj31_12 =.;
  if imamj34_12  =0 then imamj34_12 =.;
run;

Title "Group3 core Housing - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var imamj26_12 imamj28_12 imamj31_12 imamj34_12; run;




/*******************************************************/
/* PROGRAM NAME  : Imput2012_group3_core_pension.SAS    */
/* PROGRAMMED BY : DONG ZHANG                           */
/* LAST UPDATEED : 01/29/2016                           */
/* Impute missing value on core and proxy questionnaire */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter; run;

/*
proc contents data=input.sect_g_j_k_sa_2012; run;       *** not imputed N=10,427,
var=680;
*/

data aa; set input.sect_g_j_k_sa_2012;                                  *** core
and proxy questionnaire N=10,427;
        proc sort  nodupkey; by cunicah subhog_12; run;  *** no duplicate;

***** Core questionnaire N=9,696;
data bb1; set aa;
        keep cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
        k17_12
        k19_1_12 k20_1_12 k21a1_12 k21b1_12 k21c1_12
        k19_2_12 k20_2_12 k21a2_12 k21b2_12 k21c2_12
        k17_12 k17a_12  k24_1_12 k25a1_12 k25b1_12 k25c1_12
                                        k24_2_12 k25a2_12 k25b2_12 k25c2_12
        k31a_12 k33_1_12 k34a1_12 k34b1_12 k34c1_12
        k31b_12 k33_2_12 k34a2_12 k34b2_12 k34c2_12
        k31c_12 k33_3_12 k34a3_12 k34b3_12 k34c3_12
        k38_12  k39_12
                k40_12 k41a_12 k41b_12 k41c_12
                k42_12 k43a_12 k43b_12 k43c_12
                k44_12 k45a_12 k45b_12 k45c_12
        k85_12 k86_12 k87a_12 k87b_12 k87c_12
```

```
                              Imput2012_Total Group3
                   k88_12 k89a_12 k89b_12 k89c_12
        k1_12  k1a_12
        k3_1_12 k4_1_12 k5a1_12 k5b1_12 k5c1_12
        k3_2_12 k4_2_12 k5a2_12 k5b2_12 k5c2_12
                  k8_1_12 k9a1_12 k9b1_12 k9c1_12
                  k8_2_12 k9a2_12 k9b2_12 k9c2_12  ;
if tipentg_12=1; run;  ;

******************** 1 **********************;
data bb2; set bb1;
        imamk20_1_12=k20_1_12;
**** Amputation N=40;
                if k17_12=2 and k20_1_12=. then imamk20_1_12=0;
                if k17_12 in (8,9) and k20_1_12=. then imamk20_1_12=.;
                if k19_1_12 =2 and k20_1_12=. then imamk20_1_12=0;
                        if k19_1_12 =2 and k20_1_12=. then imamk20_1_12=0;
                        if k19_1_12 in(8,9) and k20_1_12=. then imamk20_1_12=.;
                if k20_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999998,99999
99) then imamk20_1_12=.;
                if imamk20_1_12=. and k21a1_12=. then k21a1_12=9;
        imamk20_2_12=k20_2_12;
**** Amputation N=1;
                if k17_12 in (2,8,9) and k20_2_12=. then imamk20_2_12=0;
                if k19_2_12 =2 and k20_2_12=. then imamk20_2_12=0;
                if k19_2_12 =. and k20_2_12=. then imamk20_2_12=0;
                if k20_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999998,99999
99) then imamk20_2_12=.;
                if imamk20_2_12=. and k21a2_12=. then k21a2_12=9;
        imamk24_1_12=k24_1_12;
**** Amputation N=227;
                if k17_12=2 and k24_1_12=. then imamk24_1_12=0;
                if k17_12 in (8,9) and k24_1_12=. then imamk24_1_12=.;
                if k24_1_12=. then imamk24_1_12=0;
                if k24_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999998,99999
99) then imamk24_1_12=.;
                if imamk24_1_12=. and k25a1_12=. then k25a1_12=9;
        imamk24_2_12=k24_2_12;
**** Amputation N=22;
        if k17_12 ne 1 and k24_2_12=. then imamk24_2_12=0;
                if k17a_12=2 and imamk24_2_12=. then imamk24_2_12=0;
                if k24_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999998,99999
99) then imamk24_2_12=.;
                if imamk24_2_12=. and k25a2_12=. then k25a2_12=9;
        dumk20_1_12=1*(imamk20_1_12=.);
        dumk20_2_12=1*(imamk20_2_12=.);
```

```
        dumk24_1_12=1*(imamk24_1_12=.);
        dumk24_2_12=1*(imamk24_2_12=.);
run;

***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname(keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
imam&vname dum&vname low&vname up&vname &mix1 &mix2);
        set bb2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                        if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
%mend range;

%range(k20_1_12,k21a1_12,k21b1_12,k21c1_12,1000000,150000,400000,75000,k17_12,
k19_1_12);  run;
%range(k20_2_12,k21a2_12,k21b2_12,k21c2_12,400000,150000,400000,75000,k19_2_12);
run;
%range(k24_1_12,k25a1_12,k25b1_12,k25c1_12,9000000,150000,400000,75000,k17_12);
run;
%range(k24_2_12,k25a2_12,k25b2_12,k25c2_12,1500000,150000,400000,75000);  run;

data output2.group3_core_pension1; merge datak20_1_12 datak20_2_12 datak24_1_12
datak24_2_12 ;
        by cunicah subhog_12;
        drop k17_12 k19_1_12 k19_2_12 ; run;


****** 2*****************;
data bb2; set bb1;
        imamk33_1_12=k33_1_12;
**** Amputation N=228/568;
```

```
                if k31a_12 =2 and k33_1_12=. then imamk33_1_12=0;
                if k31a_12 in(8,9) and k33_1_12=. then imamk33_1_12=.;
                if k33_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999998,99999
99) then imamk33_1_12=.;
                if imamk33_1_12=. and k34a1_12=. then k34a1_12=9;
        imamk33_2_12=k33_2_12;
**** Amputation N=9/64;
                if k31b_12 =2 and k33_2_12=. then imamk33_2_12=0;
                if k31b_12 in (8,9) and k33_2_12=. then imamk33_2_12=.;
                if k33_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999998,99999
99) then imamk33_2_12=.;
                if imamk33_2_12=. and k34a2_12=. then k34a2_12=9;
        imamk33_3_12=k33_3_12;
**** Amputation N=8/16;
                if k31c_12 =2 and k33_3_12=. then imamk33_3_12=0;
                if k31c_12 in (8,9) and k33_3_12=. then imamk33_3_12=.;
                if k33_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999998,99999
99) then imamk33_3_12=.;
                if imamk33_3_12=. and k34a3_12=. then k34a3_12=9;
                        dumk33_1_12=1*(imamk33_1_12=.);
                        dumk33_2_12=1*(imamk33_2_12=.);
                        dumk33_3_12=1*(imamk33_3_12=.);
run;

%range(k33_1_12,k34a1_12,k34b1_12,k34c1_12,5000000,20000,70000,10000,k31a_12);
run;
%range(k33_2_12,k34a2_12,k34b2_12,k34c2_12, 300000,20000,70000,10000,k31b_12);
run;
%range(k33_3_12,k34a3_12,k34b3_12,k34c3_12,1500000,20000,70000,10000,k31c_12);
run;
data output2.group3_core_pension2; merge datak33_1_12 datak33_2_12 datak33_3_12  ;
        by cunicah subhog_12;
        drop k31a_12 k31b_12 k31c_12; run;


********** 3 ********************;
data bb2; set bb1;
        imamk40_12=k40_12;
**** Amputation N=42/179;
                if k38_12=2 and k40_12=. then imamk40_12=0;
                if k38_12 in (8,9) and k40_12=. then imamk40_12=.;
                        if k39_12 =2 and k40_12=. then imamk40_12=0;
                        if k39_12 in(8,9) and k40_12=. then imamk40_12=.;
                if k40_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
8,9999999,9999099) then imamk40_12=.;
```

```
                if imamk40_12=. and k41a_12=. then k41a_12=9;
        imamk42_12=k42_12;
**** Amputation N=612/2704;
                if k38_12=2 and k42_12=. then imamk42_12=0;
                if k38_12 in (8,9) and k42_12=. then imamk42_12=.;
                if k42_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
8,9999999,9999099) then imamk42_12=.;
                if imamk42_12=. and k43a_12=. then k43a_12=9;
        imamk44_12=k44_12;
**** Amputation N=2941/6488;
                if k44_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
8,9999999,9999099) then imamk44_12=.;
                if k44_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
8,9999999,9999099)
                        then k44b_12=9;           *** create a variable for mix
imputed;
                if imamk44_12=. and k45a_12=. then k45a_12=9;
                        dumk40_12=1*(imamk40_12=.);
                        dumk42_12=1*(imamk42_12=.);
                        dumk44_12=1*(imamk44_12=.);
run;

%range(k40_12,k41a_12,k41b_12,k41c_12, 320000,150000,400000,75000,k38_12,k39_12);
run;
%range(k42_12,k43a_12,k43b_12,k43c_12,6150000,150000,400000,75000,k38_12);  run;
%range(k44_12,k45a_12,k45b_12,k45c_12,9000000,150000,400000,75000,k44b_12);  run;

data output2.group3_core_pension3; merge datak40_12 datak42_12 datak44_12  ;
        by cunicah subhog_12;
        drop k38_12 k39_12 k44b_12; run;


****************** 4 ********************;
data bb2; set bb1;
        imamk86_12=k86_12;
**** Amputation N=77/1080;
                if k85_12 =2 and k86_12=. then imamk86_12=0;
                if k85_12 in (8,9) and k86_12=. then imamk86_12=.;
                if k86_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
8,9999999,9999099) then imamk86_12=.;
                if imamk86_12=. and k87a_12=. then k87a_12=9;
        imamk88_12=k88_12;
**** Amputation N=951/9696;
                if k88_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999989,999998,8888888
```

```
,9999998,9999999,9999099) then imamk88_12=.;
                if k88_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999989,999998,8888888
,9999998,9999999,9999099)
                        then k88_12b=9;                          *** create a
variable for mix imputed;
                if imamk88_12=. and k89a_12=. then k89a_12=9;

        imamk4_1_12=k4_1_12;
**** Amputation N=15/74;
                if k1_12 =2 and k4_1_12=. then imamk4_1_12=0;
                if k1_12 in (8,9) and k4_1_12=. then imamk4_1_12=.;
                        if k3_1_12 =2 and k4_1_12=. then imamk4_1_12=0;
                        if k3_1_12 in (8,9) and k4_1_12=. then imamk4_1_12=.;
                if k4_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
8,9999999,9999099) then imamk4_1_12=.;
                if imamk4_1_12=. and k5a1_12=. then k5a1_12=9;
        imamk4_2_12=k4_2_12;
**** Amputation N=1/6;
                if k1_12 ne 1 and k4_2_12 =. then imamk4_2_12=0;
                if k4_2_12 =2 and k4_2_12 =. then imamk4_2_12=0;
                        if k3_2_12 in (8,9) and k4_2_12=. then imamk4_2_12=.;
                if k4_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
8,9999999,9999099) then imamk4_2_12=.;
                if imamk4_2_12=. and k5a2_12=. then k5a2_12=9;

        imamk8_1_12=k8_1_12;
**** Amputation N=584/1335;
                if k1_12 =2 and k8_1_12=. then imamk8_1_12=0;
                if k1_12 in (8,9) and k8_1_12=. then imamk8_1_12=.;
                if k8_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
8,9999999,9999099) then imamk8_1_12=.;
                if imamk8_1_12=. and k9a1_12=. then k9a1_12=9;
        imamk8_2_12=k8_2_12;
**** Amputation N=33/82;
                if k1_12 ne 1 and k8_2_12=. then imamk8_2_12=0;
                if k1a_12 =2 and k8_2_12=. then imamk8_2_12=0;
                if k8_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
8,9999999,9999099) then imamk8_2_12=.;
                if imamk8_2_12=. and k9a2_12=. then k9a2_12=9;
                        dumk86_12=1*(imamk86_12=.);
                        dumk88_12=1*(imamk88_12=.);
                        dumk4_1_12=1*(imamk4_1_12=.);
                        dumk4_2_12=1*(imamk4_2_12=.);
                        dumk8_1_12=1*(imamk8_1_12=.);
```

```
                              Imput2012_Total Group3
                          dumk8_2_12=1*(imamk8_2_12=.);
run;

%range(k86_12,k87a_12,k87b_12,k87c_12, 2000000,20000,70000,10000, k85_12);  run;
%range(k88_12,k89a_12,k89b_12,k89c_12,  250000, 6000,10000, 3000);  run;

%range(k4_1_12,k5a1_12,k5b1_12,k5c1_12, 560000,120000,400000,40000,k1_12,k3_1_12);
run;
%range(k4_2_12,k5a2_12,k5b2_12,k5c2_12,  100000, 120000,400000,40000,k3_2_12);
run;

%range(k8_1_12,k9a1_12,k9b1_12,k9c1_12, 9000000,120000,400000,40000,k1_12);  run;
%range(k8_2_12,k9a2_12,k9b2_12,k9c2_12, 8000000,120000,400000,40000);  run;

data output2.group3_core_pension4; merge datak86_12  datak88_12  datak4_1_12
datak4_2_12  datak8_1_12  datak8_2_12 ;
        by cunicah subhog_12;
        drop k85_12 k1_12 k3_1_12 k3_2_12 ; run;


********* 1 ********************;
data dd1; set output2.group3_core_pension1;    **** Core nonproxy N=9,696 var=54;
keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
                imamk20_1_12  lowk20_1_12  upk20_1_12    dumk20_1_12
                imamk20_2_12  lowk20_2_12  upk20_2_12    dumk20_2_12; run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk20_1_12  imamk20_2_12 yrschool;

transfer cunicah subhog_12 tipentg_12
```

```
                                Imput2012_Total Group3
  lowk20_1_12  upk20_1_12
  lowk20_2_12  upk20_2_12
   dumk20_1_12   dumk20_2_12
;
 bounds
  imamk20_1_12 (>=lowk20_1_12 ,<=upk20_1_12)
  imamk20_2_12 (>=lowk20_2_12 ,<=upk20_2_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);


data dd1; set output2.group3_core_pension1;    **** Core nonproxy N=9,696 var=54;
keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
                imamk24_1_12 imamk24_2_12 lowk24_1_12  upk24_1_12 dumk24_1_12
lowk24_2_12 upk24_2_12 dumk24_2_12; run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;

mixed  imamk24_1_12 imamk24_2_12 yrschool;

transfer cunicah subhog_12 tipentg_12
```

```
  lowk24_1_12  upk24_1_12
  lowk24_2_12  upk24_2_12
   dumk24_1_12
   dumk24_2_12
;
 bounds
  imamk24_1_12 (>=lowk24_1_12 ,<=upk24_1_12)
  imamk24_2_12 (>=lowk24_2_12 ,<=upk24_2_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5; */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data imp2.group3_core_pension1_imputed; merge dd_1 dd_2; by cunicah subhog_12;
        drop
        lowk20_1_12  upk20_1_12
        lowk20_2_12  upk20_2_12
        lowk24_1_12  upk24_1_12
        lowk24_2_12  upk24_2_12
 ; run;

/* data temp; set imp2.group3_core_pension1_imputed; run;
        proc freq; table imamk20_1_12; where dumk20_1_12=1; run;  *** not imp n=40;
        proc freq; table imamk20_2_12; where dumk20_2_12=1; run;  *** n=1 imp=0;
        proc freq; table imamk24_1_12; where dumk24_1_12=1; run;   ***n=227 imp;
        proc freq; table imamk24_2_12; where dumk24_2_12=1; run;   ****n=22
imputed;
*/

************** 2********************;
data dd1; set output2.group3_core_pension2;     **** Core nonproxy N=9,696 var=54;
keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
        imamk33_1_12  lowk33_1_12  upk33_1_12    dumk33_1_12; run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;
```

Imput2012_Total Group3

```
data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk33_1_12  yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk33_1_12  upk33_1_12
   dumk33_1_12
 ;
 bounds
  imamk33_1_12 (>=lowk33_1_12 ,<=upk33_1_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data dd1; set output2.group3_core_pension2;     **** Core nonproxy N=9,696 var=54;
keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
        imamk33_2_12  lowk33_2_12  upk33_2_12    dumk33_2_12; run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
```

```
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;

mixed  imamk33_2_12  yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk33_2_12  upk33_2_12
    dumk33_2_12
 ;
 bounds
  imamk33_2_12 (>=lowk33_2_12 ,<=upk33_2_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);


data dd1; set output2.group3_core_pension2;     **** Core nonproxy N=9,696 var=54;
keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
        imamk33_3_12  lowk33_3_12  upk33_3_12    dumk33_3_12; run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
```

```
                                Imput2012_Total Group3
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_3;

categorical sex_12_max ;

count age_12_max;

mixed  imamk33_3_12  yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk33_3_12  upk33_3_12
   dumk33_3_12
 ;
 bounds
  imamk33_3_12 (>=lowk33_3_12 ,<=upk33_3_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data imp2.group3_core_pension2_imputed; merge dd_1 dd_2 dd_3; by cunicah subhog_12;
        drop
  lowk33_1_12  upk33_1_12
  lowk33_2_12  upk33_2_12
  lowk33_3_12  upk33_3_12
 ; run;

/* data temp; set imp2.group3_core_pension2_imputed; run;
        proc freq; table imamk33_1_12; where dumk33_1_12=1; run;  *** n=290 imp;
        proc freq; table imamk33_2_12; where dumk33_2_12=1; run;  *** n=64 univar
imp;
        proc freq; table imamk33_3_12; where dumk33_3_12=1; run;   ***n=57 noimp;
*/

********************** 3 ************************;
data dd1; set output2.group3_core_pension3;     **** Core nonproxy N=9,696 var=54;
keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
               imamk40_12  lowk40_12  upk40_12    dumk40_12; run;
```

```
                              Imput2012_Total Group3
***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk40_12  yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk40_12  upk40_12
   dumk40_12
  ;
 bounds
  imamk40_12 (>=lowk40_12 ,<=upk40_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data dd1; set output2.group3_core_pension3;     **** Core nonproxy N=9,696 var=54;
keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
                imamk42_12  lowk42_12  upk42_12    dumk42_12
                imamk44_12  lowk44_12  upk44_12    dumk44_12;
run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
```

```
                              Imput2012_Total Group3
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;

mixed   imamk42_12 imamk44_12 yrschool;

transfer cunicah subhog_12 tipentg_12
   lowk42_12  upk42_12
  lowk44_12  upk44_12

   dumk42_12
   dumk44_12
  ;
 bounds

  imamk42_12 (>=lowk42_12 ,<=upk42_12)
  imamk44_12 (>=lowk44_12 ,<=upk44_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data imp2.group3_core_pension3_imputed; merge dd_1 dd_2; by cunicah subhog_12;
        drop
  lowk40_12  upk40_12
  lowk42_12  upk42_12
```

```
  lowk44_12  upk44_12
 ; run;

/* data temp; set imp2.group3_core_pension3_imputed; run;
        proc freq; table imamk40_12; where dumk40_12=1; run;  *** n=83 imp;
        proc freq; table imamk42_12; where dumk42_12=1; run;  *** n=646 imp;
        proc freq; table imamk44_12; where dumk44_12=1; run;   ***n=2,941 imp;
  ****n=22 not imputed/no degrees of freedom left for perturbations;

*/


************ 4************************;
data dd1; set output2.group3_core_pension4;
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
        imamk86_12    lowk86_12  upk86_12   dumk86_12   ;
run;

**RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed    imamk86_12  yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk86_12  upk86_12
                        dumk86_12
;
 bounds
   imamk86_12 (>=lowk86_12 ,<=upk86_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
```

```
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data dd1; set output2.group3_core_pension4;
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
        imamk88_12  lowk88_12  upk88_12  dumk88_12 ;
run;

**RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;

mixed   imamk88_12  yrschool;

transfer cunicah subhog_12 tipentg_12
    lowk88_12  upk88_12
               dumk88_12
;
 bounds
  imamk88_12 (>=lowk88_12 ,<=upk88_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/*  ITERATIONS 5;  */
```

```
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data dd1; set output2.group3_core_pension4;
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
        imamk4_1_12   lowk4_1_12  upk4_1_12  dumk4_1_12  ;
run;

**RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_3;
categorical sex_12_max ;

count age_12_max;

mixed    imamk4_1_12   yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk4_1_12  upk4_1_12
                        dumk4_1_12
;
 bounds
  imamk4_1_12 (>=lowk4_1_12 ,<=upk4_1_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
```

```
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);


data dd1; set output2.group3_core_pension4;
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
        imamk4_2_12   lowk4_2_12  upk4_2_12  dumk4_2_12  ;
run;

**RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_4;

categorical sex_12_max ;

count age_12_max;

mixed    imamk4_2_12   yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk4_2_12  upk4_2_12
                        dumk4_2_12
;
 bounds
  imamk4_2_12 (>=lowk4_2_12 ,<=upk4_2_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);
```

Imput2012_Total Group3

```
data dd1; set output2.group3_core_pension4;
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
        imamk8_1_12   lowk8_1_12  upk8_1_12  dumk8_1_12  ;
run;

**RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_5;

categorical sex_12_max ;

count age_12_max;

mixed    imamk8_1_12   yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk8_1_12  upk8_1_12
                        dumk8_1_12
;
 bounds
  imamk8_1_12 (>=lowk8_1_12 ,<=upk8_1_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data dd1; set output2.group3_core_pension4;
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
```

```
                                Imput2012_Total Group3
        imamk8_2_12   lowk8_2_12  upk8_2_12  dumk8_2_12  ;
run;

**RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_6;

categorical sex_12_max ;

count age_12_max;

mixed    imamk8_2_12   yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk8_2_12  upk8_2_12
                        dumk8_2_12
;
 bounds
  imamk8_2_12 (>=lowk8_2_12 ,<=upk8_2_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group3_core_pension4_imputed; merge dd_1 dd_2 dd_3 dd_4 dd_5 dd_6;
by cunicah subhog_12;
        drop
  lowk86_12  upk86_12
  lowk88_12  upk88_12
```

```
  lowk4_1_12  upk4_1_12
  lowk4_2_12  upk4_2_12
  lowk8_1_12  upk8_1_12
  lowk8_2_12  upk8_2_12
 ; run;

/* data temp; set imp2.group3_core_pension4_imputed; run;
        proc freq; table imamk86_12; where dumk86_12=1; run;  *** n=118 univar imp;
        proc freq; table imamk88_12; where dumk88_12=1; run;  *** n=951 noimp;
        proc freq; table imamk4_1_12; where dumk4_1_12=1; run;   ***n=54 univar
imp;
        proc freq; table imamk4_2_12; where dumk4_2_12=1; run;   ***n=1330
univarimp ;
        proc freq; table imamk8_1_12; where dumk8_1_12=1; run;   ***n=614  univar
imp;
        proc freq; table imamk8_2_12; where dumk8_2_12=1; run;   ***n=33 univar
imp;
*/




*** print putput: prior imputation;
Title "group3 core pension - before imputation (mean with zero)";
proc means data=output2.group3_core_pension  mean std min max n nmiss;
        variable imamk20_1_12 imamk20_2_12 imamk24_1_12 imamk24_2_12 imamk33_1_12
imamk33_2_12 imamk33_3_12 imamk40_12  imamk42_12  imamk44_12
                                  imamk86_12  imamk88_12  imamk4_1_12  imamk4_2_12
imamk8_1_12  imamk8_2_12; run;

*** print putput: mean with zero;
Title "group3 core pension - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group3_core_pension_imputed;
        var imamk20_1_12 imamk20_2_12 imamk24_1_12 imamk24_2_12 imamk33_1_12
imamk33_2_12 imamk33_3_12 imamk40_12  imamk42_12  imamk44_12
                                  imamk86_12  imamk88_12  imamk4_1_12  imamk4_2_12
imamk8_1_12  imamk8_2_12;
run;

*** print output2: mean without zero;
data group1; set imp2.group3_core_pension_imputed;
  if imamk20_1_12  =0  then  imamk20_1_12 =.;
  if imamk20_2_12  =0  then  imamk20_2_12 =.;
  if imamk24_1_12  =0  then  imamk24_1_12 =.;
  if imamk24_2_12  =0  then  imamk24_2_12 =.;

  if imamk33_1_12  =0  then imamk33_1_12 =.;
  if imamk33_2_12  =0  then  imamk33_2_12 =.;
  if imamk33_3_12  =0  then  imamk33_3_12 =.;
```

```
  if imamk40_12  =0  then  imamk40_12 =.;
  if imamk42_12  =0  then  imamk42_12 =.;
  if imamk44_12  =0  then  imamk44_12 =.;

  if imamk86_12  =0  then  imamk86_12 =.;
  if imamk88_12  =0  then  imamk88_12 =.;

  if imamk4_1_12  =0  then  imamk4_1_12 =.;
  if imamk4_2_12  =0  then  imamk4_2_12 =.;

  if imamk8_1_12  =0  then  imamk8_1_12 =.;
  if imamk8_2_12  =0  then  imamk8_2_12 =.;
run;

Title "group3 core pension - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var imamk20_1_12 imamk20_2_12 imamk24_1_12 imamk24_2_12 imamk33_1_12
imamk33_2_12 imamk33_3_12 imamk40_12  imamk42_12  imamk44_12
                                imamk86_12  imamk88_12  imamk4_1_12  imamk4_2_12
imamk8_1_12  imamk8_2_12;
run;




/*****************************************************/
/* PROGRAM NAME  : Imput2012_group3_proxy_housing.SAS    */
/* PROGRAMMED BY : DONG ZHANG                          */
/* LAST UPDATEED : 01/29/2015                          */
/* Impute missing value on core and proxy questionnaire */

/*****************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter; run;

/*
proc contents data=input.sect_g_j_k_sa_2012; run;       *** not imputed N=10,427,
var=680;
*/

data aa; set input.sect_g_j_k_sa_2012;                                  *** core
and proxy questionnaire N=10,427;
        proc sort out=temp nodupkey; by cunicah subhog_12; run;  *** no duplicate;
```

```
                              Imput2012_Total Group3
***** Proxy questionnaire N=731;
data aa1; set aa;
        keep cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
        j25_12 j26_12 j27a_12 j27b_12 J27c_12
        j26_12 j28_12 j29a_12 j29b_12 J29c_12
        j22_12 j31_12 j32a_12 j32b_12 J32c_12
        j33_12 j34_12 j35a_12 j35b_12 J35c_12
        j19_12 ;
if tipentg_12=2; run;

data aa2; set aa1;
        imamj26_12=j26_12;
**** Amputation N=4;
        if j25_12 =1 and j26_12=. then imamj26_12=0;
        if j25_12 =. and j26_12=. then imamj26_12=0;
        if j25_12 >=2 and j26_12=. then imamj26_12=.;
        if j26_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamj26_12=.;
                if imamj26_12=. and j27a_12=. then j27a_12=9;
        dumj26_12=1*(imamj26_12=.);
        imamj28_12=j28_12;
**** Amputation N=4;
        if j25_12 =1 and j28_12=. then imamj28_12=0;
        if j25_12 =. and j28_12=. then imamj26_12=0;
        if j26_12 <=0 and j28_12=. then imamj28_12=0;
        if j28_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamj28_12=.;
                if imamj28_12=. and j29a_12=. then j29a_12=9;
                dumj28_12=1*(imamj28_12=.);
        imamj31_12=j31_12;
**** Amputation N=313;
        if j19_12 =1 and j31_12=. then imamj31_12=0;
        if j22_12 in (6,7) and j31_12=. then imamj31_12=0;
        if j22_12 =. and j31_12=. then imamj31_12=0;
        if j22_12 in (8,9) and j31_12=. then imamj31_12=.;
        if j22_12 in (1,2,3,4,5) and j31_12=. then imamj31_12=.;
         if j31_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999,99999
98) then imamj31_12=.; ***n>3,487;
                if imamj31_12=. and j32a_12=. then j32a_12=9;
                        dumj31_12=1*(imamj31_12=.);
        imamj34_12=j34_12;
**** Amputation N=29;
        if j33_12 ne 1 and j34_12=. then imamj34_12=0;
        if j34_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999,99999
98) then imamj34_12=.;
```

```
                if imamj34_12=. and j35a_12=. then j35a_12=9;
                dumj34_12=1*(imamj34_12=.);
run;

***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname(keep=cunicah  subhog_12 tipentg_12 yrschool sex_12_max age_12_max
imam&vname dum&vname low&vname up&vname &mix1 &mix2); set aa2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
                if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax; end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
%mend range;

%range(j26_12,j27a_12,j27b_12,J27c_12, 24000,6000,15000,1500,j27a_12);  run;
%range(j28_12,j29a_12,j29b_12,J29c_12,4200000,150000,400000,75000);  run;
%range(j31_12,j32a_12,j32b_12,J32c_12,9000000,150000,750000,75000,j22_12);  run;
%range(j34_12,j35a_12,j35b_12,J35c_12,7000000,150000,750000,75000,j33_12);  run;

data output2.group3_proxy_housing1; merge dataj26_12 dataj28_12 dataj31_12
dataj34_12 ;
        by cunicah subhog_12; run;


data dd1; set output2.group3_proxy_housing1;    **** proxy N=731 ;
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
                imamj26_12
                lowj26_12 upj26_12
        dumj26_12
                ;
run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
```

```
                                Imput2012_Total Group3
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamj26_12  yrschool;

transfer cunicah subhog_12 tipentg_12
        lowj26_12 upj26_12
                dumj26_12
;
 bounds
  imamj26_12 (>=lowj26_12 ,<=upj26_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data dd1; set output2.group3_proxy_housing1;    **** proxy N=731;
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
                imamj28_12
                lowj28_12 upj28_12
        dumj28_12
                ;
run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
```

```
                                Imput2012_Total Group3
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;

mixed  imamj28_12  yrschool;

transfer cunicah subhog_12 tipentg_12
        lowj28_12 upj28_12
                dumj28_12
;
 bounds
  imamj28_12 (>=lowj28_12 ,<=upj28_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data dd1; set output2.group3_proxy_housing1;    **** proxy N=731;
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
                imamj31_12 imamj34_12
                lowj31_12 upj31_12
        lowj34_12 upj34_12
                dumj31_12
                dumj34_12;
run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
```

```
                              Imput2012_Total Group3
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_3;

categorical sex_12_max ;

count age_12_max;

mixed  imamj31_12 imamj34_12 yrschool;

transfer cunicah subhog_12 tipentg_12
        lowj31_12 upj31_12
    lowj34_12 upj34_12
                dumj31_12
                dumj34_12
;
 bounds
  imamj31_12 (>=lowj31_12 ,<=upj31_12)
  imamj34_12 (>=lowj34_12 ,<=upj34_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group3_proxy_housing1_imputed; merge dd_1 dd_2 dd_3; by cunicah
subhog_12;
        drop
        lowj26_12 upj26_12
    lowj28_12 upj28_12
        lowj31_12 upj31_12
    lowj34_12 upj34_12   ; run;
```

Imput2012_Total Group3

```
proc freq; table imamj26_12; where dumj26_12=1;  run;   *** n=4;
proc freq; table imamj28_12; where dumj28_12=1;  run;   *** n=4;
proc freq; table imamj31_12; where dumj31_12=1;  run;   *** n=313;
proc freq; table imamj34_12; where dumj34_12=1;  run;   *** n=29;



*** print putput: prior imputation;
Title "Group3 proxy Housing - before imputation (mean with zero)";
proc means data=output2.group3_proxy_housing  mean std min max n nmiss;
        variable amj26 amj28 amj31 amj34; run;

*** print putput: mean with zero;
Title "Group3 proxy Housing - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group3_proxy_housing_imputed;
        var amj26 amj28 amj31 amj34;
run;

*** print output2: mean without zero;
data group1; set imp2.group3_proxy_housing_imputed;
  if amj26  =0 then amj26 =.;
  if amj28  =0 then amj28 =.;
  if amj31  =0 then amj31 =.;
  if amj34  =0 then amj34 =.;
run;

Title "Group3 proxy Housing - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var amj26 amj28 amj31 amj34; run;




proc freq; table j25_12 j26_12 amj26 j27a_12; run;
proc freq; table j26_12 j28_12 amj28 j29a_12 ;  run;
proc freq; table j22_12 j31_12 amj31 j32a_12 ; run;
proc freq; table j33_12 j34_12 amj34 j35a_12 ; run;

proc means data=aa2 n mean std min max nmiss; variable amj26 amj28 amj31 amj34 ;
run;



/*******************************************************/
/* PROGRAM NAME  : Imput2012_group3_proxy_pension.SAS    */
/* PROGRAMMED BY : DONG ZHANG                          */
```

```
                              Imput2012_Total Group3
/* LAST UPDATEED : 02/04/2016                                  */
/* Impute missing value on proxy questionnaire                 */

/*************************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter; run;

/*
proc contents data=input.sect_g_j_k_sa_2012; run;       *** not imputed N=10,427,
var=680;
*/

data aa; set input.sect_g_j_k_sa_2012;                                  *** proxy
and proxy questionnaire N=10,427;
        proc sort  nodupkey; by cunicah subhog_12; run;  *** no duplicate;

***** Proxy questionnaire N=731;
data bb1; set aa;
        keep cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
        k17_12
        k19_1_12 k20_1_12 k21a1_12 k21b1_12 k21c1_12
        k19_2_12 k20_2_12 k21a2_12 k21b2_12 k21c2_12
        k17_12 k17a_12  k24_1_12 k25a1_12 k25b1_12 k25c1_12
                                    k24_2_12 k25a2_12 k25b2_12 k25c2_12
        k31a_12 k33_1_12 k34a1_12 k34b1_12 k34c1_12
        k31b_12 k33_2_12 k34a2_12 k34b2_12 k34c2_12
        k31c_12 k33_3_12 k34a3_12 k34b3_12 k34c3_12
        k38_12  k39_12
                k40_12 k41a_12 k41b_12 k41c_12
                k42_12 k43a_12 k43b_12 k43c_12
                k44_12 k45a_12 k45b_12 k45c_12
        k85_12 k86_12 k87a_12 k87b_12 k87c_12
                   k88_12 k89a_12 k89b_12 k89c_12
        k1_12  k1a_12
        k3_1_12 k4_1_12 k5a1_12 k5b1_12 k5c1_12
        k3_2_12 k4_2_12 k5a2_12 k5b2_12 k5c2_12
                  k8_1_12 k9a1_12 k9b1_12 k9c1_12
                  k8_2_12 k9a2_12 k9b2_12 k9c2_12  ;
if tipentg_12=2; run;

******************** 1 **********************;
data bb2; set bb1;
        imamk20_1_12=k20_1_12;
**** Amputation N=0;
                if k17_12=2 and k20_1_12=. then imamk20_1_12=0;
                if k17_12 in (8,9) and k20_1_12=. then imamk20_1_12=.;
```

```
                if k19_1_12 =2 and k20_1_12=. then imamk20_1_12=0;
                        if k19_1_12 =2 and k20_1_12=. then imamk20_1_12=0;
                        if k19_1_12 in(8,9) and k20_1_12=. then imamk20_1_12=.;
                if k20_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999998,99999
99) then imamk20_1_12=.;
                if imamk20_1_12=. and k21a1_12=. then k21a1_12=9;
        imamk20_2_12=k20_2_12;
**** Amputation N=0;
                if k17_12 in (2,8,9) and k20_2_12=. then imamk20_2_12=0;
                if k19_2_12 =2 and k20_2_12=. then imamk20_2_12=0;
                if k19_2_12 =. and k20_2_12=. then imamk20_2_12=0;
                if k20_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999998,99999
99) then imamk20_2_12=.;
                if imamk20_2_12=. and k21a2_12=. then k21a2_12=9;
        imamk24_1_12=k24_1_12;
**** Amputation N=23;
                if k17_12=2 and k24_1_12=. then imamk24_1_12=0;
                if k17_12 in (8,9) and k24_1_12=. then imamk24_1_12=.;
                if k24_1_12=. then imamk24_1_12=0;
                if k24_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999998,99999
99) then imamk24_1_12=.;
                if imamk24_1_12=. and k25a1_12=. then k25a1_12=9;
        imamk24_2_12=k24_2_12;
**** Amputation N=1;
        if k17_12 ne 1 and k24_2_12=. then imamk24_2_12=0;
                if k17a_12=2 and imamk24_2_12=. then imamk24_2_12=0;
                if k24_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999998,99999
99) then imamk24_2_12=.;
                if imamk24_2_12=. and k25a2_12=. then k25a2_12=9;
        dumk20_1_12=1*(imamk20_1_12=.);
        dumk20_2_12=1*(imamk20_2_12=.);
        dumk24_1_12=1*(imamk24_1_12=.);
        dumk24_2_12=1*(imamk24_2_12=.);
run;

***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname(keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
imam&vname dum&vname low&vname up&vname &mix1 &mix2);
        set bb2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
```

```
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                        if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
%mend range;

%range(k20_1_12,k21a1_12,k21b1_12,k21c1_12,1000000,150000,400000,75000,k17_12,
k19_1_12);  run;
%range(k20_2_12,k21a2_12,k21b2_12,k21c2_12,400000,150000,400000,75000,k19_2_12);
run;
%range(k24_1_12,k25a1_12,k25b1_12,k25c1_12,9000000,150000,400000,75000,k17_12);
run;
%range(k24_2_12,k25a2_12,k25b2_12,k25c2_12,1500000,150000,400000,75000);  run;

data output2.group3_proxy_pension1; merge datak20_1_12 datak20_2_12 datak24_1_12
datak24_2_12 ;
        by cunicah subhog_12;
        drop k17_12 k19_1_12 k19_2_12 ; run;

****** 2*****************;
data bb2; set bb1;
        imamk33_1_12=k33_1_12;
**** Amputation N=       ;
                if k31a_12 =2 and k33_1_12=. then imamk33_1_12=0;
                if k31a_12 in(8,9) and k33_1_12=. then imamk33_1_12=.;
                if k33_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999998,99999
99) then imamk33_1_12=.;
                if imamk33_1_12=. and k34a1_12=. then k34a1_12=9;
        imamk33_2_12=k33_2_12;
**** Amputation N=;
                if k31b_12 =2 and k33_2_12=. then imamk33_2_12=0;
                if k31b_12 in (8,9) and k33_2_12=. then imamk33_2_12=.;
                if k33_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999998,99999
99) then imamk33_2_12=.;
                if imamk33_2_12=. and k34a2_12=. then k34a2_12=9;
        imamk33_3_12=k33_3_12;
```

```
                                Imput2012_Total Group3
**** Amputation N=;
                if k31c_12 =2 and k33_3_12=. then imamk33_3_12=0;
                if k31c_12 in (8,9) and k33_3_12=. then imamk33_3_12=.;
                if k33_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999998,99999
99) then imamk33_3_12=.;
                if imamk33_3_12=. and k34a3_12=. then k34a3_12=9;
                        dumk33_1_12=1*(imamk33_1_12=.);
                        dumk33_2_12=1*(imamk33_2_12=.);
                        dumk33_3_12=1*(imamk33_3_12=.);
run;

%range(k33_1_12,k34a1_12,k34b1_12,k34c1_12,5000000,20000,70000,10000,k31a_12);
run;
%range(k33_2_12,k34a2_12,k34b2_12,k34c2_12, 300000,20000,70000,10000,k31b_12);
run;
%range(k33_3_12,k34a3_12,k34b3_12,k34c3_12,1500000,20000,70000,10000,k31c_12);
run;
data output2.group3_proxy_pension2; merge datak33_1_12 datak33_2_12 datak33_3_12  ;

        by cunicah subhog_12;
        drop k31a_12 k31b_12 k31c_12; run;

********** 3 ********************;
data bb2; set bb1;
        imamk40_12=k40_12;
**** Amputation N=42/179;
                if k38_12=2 and k40_12=. then imamk40_12=0;
                if k38_12 in (8,9) and k40_12=. then imamk40_12=.;
                        if k39_12 =2 and k40_12=. then imamk40_12=0;
                        if k39_12 in(8,9) and k40_12=. then imamk40_12=.;
                if k40_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
8,9999999,9999099) then imamk40_12=.;
                if imamk40_12=. and k41a_12=. then k41a_12=9;
        imamk42_12=k42_12;
**** Amputation N=612/2704;
                if k38_12=2 and k42_12=. then imamk42_12=0;
                if k38_12 in (8,9) and k42_12=. then imamk42_12=.;
                if k42_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
8,9999999,9999099) then imamk42_12=.;
                if imamk42_12=. and k43a_12=. then k43a_12=9;
        imamk44_12=k44_12;
**** Amputation N=2941/6488;
                if k44_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
8,9999999,9999099) then imamk44_12=.;
                if k44_12 in
```

```
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
8,9999999,9999099)
                        then k44b_12=9;           *** create a variable for mix
imputed;
                if imamk44_12=. and k45a_12=. then k45a_12=9;
                        dumk40_12=1*(imamk40_12=.);
                        dumk42_12=1*(imamk42_12=.);
                        dumk44_12=1*(imamk44_12=.);
run;

%range(k40_12,k41a_12,k41b_12,k41c_12, 320000,150000,400000,75000,k38_12,k39_12);
run;
%range(k42_12,k43a_12,k43b_12,k43c_12,6150000,150000,400000,75000,k38_12);  run;
%range(k44_12,k45a_12,k45b_12,k45c_12,9000000,150000,400000,75000,k44b_12);  run;

data output2.group3_proxy_pension3; merge datak40_12 datak42_12 datak44_12  ;
        by cunicah subhog_12;
        drop k38_12 k39_12 k44b_12; run;

****************** 4 ********************;
data bb2; set bb1;
        imamk86_12=k86_12;
**** Amputation N=77/1080;
                if k85_12 =2 and k86_12=. then imamk86_12=0;
                if k85_12 in (8,9) and k86_12=. then imamk86_12=.;
                if k86_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
8,9999999,9999099) then imamk86_12=.;
                if imamk86_12=. and k87a_12=. then k87a_12=9;
        imamk88_12=k88_12;
**** Amputation N=951/9696;
                if k88_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999989,999998,8888888
,9999998,9999999,9999099) then imamk88_12=.;
                if k88_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999989,999998,8888888
,9999998,9999999,9999099)
                        then k88_12b=9;                         *** create a
variable for mix imputed;
                if imamk88_12=. and k89a_12=. then k89a_12=9;

        imamk4_1_12=k4_1_12;
**** Amputation N=15/74;
                if k1_12 =2 and k4_1_12=. then imamk4_1_12=0;
                if k1_12 in (8,9) and k4_1_12=. then imamk4_1_12=.;
                        if k3_1_12 =2 and k4_1_12=. then imamk4_1_12=0;
                        if k3_1_12 in (8,9) and k4_1_12=. then imamk4_1_12=.;
                if k4_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
```

```
8,9999999,9999099) then imamk4_1_12=.;
                if imamk4_1_12=. and k5a1_12=. then k5a1_12=9;
        imamk4_2_12=k4_2_12;
**** Amputation N=1/6;
                if k1_12 ne 1 and k4_2_12 =. then imamk4_2_12=0;
                if k4_2_12 =2 and k4_2_12 =. then imamk4_2_12=0;
                        if k3_2_12 in (8,9) and k4_2_12=. then imamk4_2_12=.;
                if k4_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
8,9999999,9999099) then imamk4_2_12=.;
                if imamk4_2_12=. and k5a2_12=. then k5a2_12=9;

        imamk8_1_12=k8_1_12;
**** Amputation N=584/1335;
                if k1_12 =2 and k8_1_12=. then imamk8_1_12=0;
                if k1_12 in (8,9) and k8_1_12=. then imamk8_1_12=.;
                if k8_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
8,9999999,9999099) then imamk8_1_12=.;
                if imamk8_1_12=. and k9a1_12=. then k9a1_12=9;
        imamk8_2_12=k8_2_12;
**** Amputation N=33/82;
                if k1_12 ne 1 and k8_2_12=. then imamk8_2_12=0;
                if k1a_12 =2 and k8_2_12=. then imamk8_2_12=0;
                if k8_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,8888888,999999
8,9999999,9999099) then imamk8_2_12=.;
                if imamk8_2_12=. and k9a2_12=. then k9a2_12=9;
                        dumk86_12=1*(imamk86_12=.);
                        dumk88_12=1*(imamk88_12=.);
                        dumk4_1_12=1*(imamk4_1_12=.);
                        dumk4_2_12=1*(imamk4_2_12=.);
                        dumk8_1_12=1*(imamk8_1_12=.);
                        dumk8_2_12=1*(imamk8_2_12=.);
run;

%range(k86_12,k87a_12,k87b_12,k87c_12, 2000000,20000,70000,10000, k85_12);  run;
%range(k88_12,k89a_12,k89b_12,k89c_12,  250000, 6000,10000, 3000);  run;

%range(k4_1_12,k5a1_12,k5b1_12,k5c1_12, 560000,120000,400000,40000,k1_12,k3_1_12);
run;
%range(k4_2_12,k5a2_12,k5b2_12,k5c2_12,  100000, 120000,400000,40000,k3_2_12);
run;

%range(k8_1_12,k9a1_12,k9b1_12,k9c1_12, 9000000,120000,400000,40000,k1_12);  run;
%range(k8_2_12,k9a2_12,k9b2_12,k9c2_12, 8000000,120000,400000,40000);  run;

data output2.group3_proxy_pension4; merge datak86_12  datak88_12  datak4_1_12
datak4_2_12  datak8_1_12  datak8_2_12 ;
```

```
                              Imput2012_Total Group3
        by cunicah subhog_12;
        drop k85_12 k1_12 k3_1_12 k3_2_12 ; run;



****** Imputation *****************;
********* 1 *********************;
data dd1; set output2.group3_proxy_pension1;    **** proxy ;
keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
                imamk20_1_12  lowk20_1_12  upk20_1_12    dumk20_1_12
                imamk20_2_12  lowk20_2_12  upk20_2_12    dumk20_2_12; run;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk20_1_12  imamk20_2_12 yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk20_1_12  upk20_1_12
  lowk20_2_12  upk20_2_12
   dumk20_1_12   dumk20_2_12
;
 bounds
  imamk20_1_12 (>=lowk20_1_12 ,<=upk20_1_12)
  imamk20_2_12 (>=lowk20_2_12 ,<=upk20_2_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
```

```
                                Imput2012_Total Group3
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);


data dd1; set output2.group3_proxy_pension1;    **** proxy nonproxy N=9,696 var=54;
keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
                imamk24_1_12 imamk24_2_12 lowk24_1_12  upk24_1_12 dumk24_1_12
lowk24_2_12 upk24_2_12 dumk24_2_12; run;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;

mixed  imamk24_1_12 imamk24_2_12 yrschool;

transfer cunicah subhog_12 tipentg_12

  lowk24_1_12  upk24_1_12
  lowk24_2_12  upk24_2_12
   dumk24_1_12
   dumk24_2_12
;
 bounds
  imamk24_1_12 (>=lowk24_1_12 ,<=upk24_1_12)
  imamk24_2_12 (>=lowk24_2_12 ,<=upk24_2_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;
```

Imput2012_Total Group3

```
/* ITERATIONS 5; */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data imp2.group3_proxy_pension1_imputed; merge dd_1 dd_2; by cunicah subhog_12;
        drop
        lowk20_1_12  upk20_1_12
        lowk20_2_12  upk20_2_12
        lowk24_1_12  upk24_1_12
        lowk24_2_12  upk24_2_12
 ; run;

/* data temp; set imp2.group3_proxy_pension1_imputed; run;
        proc freq; table imamk20_1_12; where dumk20_1_12=1; run;  *** n=5 imp=0 ;
        proc freq; table imamk20_2_12; where dumk20_2_12=1; run;  *** n=9 noimp;
        proc freq; table imamk24_1_12; where dumk24_1_12=1; run;   ***n=23 imp;
        proc freq; table imamk24_2_12; where dumk24_2_12=1; run;   ****n=1 no imp;

*/

************** 2********************;
data dd1; set output2.group3_proxy_pension2;     **** proxy nonproxy N=9,696
var=54;
keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
        imamk33_1_12  lowk33_1_12  upk33_1_12    dumk33_1_12; run;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;
```

```
count age_12_max;

mixed  imamk33_1_12  yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk33_1_12  upk33_1_12
   dumk33_1_12
 ;
 bounds
  imamk33_1_12 (>=lowk33_1_12 ,<=upk33_1_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data dd1; set output2.group3_proxy_pension2;     **** proxy nonproxy N=9,696
var=54;
keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
        imamk33_2_12  lowk33_2_12  upk33_2_12    dumk33_2_12; run;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;
```

```
                                Imput2012_Total Group3
mixed  imamk33_2_12  yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk33_2_12  upk33_2_12
    dumk33_2_12
 ;
 bounds
  imamk33_2_12 (>=lowk33_2_12 ,<=upk33_2_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);


data dd1; set output2.group3_proxy_pension2;     **** proxy nonproxy N=9,696
var=54;
keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
        imamk33_3_12  lowk33_3_12  upk33_3_12    dumk33_3_12; run;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_3;

categorical sex_12_max ;

count age_12_max;

mixed  imamk33_3_12  yrschool;
```

```
                              Imput2012_Total Group3
transfer cunicah subhog_12 tipentg_12
  lowk33_3_12  upk33_3_12
   dumk33_3_12
 ;
 bounds
  imamk33_3_12 (>=lowk33_3_12 ,<=upk33_3_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data imp2.group3_proxy_pension2_imputed; merge dd_1 dd_2 dd_3; by cunicah
subhog_12;
        drop
  lowk33_1_12  upk33_1_12
  lowk33_2_12  upk33_2_12
  lowk33_3_12  upk33_3_12
 ; run;

/* data temp; set imp2.group3_proxy_pension2_imputed; run;
        proc freq; table imamk33_1_12; where dumk33_1_12=1; run;  *** n=28 imp;
        proc freq; table imamk33_2_12; where dumk33_2_12=1; run;  *** n=7 no imp;
        proc freq; table imamk33_3_12; where dumk33_3_12=1; run;   ***n=7 noimp
all=0;
*/

********************** 3 ************************;
data dd1; set output2.group3_proxy_pension3;     **** proxy nonproxy N=9,696
var=54;
keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
                imamk40_12  lowk40_12  upk40_12    dumk40_12; run;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
```

```
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk40_12  yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk40_12  upk40_12
   dumk40_12
  ;
 bounds
  imamk40_12 (>=lowk40_12 ,<=upk40_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data dd1; set output2.group3_proxy_pension3;     **** proxy nonproxy N=9,696
var=54;
keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
                imamk42_12  lowk42_12  upk42_12    dumk42_12
                imamk44_12  lowk44_12  upk44_12    dumk44_12;
run;

***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
```

```
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;

mixed   imamk42_12 imamk44_12 yrschool;

transfer cunicah subhog_12 tipentg_12
   lowk42_12  upk42_12
  lowk44_12  upk44_12

   dumk42_12
   dumk44_12
  ;
 bounds

  imamk42_12 (>=lowk42_12 ,<=upk42_12)
  imamk44_12 (>=lowk44_12 ,<=upk44_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data imp2.group3_proxy_pension3_imputed; merge dd_1 dd_2; by cunicah subhog_12;
        drop
  lowk40_12  upk40_12
  lowk42_12  upk42_12
  lowk44_12  upk44_12
 ; run;

/* data temp; set imp2.group3_proxy_pension3_imputed; run;
        proc freq; table imamk40_12; where dumk40_12=1; run;  *** n=4 noimp;
        proc freq; table imamk42_12; where dumk42_12=1; run;  *** n=21 imp;
        proc freq; table imamk44_12; where dumk44_12=1; run;   ***n=227 imp;
  ****n=22 not imputed/no degrees of freedom left for perturbations;
```

```
                                Imput2012_Total Group3

*/


************ 4************************;
data dd1; set output2.group3_proxy_pension4;
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
        imamk86_12    lowk86_12  upk86_12   dumk86_12   ;
run;

**RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed    imamk86_12  yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk86_12  upk86_12
                        dumk86_12
;
 bounds
   imamk86_12 (>=lowk86_12 ,<=upk86_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
```

```
                                Imput2012_Total Group3
%impute(name=impute, dir=d:/piname/wong/year2012/);

data dd1; set output2.group3_proxy_pension4;
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
        imamk88_12  lowk88_12  upk88_12  dumk88_12 ;
run;

**RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12_max ;

count age_12_max;

mixed   imamk88_12  yrschool;

transfer cunicah subhog_12 tipentg_12
    lowk88_12  upk88_12
                dumk88_12
;
 bounds
  imamk88_12 (>=lowk88_12 ,<=upk88_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/*  ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data dd1; set output2.group3_proxy_pension4;
```

```
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
        imamk4_1_12   lowk4_1_12  upk4_1_12  dumk4_1_12  ;
run;

**RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_3;
categorical sex_12_max ;

count age_12_max;

mixed    imamk4_1_12   yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk4_1_12  upk4_1_12
                        dumk4_1_12
;
 bounds
  imamk4_1_12 (>=lowk4_1_12 ,<=upk4_1_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);


data dd1; set output2.group3_proxy_pension4;
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
        imamk4_2_12   lowk4_2_12  upk4_2_12  dumk4_2_12  ;
run;
```

Imput2012_Total Group3

```
**RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_4;

categorical sex_12_max ;

count age_12_max;

mixed    imamk4_2_12   yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk4_2_12  upk4_2_12
                        dumk4_2_12
;
 bounds
  imamk4_2_12 (>=lowk4_2_12 ,<=upk4_2_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data dd1; set output2.group3_proxy_pension4;
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
        imamk8_1_12   lowk8_1_12  upk8_1_12  dumk8_1_12  ;
run;

**RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
```

```
                              Imput2012_Total Group3
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_5;

categorical sex_12_max ;

count age_12_max;

mixed    imamk8_1_12   yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk8_1_12  upk8_1_12
                        dumk8_1_12
;
 bounds
  imamk8_1_12 (>=lowk8_1_12 ,<=upk8_1_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data dd1; set output2.group3_proxy_pension4;
        keep cunicah subhog_12 tipentg_12 sex_12_max age_12_max yrschool
        imamk8_2_12   lowk8_2_12  upk8_2_12  dumk8_2_12  ;
run;   ***** k8_2_12 has no missing;


**RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;
```

Imput2012_Total Group3

```
data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_6;

categorical sex_12_max ;

count age_12_max;

mixed    imamk8_2_12   yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk8_2_12  upk8_2_12
                        dumk8_2_12
;
 bounds
  imamk8_2_12 (>=lowk8_2_12 ,<=upk8_2_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
 multiples 1 ;
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group3_proxy_pension4_imputed; merge dd_1 dd_2 dd_3 dd_4 dd_5 dd1;
by cunicah subhog_12;
        drop
  lowk86_12  upk86_12
  lowk88_12  upk88_12
  lowk4_1_12  upk4_1_12
  lowk4_2_12  upk4_2_12
  lowk8_1_12  upk8_1_12
  lowk8_2_12  upk8_2_12

 ; run;
```

```
                                Imput2012_Total Group3
/* data temp; set imp2.group3_proxy_pension4_imputed; run;
        proc freq; table imamk86_12; where dumk86_12=1; run;  *** n=12 no imp;
        proc freq; table imamk88_12; where dumk88_12=1; run;  *** n=102 imp;
        proc freq; table imamk4_1_12; where dumk4_1_12=1; run;   ***n=5 all=0
noimp;
        proc freq; table imamk4_2_12; where dumk4_2_12=1; run;   ***n=84  all=6000
noimp ;
        proc freq; table imamk8_1_12; where dumk8_1_12=1; run;   ***n=39   imp;
        proc freq; table imamk8_2_12; where dumk8_2_12=1; run;   ***no missing;
*/



proc means n mean std min max nmiss; variable amk201 lowk201 upk201; where amk201
ne 0; run;
proc means n mean std min max nmiss; variable amk202 lowk202 upk202; where amk202
ne 0; run;
proc means n mean std min max nmiss; variable amk241 lowk241 upk241; where amk241
ne 0; run;
proc means n mean std min max nmiss; variable amk242 lowk242 upk242; where amk242
ne 0; run;

proc means n mean std min max nmiss; variable amk331 lowk331 upk331; where amk331
ne 0; run;
proc means n mean std min max nmiss; variable amk332 lowk332 upk332; where amk332
ne 0; run;
proc means n mean std min max nmiss; variable amk333 lowk333 upk333; where amk333
ne 0; run;

proc means n mean std min max nmiss; variable amk40 lowk40 upk40; where amk40 ne 0;
run;
proc means n mean std min max nmiss; variable amk42 lowk42 upk42; where amk42 ne 0;
run;
proc means n mean std min max nmiss; variable amk44 lowk44 upk44; where amk44 ne 0;
run;

proc means n mean std min max nmiss; variable amk86 lowk86 upk86; where amk86 ne 0;
run;
proc means n mean std min max nmiss; variable amk88 lowk88 upk88; where amk88 ne 0;
run;

proc means n mean std min max nmiss; variable amk4_1 lowk4_1 upk4_1; where amk4_1
ne 0; run;
proc means n mean std min max nmiss; variable amk4_2 lowk4_2 upk4_2; where amk4_2
ne 0; run;

proc means n mean std min max nmiss; variable amk8_1 lowk8_1 upk8_1; where amk8_1
ne 0; run;
```

```
                                Imput2012_Total Group3
proc means n mean std min max nmiss; variable amk8_2 lowk8_2 upk8_2; where amk8_2
ne 0; run;



libname imp 'd:\piname\wong\year2012\IMPfiles';  run;
data dd1; set output.group3_proxy_pension;  run;   **** proxy nonproxy N=731
var=54;


***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  amk201 amk202 amk241 amk242 amk331 amk332 amk333 amk40  amk42  amk44
                                  amk86  amk88  amk4_1  amk4_2  amk8_1  amk8_2
yrschool;
transfer cunicah subhog_12 tipentg_12
  lowk201  upk201
  lowk202  upk202
  lowk241  upk241
  lowk242  upk242
  lowk331  upk331
  lowk332  upk332
  lowk333  upk333
  lowk40  upk40
  lowk42  upk42
  lowk44  upk44
  lowk86  upk86
  lowk88  upk88
  lowk4_1  upk4_1
  lowk4_2  upk4_2
```

```
  lowk8_1  upk8_1
  lowk8_2  upk8_2        ;
 bounds
  amk201 (>=lowk201 ,<=upk201)
  amk202 (>=lowk202 ,<=upk202)
  amk241 (>=lowk241 ,<=upk241)
  amk242 (>=lowk242 ,<=upk242)

  amk331 (>=lowk331 ,<=upk331)
  amk332 (>=lowk332 ,<=upk332)
  amk333 (>=lowk333 ,<=upk333)

  amk40 (>=lowk40 ,<=upk40)
  amk42 (>=lowk42 ,<=upk42)
  amk44 (>=lowk44 ,<=upk44)

  amk86 (>=lowk86 ,<=upk86)
  amk88 (>=lowk88 ,<=upk88)

  amk4_1 (>=lowk4_1 ,<=upk4_1)
  amk4_2 (>=lowk4_2 ,<=upk4_2)

  amk8_1 (>=lowk8_1 ,<=upk8_1)
  amk8_2 (>=lowk8_2 ,<=upk8_2)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

ITERATIONS 5;
/* multiples 5 ; */
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp.group3_proxy_pension_imputed; set dd_1;
        drop
  lowk201  upk201
  lowk202  upk202
  lowk241  upk241
  lowk242  upk242
  lowk331  upk331
  lowk332  upk332
  lowk333  upk333
  lowk40  upk40
  lowk42  upk42
  lowk44  upk44
```

```
  lowk86  upk86
  lowk88  upk88
  lowk4_1  upk4_1
  lowk4_2  upk4_2
  lowk8_1  upk8_1
  lowk8_2  upk8_2
 ; run;

*** print putput: prior imputation;
Title "group3 proxy pension - before imputation (mean with zero)";
proc means data=output.group3_proxy_pension  mean std min max n nmiss;
        variable amk201 amk202 amk241 amk242 amk331 amk332 amk333 amk40  amk42
amk44
                                   amk86  amk88  amk4_1  amk4_2  amk8_1  amk8_2; run;


*** print putput: mean with zero;
Title "group3 proxy pension - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp.group3_proxy_pension_imputed;
        var amk201 amk202 amk241 amk242 amk331 amk332 amk333 amk40  amk42  amk44
                                   amk86  amk88  amk4_1  amk4_2  amk8_1  amk8_2;
run;

*** print output: mean without zero;
data group1; set imp.group3_proxy_pension_imputed;
  if amk201  =0  then  amk201 =.;
  if amk202  =0  then  amk202 =.;
  if amk241  =0  then  amk241 =.;
  if amk242  =0  then  amk242 =.;

  if amk331  =0  then amk331 =.;
  if amk332  =0  then  amk332 =.;
  if amk333  =0  then  amk333 =.;

  if amk40  =0  then  amk40 =.;
  if amk42  =0  then  amk42 =.;
  if amk44  =0  then  amk44 =.;

  if amk86  =0  then  amk86 =.;
  if amk88  =0  then  amk88 =.;

  if amk4_1  =0  then  amk4_1 =.;
  if amk4_2  =0  then  amk4_2 =.;

  if amk8_1  =0  then  amk8_1 =.;
  if amk8_2  =0  then  amk8_2 =.;
run;

Title "group3 proxy pension - imputed (mean without zero)";
```

```
                              Imput2012_Total Group3
proc means data=group1 mean std min max n ;
        var amk201 amk202 amk241 amk242 amk331 amk332 amk333 amk40  amk42  amk44
                                amk86  amk88  amk4_1  amk4_2  amk8_1  amk8_2;
run;


/*******************************************************/
/* PROGRAM NAME  : Imput2012_group3_report.SAS         */
/* PROGRAMMED BY : DONG ZHANG                          */
/* LAST UPDATEED : 02/12/2016                          */
/*
                        */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter nodate; run;

*************** core/housing ************************;
*** print putput: prior imputation;
Title "Group3 core Housing - before imputation (mean with zero)";
proc means data=output2.group3_core_housing1  mean std min max n nmiss;
        variable imamj26_12 imamj28_12 imamj31_12 imamj34_12; run;

Title "Group3 core Housing - before imputation (mean without zero)";
data out1; set output2.group3_core_housing1;
  if imamj26_12  =0 then imamj26_12 =.;
  if imamj28_12  =0 then imamj28_12 =.;
  if imamj31_12  =0 then imamj31_12 =.;
  if imamj34_12  =0 then imamj34_12 =.;
proc means data=out1  mean std min max n nmiss;
        variable imamj26_12 imamj28_12 imamj31_12 imamj34_12; run;

*** print putput: mean with zero;
Title "Group3 core Housing - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group3_core_housing1_imputed;
        var imamj26_12 imamj28_12 imamj31_12 imamj34_12;
run;

*** print output: mean without zero;
data imp1; set imp2.group3_core_housing1_imputed;
  if imamj26_12  =0 then imamj26_12 =.;
  if imamj28_12  =0 then imamj28_12 =.;
  if imamj31_12  =0 then imamj31_12 =.;
  if imamj34_12  =0 then imamj34_12 =.;
run;
Title "Group3 core Housing - imputed (mean without zero)";
```

```
                              Imput2012_Total Group3
proc means data=imp1 mean std min max n ;
        var imamj26_12 imamj28_12 imamj31_12 imamj34_12; run;

****************** core /pension  ******************;
data out1; merge output2.group3_core_pension1 output2.group3_core_pension2
output2.group3_core_pension3 output2.group3_core_pension4;
        by cunicah subhog_12; run;
data imp1; merge imp2.group3_core_pension1_imputed
imp2.group3_core_pension2_imputed imp2.group3_core_pension3_imputed
        imp2.group3_core_pension4_imputed;
        by cunicah subhog_12; run;

*** print putput: prior imputation;
Title "group3 core pension - before imputation (mean with zero)";
proc means data=out1  mean std min max n nmiss;
        variable imamk20_1_12 imamk20_2_12 imamk24_1_12 imamk24_2_12 imamk33_1_12
imamk33_2_12 imamk33_3_12 imamk40_12  imamk42_12  imamk44_12
                         imamk86_12  imamk88_12  imamk4_1_12  imamk4_2_12
imamk8_1_12  imamk8_2_12; run;

Title "group3 core pension - before imputation (mean without zero)";
data out2; set out1;
  if imamk20_1_12  =0  then  imamk20_1_12 =.;
  if imamk20_2_12  =0  then  imamk20_2_12 =.;
  if imamk24_1_12  =0  then  imamk24_1_12 =.;
  if imamk24_2_12  =0  then  imamk24_2_12 =.;
  if imamk33_1_12  =0  then imamk33_1_12 =.;
  if imamk33_2_12  =0  then  imamk33_2_12 =.;
  if imamk33_3_12  =0  then  imamk33_3_12 =.;
  if imamk40_12  =0  then  imamk40_12 =.;
  if imamk42_12  =0  then  imamk42_12 =.;
  if imamk44_12  =0  then  imamk44_12 =.;
  if imamk86_12  =0  then  imamk86_12 =.;
  if imamk88_12  =0  then  imamk88_12 =.;
  if imamk4_1_12  =0  then  imamk4_1_12 =.;
  if imamk4_2_12  =0  then  imamk4_2_12 =.;
  if imamk8_1_12  =0  then  imamk8_1_12 =.;
  if imamk8_2_12  =0  then  imamk8_2_12 =.;
run;
proc means data=out2  mean std min max n ;
        variable imamk20_1_12 imamk20_2_12 imamk24_1_12 imamk24_2_12 imamk33_1_12
imamk33_2_12 imamk33_3_12 imamk40_12  imamk42_12  imamk44_12
                         imamk86_12  imamk88_12  imamk4_1_12  imamk4_2_12
imamk8_1_12  imamk8_2_12; run;

*** print putput: imputed;
*** print putput: mean with zero;

Title "group3 core pension - imputed (mean with zero)";
```

```
                              Imput2012_Total Group3
proc means mean std min max n nmiss data=imp1;
        var imamk20_1_12 imamk20_2_12 imamk24_1_12 imamk24_2_12 imamk33_1_12
imamk33_2_12 imamk33_3_12 imamk40_12  imamk42_12  imamk44_12
            imamk86_12  imamk88_12  imamk4_1_12  imamk4_2_12  imamk8_1_12
imamk8_2_12;
run;

*** print output2: mean without zero;
data imp2; set imp1;
  if imamk20_1_12  =0  then  imamk20_1_12 =.;
  if imamk20_2_12  =0  then  imamk20_2_12 =.;
  if imamk24_1_12  =0  then  imamk24_1_12 =.;
  if imamk24_2_12  =0  then  imamk24_2_12 =.;
  if imamk33_1_12  =0  then imamk33_1_12 =.;
  if imamk33_2_12  =0  then  imamk33_2_12 =.;
  if imamk33_3_12  =0  then  imamk33_3_12 =.;
  if imamk40_12  =0  then  imamk40_12 =.;
  if imamk42_12  =0  then  imamk42_12 =.;
  if imamk44_12  =0  then  imamk44_12 =.;
  if imamk86_12  =0  then  imamk86_12 =.;
  if imamk88_12  =0  then  imamk88_12 =.;
  if imamk4_1_12  =0  then  imamk4_1_12 =.;
  if imamk4_2_12  =0  then  imamk4_2_12 =.;
  if imamk8_1_12  =0  then  imamk8_1_12 =.;
  if imamk8_2_12  =0  then  imamk8_2_12 =.;
run;

Title "group3 core pension - imputed (mean without zero)";
proc means data=imp2 mean std min max n ;
        var imamk20_1_12 imamk20_2_12 imamk24_1_12 imamk24_2_12 imamk33_1_12
imamk33_2_12 imamk33_3_12 imamk40_12  imamk42_12  imamk44_12
                                  imamk86_12  imamk88_12  imamk4_1_12  imamk4_2_12
imamk8_1_12  imamk8_2_12;
run;


***************** proxy/ Housing ****************************;
*** print putput: prior imputation;
Title "Group3 proxy Housing - before imputation (mean with zero)";
proc means data=output2.group3_proxy_housing1  mean std min max n nmiss;
        variable imamj26_12 imamj28_12 imamj31_12 imamj34_12; run;

Title "Group3 proxy Housing - before imputation (mean without zero)";
data out1; set output2.group3_proxy_housing1;
  if imamj26_12  =0 then imamj26_12 =.;
  if imamj28_12  =0 then imamj28_12 =.;
  if imamj31_12  =0 then imamj31_12 =.;
  if imamj34_12  =0 then imamj34_12 =.;
proc means data=out1  mean std min max n nmiss;
```

```
                                Imput2012_Total Group3
        variable imamj26_12 imamj28_12 imamj31_12 imamj34_12; run;

*** print putput: imputed - mean with zero;
Title "Group3 proxy Housing - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group3_proxy_housing1_imputed;
        var imamj26_12 imamj28_12 imamj31_12 imamj34_12;
run;

*** print output: imputed-mean without zero;
data imp1; set imp2.group3_proxy_housing1_imputed;
  if imamj26_12  =0 then imamj26_12 =.;
  if imamj28_12  =0 then imamj28_12 =.;
  if imamj31_12  =0 then imamj31_12 =.;
  if imamj34_12  =0 then imamj34_12 =.;
run;
Title "Group3 proxy Housing - imputed (mean without zero)";
proc means data=imp1 mean std min max n ;
        var imamj26_12 imamj28_12 imamj31_12 imamj34_12; run;


****************** proxy /pension  ******************;
data out1; merge output2.group3_proxy_pension1 output2.group3_proxy_pension2
output2.group3_proxy_pension3 output2.group3_proxy_pension4;
        by cunicah subhog_12; run;
data imp1; merge imp2.group3_proxy_pension1_imputed
imp2.group3_proxy_pension2_imputed imp2.group3_proxy_pension3_imputed
        imp2.group3_proxy_pension4_imputed;
        by cunicah subhog_12; run;

*** print putput: prior imputation;
Title "group3 proxy pension - before imputation (mean with zero)";
proc means data=out1  mean std min max n nmiss;
        variable imamk20_1_12 imamk20_2_12 imamk24_1_12 imamk24_2_12 imamk33_1_12
imamk33_2_12 imamk33_3_12 imamk40_12  imamk42_12  imamk44_12
                         imamk86_12  imamk88_12  imamk4_1_12  imamk4_2_12
imamk8_1_12  imamk8_2_12; run;

Title "group3 proxy pension - before imputation (mean without zero)";
data out2; set out1;
  if imamk20_1_12  =0  then  imamk20_1_12 =.;
  if imamk20_2_12  =0  then  imamk20_2_12 =.;
  if imamk24_1_12  =0  then  imamk24_1_12 =.;
  if imamk24_2_12  =0  then  imamk24_2_12 =.;
  if imamk33_1_12  =0  then imamk33_1_12 =.;
  if imamk33_2_12  =0  then  imamk33_2_12 =.;
  if imamk33_3_12  =0  then  imamk33_3_12 =.;
  if imamk40_12  =0  then  imamk40_12 =.;
  if imamk42_12  =0  then  imamk42_12 =.;
  if imamk44_12  =0  then  imamk44_12 =.;
```

```
  if imamk86_12  =0  then  imamk86_12 =.;
  if imamk88_12  =0  then  imamk88_12 =.;
  if imamk4_1_12  =0  then  imamk4_1_12 =.;
  if imamk4_2_12  =0  then  imamk4_2_12 =.;
  if imamk8_1_12  =0  then  imamk8_1_12 =.;
  if imamk8_2_12  =0  then  imamk8_2_12 =.;
run;
proc means data=out2  mean std min max n ;
        variable imamk20_1_12 imamk20_2_12 imamk24_1_12 imamk24_2_12 imamk33_1_12
imamk33_2_12 imamk33_3_12 imamk40_12  imamk42_12  imamk44_12
                         imamk86_12  imamk88_12  imamk4_1_12  imamk4_2_12
imamk8_1_12  imamk8_2_12; run;

*** print putput: imputed;
*** print putput: mean with zero;

Title "group3 proxy pension - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp1;
        var imamk20_1_12 imamk20_2_12 imamk24_1_12 imamk24_2_12 imamk33_1_12
imamk33_2_12 imamk33_3_12 imamk40_12  imamk42_12  imamk44_12
            imamk86_12  imamk88_12  imamk4_1_12  imamk4_2_12  imamk8_1_12
imamk8_2_12;
run;

*** print output2: mean without zero;
data imp2; set imp1;
  if imamk20_1_12  =0  then  imamk20_1_12 =.;
  if imamk20_2_12  =0  then  imamk20_2_12 =.;
  if imamk24_1_12  =0  then  imamk24_1_12 =.;
  if imamk24_2_12  =0  then  imamk24_2_12 =.;
  if imamk33_1_12  =0  then imamk33_1_12 =.;
  if imamk33_2_12  =0  then  imamk33_2_12 =.;
  if imamk33_3_12  =0  then  imamk33_3_12 =.;
  if imamk40_12  =0  then  imamk40_12 =.;
  if imamk42_12  =0  then  imamk42_12 =.;
  if imamk44_12  =0  then  imamk44_12 =.;
  if imamk86_12  =0  then  imamk86_12 =.;
  if imamk88_12  =0  then  imamk88_12 =.;
  if imamk4_1_12  =0  then  imamk4_1_12 =.;
  if imamk4_2_12  =0  then  imamk4_2_12 =.;
  if imamk8_1_12  =0  then  imamk8_1_12 =.;
  if imamk8_2_12  =0  then  imamk8_2_12 =.;
run;

Title "group3 proxy pension - imputed (mean without zero)";
proc means data=imp2 mean std min max n ;
        var imamk20_1_12 imamk20_2_12 imamk24_1_12 imamk24_2_12 imamk33_1_12
imamk33_2_12 imamk33_3_12 imamk40_12  imamk42_12  imamk44_12
                                imamk86_12  imamk88_12  imamk4_1_12  imamk4_2_12
```

```
                                    Imput2012_Total Group3
imamk8_1_12  imamk8_2_12;
run;
```

GROUP 4. Hospitalizations and other utilization of services

```
                                Imput2012_Total Group4
/*****************************************************/
/* PROGRAM NAME  : Imput2012_group4_core.SAS          */
/* PROGRAMMED BY : DONG ZHANG                         */
/* LAST UPDATEED : 02/04/2016                         */
/* Impute missing value on core and proxy questionnaire */

/*****************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter; run;

/*
proc contents data=input.sect_a_c_d_e_pc_f_h_i_em_2012; run;    *** not imputed
N=15,723, var=999;
*/

data aa; set input.sect_a_c_d_e_pc_f_h_i_em_2012;                                  ***
core and proxy questionnaire;
        proc sort out=temp nodupkey; by cunicah np; run;                           ***
no duplicate;
        proc freq ;table tipent_12; run;

**** Core N=14,448;
data aa1; set aa;
        keep cunicah np age_12 sex_12 yrschool tipent_12 subhog_12
        d4_12
        d6_12 d7a_12 d7b_12 d7c_12
        d8_1_12 d9_1_12 d10a1_12 d10b1_12 d10c1_12
        d8_2_12 d9_2_12 d10a2_12 d10b2_12 d10c2_12
        d8_3_12 d9_3_12 d10a3_12 d10b3_12 d10c3_12
        d8_4_12 d9_4_12 d10a4_12 d10b4_12 d10c4_12
        d11_12 d12a_12  d12b_a_12 d12b_b_12 d12b_c_12;
        if tipent_12<=2;
run;
        proc sort;  by cunicah np; run;


***** define missing value;
data aa2; set aa1;
        if age_12=999 then age_12=.;                                    ****
missing N=25;
        if yrschool in (88,99) then yrschool=.;                 **** missing N=68;
        amd_school=yrschool;
        amd_age=age_12;
        imamd6_12=d6_12;
        **** impute N=81;
                if d4_12=0 and d6_12=. then imamd6_12=0;
```

```
                                Imput2012_Total Group4
                if d4_12>=888 and d6_12=. then imamd6_12=.;
                if d4_12 in(888,999) then d4_12m=9;       **** create mix imp
variable;
                if d6_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777) then imamd6_12=.;
                if imamd6_12=. and d7a_12=. then d7a_12=9;
        imamd9_1_12=d9_1_12;
**** impute N=16/833;
                if d8_1_12=0 and d9_1_12=. then imamd9_1_12=0;
                if d9_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777)  then imamd9_1_12=.;

                if d9_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888)  then d9_1_12m=9;   ***
create a mix imp variable;
                if imamd9_1_12=. and d10a1_12=. then d10a1_12=9;
        imamd9_2_12=d9_2_12;
**** impute N=102/3342;
                if d8_2_12=0 and d9_2_12=.  then imamd9_2_12=0;
                if d9_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777) then imamd9_2_12=.;
                if d9_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888) then d9_2_12m=9;;
                if imamd9_2_12=. and  d10a2_12=. then d10a2_12=9;
        imamd9_3_12=d9_3_12;
        **** impute N=13/188;
                if d8_3_12=0 and d9_3_12=. then imamd9_3_12=0;
                if d9_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777) then imamd9_3_12=.;

                if d9_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888) then d9_3_12m=.;
                if imamd9_3_12=. and d10a3_12=. then d10a3_12=9;
        imamd9_4_12=d9_4_12;
        **** impute N=116/3272;
                if d8_4_12=0 and d9_4_12=. then imamd9_4_12=0;
                if d9_4_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777) then imamd9_4_12=.;

                if d9_4_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888) then d9_4_12m=9;

                if imamd9_4_12=. and d10a4_12=. then d10a4_12=9;
        imamd12a_12=d12a_12;
        **** impute N=306/5765;
                if d12a_12  in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777) then imamd12a_12=.;
                if d12a_12  in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888) then d12a_12m=9;
```

```
                if imamd12a_12=. and d12b_a_12=. then d12b_a_12=9;
                dumd6_12=1*(imamd6_12=.);
                dumd9_1_12=1*(imamd9_1_12=.);
                dumd9_2_12=1*(imamd9_2_12=.);
                dumd9_3_12=1*(imamd9_3_12=.);
                dumd9_4_12=1*(imamd9_4_12=.);
                dumd12a_12=1*(imamd12a_12=.);
run;

/* proc freq; table d4_12m d9_1_12m d9_2_12m d9_3_12m d9_4_12m d12a_12m; run;  */

***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname(keep=cunicah np tipent_12 age_12 sex_12 yrschool imam&vname
dum&vname low&vname up&vname &mix1 &mix2);
        set aa2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                        if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
%mend range;

%range(d6_12,d7a_12,d7b_12,d7c_12,300000,6000,24000,3000,d4_12m);  run;
%range(d9_1_12,d10a1_12,d10b1_12,d10c1_12,24000,1500,12000,300,d9_1_12m);  run;
%range(d9_2_12,d10a2_12,d10b2_12,d10c2_12,600000,1500,12000,300,d9_2_12m);  run;
%range(d9_3_12,d10a3_12,d10b3_12,d10c3_12,130000,1500,12000,300,d9_3_12m);  run;
%range(d9_4_12,d10a4_12,d10b4_12,d10c4_12,260000,1500,12000,300,d9_4_12m);  run;
%range(d12a_12,d12b_a_12,d12b_b_12,d12b_c_12,70000,300,1500,150,d12a_12m);  run;

data output2.group4_core_health; merge datad6_12 datad9_1_12 datad9_2_12
datad9_3_12 datad9_4_12 datad12a_12;
 by cunicah np;
        drop d4_12m d9_1_12m  d9_2_12m  d9_3_12m  d9_4_12m d12a_12m; run;
```

```
                              Imput2012_Total Group4
 /*     label imamd6_12="total hospital expense"
               imamd9_1_12="total expense for consults"
               imamd9_2_12="total expense for dentist visit(s)"
               imamd9_3_12="total expense for outpatient procedures"
               imamd9_4_12="total expense for medical visits"
               imamd12a_12="monthly medication expense"   */


data dd1; set output2.group4_core_health;  run;   **** Core nonproxy N=14,448
var=30;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12 ;
count age_12;
mixed  imamd6_12 imamd9_1_12 imamd9_2_12 imamd9_3_12 imamd9_4_12 imamd12a_12
yrschool;
transfer cunicah np  tipent_12
        lowd6_12 upd6_12 lowd9_1_12 upd9_1_12 lowd9_2_12 upd9_2_12 lowd9_3_12

        upd9_3_12 lowd9_4_12 upd9_4_12 lowd12a_12 upd12a_12
               dumd6_12
               dumd9_1_12
               dumd9_2_12
               dumd9_3_12
               dumd9_4_12
               dumd12a_12 ;
 bounds        imamd6_12(<=upd6_12,>=lowd6_12)
                       imamd9_1_12(<=upd9_1_12,>=lowd9_1_12)
                       imamd9_2_12(<=upd9_2_12,>=lowd9_2_12)
                       imamd9_3_12(<=upd9_3_12,>=lowd9_3_12)

                       imamd9_4_12(<=upd9_4_12,>=lowd9_4_12)
                       imamd12a_12(<=upd12a_12,>=lowd12a_12)
```

```
                                Imput2012_Total Group4
                            yrschool(<=22, >=0);

INTERACT age_12*sex_12 age_12*age_12 sex_12*yrschool yrschool*yrschool ;


/*ITERATIONS 5;  */
/* multiples 5 ; */
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);


/*
        proc freq; table imamd6_12; where dumd6_12=1; run;  *** imp n=81;
        proc freq; table imamd9_1_12; where dumd9_1_12=1; run;  *** n=16 imp;
        proc freq; table imamd9_2_12; where dumd9_2_12=1; run;  *** n=102 imp;
        proc freq; table imamd9_3_12; where dumd9_3_12=1; run;  *** n=13 imp;
        proc freq; table imamd9_4_12; where dumd9_4_12=1; run;  *** n=116 imp;
        proc freq; table imamd12a_12; where dumd12a_12=1; run;  *** n=306 imp;

*/


data data imp2.group4_core_health_imputed; set dd_1;
        drop
        lowd6_12 upd6_12 lowd9_1_12 upd9_1_12 lowd9_2_12 upd9_2_12 lowd9_3_12

        upd9_3_12 lowd9_4_12 upd9_4_12 lowd12a_12 upd12a_12 ;
  run;




*** print putput: prior imputation;
Title "group4 core health - before imputation (mean with zero)";
proc means data=output2.group4_core_health  mean std min max n nmiss;
        variable imamd6_12 imamd9_1_12 imamd9_2_12  imamd9_3_12  imamd9_4_12
imamd12a_12; run;

*** print putput: mean with zero;
Title "group4 core health - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp.group4_core_health_imputed;
        var imamd6_12 imamd9_1_12 imamd9_2_12  imamd9_3_12  imamd9_4_12
imamd12a_12; run;

*** print output: mean without zero;
```

```
                              Imput2012_Total Group4
data group1; set imp.group4_core_health_imputed;
  if imamd6_12  =0  then  imamd6_12 =.;
  if imamd9_1_12  =0  then  imamd9_1_12 =.;
  if imamd9_2_12  =0  then  imamd9_2_12 =.;
  if imamd9_3_12  =0  then  imamd9_3_12 =.;
  if imamd9_4_12  =0  then  imamd9_4_12 =.;
  if imamd12a_12  =0  then  imamd12a_12 =.;
run;

Title "group4 core health - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var imamd6_12 imamd9_1_12 imamd9_2_12  imamd9_3_12  imamd9_4_12
imamd12a_12;
run;




data dd1; set aa3; if tipent_12<=2;   **** Core N=14,448;
                keep cunicah np sex_12 amd_age amd_school imamd6_12 imamd9_1_12
imamd9_2_12 imamd9_3_12 imamd9_4_12 imamd12a_12 amd41
                        lowd6_12 upd6_12 low9_1 up9_1 low9_2 up9_2 low9_3 up9_3
low9_4 up9_4 low12a up12a low41 up41;  run;
data dd2; set aa3; if tipent_12>2;   **** Proxy N=1,275;
                keep cunicah np sex_12 amd_age amd_school imamd6_12 imamd9_1_12
imamd9_2_12 imamd9_3_12 imamd9_4_12 imamd12a_12 amd41
                        lowd6_12 upd6_12 low9_1 up9_1 low9_2 up9_2 low9_3 up9_3
low9_4 up9_4 low12a up12a low41 up41;  run;




/*******************************************************/
/* PROGRAM NAME  : Imput2012_group4_proxy.SAS          */
/* PROGRAMMED BY : DONG ZHANG                          */
/* LAST UPDATEED : 02/05/2016                          */
/* Impute missing value on core and proxy questionnaire */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter; run;
/*
proc contents data=input.sect_a_c_d_e_pc_f_h_i_em_2012; run;    *** not imputed
N=15,723, var=999;
*/
```

```
data aa; set input.sect_a_c_d_e_pc_f_h_i_em_2012;                                   ***
core and proxy questionnaire;
        proc sort out=temp nodupkey; by cunicah np; run;                            ***
no duplicate;
        proc freq ;table tipent_12; run;

**** proxy N=1,275;
data bb1; set aa;
        keep cunicah np age_12 sex_12 yrschool tipent_12 subhog_12
        d4_12
        d6_12 d7a_12 d7b_12 d7c_12
        d8_1_12 d9_1_12 d10a1_12 d10b1_12 d10c1_12
        d8_2_12 d9_2_12 d10a2_12 d10b2_12 d10c2_12
        d8_3_12 d9_3_12 d10a3_12 d10b3_12 d10c3_12
        d8_4_12 d9_4_12 d10a4_12 d10b4_12 d10c4_12
        d11_12 d12a_12  d12b_a_12 d12b_b_12 d12b_c_12;
        if tipent_12>2;
run;
        proc sort;  by cunicah np; run;

***** define missing value;
data bb2; set bb1;
        if age_12=999 then age_12=.;
        if yrschool in (88,99) then yrschool=.;
        /* amd_school=yrschool;
        amd_age=age_12; */
        imamd6_12=d6_12;
        **** impute N=;
                if d4_12=0 and d6_12=. then imamd6_12=0;
                if d4_12>=888 and d6_12=. then imamd6_12=.;
                if d4_12 in(888,999) then d4_12m=9;       **** create mix imp
variable;
                if d6_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777) then imamd6_12=.;
                if imamd6_12=. and d7a_12=. then d7a_12=9;
        imamd9_1_12=d9_1_12;
**** impute N=;
                if d8_1_12=0 and d9_1_12=. then imamd9_1_12=0;
                if d9_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777)  then imamd9_1_12=.;

                if d9_1_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888)  then d9_1_12m=9;   ***
create a mix imp variable;
                if imamd9_1_12=. and d10a1_12=. then d10a1_12=9;
        imamd9_2_12=d9_2_12;
**** impute N=;
                if d8_2_12=0 and d9_2_12=.  then imamd9_2_12=0;
```

```
                if d9_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777) then imamd9_2_12=.;
                if d9_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888) then d9_2_12m=9;;
                if imamd9_2_12=. and  d10a2_12=. then d10a2_12=9;
        imamd9_3_12=d9_3_12;
        **** impute N=;
                if d8_3_12=0 and d9_3_12=. then imamd9_3_12=0;
                if d9_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777) then imamd9_3_12=.;

                if d9_3_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888) then d9_3_12m=.;
                if imamd9_3_12=. and d10a3_12=. then d10a3_12=9;
        imamd9_4_12=d9_4_12;
        **** impute N=;
                if d8_4_12=0 and d9_4_12=. then imamd9_4_12=0;
                if d9_4_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777) then imamd9_4_12=.;

                if d9_4_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888) then d9_4_12m=9;

                if imamd9_4_12=. and d10a4_12=. then d10a4_12=9;
        imamd12a_12=d12a_12;
        **** impute N=;
                if d12a_12  in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777) then imamd12a_12=.;
                if d12a_12  in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888) then d12a_12m=9;
                if imamd12a_12=. and d12b_a_12=. then d12b_a_12=9;
                dumd6_12=1*(imamd6_12=.);
                dumd9_1_12=1*(imamd9_1_12=.);
                dumd9_2_12=1*(imamd9_2_12=.);
                dumd9_3_12=1*(imamd9_3_12=.);
                dumd9_4_12=1*(imamd9_4_12=.);
                dumd12a_12=1*(imamd12a_12=.);
run;



***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname(keep=cunicah np tipent_12 age_12 sex_12 yrschool imam&vname
dum&vname low&vname up&vname &mix1 &mix2);
        set bb2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
```

```
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                        if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
%mend range;

%range(d6_12,d7a_12,d7b_12,d7c_12,300000,6000,24000,3000,d4_12m);  run;
%range(d9_1_12,d10a1_12,d10b1_12,d10c1_12,24000,1500,12000,300,d9_1_12m);  run;
%range(d9_2_12,d10a2_12,d10b2_12,d10c2_12,600000,1500,12000,300,d9_2_12m);  run;
%range(d9_3_12,d10a3_12,d10b3_12,d10c3_12,130000,1500,12000,300,d9_3_12m);  run;
%range(d9_4_12,d10a4_12,d10b4_12,d10c4_12,260000,1500,12000,300,d9_4_12m);  run;
%range(d12a_12,d12b_a_12,d12b_b_12,d12b_c_12,70000,300,1500,150,d12a_12m);  run;

data output2.group4_proxy_health; merge datad6_12 datad9_1_12 datad9_2_12
datad9_3_12 datad9_4_12 datad12a_12;
 by cunicah np;
        drop d4_12m d9_1_12m  d9_2_12m  d9_3_12m  d9_4_12m d12a_12m; run;
        /* label amd6="total hospital expense"
                amd9_1="total expense for consults"
                amd9_2="total expense for dentist visit(s)"
                amd9_3="total expense for outpatient procedures"
                amd9_4="total expense for medical visits"
                amd12a="monthly medication expense"  */


data dd1; set output2.group4_proxy_health;  run;   **** proxy N=1,275 var=30;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
```

```
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12 ;
count age_12;
mixed  imamd6_12 imamd9_1_12 imamd9_2_12 imamd9_3_12 imamd9_4_12 imamd12a_12
yrschool;
transfer cunicah np  tipent_12
        lowd6_12 upd6_12 lowd9_1_12 upd9_1_12 lowd9_2_12 upd9_2_12 lowd9_3_12

        upd9_3_12 lowd9_4_12 upd9_4_12 lowd12a_12 upd12a_12
                dumd6_12
                dumd9_1_12
                dumd9_2_12
                dumd9_3_12
                dumd9_4_12
                dumd12a_12 ;
 bounds         imamd6_12(<=upd6_12,>=lowd6_12)
                        imamd9_1_12(<=upd9_1_12,>=lowd9_1_12)
                        imamd9_2_12(<=upd9_2_12,>=lowd9_2_12)
                        imamd9_3_12(<=upd9_3_12,>=lowd9_3_12)

                        imamd9_4_12(<=upd9_4_12,>=lowd9_4_12)
                        imamd12a_12(<=upd12a_12,>=lowd12a_12)

                        yrschool(<=22, >=0);

INTERACT age_12*sex_12 age_12*age_12 sex_12*yrschool yrschool*yrschool ;


/*ITERATIONS 5;  */
/* multiples 5 ; */
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);


data data imp2.group4_proxy_health_imputed; set dd_1;
        drop
        lowd6_12 upd6_12 lowd9_1_12 upd9_1_12 lowd9_2_12 upd9_2_12 lowd9_3_12

        upd9_3_12 lowd9_4_12 upd9_4_12 lowd12a_12 upd12a_12 ;
  run;
```

Imput2012_Total Group4

```
/*
        proc freq; table imamd6_12; where dumd6_12=1; run;  *** imp n=21;
        proc freq; table imamd9_1_12; where dumd9_1_12=1; run;  *** n=6 imp;
        proc freq; table imamd9_2_12; where dumd9_2_12=1; run;  *** n=37 imp;
        proc freq; table imamd9_3_12; where dumd9_3_12=1; run;  *** n=8 imp;
        proc freq; table imamd9_4_12; where dumd9_4_12=1; run;  *** n=40 imp;
        proc freq; table imamd12a_12; where dumd12a_12=1; run;  *** n=71 imp;

*/



proc means n mean std min max  nmiss; var amd6 lowd6 upd6; where amd6 ne 0; run;
proc means n mean std min max  nmiss; var amd9_1 lowd9_1 upd9_1; where amd9_1 ne 0;
run;
proc means n mean std min max  nmiss; var amd9_2 lowd9_2 upd9_2; where amd9_2 ne 0;
run;
proc means n mean std min max  nmiss; var amd9_3 lowd9_3 upd9_3; where amd9_3 ne 0;
run;
proc means n mean std min max  nmiss; var amd9_4 lowd9_4 upd9_4; where amd9_4 ne 0;
run;
proc means n mean std min max  nmiss; var amd12a lowd12a upd12a; where amd12a ne 0;
run;



  *** print putput: prior imputation;
Title "group4 proxy health - before imputation (mean with zero)";
proc means data=output.group4_proxy_health  mean std min max n nmiss;
        variable amd6 amd9_1 amd9_2  amd9_3  amd9_4  amd12a; run;

*** print putput: mean with zero;
Title "group4 proxy health - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp.group4_proxy_health_imputed;
        var amd6 amd9_1 amd9_2  amd9_3  amd9_4  amd12a; run;

*** print output: mean without zero;
data group1; set imp.group4_proxy_health_imputed;
  if amd6  =0  then  amd6 =.;
  if amd9_1  =0  then  amd9_1 =.;
  if amd9_2  =0  then  amd9_2 =.;
  if amd9_3  =0  then  amd9_3 =.;
  if amd9_4  =0  then  amd9_4 =.;
  if amd12a  =0  then  amd12a =.;
run;
```

```
                                Imput2012_Total Group4
Title "group4 proxy health - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var amd6 amd9_1 amd9_2  amd9_3  amd9_4  amd12a;
run;



/*************************************************/
/* PROGRAM NAME  : Imput2012_group4_kin.SAS          */
/* PROGRAMMED BY : DONG ZHANG                        */
/* LAST UPDATEED : 02/05/2015                        */
/* Impute missing value on Next-of-Kin questionnaire */
/*************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter; run;

/*
proc contents data=input.sect_sa_sb_sc_sd_se_sh_si_2012; run;   *** not imputed
N=2,742, var=358;
*/

data bb; set input.sect_sa_sb_sc_sd_se_sh_si_2012;                      ***
Next-of-Kin questionnaire;
        proc sort out=temp nodupkey; by cunicah np; run;                        ***
no duplicate;

data bb1; set bb;
**** n=2,742 var=26;
        keep cunicah np d_age_12 sex_12 yrschool
        sd3_12 sd5_12 sd6a_12 sd6b_12 sd6c_12
        sd7_12 sd8_12 sd9a_12 sd9b_12 sd9c_12
        sd10a_12 sd10b1_12 sd10b2_12 sd10b3_12
        sd11a_12
        sd12a_12 sd12b_12 sd12c_12
        sd13a_12 sd13b_12 sd13c_12;
run;
        proc sort;  by cunicah np; run;

proc freq; table sd11a_12 sd12a_12; run;


***** define missing value;
data bb2; set bb1;
        if d_age_12=999 then d_age_12=.;
**** missing N=16;
        if yrschool in (88,99) then yrschool=.;                         ****
```

```
                                Imput2012_Total Group4
missing N=30;
        imamsd5_12=sd5_12;
                **** impute n=209/609;
                if sd3_12=0 and sd5_12=. then imamsd5_12=0;
                if sd3_12>=888 and sd5_12=. then imamsd5_12=.;
                if sd3_12>=888 and sd5_12=. then sd3_12m =9;   ***mix imp
variables;
                if sd5_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,888889) then
imamsd5_12=.;
                if sd5_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,888889) then
sd5_12m=9;  ***mix imp var;
                if imamsd5_12=. and sd6a_12=. then sd6a_12=9;
        imamsd8_12=sd8_12;
                **** impute n=259/1029;
                if sd7_12=0 and sd8_12=. then imamsd8_12=0;
                if sd8_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,888889) then
imamsd8_12=.;
                if sd8_12 in (888888,999999) then sd8_12m=9;     ***mix imp
variables;
                if imamsd8_12=. and sd9a_12=. then sd9a_12=9;
        imamsd10a_12=sd10a_12;
        **** impute n=344/1429;
                if sd10a_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,888889) then
imamsd10a_12=.;
                if sd10a_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,999998,888889) then
sd10a_12m=9; ***mix imp var;
                if imamsd10a_12=. and sd10b1_12=. then sd10b1_12=9;
        imamsd12a_12=.;
        **** impute n=344/1429;
                if sd11a_12 =8 then imamsd12a_12=0;
                if sd11a_12 in (88,99) then imamsd12a_12=.;
                if sd11a_12 in (88,99) then sd11a_12m=9;
                if sd12a_12=7 then imamsd12a_12=0;
                if sd12a_12=9 then sd12a_12m=9;
        imamsd13a_12=.;
        **** impute n=344/1429;
                if sd13a_12=7 then imamsd13a_12=0;
                if sd13a_12 =9 then imamsd13a_12=.;
                if sd13a_12 =9 then sd13a_12m=9;             *** mix imp var;
                        dumsd5_12=1*(imamsd5_12=.);
                        dumsd8_12=1*(imamsd8_12=.);
                        dumsd10a_12=1*(imamsd10a_12=.);
                        dumsd12a_12=1*(imamsd12a_12=.);
                        dumsd13a_12=1*(imamsd13a_12=.);
```

```
run;
/*
label   imamsd5_12="total hospital expense"
                imamsd8_12="total Medical visit expense"
                imamsd10a_12="Monthly medication expense";
run;  */


***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname(keep=cunicah np d_age_12 sex_12 yrschool  imam&vname dum&vname
low&vname up&vname &mix1 &mix2);
        set bb2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                        if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
%mend range;

%range(sd5_12,sd6a_12,sd6b_12,sd6c_12,600000,6000,24000,3000,sd3_12m,sd5_12m);
run;
%range(sd8_12,sd9a_12,sd9b_12,sd9c_12,700000,1500,12000,300,sd8_12m);  run;
%range(sd10a_12,sd10b1_12,sd10b2_12,sd10b3_12,300000,300,1500,150,sd10a_12m);  run;
%range(sd12a_12,sd12a_12,sd12b_12,sd12c_12,24000,6000,24000,3000,sd11a_12m,sd12a_12
m);  run;
%range(sd13a_12,sd13a_12,sd13b_12,sd13c_12,24000,6000,24000,3000,sd13a_12m);  run;


data output2.group4_kin_health; merge datasd5_12 datasd8_12 datasd10a_12
datasd12a_12 datasd13a_12; *** n=2,742 var=26;
 by cunicah np;
        drop sd3_12m sd5_12m sd8_12m sd10a12m sd11a_12m sd12a_12m sd13a_12m; run;
```

Imput2012_Total Group4

```
data dd1; set output2.group4_kin_health;     **** kin N=2,742 var=26;
keep cunicah np d_age_12 sex_12 yrschool
        imamsd5_12 dumsd5_12 lowsd5_12 upsd5_12
        imamsd8_12 dumsd8_12 lowsd8_12 upsd8_12
        imamsd10a_12 dumsd10a_12 lowsd10a_12 upsd10a_12
        ; run;


***RUN IVEWARE PROGRAM : kin;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12 ;
count d_age_12;
mixed  imamsd5_12 imamsd8_12 imamsd10a_12  yrschool;

transfer cunicah np
        lowsd5_12 upsd5_12 lowsd8_12 upsd8_12 lowsd10a_12 upsd10a_12
        dumsd5_12 dumsd8_12 dumsd10a_12
        ;
 bounds         imamsd5_12(<=upsd5_12,>=lowsd5_12)
                        imamsd8_12(<=upsd8_12,>=lowsd8_12)
                        imamsd10a_12(<=upsd10a_12,>=lowsd10a_12)

                        yrschool(<=22, >=0);

INTERACT d_age_12*sex_12 d_age_12*d_age_12 sex_12*yrschool yrschool*yrschool ;


/* ITERATIONS 5;  */
/* multiples 5 ; */
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);
```

Imput2012_Total Group4

```
data data imp2.group4_kin_health_imputed; set dd_1;
        drop
        lowsd5_12 upsd5_12 lowsd8_12 upsd8_12 lowsd10a_12 upsd10a_12 ;
  run;

        proc freq; table imamsd5_12; where dumsd5_12=1; run;  *** imp n=232;
        proc freq; table imamsd8_12; where dumsd8_12=1; run;  *** n=259 imp;
        proc freq; table imamsd10a_12; where dumsd10a_12=1; run;  *** n=344 imp;


data dd1; set output2.group4_kin_health;     **** kin N=2,742 var=26;
keep cunicah np d_age_12 sex_12 yrschool
        imamsd12a_12 dumsd12a_12 lowsd12a_12 upsd12a_12
        imamsd13a_12 dumsd13a_12 lowsd13a_12 upsd13a_12
        ; run;


***RUN IVEWARE PROGRAM : kin;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_2;

categorical sex_12 ;
count d_age_12;
mixed  imamsd12a_12 imamsd13a_12  yrschool;

transfer cunicah np
        lowsd12a_12 upsd12a_12  lowsd13a_12 upsd13a_12
         dumsd12a_12     dumsd13a_12
        ;
 bounds
                        imamsd12a_12(<=upsd12a_12,>=lowsd12a_12)
                        imamsd13a_12(<=upsd13a_12,>=lowsd13a_12)

                        yrschool(<=22, >=0);

INTERACT d_age_12*sex_12 d_age_12*d_age_12 sex_12*yrschool yrschool*yrschool ;
```

Imput2012_Total Group4

```
/* ITERATIONS 5;  */
/* multiples 5 ; */
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);


        proc freq; table imamsd12a_12; where dumsd12a_12=1; run;  *** n=1,536 all
zero;
        proc freq; table imamsd13a_12; where dumsd13a_12=1; run;  *** n=1,320 all
zero;
```

```
*** print putput: prior imputation;
Title "group4 kin health - before imputation (mean with zero)";
proc means data=output.group4_kin_health  mean std min max n nmiss;
        variable amsd5 amsd8 amsd10; run;

*** print putput: mean with zero;
Title "group4 kin health - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp.group4_kin_health_imputed;
        var amsd5 amsd8 amsd10; run;

*** print output: mean without zero;
data group1; set imp.group4_kin_health_imputed;
```

```
  if amsd5  =0  then  amsd5 =.;
    if amsd8  =0  then  amsd8 =.;
         if amsd10  =0  then  amsd10 =.;
run;

Title "group4 kin health - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var amsd5 amsd8 amsd10;
run;
```

```
data dd1; set bb3;
                keep cunicah np sex_12 amd_age amd_school amsd5 amsd8 amsd10
                        lowsd5_12 upsd5 lowsd8_12 upsd8_12 lowsd10_12 upsd10_12_12;
 run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12 ;
count amd_age;
mixed  amsd5 amsd8 amsd10 amd_school;

transfer cunicah np
        lowsd5_12 upsd5 lowsd8_12 upsd8_12 lowsd10_12 upsd10_12_12;

 bounds         amsd5(<=upsd5,>=lowsd5_12)
                        amsd8(<=upsd8_12,>=lowsd8_12)
```

```
                              Imput2012_Total Group4
                          amsd10(<=upsd10_12_12,>=lowsd10_12)
                          amd_school(<=22, >=0);

INTERACT amd_age*sex_12 amd_age*amd_age sex_12*amd_school amd_school*amd_school ;


ITERATIONS 5;
/* multiples 5 ; */
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data ddd_1(keep= cunicah np imamsd5_12 imamsd8_12 imamsd10_12 );
        set dd_1;
        rename  amsd5=imamsd5_12 amsd8=imamsd8_12 amsd10=imamsd10_12 ; run;
data ddd_2; set ddd_1 ;
        label   imamsd5_12="total hospital expense(imputed)"
                        imamsd8_12="total Medical visit expense(imputed)"
                        imamsd10_12="Monthly medication expense(imputed)"
;
        proc sort; by cunicah np; run;
data data output.group4b; merge bb2(keep= cunicah np  amsd5 amsd8 amsd10) ddd_2; by
cunicah np; run;


*** print putput: mean with zero;
Title "Group4b (mean with zero)";
proc means mean std min max n nmiss data=output.group4b;
        var amsd5 imamsd5_12 amsd8 imamsd8_12 amsd10 imamsd10_12;
run;

data group4b; set output.group4b;
    if amsd5=0 then amsd5=.;
    if amsd8=0 then amsd8=.;
    if amsd10=0 then amsd10=.;
                    if imamsd5_12=0 then imamsd5_12=.;
                if imamsd8_12=0 then imamsd8_12=.;
                if imamsd10_12=0 then imamsd10_12=.;            run;

*** print output: mean without zero;
Title "Group4b (mean without zero)";
proc means data=group4b mean std min max n ;
        var amsd5 imamsd5_12 amsd8 imamsd8_12 amsd10 imamsd10_12;
run;
```

```
/*******************************************************/
/* PROGRAM NAME  : Imput2012_group4_report.SAS         */
/* PROGRAMMED BY : DONG ZHANG                          */
/* LAST UPDATEED : 02/12/2016                          */
/*
                        */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter nodate; run;


*************** core **************
*** print putput: prior imputation;
Title "group4 core health - before imputation (mean with zero)";
proc means data=output2.group4_core_health  mean std min max n nmiss;
        variable imamd6_12 imamd9_1_12 imamd9_2_12  imamd9_3_12  imamd9_4_12
imamd12a_12; run;
Title "group4 core health - before imputation (mean without zero)";
data out1; set output2.group4_core_health;
  if imamd6_12  =0  then  imamd6_12 =.;
  if imamd9_1_12  =0  then  imamd9_1_12 =.;
  if imamd9_2_12  =0  then  imamd9_2_12 =.;
  if imamd9_3_12  =0  then  imamd9_3_12 =.;
  if imamd9_4_12  =0  then  imamd9_4_12 =.;
  if imamd12a_12  =0  then  imamd12a_12 =.;
run;
proc means data=out1 mean std min max n ;
        var imamd6_12 imamd9_1_12 imamd9_2_12  imamd9_3_12  imamd9_4_12
imamd12a_12;
run;

*** print putput: impted -mean with zero;
Title "group4 core health - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group4_core_health_imputed;
        var imamd6_12 imamd9_1_12 imamd9_2_12  imamd9_3_12  imamd9_4_12
imamd12a_12; run;

*** print output: imputed - mean without zero;
data imp1; set imp2.group4_core_health_imputed;
  if imamd6_12  =0  then  imamd6_12 =.;
  if imamd9_1_12  =0  then  imamd9_1_12 =.;
  if imamd9_2_12  =0  then  imamd9_2_12 =.;
```

```
  if imamd9_3_12  =0  then  imamd9_3_12 =.;
  if imamd9_4_12  =0  then  imamd9_4_12 =.;
  if imamd12a_12  =0  then  imamd12a_12 =.;
run;
Title "group4 core health - imputed (mean without zero)";
proc means data=imp1 mean std min max n ;
        var imamd6_12 imamd9_1_12 imamd9_2_12  imamd9_3_12  imamd9_4_12
imamd12a_12;
run;


*************** proxy **************
*** print putput: prior imputation;
Title "group4 proxy health - before imputation (mean with zero)";
proc means data=output2.group4_proxy_health  mean std min max n nmiss;
        variable imamd6_12 imamd9_1_12 imamd9_2_12  imamd9_3_12  imamd9_4_12
imamd12a_12; run;
Title "group4 proxy health - before imputation (mean without zero)";
data out1; set output2.group4_proxy_health;
  if imamd6_12  =0  then  imamd6_12 =.;
  if imamd9_1_12  =0  then  imamd9_1_12 =.;
  if imamd9_2_12  =0  then  imamd9_2_12 =.;
  if imamd9_3_12  =0  then  imamd9_3_12 =.;
  if imamd9_4_12  =0  then  imamd9_4_12 =.;
  if imamd12a_12  =0  then  imamd12a_12 =.;
run;
proc means data=out1 mean std min max n ;
        var imamd6_12 imamd9_1_12 imamd9_2_12  imamd9_3_12  imamd9_4_12
imamd12a_12;
run;

*** print putput: impted -mean with zero;
Title "group4 proxy health - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group4_proxy_health_imputed;
        var imamd6_12 imamd9_1_12 imamd9_2_12  imamd9_3_12  imamd9_4_12
imamd12a_12; run;

*** print output: imputed - mean without zero;
data imp1; set imp2.group4_proxy_health_imputed;
  if imamd6_12  =0  then  imamd6_12 =.;
  if imamd9_1_12  =0  then  imamd9_1_12 =.;
  if imamd9_2_12  =0  then  imamd9_2_12 =.;
  if imamd9_3_12  =0  then  imamd9_3_12 =.;
  if imamd9_4_12  =0  then  imamd9_4_12 =.;
  if imamd12a_12  =0  then  imamd12a_12 =.;
run;
Title "group4 proxy health - imputed (mean without zero)";
proc means data=imp1 mean std min max n ;
        var imamd6_12 imamd9_1_12 imamd9_2_12  imamd9_3_12  imamd9_4_12
```

```
imamd12a_12;
run;

********************** Kin ******************************;
*** print putput: prior imputation;
Title "group4 kin health - before imputation (mean with zero)";
proc means data=output2.group4_kin_health  mean std min max n nmiss;
        variable imamsd5_12 imamsd8_12 imamsd10a_12 imamsd12a_12 imamsd13a_12; run;

Title "group4 kin health - before imputation (mean without zero)";
data out1; set output2.group4_kin_health;
        if imamsd5_12=0 then imamsd5_12=.;
        if imamsd8_12=0 then imamsd8_12=.;
        if imamsd10a_12=0 then imamsd10a_12=.;
        if imamsd12a_12=0 then imamsd12a_12=.;
        if imamsd13a_12=0 then imamsd13a_12=.;  run;
proc means data=out1  mean std min max n ;
        variable imamsd5_12 imamsd8_12 imamsd10a_12 imamsd12a_12 imamsd13a_12; run;


*** print putput: mean with zero;
Title "group4 kin health - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group4_kin_health_imputed;
        var imamsd5_12 imamsd8_12 imamsd10a_12 ; run;

*** print output: mean without zero;
Title "group4 kin health - imputed (mean without zero)";
data imp1; set imp2.group4_kin_health_imputed;
        if imamsd5_12=0 then imamsd5_12=.;
        if imamsd8_12=0 then imamsd8_12=.;
        if imamsd10a_12=0 then imamsd10a_12=.;
        if imamsd12a_12=0 then imamsd12a_12=.;
        if imamsd13a_12=0 then imamsd13a_12=.;  run;
proc means data=imp1  mean std min max n ;
        variable imamsd5_12 imamsd8_12 imamsd10a_12 imamsd12a_12 imamsd13a_12; run;
```

GROUP 5. Household Monthly Rent

```
                                Imput2012_Total Group5
/*******************************************************/
/* PROGRAM NAME  : Imput2012_group5_core_housing.SAS    */
/* PROGRAMMED BY : DONG ZHANG                           */
/* LAST UPDATEED : 02/08/2016                           */
/* Impute missing value on core and proxy questionnaire */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter; run;

/*
proc contents data=input.sect_g_j_k_sa_2012; run;       *** not imputed N=10,427,
var=680;
*/

data aa; set input.sect_g_j_k_sa_2012;                                    *** core
and proxy questionnaire N=10,427;
        proc sort out=temp nodupkey; by cunicah subhog_12; run;  *** no duplicate;

***** Core questionnaire N=9,696;
data aa1; set aa;
        keep cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
        j19_12 j20_12 j21a_12 j21b_12 J21c_12
        ;
if tipentg_12=1; run;

data aa2; set aa1;
        imamj20_12=j20_12;
**** Amputation N=21/442;
        if j19_12 ne 1 and j20_12=. then imamj20_12=0;
        if j20_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamj20_12=.;
                if imamj20_12=. and j21a_12=. then j21a_12=9;
                dumj20_12=1*(imamj20_12=.);
run;

***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname(keep=cunicah  subhog_12 tipentg_12 yrschool  sex_12_max age_12_max
imam&vname dum&vname low&vname up&vname &mix1 &mix2);
        set aa2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
```

```
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                        if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
%mend range;

%range(j20_12,j21a_12,j21b_12,J21c_12, 18000,4500,14000,1500);  run;

data output2.group5_core_housing; set dataj20_12 ;      run;

data dd1; set output2.group5_core_housing;  run;   **** Core nonproxy N=9,696
var=9;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamj20_12 yrschool;

transfer cunicah subhog_12 tipentg_12
        lowj20_12 upj20_12 dumj20_12
```

```
 ;
 bounds
  imamj20_12 (>=lowj20_12 ,<=upj20_12)
        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
/* multiples 5 ; */
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group5_core_housing_imputed; set dd_1;
        drop    lowj20_12 upj20_12
    ; run;

        proc freq; table imamj20_12; where dumj20_12=1;  run;



*** print putput: prior imputation;
Title "group5 core Housing - before imputation (mean with zero)";
proc means data=output.group5_core_housing  mean std min max n nmiss;
        variable amj19; run;

*** print putput: mean with zero;
Title "group5 core Housing - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp.group5_core_housing_imputed;
        var amj19;
run;

*** print output: mean without zero;
data group1; set imp.group5_core_housing_imputed;
  if amj19  =0 then amj19 =.;
 run;

Title "group5 core Housing - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var amj19; run;



/*******************************************************/
/* PROGRAM NAME  : Imput2012_group5_proxy_housing.SAS   */
/* PROGRAMMED BY : DONG ZHANG                           */
```

```
                              Imput2012_Total Group5
/* LAST UPDATEED : 02/09/2016                              */
/* Impute missing value on core and proxy questionnaire */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter; run;
/*
proc contents data=input.sect_g_j_k_sa_2012; run;       *** not imputed N=10,427,
var=680;
*/

data aa; set input.sect_g_j_k_sa_2012;                                    *** core
and proxy questionnaire N=10,427;
        proc sort out=temp nodupkey; by cunicah subhog_12; run;  *** no duplicate;

***** Proxy questionnaire N=731;
data aa1; set aa;
        keep cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
        j19_12 j20_12 j21a_12 j21b_12 J21c_12
        ;
if tipentg_12=2; run;

data aa2; set aa1;
        imamj20_12=j20_12;
**** Amputation n=1;
        if j19_12 ne 1 and j20_12=. then imamj20_12=0;
        if j20_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamj20_12=.;
                if imamj20_12=. and j21a_12=. then j21a_12=9;
                dumj20_12=1*(imamj20_12=.);
run;

***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname(keep=cunicah  subhog_12 tipentg_12 yrschool  sex_12_max age_12_max
imam&vname dum&vname low&vname up&vname &mix1 &mix2);
        set aa2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
```

```
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                        if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
%mend range;

%range(j20_12,j21a_12,j21b_12,J21c_12, 18000,4500,14000,1500);  run;

data output2.group5_proxy_housing; set dataj20_12;      run;

data dd1; set output2.group5_proxy_housing;  run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamj20_12 yrschool;

transfer cunicah subhog_12 tipentg_12
        lowj20_12 upj20_12 dumj20_12
 ;
 bounds
  imamj20_12 (>=lowj20_12 ,<=upj20_12)
        yrschool(<=22, >=0);
```

```
                                Imput2012_Total Group5
INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
/* multiples 5 ; */
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group5_proxy_housing_imputed; set dd_1;
        drop    lowj20_12 upj20_12
    ; run;

        proc freq; table imamj20_12; where dumj20_12=1;  run;   ****n=1 imp;



*** print putput: prior imputation;
Title "group5 proxy Housing - before imputation (mean with zero)";
proc means data=output.group5_proxy_housing  mean std min max n nmiss;
        variable amj19; run;

*** print putput: mean with zero;
Title "group5 proxy Housing - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp.group5_proxy_housing_imputed;
        var amj19;
run;

*** print output: mean without zero;
data group1; set imp.group5_proxy_housing_imputed;
  if amj19  =0 then amj19 =.;
 run;

Title "group5 proxy Housing - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var amj19; run;



/*******************************************************/
/* PROGRAM NAME  : Imput2012_group5_report.SAS         */
/* PROGRAMMED BY : DONG ZHANG                          */
/* LAST UPDATEED : 02/12/2016                          */
/*
                        */

/*******************************************************/
```

Imput2012_Total Group5

```
Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter nodate; run;

*************** Core ***************;
*** print putput: prior imputation;
Title "group5 core Housing - before imputation (mean with zero)";
proc means data=output2.group5_core_housing  mean std min max n nmiss;
        variable imamj20_12; run;
Title "group5 core Housing - before imputation (mean without zero)";
data group1; set output2.group5_core_housing;
  if imamj20_12  =0 then imamj20_12 =.; run;
proc means data=group1 mean std min max n ;
        var imamj20_12; run;


*** print putput: imputed - mean with zero;
Title "group5 core Housing - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group5_core_housing_imputed;
        var imamj20_12;
run;

*** print output: mean without zero;
data group1; set imp2.group5_core_housing_imputed;
   if imamj20_12  =0 then imamj20_12 =.; run;
 run;

Title "group5 core Housing - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var imamj20_12; run;


*************** proxy ***************;
*** print putput: prior imputation;
Title "group5 proxy Housing - before imputation (mean with zero)";
proc means data=output2.group5_proxy_housing  mean std min max n nmiss;
        variable imamj20_12; run;
Title "group5 proxy Housing - before imputation (mean without zero)";
data group1; set output2.group5_proxy_housing;
  if imamj20_12  =0 then imamj20_12 =.; run;
proc means data=group1 mean std min max n ;
        var imamj20_12; run;


*** print putput: imputed - mean with zero;
Title "group5 proxy Housing - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group5_proxy_housing_imputed;
```

```
                                Imput2012_Total Group5
        var imamj20_12;
run;

*** print output: mean without zero;
data group1; set imp2.group5_proxy_housing_imputed;
   if imamj20_12  =0 then imamj20_12 =.; run;
 run;

Title "group5 proxy Housing - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var imamj20_12; run;
```

GROUP 6. Pensions Income

```
                                Imput2012_Total Group6
/*******************************************************/
/* PROGRAM NAME  : Imput2012_group6_core_pension.SAS    */
/* PROGRAMMED BY : DONG ZHANG                           */
/* LAST UPDATEED : 02/08/2016                           */
/* Impute missing value on core and proxy questionnaire */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter; run;
/*
proc contents data=input.sect_g_j_k_sa_2012; run;       *** not imputed N=10,427,
var=680;
*/

data aa; set input.sect_g_j_k_sa_2012;                                  *** core
and proxy questionnaire N=10,427;
        proc sort  nodupkey; by cunicah subhog_12; run;  *** no duplicate;

***** Core questionnaire N=9,696;
data bb1; set aa;
        keep cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
        k100_12 k101_12 k102a_12 k102b_12 k102c_12
                        k103_12 k104a_12 k104b_12 k104c_12
        k98_12  k111_12 k112a_12 k112b_12 k112c_12
;
if tipentg_12=1; run;
proc freq; table k98_12 k111_12 ; run;

data bb2; set bb1; if k98_12 ne .;              ****1,161;
        imamk101_12=k101_12;            **** Amputation N=3/25;
        if k100_12 in (1,4,5) and k101_12=. then imamk101_12=0;
        if k100_12 in (8,9) and k101_12=. then imamk101_12=.;
                if k100_12 in (8,9) then k100_12m=9;               **   mix imp
var;
                if k101_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk101_12=.;
                if imamk101_12=. and k102a_12=. then k102a_12=9;
        imamk103_12=k103_12;            **** Amputation N=14/273;
        if k100_12 in (4,5) and k103_12=. then imamk103_12=0;
        if k100_12 in (8,9) and k103_12=. then imamk103_12=.;
                if k100_12 in (8,9) then k100_12m=9;                    **   mix
imp var;
                if k103_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk103_12=.;
```

```
                if k103_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
k103_12m=.; **   mix imp var;
                if imamk103_12=. and k104a_12=. then k104a_12=9;
        imamk111_12=k111_12;                    **** Amputation N=340/1062;
                if k111_12=. then imamk111_12=0;
                if k111_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk111_12=.;
                if k111_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
k111_12m=9;
        dumk101_12=1*(imamk101_12=.);
        dumk103_12=1*(imamk103_12=.);
        dumk111_12=1*(imamk111_12=.);
run;

***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname(keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
imam&vname dum&vname low&vname up&vname &mix1 &mix2);
        set bb2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                        if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
%mend range;

%range(k101_12,k102a_12,k102b_12,k102c_12,10000,1500,6000,750,k100_12m);  run;
%range(k103_12,k104a_12,k104b_12,k104c_12,60000,1500,6000,750,k100_12m,k103_12m);
run;
%range(k111_12,k112a_12,k112b_12,k112c_12,300000,6000,24000,3000,k111_12m);  run;
```

```
                                Imput2012_Total Group6
data output2.group6_core_pension; merge datak101_12 datak103_12 datak111_12 ; *****
1,161 var=18;
        by cunicah subhog_12;
        drop k100_12m k103_12m k111_12m; run;


data dd1; set output2.group6_core_pension;  run;   **** Core proxy N=1,161 var=18;


***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk101_12 imamk103_12 imamk111_12  yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk101_12  upk101_12
  lowk103_12  upk103_12
  lowk111_12  upk111_12
        dumk101_12
        dumk103_12
        dumk111_12
;
 bounds
  imamk101_12 (>=lowk101_12 ,<=upk101_12)
  imamk103_12 (>=lowk103_12 ,<=upk103_12)
  imamk111_12 (>=lowk111_12 ,<=upk111_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;
```

```
                                Imput2012_Total Group6
/* ITERATIONS 5;  */
/* multiples 5 ; */
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp2.group6_core_pension_imputed; set dd_1;
        drop
  lowk101_12  upk101_12
  lowk103_12  upk103_12
  lowk111_12  upk111_12
 ; run;

proc freq; table imamk101_12; where dumk101_12=1; run;  ***n=12 imp;
proc freq; table imamk103_12; where dumk103_12=1; run;  ***n=23 imp;
proc freq; table imamk111_12; where dumk111_12=1; run;  ***n=340 imp;


*** print putput: prior imputation;
Title "group6 core pension - before imputation (mean with zero)";
proc means data=output.group6_core_pension  mean std min max n nmiss;
        variable imamk101_12 imamk103_12 imamk111_12; run;

*** print putput: mean with zero;
Title "group6 core pension - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp.group6_core_pension_imputed;
        var imamk101_12 imamk103_12 imamk111_12;
run;

*** print output: mean without zero;
data group1; set imp.group6_core_pension_imputed;
  if imamk101_12  =0  then  imamk101_12 =.;
  if imamk103_12  =0  then  imamk103_12 =.;
  if imamk111_12  =0  then  imamk111_12 =.;
run;

Title "group6 core pension - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var imamk101_12 imamk103_12 imamk111_12;
run;




/*******************************************************/
/* PROGRAM NAME  : Imput2012_group6_proxy_pension.SAS   */
/* PROGRAMMED BY : DONG ZHANG                           */
```

```
                              Imput2012_Total Group6
/* LAST UPDATEED : 02/08/2016                              */
/* Impute missing value on core and proxy questionnaire */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter; run;
/*
proc contents data=input.sect_g_j_k_sa_2012; run;       *** not imputed N=10,427,
var=680;
*/

data aa; set input.sect_g_j_k_sa_2012;                                    *** core
and proxy questionnaire N=10,427;
        proc sort  nodupkey; by cunicah subhog_12; run;  *** no duplicate;

***** proxy questionnaire N=731;
data bb1; set aa;
        keep cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
        k100_12 k101_12 k102a_12 k102b_12 k102c_12
                        k103_12 k104a_12 k104b_12 k104c_12
        k98_12  k111_12 k112a_12 k112b_12 k112c_12
;
if tipentg_12=2; run;

data bb2; set bb1; if k98_12 ne .;              ****145;
        imamk101_12=k101_12;            **** Amputation N=3/25;
        if k100_12 in (1,4,5) and k101_12=. then imamk101_12=0;
        if k100_12 in (8,9) and k101_12=. then imamk101_12=.;
                if k100_12 in (8,9) then k100_12m=9;               **   mix imp
var;
                if k101_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk101_12=.;
                if imamk101_12=. and k102a_12=. then k102a_12=9;
        imamk103_12=k103_12;            **** Amputation N=14/273;
        if k100_12 in (4,5) and k103_12=. then imamk103_12=0;
        if k100_12 in (8,9) and k103_12=. then imamk103_12=.;
                if k100_12 in (8,9) then k100_12m=9;                    **   mix
imp var;
                if k103_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk103_12=.;
                if k103_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
k103_12m=.; **   mix imp var;
                if imamk103_12=. and k104a_12=. then k104a_12=9;
```

```
        imamk111_12=k111_12;                    **** Amputation N=340/1062;
                if k111_12=. then imamk111_12=0;
                if k111_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamk111_12=.;
                if k111_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
k111_12m=9;
        dumk101_12=1*(imamk101_12=.);
        dumk103_12=1*(imamk103_12=.);
        dumk111_12=1*(imamk111_12=.);
run;

***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1,mix2);
data data&vname(keep=cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
imam&vname dum&vname low&vname up&vname &mix1 &mix2);
        set bb2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                        if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if &mix2 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
%mend range;

%range(k101_12,k102a_12,k102b_12,k102c_12,10000,1500,6000,750,k100_12m);  run;
%range(k103_12,k104a_12,k104b_12,k104c_12,60000,1500,6000,750,k100_12m,k103_12m);
run;
%range(k111_12,k112a_12,k112b_12,k112c_12,300000,6000,24000,3000,k111_12m);  run;


data output2.group6_proxy_pension; merge datak101_12 datak103_12 datak111_12 ;
***** 145 var=18;
        by cunicah subhog_12;
```

```
        drop k100_12m k103_12m k111_12m; run;


data dd1; set output2.group6_proxy_pension;  run;   **** proxy ;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamk101_12 imamk103_12 imamk111_12  yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk101_12  upk101_12
  lowk103_12  upk103_12
  lowk111_12  upk111_12
        dumk101_12
        dumk103_12
        dumk111_12
;
 bounds
  imamk101_12 (>=lowk101_12 ,<=upk101_12)
  imamk103_12 (>=lowk103_12 ,<=upk103_12)
  imamk111_12 (>=lowk111_12 ,<=upk111_12)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
/* multiples 5 ; */
SEED 2012;
```

```
run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data imp2.group6_proxy_pension_imputed; set dd_1;
        drop
  lowk101_12  upk101_12
  lowk103_12  upk103_12
  lowk111_12  upk111_12
 ; run;

proc freq; table imamk101_12; where dumk101_12=1; run;  ***n=1 imp;
proc freq; table imamk103_12; where dumk103_12=1; run;  ***n=7 not imp;
proc freq; table imamk111_12; where dumk111_12=1; run;  ***n=51 imp;
```

```
***RUN IVEWARE PROGRAM : proxy;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  amk101 amk103 amk111  yrschool;

transfer cunicah subhog_12 tipentg_12
  lowk101  upk101
```

```
  lowk103  upk103
  lowk111  upk111
        ;
 bounds
  amk101 (>=lowk101 ,<=upk101)
  amk103 (>=lowk103 ,<=upk103)
  amk111 (>=lowk111 ,<=upk111)

        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

ITERATIONS 5;
/* multiples 5 ; */
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data data imp.group6_proxy_pension_imputed; set dd_1;
        drop
  lowk101  upk101
  lowk103  upk103
  lowk111  upk111
 ; run;

*** print putput: prior imputation;
Title "group6 proxy pension - before imputation (mean with zero)";
proc means data=output.group6_proxy_pension  mean std min max n nmiss;
        variable amk101 amk103 amk111; run;

*** print putput: mean with zero;
Title "group6 proxy pension - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp.group6_proxy_pension_imputed;
        var amk101 amk103 amk111;
run;

*** print output: mean without zero;
data group1; set imp.group6_proxy_pension_imputed;
  if amk101  =0  then  amk101 =.;
  if amk103  =0  then  amk103 =.;
  if amk111  =0  then  amk111 =.;
run;

Title "group6 proxy pension - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var amk101 amk103 amk111;
```

```
run;




/*******************************************************/
/* PROGRAM NAME  : Imput2012_group6_report.SAS         */
/* PROGRAMMED BY : DONG ZHANG                          */
/* LAST UPDATEED : 02/12/2016                          */
/*
                        */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter nodate; run;


*************** core ******************;
*** print putput: prior imputation;
Title "group6 core pension - before imputation (mean with zero)";
proc means data=output2.group6_core_pension  mean std min max n nmiss;
        variable imamk101_12 imamk103_12 imamk111_12; run;
Title "group6 core pension - before imputation (mean without zero)";
data group1; set output2.group6_core_pension;
  if imamk101_12  =0  then  imamk101_12 =.;
  if imamk103_12  =0  then  imamk103_12 =.;
  if imamk111_12  =0  then  imamk111_12 =.;
run;
proc means data=group1 mean std min max n ;
        var imamk101_12 imamk103_12 imamk111_12;
run;


*** print putput: mean with zero;
Title "group6 core pension - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group6_core_pension_imputed;
        var imamk101_12 imamk103_12 imamk111_12;
run;

*** print output: mean without zero;
data group1; set imp2.group6_core_pension_imputed;
  if imamk101_12  =0  then  imamk101_12 =.;
  if imamk103_12  =0  then  imamk103_12 =.;
  if imamk111_12  =0  then  imamk111_12 =.;
run;
```

Imput2012_Total Group6

```
Title "group6 core pension - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var imamk101_12 imamk103_12 imamk111_12;
run;


*************** proxy ******************;
*** print putput: prior imputation;
Title "group6 proxy pension - before imputation (mean with zero)";
proc means data=output2.group6_proxy_pension  mean std min max n nmiss;
        variable imamk101_12 imamk103_12 imamk111_12; run;
Title "group6 proxy pension - before imputation (mean without zero)";
data group1; set output2.group6_proxy_pension;
  if imamk101_12  =0  then  imamk101_12 =.;
  if imamk103_12  =0  then  imamk103_12 =.;
  if imamk111_12  =0  then  imamk111_12 =.;
run;
proc means data=group1 mean std min max n ;
        var imamk101_12 imamk103_12 imamk111_12;
run;


*** print putput: mean with zero;
Title "group6 proxy pension - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group6_proxy_pension_imputed;
        var imamk101_12 imamk103_12 imamk111_12;
run;

*** print output: mean without zero;
data group1; set imp2.group6_proxy_pension_imputed;
  if imamk101_12  =0  then  imamk101_12 =.;
  if imamk103_12  =0  then  imamk103_12 =.;
  if imamk111_12  =0  then  imamk111_12 =.;
run;

Title "group6 proxy pension - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var imamk101_12 imamk103_12 imamk111_12;
run;
```

GROUP 7. Help Given

```
                                Imput2012_Total Group7
/*******************************************************/
/* PROGRAM NAME  : Imput2012_group7_core_help.SAS      */
/* PROGRAMMED BY : DONG ZHANG                          */
/* LAST UPDATEED : 02/09/2016                          */
/* Impute missing value on core and proxy questionnaire */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter nodate; run;

/*
proc contents data=input.sect_g_j_k_sa_2012; run;       *** not imputed N=10,427,
var=680;
*/

data aa; set input.sect_g_j_k_sa_2012;                                  *** core
and proxy questionnaire N=10,427;
        proc sort out=temp nodupkey; by cunicah subhog_12; run;  *** no duplicate;

***** Core questionnaire N=9,696;
data aa1; set aa;
        keep cunicah  subhog_12 tipentg_12  yrschool  sex_12_max age_12_max
        g7_12
         g8b1_2_12 g8b1_monthly_12 g9a1_12 g9b1_12
         g8b2_2_12 g8b2_monthly_12 g9a2_12 g9b2_12
         g8b3_2_12 g8b3_monthly_12 g9a3_12 g9b3_12
         g8b4_2_12 g8b4_monthly_12 g9a4_12 g9b4_12
         g8b5_2_12 g8b5_monthly_12 g9a5_12 g9b5_12
         g8b6_2_12 g8b6_monthly_12 g9a6_12 g9b6_12
         g8b7_2_12 g8b7_monthly_12 g9a7_12 g9b7_12
         ;
if tipentg_12=1; run;

data aa2; set aa1;
        imamg8b1_12=g8b1_monthly_12;
        if g7_12 ne 1 and g8b1_monthly_12=. then imamg8b1_12=0;
        if g7_12 in (8,9) and g8b1_monthly_12=. then imamg8b1_12=.;
                if g8b1_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamg8b1_12=.;
                if imamg8b1_12=. and g9a1_12=. then g9a1_12=9;
**** Amputation N=220/2082;
                dumg8b1_12=1*(imamg8b1_12=.);
        imamg8b2_12=g8b2_monthly_12;
        if g7_12 ne 1 and g8b2_monthly_12=. then imamg8b2_12=0;
                if g8b2_2_12=. then imamg8b2_12=0;
```

```
                if g8b2_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamg8b2_12=.;
                if imamg8b2_12=. and g9a2_12=. then g9a2_12=9;
**** Amputation N=110/1004;
                dumg8b2_12=1*(imamg8b2_12=.);
        imamg8b3_12=g8b3_monthly_12;
        if g7_12 ne 1 and g8b3_monthly_12=. then imamg8b3_12=0;
                if g8b3_2_12=. then imamg8b3_12=0;
                if g8b3_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamg8b3_12=.;
                if imamg8b3_12=. and g9a3_12=. then g9a3_12=9;
**** Amputation N=46;
                dumg8b3_12=1*(imamg8b3_12=.);
        imamg8b4_12=g8b4_monthly_12;
        if g7_12 ne 1 and g8b4_monthly_12=. then imamg8b4_12=0;
                if g8b4_2_12=. then imamg8b4_12=0;
                if g8b4_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamg8b4_12=.;
                if imamg8b4_12=. and g9a4_12=. then g9a4_12=9;
**** Amputation N=13;
                dumg8b4_12=1*(imamg8b4_12=.);
        imamg8b5_12=g8b5_monthly_12;
        if g7_12 ne 1 and g8b5_monthly_12=. then imamg8b5_12=0;
                if g8b5_2_12=. then imamg8b5_12=0;
                if g8b5_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamg8b5_12=.;
                if imamg8b5_12=. and g9a5_12=. then g9a5_12=9;
**** Amputation N=5;
                dumg8b5_12=1*(imamg8b5_12=.);
        imamg8b6_12=g8b6_monthly_12;
        if g7_12 ne 1 and g8b6_monthly_12=. then imamg8b6_12=0;
                if g8b6_2_12=. then imamg8b6_12=0;
                if g8b6_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamg8b6_12=.;
                if imamg8b6_12=. and g9a6_12=. then g9a6_12=9;
**** Amputation N=3;
                dumg8b6_12=1*(imamg8b6_12=.);
        imamg8b7_12=g8b7_monthly_12;
        if g7_12 ne 1 and g8b7_monthly_12=. then imamg8b7_12=0;
                if g8b7_2_12=. then imamg8b7_12=0;
                if g8b7_2_12 in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777,8888888,9999999) then
imamg8b7_12=.;
                if imamg8b7_12=. and g9a7_12=. then g9a7_12=9;
```

```
                                Imput2012_Total Group7
**** Amputation N=1;
                dumg8b7_12=1*(imamg8b7_12=.);
run;

***** define range of imputation;
%macro range(vname,va,vc,rmax,r1,r1_2,mix1);
data data&vname(keep=cunicah  subhog_12 tipentg_12 yrschool sex_12_max age_12_max
imam&vname dum&vname low&vname up&vname &mix1);
        set aa2;
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 then do;       low&vname=1;    up&vname=&r1;   end;
                if &va=9 then do;       low&vname=1;    up&vname=&rmax; end;
                        if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
%mend range;

%range(g8b1_12,g9a1_12,g9b1_12,33333,150,300,g7_12);  run;
%range(g8b2_12,g9a2_12,g9b2_12,33333,150,300);  run;
%range(g8b3_12,g9a3_12,g9b3_12,12500,150,300);  run;
%range(g8b4_12,g9a4_12,g9b4_12,10000,150,300);  run;
%range(g8b5_12,g9a5_12,g9b5_12,10000,150,300);  run;
%range(g8b6_12,g9a6_12,g9b6_12,3000,150,300);  run;
%range(g8b7_12,g9a7_12,g9b7_12,1000,150,300);  run;

data output2.group7_core_help; merge datag8b1_12 datag8b2_12 datag8b3_12
datag8b4_12 datag8b5_12 datag8b6_12 datag8b7_12;
        by cunicah subhog_12; run;


data dd1; set output2.group7_core_help;     **** Core nonproxy N=9,696 var=27;
drop g7_12;
run;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
```

```
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12_max ;

count age_12_max;

mixed  imamg8b1_12 imamg8b2_12 imamg8b3_12 imamg8b4_12 imamg8b5_12 imamg8b6_12
imamg8b7_12 yrschool;
transfer cunicah subhog_12 tipentg_12
        lowg8b1_12 upg8b1_12
        lowg8b2_12 upg8b2_12
        lowg8b3_12 upg8b3_12
        lowg8b4_12 upg8b4_12
        lowg8b5_12 upg8b5_12
        lowg8b6_12 upg8b6_12
        lowg8b7_12 upg8b7_12
        dumg8b1_12 dumg8b2_12 dumg8b3_12 dumg8b4_12 dumg8b5_12 dumg8b6_12
dumg8b7_12
;
 bounds         imamg8b1_12(>=lowg8b1_12, <=upg8b1_12)
                        imamg8b2_12(>=lowg8b2_12, <=upg8b2_12)
                        imamg8b3_12(>=lowg8b3_12, <=upg8b3_12)
                        imamg8b4_12(>=lowg8b4_12, <=upg8b4_12)
                        imamg8b5_12(>=lowg8b5_12, <=upg8b5_12)
                        imamg8b6_12(>=lowg8b6_12, <=upg8b6_12)
                        imamg8b7_12(>=lowg8b7_12, <=upg8b7_12)
                        yrschool(<=22, >=0);

INTERACT age_12_max*sex_12_max age_12_max*age_12_max sex_12_max*yrschool
yrschool*yrschool ;

/* ITERATIONS 5;  */
/* multiples 5 ; */
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data imp2.group7_core_help_imputed; set dd_1;   ***** 9,696 var=20;
drop    lowg8b1_12 upg8b1_12
        lowg8b2_12 upg8b2_12
        lowg8b3_12 upg8b3_12
```

```
                              Imput2012_Total Group7
        lowg8b4_12 upg8b4_12
        lowg8b5_12 upg8b5_12
        lowg8b6_12 upg8b6_12
        lowg8b7_12 upg8b7_12; run;

proc freq; table imamg8b1_12; where dumg8b1_12=1; run;  **** n=236 imp;
proc freq; table imamg8b2_12; where dumg8b2_12=1; run;  **** n=110 imp;
proc freq; table imamg8b3_12; where dumg8b3_12=1; run;  **** n=46 imp;
proc freq; table imamg8b4_12; where dumg8b4_12=1; run;  **** n=13 imp;
proc freq; table imamg8b5_12; where dumg8b5_12=1; run;  **** n=5 imp;
proc freq; table imamg8b6_12; where dumg8b6_12=1; run;  **** n=3 imp;
proc freq; table imamg8b7_12; where dumg8b7_12=1; run;  **** n=1 imp;




*** print putput: prior imputation;
Title "Group7 core help - before imputation (mean with zero)";
proc means data=output.group7_core_help mean std min max n nmiss;
        variable imamg8b1_12 imamg8b2_12 imamg8b3_12 imamg8b4_12 imamg8b5_12
imamg8b6_12 imamg8b7_12; run;

*** print putput: mean with zero;
Title "Group7 core help - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp.group7_core_help_imputed;
        var imamg8b1_12 imamg8b2_12 imamg8b3_12 imamg8b4_12 imamg8b5_12 imamg8b6_12
imamg8b7_12;
run;

*** print output: mean without zero;
data group1; set imp.group7_core_help_imputed;
    if imamg8b1_12=0 then imamg8b1_12=.;
    if imamg8b2_12=0 then imamg8b2_12=.;
    if imamg8b3_12=0 then imamg8b3_12=.;
    if imamg8b4_12=0 then imamg8b4_12=.;
    if imamg8b5_12=0 then imamg8b5_12=.;
    if imamg8b6_12=0 then imamg8b6_12=.;
    if imamg8b7_12=0 then imamg8b7_12=.;
  run;

Title "Group7 core help - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var imamg8b1_12 imamg8b2_12 imamg8b3_12 imamg8b4_12 imamg8b5_12 imamg8b6_12
imamg8b7_12;
run;
```

Imput2012_Total Group7

```
/*******************************************************/
/* PROGRAM NAME  : Imput2012_group7_report.SAS         */
/* PROGRAMMED BY : DONG ZHANG                          */
/* LAST UPDATEED : 02/12/2016                          */
/*
                        */

/*******************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter nodate; run;


*** print putput: prior imputation;
Title "Group7 core help - before imputation (mean with zero)";
proc means data=output2.group7_core_help mean std min max n nmiss;
        variable imamg8b1_12 imamg8b2_12 imamg8b3_12 imamg8b4_12 imamg8b5_12
imamg8b6_12 imamg8b7_12; run;

Title "Group7 core help - before imputation (mean without zero)";
data group1; set output2.group7_core_help;
    if imamg8b1_12=0 then imamg8b1_12=.;
    if imamg8b2_12=0 then imamg8b2_12=.;
    if imamg8b3_12=0 then imamg8b3_12=.;
    if imamg8b4_12=0 then imamg8b4_12=.;
    if imamg8b5_12=0 then imamg8b5_12=.;
    if imamg8b6_12=0 then imamg8b6_12=.;
    if imamg8b7_12=0 then imamg8b7_12=.;
  run;
proc means data=group1 mean std min max n ;
        variable imamg8b1_12 imamg8b2_12 imamg8b3_12 imamg8b4_12 imamg8b5_12
imamg8b6_12 imamg8b7_12; run;


*** print putput: mean with zero;
Title "Group7 core help - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group7_core_help_imputed;
        var imamg8b1_12 imamg8b2_12 imamg8b3_12 imamg8b4_12 imamg8b5_12 imamg8b6_12
imamg8b7_12;
run;

*** print output: mean without zero;
data group1; set imp2.group7_core_help_imputed;
    if imamg8b1_12=0 then imamg8b1_12=.;
```

```
    if imamg8b2_12=0 then imamg8b2_12=.;
    if imamg8b3_12=0 then imamg8b3_12=.;
    if imamg8b4_12=0 then imamg8b4_12=.;
    if imamg8b5_12=0 then imamg8b5_12=.;
    if imamg8b6_12=0 then imamg8b6_12=.;
    if imamg8b7_12=0 then imamg8b7_12=.;
  run;

Title "Group7 core help - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var imamg8b1_12 imamg8b2_12 imamg8b3_12 imamg8b4_12 imamg8b5_12 imamg8b6_12
imamg8b7_12;
run;
```

GROUP 8. Economic Help

```
                                Imput2012_Total Group8
/*****************************************************/
/* PROGRAM NAME  : Imput2012_group8.SAS                */
/* PROGRAMMED BY : DONG ZHANG                          */
/* LAST UPDATEED : 02/09/2016                          */
/* Impute missing value on core and proxy questionnaire */

/*****************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter nodate; run;
/*
proc contents data=input.sect_a_c_d_e_pc_f_h_i_em_2012; run;    *** not imputed
N=15,723, var=999;
*/

data aa; set input.sect_a_c_d_e_pc_f_h_i_em_2012;                              ***
core and proxy questionnaire;
        proc sort out=temp nodupkey; by cunicah np; run;                       ***
no duplicate;

data aa1; set aa;
        keep cunicah np sex_12 age_12 yrschool tipent_12
        f40_12  f41_12 f42a_12 f42b_12 f42c_12;         run;
        proc sort;  by cunicah np; run;


***** define missing value;
data aa2; set aa1;
        if age_12=999 then age_12=.;                                    ****
missing N=25;
        if yrschool in (88,99) then yrschool=.;                 **** missing N=68;
        imamf41_12=f41_12;
                *** imputed 402/2014;
                if f40_12 ne 1 and f41_12=. then imamf41_12=0;
                if f40_12 in (8,9) and f41_12=. then imamf41_12=.;
                if f41_12  in
(9,99,999,9999,99999,999999,8,88,888,8888,88888,888888,777777) then imamf41_12=.;
                if imamf41_12=.  and f42a_12=.   then f42a_12=9;
                dumf41_12=1*(imamf41_12=.);
        label
                imamf41_12="total expense for assiating parent(s)"; run;

***** define range of imputation;
%macro range(vname,va,vb,vc,rmax,r1,r1_2,r2_1,mix1);
data data&vname(keep=cunicah np sex_12 age_12 yrschool tipent_12 imam&vname
dum&vname low&vname up&vname &mix1);
        set aa2;
```

```
        low&vname=1; up&vname=&rmax ;
                if &va=1 and &vc=1 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=1 and &vc=2 then do;     low&vname=&r1;  up&vname=&r1_2;
end;
                if &va=1 and &vc=9 then do;     low&vname=&r1;  up&vname=&rmax;
end;
                if &va=2 and &vb=1 then do;     low&vname=&r2_1;
up&vname=&r1;   end;
                if &va=2 and &vb=2 then do;     low&vname=1;    up&vname=&r2_1;
end;
                if &va=2 and &vb=9 then do;     low&vname=1;    up&vname=&r1;
end;
                if &va=9  then do;      low&vname=1;    up&vname=&rmax; end;
                        if &mix1 in (8,9) then do; low&vname=0; up&vname=&rmax;
end;
                        if imam&vname >=0 then do; low&vname=imam&vname; end;
                        if imam&vname >=0 then do; up&vname=imam&vname; end;
%mend range;

%range(f41_12,f42a_12,f42b_12,f42c_12, 480000,7500,12000,4000,f40_12);  run;

data output2.group8_help; set dataf41_12; run;  **** 15,723 var=11;


data dd1; set output2.group8_help;  drop f40_12; run;   ****  N=15,723 var=10;

***RUN IVEWARE PROGRAM : Core;
options set = SRCLIB "C:\iveware\SRCLIB"
        sasautos = ('!SRCLIB' sasautos) mautosource ;
options nofmterr;

data _null_;
  infile datalines;
  filename setup "d:/piname/wong/year2012/impute.set";
  file setup;
  input;
  put _infile_;
datalines4;
  title Multiple imputation;
  datain dd1;
  dataout dd_1;

categorical sex_12 ;
count age_12;
mixed  imamf41_12 yrschool;

transfer cunicah np  tipent_12
        lowf41_12 upf41_12
```

```
                              Imput2012_Total Group8
;
 bounds         imamf41_12(>=lowf41_12, <=upf41_12)
                        yrschool(<=22, >=0);

INTERACT age_12*sex_12 age_12*age_12 sex_12*yrschool yrschool*yrschool ;


/* ITERATIONS 5; */
/* multiples 5 ; */
SEED 2012;

run;
;;;;
%impute(name=impute, dir=d:/piname/wong/year2012/);

data imp2.group8_help_imputed; set dd_1;
        drop lowf41_12 upf41_12; run;
        proc freq; table imamf41_12; where dumf41_12=1; run;




*** print putput: prior imputation;
Title "group8  help - before imputation (mean with zero)";
proc means data=output.group8 mean std min max n nmiss;
        variable imamf41_12; run;

*** print putput: mean with zero;
Title "group8  help - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp.group8_imputed;
        var imamf41_12;
run;

*** print output: mean without zero;
data group1; set imp.group8_imputed;
    if imamf41_12=0 then imamf41_12=.;
  run;

Title "group8 help - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var imamf41_12;
run;



/*******************************************************/
/* PROGRAM NAME  : Imput2012_group8_report.SAS         */
/* PROGRAMMED BY : DONG ZHANG                          */
/* LAST UPDATEED : 02/12/2016                          */
```

```
                                Imput2012_Total Group8
/*
                          */

/*****************************************************/

Libname input 'd:\piname\wong\year2012\data_file';  run;
libname output2 'd:\piname\wong\year2012\output2';  run;
libname imp2 'd:\piname\wong\year2012\IMPfiles2';  run;
options ps=65 ls=120 nocenter nodate; run;


*** print putput: prior imputation;
Title "group8  help - before imputation (mean with zero)";
proc means data=output2.group8_help mean std min max n nmiss;
        variable imamf41_12; run;

Title "group8  help - before imputation (mean without zero)";
data group1; set output2.group8_help;
    if imamf41_12=0 then imamf41_12=.;
  run;
proc means mean std min max n ;
        variable imamf41_12; run;


*** print putput: mean with zero;
Title "group8  help - imputed (mean with zero)";
proc means mean std min max n nmiss data=imp2.group8_help_imputed;
        var imamf41_12;
run;

*** print output: mean without zero;
data group1; set imp2.group8_help_imputed;
    if imamf41_12=0 then imamf41_12=.;
  run;

Title "group8 help - imputed (mean without zero)";
proc means data=group1 mean std min max n ;
        var imamf41_12;
run;
```