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%let seed_es = %eval(&seed*6) ;
/*
proc import file = "&par_path/parameters_ES_model2.csv" out = par_es
dbms=csv replace ;
run ;*/

data par_es ;
infile "&par_path/parameters_ES_model2.csv" DSD MISSOVER delimiter =
"," termstr = CRLF lrecl = 32767 firstobs = 2 ;
informat variable $15. ;
informat estimate BEST12. ;
format variable $15. ;
format estimate BEST12. ;
input variable $
      estimate
;
run ;
/*
proc import file = "&par_path/vres_ES_model2.csv" out = v_es
dbms=csv replace ;
run ;*/

data v_es ;
infile "&par_path/vres_ES_model2.csv" DSD MISSOVER delimiter = ","
termstr = CRLF lrecl = 32767 firstobs = 2 ;
informat v BEST12. ;
format v BEST12. ;
input v ;
run ;

data _null_ ;
set v_es ;
call symput("sd",sqrt(v)) ;
run ;

/* generate u following a uniform law */

proc sort data = h_es ;
by sa0100 sa0010 im0100 ;
run ;

data h_es ;
set h_es ;
retain x1 &seed_es x2 0 ;
if _n_ = 1 then do ;
    x1 = &seed_es ;
    x2 = 0 ;
end ;
else do ;
    y = mod(x1*20077+12345,65536) ;
    x2 = mod(int((x1*20077+12345-y)/65536)+mod(16838*x1+20077
*x2,65536),32768) ;
    x1 = y ;
end ;
z = 65536*x2+x1 ;
u = z/2147483648 ;
drop y z x1 x2 ;

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run ;

/* compute the consumption */

data par_es ;
set par_es ;
call symput(compress("par"!!_n_),estimate) ;
run ;

data h_es ;
set h_es ;
/* reshape covariates */
cfood = hi0100*12 ;
rent = max(hb2300*12,0) ;
l_cfood = log(max(cfood,1)) ;
l_rent = log(max(rent,1)) ;
head_male = (ra0200 = 1) ;
owner = (hb0300 in (1,2)) ;
free_use = (hb0300 = 4) ;
hhsz1 = (dh0001 = 1) ;
hhsz3 = (dh0001 >= 3) ;
agerp_1 = (ra0300 < 30) ;
agerp_2 = (30 <= ra0300 < 40) ;
agerp_3 = (40 <= ra0300 < 50) ;
agerp_4 = (50 <= ra0300 < 60) ;
agerp_5 = (60 <= ra0300 < 70) ;
agerp_6 = (ra0300 >= 70) ;
number_children_1 = (number_children = 1) ;
number_children_2 = (number_children = 2) ;
number_children_3 = (number_children = 3) ;
labour_status_1 = (pe0100a in (1,2)) ;
labour_status_2 = (pe0100a in (3,4,6,7,8,9)) ;
labour_status_3 = (pe0100a = 5) ;
diploma_1 = (pa0200 = 1) ;
diploma_2 = (pa0200 = 2) ;
diploma_5 = (pa0200 = 5) ;
run ;

proc sort data = h_es ;
by im0100 ;
run ;

proc univariate data = h_es ;
by im0100 ;
var di2000 ;
weight hw0010 ;
output out = perc_implicates pctlpts = 20 40 60 80 pctlpre=p ;
run ;

proc univariate data = perc_implicates ;
var p20 p40 p60 p80 ;
output out = perc_mean = p20 p40 p60 p80 ;

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run ;

data perc;
set perc ;
call symput("quint1",p20) ;
call symput("quint2",p40) ;
call symput("quint3",p60) ;
call symput("quint4",p80) ;
run ;

data h_es ;
set h_es ;
income_quintile_1 = (di2000 <= &quint1) ;
income_quintile_2 = (&quint1 < di2000 <= &quint2) ;
income_quintile_3 = (&quint2 < di2000 <= &quint3) ;
income_quintile_4 = (&quint3 < di2000 <= &quint4) ;
income_quintile_5 = (di2000 > &quint4) ;
run ;

/* set up bounds */
/*
proc import file = "&par_path/bound_ES.csv" out = bound_es dbms=csv
replace ;
run ;*/

data bound_es ;
infile "&par_path/bound_ES.csv" DSD MISSOVER delimiter = "," termstr
= CRLF lrecl = 32767 firstobs = 2 ;
informat m BEST12. ;
format m BEST12. ;
input m ;
run ;

data _null_ ;
set bound_es ;
call symput("m",m) ;
run ;

/* compute consumption */

data h_es ;
set h_es ;
/* bounds */
lbound = cfood+rent ;
ubound = &m ;
a = log(lbound) ;
b = log(ubound) ;
Xbeta = &par1+&par2*l_cfood+&par3*(l_cfood**2)+&par4*(l_cfood**3)
+&par5*income_quintile_2+&par6*income_quintile_3+&par7
*income_quintile_4+&par8*income_quintile_5
+&par9*l_rent+&par10*(l_rent**2)+&par11*(l_rent**3)
+&par12*agerp_1+&par13*agerp_2+&par14*agerp_4+&par15*agerp_5
+&par16*agerp_6
+&par17*head_male

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+&par18*hhsize_1+&par19*hhsize_3
+&par20*number_children_1+&par21*number_children_2+&par22
*number_children_3
+&par23*owner+&par24*free_use
+&par25*diploma_1+&par26*diploma_2+&par27*diploma_5
+&par28*labour_status_2+&par29*labour_status_3
+&par30*l_cfood*income_quintile_2+&par31*(l_cfood**2)
*income_quintile_2+&par32*(l_cfood**3)*income_quintile_2
+&par33*l_cfood*income_quintile_3+&par34*(l_cfood**2)
*income_quintile_3+&par35*(l_cfood**3)*income_quintile_3
+&par36*l_cfood*income_quintile_4+&par37*(l_cfood**2)
*income_quintile_4+&par38*(l_cfood**3)*income_quintile_4
+&par39*l_cfood*income_quintile_5+&par40*(l_cfood**2)
*income_quintile_5+&par41*(l_cfood**3)*income_quintile_5 ;
Phi_a = cdf('NORMAL',a-Xbeta,0,&sd) ;
Phi_b = cdf('NORMAL',b-Xbeta,0,&sd) ;
/* estimation of consumption */
/*alpha = a/&sd ;
beta = b/&sd ;
correction_mean = &sd*(pdf('NORMAL',alpha) - pdf('NORMAL',beta))/
(cdf('NORMAL',beta) - cdf('NORMAL',alpha)) ;
correction_sd = 1+(alpha*pdf('NORMAL',alpha)-beta*pdf
('NORMAL',beta))/(cdf('NORMAL',beta) - cdf('NORMAL',alpha))-((pdf
('NORMAL',alpha)-pdf('NORMAL',beta))/(cdf('NORMAL',beta) - cdf
('NORMAL',alpha)))*2 ;*/
DI3001 = round(exp(Xbeta+quantile('NORMAL',Phi_a + (Phi_b-Phi_a)
*u,0,&sd))) ;
run ;

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