2019 Age, Income, Kids, Marry EV and EC All Checks

This is the example vignette for function: **snw_evuvw19_jmky_allchecks** from the **PrjOptiSNW Package.**
2019 integrated over VU and VW

Test SNW_EVUVW19_JMKY_ALLCHECKS Parameters

Save a result that is low in memory cost so that it can be loaded quickly for various allocation tests. Turn off Various Printing Controls. Call function with wide income bins to reduce memory storage and retrievel costs

```
clear all;
% Start mp contorls
mp_controls = snw_mp_control('default_test');
% Solve for Unemployment Values
mp_controls('bl_timer') = true;
mp_controls('bl_print_vfi') = false;
mp_controls('bl_print_vfi_verbose') = false;
mp_controls('bl_print_ds') = false;
mp_controls('bl_print_ds_verbose') = true;
mp_controls('bl_print_precompute') = false;
mp_controls('bl_print_precompute_verbose') = false;
mp_controls('bl_print_a4chk') = false;
mp_controls('bl_print_a4chk_verbose') = false;
mp_controls('bl_print_evuvw20_jaeemk') = false;
mp_controls('bl_print_evuvw20_jaeemk_verbose') = false;
mp_controls('bl_print_evuvw19_jaeemk') = false;
mp_controls('bl_print_evuvw19_jaeemk_verbose') = false;
mp_controls('bl_print_evuvw19_jmky') = false;
mp_controls('bl_print_evuvw19_jmky_verbose') = false;
```

Dense default, and unemployment parameters:

```
% default dense load
% mp_params = snw_mp_param('default_dense');
mp_params = snw_mp_param('default_docdense');
% Unemployment
xi=0.5; % Proportional reduction in income due to unemployment (xi=0 refers to 0 labor income;
b=0; % Unemployment insurance replacement rate (b=0 refers to no UI benefits; b=1 refers to 100
TR=100/58056; % Value of a wezlfare check (can receive multiple checks). TO DO: Update with alt
mp_params('xi') = xi;
mp_params('b') = b;
mp_params('TR') = TR;
% Check Count: 89 checks to allow for both the first and the second round
n_welfchecksgrid = 3;
mp_params('n_welfchecksgrid') = n_welfchecksgrid;
mp_params('a2_covidyr') = mp_params('a2_covidyr_manna_heaven');
```

Income bins:

```
% Income Grid
% 4 refers to 4*58056=232224 dollars in 2012USD
% max 7 refers to 7*58056=406392 dollars in 2012USD
```

```
% all phase out = (4400/5)*100 + 150000 = 238000
% if 500 dollar interval, need 476 inc groups before 238000
% if have 85 percent of points betwen 238000,
fl_max_phaseout = 238000;
fl_multiple = 58056;
it_bin_dollar_before_phaseout = 5000;
it_bin_dollar_after_phaseout = 25000;
fl_thres = fl_max_phaseout/fl_multiple;
inc_grid1 = linspace(0,fl_thres,(fl_max_phaseout)/it_bin_dollar_before_phaseout);
inc_grid2 = linspace(fl_thres, 7, (7*fl_multiple-fl_max_phaseout)/it_bin_dollar_after_phaseout)
inc_grid=sort(unique([inc_grid1 inc_grid2]'));
mp_params('n_incgrid') = length(inc_grid);
mp_params('inc_grid') = inc_grid;
```

SNW_EVUVW19_JMKY_ALLCHECKS Low Storage Invoke

The simulation here (dense) requires less than 10 GB of memory with 8 workers (8 threads needed), simulating over 88 checks takes with 8 workers

```
st_solu_type = 'bisec_vec';
bl_parfor = false;
it_workers = 1;
bl_export = false;
bl_load_mat = false;
snm_suffix = ['_test_ybin' num2str(it_bin_dollar_before_phaseout)];
[ev19_jmky_allchecks, ec19_jmky_allchecks, output] = ...
    snw_evuvw19_jmky_allchecks(mp_params, mp_controls, st_solu_type, ...
    bl_parfor, it_workers, ...
    bl_export, bl_load_mat, snm_suffix);
```

```
Completed SNW_VFI_MAIN_BISEC_VEC;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=331.2941
Completed SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time
Completed SNW_DS_MAIN_VEC;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=916.1458
Wage quintile cutoffs=0.4645     0.71528      1.0335      1.5632
Completed SNW_HH_PRECOMPUTE;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time cost=361.6874
SNW_EVUVW19_JMKY_MASS Start
Completed SNW_EVUVW19_JMKY_MASS;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=5.5035
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_outcomes ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
                    i    idx    ndim     numel      rowN      colN        sum         mean          std       coefv
                    _    ___    ____    ________    ____    _________    ______    __________    _________    _____

    Phi_true        1     1      6      4.37e+07     83     5.265e+05    45.793    1.0479e-06    1.242e-05     11.8
    Phi_true_jmky   2     2      4         42640     82           520    45.787     0.0010738    0.0029446     2.74

SNW_EVUVW19_JMKY_ALLCHECKS Start
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Completed SNW_A4CHK_WRK_BISEC_VEC;welf_checks=0;TR=0.0017225;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_te
Completed SNW_A4CHK_UNEMP_BISEC_VEC;welf_checks=0;TR=0.0017225;xi=0.5;b=0;SNW_MP_PARAM=default_docdense;SNW_MP_CONTR
Completed SNW_EVUVW20_JAEEMK;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;timeEUEC=8.7347
Completed SNW_EVUVW19_JAEEMK_FOC;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=14.7985
Completed SNW_EVUVW19_JMKY;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=11.4225
SNW_EVUVW19_JMKY_ALLCHECKS: Finished Check 0 of 2, time=188.6232
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Completed SNW_A4CHK_WRK_BISEC_VEC;welf_checks=1;TR=0.0017225;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_te
Completed SNW_A4CHK_UNEMP_BISEC_VEC;welf_checks=1;TR=0.0017225;xi=0.5;b=0;SNW_MP_PARAM=default_docdense;SNW_MP_CONTR
```

```
Completed SNW_EVUVW20_JAEEMK;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;timeEUEC=8.3801
Completed SNW_EVUVW19_JAEEMK_FOC;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=14.8583
Completed SNW_EVUVW19_JMKY;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=11.4378
SNW_EVUVW19_JMKY_ALLCHECKS: Finished Check 1 of 2, time=189.5593
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Completed SNW_A4CHK_WRK_BISEC_VEC;welf_checks=2;TR=0.0017225;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_te
Completed SNW_A4CHK_UNEMP_BISEC_VEC;welf_checks=2;TR=0.0017225;xi=0.5;b=0;SNW_MP_PARAM=default_docdense;SNW_MP_CONTR
Completed SNW_EVUVW20_JAEEMK;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;timeEUEC=8.1297
Completed SNW_EVUVW19_JAEEMK_FOC;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=14.888
Completed SNW_EVUVW19_JMKY;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=10.9041
SNW_EVUVW19_JMKY_ALLCHECKS: Finished Check 2 of 2, time=188.6191
Completed SNW_EVUVW19_JMKY_ALLCHECKS;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=2595.3774
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_outcomes ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

	i	idx	ndim	numel	rowN	colN	sum	mean
Output	1	1	2	1.0307e+06	1.1452e+05	9	6.804e+06	6.6014
ec19_jmky_allchecks	2	2	5	1.2792e+05	3	42640	2.6964e+05	2.1079
ec19_jmky_allchecks_posmass	3	3	2	1.1452e+05	1.1452e+05	1	2.6964e+05	2.3545
ev19_jmky_allchecks	4	4	5	1.2792e+05	3	42640	-8.4257e+05	-6.5867
ev19_jmky_allchecks_posmass	5	5	2	1.1452e+05	1.1452e+05	1	-8.4257e+05	-7.3573

xxx TABLE:Output xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c6	c7	c8	c9
r1	18	0	0	0	2.9349e-05	-0.57722	-204.67	0.069778
r2	18	0	0	1	2.9349e-05	-0.57722	-204.21	0.07068
r3	18	0	0	2	2.9349e-05	-0.57722	-203.76	0.07159
r4	19	0	0	0	2.5821e-05	0.42278	-196.02	0.07008
r5	19	0	0	1	2.5821e-05	0.42278	-195.57	0.071671
r114518	87	1	4	1	1.897e-42	4.2413	3.8911	14.055
r114519	87	1	4	2	1.897e-42	4.2413	3.8911	14.055
r114520	88	1	4	0	1.5306e-60	4.2556	3.7289	15.409
r114521	88	1	4	1	1.5306e-60	4.2556	3.7289	15.409
r114522	88	1	4	2	1.5306e-60	4.2556	3.7289	15.409

xxx TABLE:ec19_jmky_allchecks xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c42637	c42638	c42639	c42640
r1	0.069778	0.07008	0.073462	0.07559	0	0	0	0
r2	0.07068	0.071671	0.075078	0.077198	0	0	0	0
r3	0.07159	0.073241	0.076648	0.078753	0	0	0	0

xxx TABLE:ec19_jmky_allchecks_posmass xxxxxxxxxxxxxxxxx

	c1
r1	0.069778
r2	0.07068
r3	0.07159
r4	0.07008
r5	0.071671
r114518	14.055
r114519	14.055
r114520	15.409
r114521	15.409
r114522	15.409

xxx TABLE:ev19_jmky_allchecks xxxxxxxxxxxxxxxxx

c1	c2	c3	c4	c42637	c42638	c42639	c42640

r1	-204.67	-196.02	-187.61	-184.45	0	0	0	0
r2	-204.21	-195.57	-187.2	-184.07	0	0	0	0
r3	-203.76	-195.13	-186.8	-183.69	0	0	0	0

xxx TABLE:ev19_jmky_allchecks_posmass xxxxxxxxxxxxxxxxxx

	c1
r1	-204.67
r2	-204.21
r3	-203.76
r4	-196.02
r5	-195.57
r114518	3.8911
r114519	3.8911
r114520	3.7289
r114521	3.7289
r114522	3.7289