2019/2020 Age, Income, Kids, Marry EV and EC All Checks (Biden Checks)

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

The key features of the Biden stimulus check are: i) determined based on 2020 information; ii) checks received in 2021, ex-post the realization of the second one-time MIT shock, which similar to the first MIT shock, is conditional on income and age groups; iii) state of the economy returns to steady-state in 2022; iv) trump checks were provided in 2020, which changes saves and consumption and distributions in 2020, and appropriate adjustments are made so that the biden check is conditional on the distributional changes in endogenous savings due to the Trump checks.

Test SNW_EVUVW19_JMKY_ALLCHECKS Parameters for Biden Checks

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')
```

```
mp_params =
  Map with properties:

       Count: 64
     KeyType: char
   ValueType: any
```

```
mp_params('beta') = 0.95;
```

```
fl_scaleconvertor = 62502;
mp_more_inputs('fl_scaleconvertor') = fl_scaleconvertor;
% Unemployment
xi = 0.651; % Proportional reduction in income due to unemployment (xi=0 refers to 0 labor inco
b=1; % Unemployment insurance replacement rate (b=0 refers to no UI benefits; b=1 refers to 100
TR=100/fl_scaleconvertor; % Value of a wezlfare check (can receive multiple checks). TO DO: Upd
mp_params('pi_unemp') = mp_params('pi_unemp_2020_juneadj');
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 = fl_scaleconvertor;
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 for Biden Checks

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_biden_or_trump = 'bidenchk';
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_biden_or_trump, 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=338.8603
Completed SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time
```

```
sum of Phi_adj:83
sum of Phi_true:45.7931
sum of Phiss:83
summ of diff of Phiss and Phi_adj:-3.4939e-12
summ of diff of Phiss and Phi_true:37.2069
Completed SNW_DS_MAIN_VEC;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=951.9985
Biden Check, resolve for distributions given Trump check
Completed SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time
sum of Phi_adj:83
sum of Phi_true:45.7931
sum of Phiss:83
summ of diff of Phiss and Phi_adj:-1.0845e-13
summ of diff of Phiss and Phi_true:37.2069
summ of diff of Phi_adj_base and Phiss:1.0838e-13
Completed SNW_DS_MAIN_VEC;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=1016.4233
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=300.7993
SNW_EVUVW19_JMKY_MASS Start
Completed SNW_EVUVW19_JMKY_MASS;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=5.3048
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_outcomes ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

	i	idx	ndim	numel	rowN	colN	sum	mean	std	coef
Phi_true	1	1	6	4.37e+07	83	5.265e+05	45.793	1.0479e-06	1.5158e-05	14.
Phi_true_jmky	2	2	4	43460	82	530	45.787	0.0010535	0.0030972	2.9

```
SNW_EVUVW19_JMKY_ALLCHECKS Start
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Completed SNW_A4CHK_WRK_BISEC_VEC;SNW_MP_PARAM=bidenchk;welf_checks=0;TR=0.0015999;SNW_MP_PARAM=default_docdense;SNW
Completed SNW_A4CHK_UNEMP_BISEC_VEC;welf_checks=0;TR=0.0015999;xi=0.651;b=1;SNW_MP_PARAM=default_docdense;SNW_MP_CON
Completed SNW_EVUVW20_JAEEMK;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;timeEUEC=8.3216
Completed SNW_EVUVW19_JAEEMK_FOC;st_biden_or_trump=bidenchk;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_tes
Completed SNW_EVUVW19_JMKY;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=9.5927
SNW_EVUVW19_JMKY_ALLCHECKS: Finished Check 0 of 2, time=190.7959
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Completed SNW_A4CHK_WRK_BISEC_VEC;SNW_MP_PARAM=bidenchk;welf_checks=1;TR=0.0015999;SNW_MP_PARAM=default_docdense;SNW
Completed SNW_A4CHK_UNEMP_BISEC_VEC;welf_checks=1;TR=0.0015999;xi=0.651;b=1;SNW_MP_PARAM=default_docdense;SNW_MP_CON
Completed SNW_EVUVW20_JAEEMK;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;timeEUEC=7.7507
Completed SNW_EVUVW19_JAEEMK_FOC;st_biden_or_trump=bidenchk;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_tes
Completed SNW_EVUVW19_JMKY;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=9.57
SNW_EVUVW19_JMKY_ALLCHECKS: Finished Check 1 of 2, time=190.7479
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Completed SNW_A4CHK_WRK_BISEC_VEC;SNW_MP_PARAM=bidenchk;welf_checks=2;TR=0.0015999;SNW_MP_PARAM=default_docdense;SNW
Completed SNW_A4CHK_UNEMP_BISEC_VEC;welf_checks=2;TR=0.0015999;xi=0.651;b=1;SNW_MP_PARAM=default_docdense;SNW_MP_CON
Completed SNW_EVUVW20_JAEEMK;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;timeEUEC=7.9871
Completed SNW_EVUVW19_JAEEMK_FOC;st_biden_or_trump=bidenchk;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_tes
Completed SNW_EVUVW19_JMKY;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=9.4891
SNW_EVUVW19_JMKY_ALLCHECKS: Finished Check 2 of 2, time=191.4103
Completed SNW_EVUVW19_JMKY_ALLCHECKS;ST_BIDEN_OR_TRUMP=bidenchk;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_outcomes ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

	i	idx	ndim	numel	rowN	colN	sum	mean
Output	1	1	2	1.0453e+06	1.1615e+05	9	7.7287e+06	7.3938
ec19_jmky_allchecks	2	2	5	1.3038e+05	3	43460	2.7167e+05	2.0836
ec19_jmky_allchecks_posmass	3	3	2	1.1615e+05	1.1615e+05	1	2.7167e+05	2.339
ev19_jmky_allchecks	4	4	5	1.3038e+05	3	43460	-2.3026e+06	-17.661
ev19_jmky_allchecks_posmass	5	5	2	1.1615e+05	1.1615e+05	1	17652	0.15199

xxx TABLE:Output xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c6	c7	c8	c9
r1	18	0	0	0	2.1599e-05	-0.57722	0.0053864	0.068495
r2	18	0	0	1	2.1599e-05	-0.57722	0.0053978	0.069683
r3	18	0	0	2	2.1599e-05	-0.57722	0.005409	0.070689
r4	19	0	0	0	1.9002e-05	0.42278	0.0056805	0.075684
r5	19	0	0	1	1.9002e-05	0.42278	0.0056903	0.07644
r116141	86	1	4	1	3.9923e-49	4.2268	0.97814	13.904
r116142	86	1	4	2	3.9923e-49	4.2268	0.97816	13.904
r116143	87	1	4	0	7.923e-63	4.2413	1.071	14.588
r116144	87	1	4	1	7.923e-63	4.2413	1.071	14.588
r116145	87	1	4	2	7.923e-63	4.2413	1.0711	14.589

xxx TABLE:ec19_jmky_allchecks xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c43457	c43458	c43459	c43460
r1	0.068495	0.075684	0.077039	0.075763	0	0	0	0
r2	0.069683	0.07644	0.077934	0.076696	0	0	0	0
r3	0.070689	0.077196	0.078828	0.077629	0	0	0	0

xxx TABLE:ec19_jmky_allchecks_posmass xxxxxxxxxxxxxxxxx

	c1
r1	0.068495
r2	0.069683
r3	0.070689
r4	0.075684
r5	0.07644
r116141	13.904
r116142	13.904
r116143	14.588
r116144	14.588
r116145	14.589

xxx TABLE:ev19_jmky_allchecks xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c43457	c43458	c43459	c43460
r1	-185.65	-176.04	-169.67	-170.69	0	0	0	0
r2	-185.26	-175.74	-169.37	-170.39	0	0	0	0
r3	-184.88	-175.43	-169.08	-170.09	0	0	0	0

xxx TABLE:ev19_jmky_allchecks_posmass xxxxxxxxxxxxxxxxx

	c1
r1	0.0053864
r2	0.0053978
r3	0.005409
r4	0.0056805
r5	0.0056903
r116141	0.97814
r116142	0.97816
r116143	1.071
r116144	1.071
r116145	1.0711