2019 (Biden/Trump Checks) Full States EV and EC of Two Checks

This is the example vignette for function: **snw_evuvw19_jaeemk_foc** from the **PrjOptiSNW Package.** 2019 integrated over VU and VW, given optimal savings choices, unemployment shocks and various expectations.

Given 2020 JAEEMK (age, endogenous savings, education, income shock, marital status, kids count), what is the expected value for the planner given 2020 JAEEMK and transition between 2019 to 2020 JAEEMK given some stimulus check assignment based on 2019 information? (Stimulus amount set by WELF_CHECKS). This is similar to **snw_evuvw19_jaeemk**, except the solution here, under **snw_evuvw19_jaeemk_foc**, relies on First Order Conditions, and are hence faster.

Despite the name, this function supports solving the 2019 looking into 2020 as well as the 2007 looking into 2008 problems. The idea is that the planner only has information from 2019 and from 2007, and must allocate using those information. Stimulus, however, is given in 2020 and in 2008. So the planner needs to consider expected values in consumption or welfare given the transition probabilities of states in 2007 to 2008 and in 2019 to 2020. The **snw_evuvw19_jmky** file then aggregates the full state-space results to just JMKY state-space, which is the extend of information available to the planner.

Test SNW_EVUVW19_JAEEMK Defaults for 2019

Call the function with defaults parameters.

```
clear all;
% Solution types
st_biden_or_trump = 'bidenchk';
st_solu_type = 'bisec_vec';

% Solve the VFI Problem and get Value Function
mp_params = snw_mp_param('default_docdense');
% mp_params = snw_mp_param('default_dense');
mp_params('beta') = 0.95;
mp_params('st_biden_or_trump') = st_biden_or_trump;
% mp_params = snw_mp_param('default_dense');
mp_controls = snw_mp_control('default_test');

% set Unemployment Related Variables
mp_params('a2_covidyr') = mp_params('a2_covidyr_manna_heaven');
% mp_params('a2_covidyr') = mp_params('a2_covidyr_tax_fully_pay');

% Solve for Unemployment Values
mp_controls('bl_print_vfi') = false;
mp_controls('bl_print_vfi_verbose') = true;
mp_controls('bl_print_ds') = false;
mp_controls('bl_print_ds_verbose') = false;
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;
```

```
% Solve the Model to get V working and unemployed
[V_ss,ap_ss,cons_ss,mp_valpol_more_ss] = snw_vfi_main_bisec_vec(mp_params, mp_controls);
```

```
Completed SNW_VFI_MAIN_BISEC_VEC;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=519.5191
---------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_outcomes ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

	i	idx	ndim	numel	rowN	colN	sum	mean	std	coefvari
V_VFI	1	1	6	4.37e+07	83	5.265e+05	-6.6619e+08	-15.245	21.865	-1.4343
ap_VFI	2	2	6	4.37e+07	83	5.265e+05	1.3967e+09	31.962	36.426	1.1397
cons_VFI	3	3	6	4.37e+07	83	5.265e+05	2.3276e+08	5.3263	8.4413	1.5848

xxx TABLE:V_VFI xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499
r1	-293.96	-293.57	-291.09	-285.44	-276.41	-4.3584	-4.2643	-4.1713	-4.0795
r2	-284.42	-284.03	-281.55	-275.97	-267.24	-4.2519	-4.1612	-4.0717	-3.9832
r3	-274.87	-274.48	-272.03	-266.62	-258.33	-4.1429	-4.0559	-3.9698	-3.8847
r4	-265.22	-264.86	-262.58	-257.53	-249.74	-4.0309	-3.9475	-3.8649	-3.7833
r5	-256.51	-256.17	-254.04	-249.3	-241.96	-3.9252	-3.8452	-3.7659	-3.6873
r79	-13.642	-13.628	-13.535	-13.298	-12.896	-0.22092	-0.21058	-0.20086	-0.19173
r80	-12.283	-12.269	-12.176	-11.939	-11.537	-0.16979	-0.16182	-0.1543	-0.14722
r81	-10.605	-10.591	-10.498	-10.261	-9.8589	-0.11712	-0.11163	-0.10646	-0.10157
r82	-8.3494	-8.3358	-8.2424	-8.0055	-7.6035	-0.065333	-0.062242	-0.05936	-0.056635
r83	-5.0665	-5.0529	-4.9595	-4.7226	-4.3206	-0.020968	-0.019972	-0.019038	-0.018161

xxx TABLE:ap_VFI xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499	c526500
r1	0	0	0.00051498	0.0066578	0.021589	112.13	117.67	123.4	129.31	135.72
r2	0	0	0.00051498	0.0057684	0.020245	112.17	117.71	123.43	129.34	135.76
r3	0	0	0.00020768	0.0041456	0.018539	112.2	117.73	123.45	129.37	135.78
r4	0	0	0.00010346	0.0041199	0.018307	112.86	118.39	124.11	130.03	136.44
r5	0	0	5.2907e-06	0.0041199	0.018091	113.53	119.07	124.79	130.71	137.12
r79	0	0	0	0	0	81.091	85.364	89.335	93.258	97.348
r80	0	0	0	0	0	76.124	79.747	83.431	86.986	90.578
r81	0	0	0	0	0	67.945	70.639	73.673	76.991	81.091
r82	0	0	0	0	0	50.126	53.467	56.302	57.884	60.587
r83	0	0	0	0	0	0	0	0	0	0

xxx TABLE:cons_VFI xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499	c
r1	0.036717	0.037251	0.040477	0.044486	0.049324	12.265	12.55	12.844	13.145	1
r2	0.036717	0.037251	0.040477	0.045375	0.050668	12.501	12.787	13.082	13.383	1
r3	0.036717	0.037251	0.040784	0.046998	0.052374	12.755	13.042	13.337	13.638	1
r4	0.038144	0.038678	0.042314	0.048449	0.054031	13	13.289	13.584	13.883	1
r5	0.039534	0.040068	0.043802	0.049839	0.055635	13.236	13.525	13.821	14.116	1
r79	0.19737	0.19791	0.20163	0.21175	0.23145	35.811	37.362	39.409	41.7	4
r80	0.19737	0.19791	0.20163	0.21175	0.23145	40.752	42.953	45.286	47.946	5
r81	0.19737	0.19791	0.20163	0.21175	0.23145	48.909	52.039	55.022	57.919	6
r82	0.19737	0.19791	0.20163	0.21175	0.23145	66.71	69.193	72.375	77.007	
r83	0.19737	0.19791	0.20163	0.21175	0.23145	116.82	122.65	128.66	134.88	1

```
inc_VFI = mp_valpol_more_ss('inc_VFI');
spouse_inc_VFI = mp_valpol_more_ss('spouse_inc_VFI');
total_inc_VFI = inc_VFI + spouse_inc_VFI;
% Solve employment, same as 2020, except with possible change in tax
```

```
mp_params('xi') = 1;
mp_params('b') = 0;
[V_emp_2020,~,cons_emp_2020,~] = snw_vfi_main_bisec_vec(mp_params, mp_controls, V_ss);
```

```
Completed SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time
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xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_outcomes ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

	i	idx	ndim	numel	rowN	colN	sum	mean	std	coefvari
V_VFI	1	1	6	4.37e+07	83	5.265e+05	-6.6619e+08	-15.245	21.865	-1.4343
ap_VFI	2	2	6	4.37e+07	83	5.265e+05	1.3967e+09	31.962	36.426	1.1397
cons_VFI	3	3	6	4.37e+07	83	5.265e+05	2.3276e+08	5.3263	8.4413	1.5848

xxx TABLE:V_VFI xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499
r1	-293.96	-293.57	-291.09	-285.44	-276.41	-4.3584	-4.2643	-4.1713	-4.0795
r2	-284.42	-284.03	-281.55	-275.97	-267.24	-4.2519	-4.1612	-4.0717	-3.9832
r3	-274.87	-274.48	-272.03	-266.62	-258.33	-4.1429	-4.0559	-3.9698	-3.8847
r4	-265.22	-264.86	-262.58	-257.53	-249.74	-4.0309	-3.9475	-3.8649	-3.7833
r5	-256.51	-256.17	-254.04	-249.3	-241.96	-3.9252	-3.8452	-3.7659	-3.6873
r79	-13.642	-13.628	-13.535	-13.298	-12.896	-0.22092	-0.21058	-0.20086	-0.19173
r80	-12.283	-12.269	-12.176	-11.939	-11.537	-0.16979	-0.16182	-0.1543	-0.14722
r81	-10.605	-10.591	-10.498	-10.261	-9.8589	-0.11712	-0.11163	-0.10646	-0.10157
r82	-8.3494	-8.3358	-8.2424	-8.0055	-7.6035	-0.065333	-0.062242	-0.05936	-0.056635
r83	-5.0665	-5.0529	-4.9595	-4.7226	-4.3206	-0.020968	-0.019972	-0.019038	-0.018161

xxx TABLE:ap_VFI xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499	c526500
r1	0	0	0.00051498	0.0066578	0.021589	112.13	117.67	123.4	129.31	135.72
r2	0	0	0.00051498	0.0057684	0.020245	112.17	117.71	123.43	129.34	135.76
r3	0	0	0.00020768	0.0041456	0.018539	112.2	117.73	123.45	129.37	135.78
r4	0	0	0.00010346	0.0041199	0.018307	112.86	118.39	124.11	130.03	136.44
r5	0	0	5.2907e-06	0.0041199	0.018091	113.53	119.07	124.79	130.71	137.12
r79	0	0	0	0	0	81.091	85.364	89.335	93.258	97.348
r80	0	0	0	0	0	76.124	79.747	83.431	86.986	90.578
r81	0	0	0	0	0	67.945	70.639	73.673	76.991	81.091
r82	0	0	0	0	0	50.126	53.467	56.302	57.884	60.587
r83	0	0	0	0	0	0	0	0	0	0

xxx TABLE:cons_VFI xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499	c
r1	0.036717	0.037251	0.040477	0.044486	0.049324	12.265	12.55	12.844	13.145	1
r2	0.036717	0.037251	0.040477	0.045375	0.050668	12.501	12.787	13.082	13.383	1
r3	0.036717	0.037251	0.040784	0.046998	0.052374	12.755	13.042	13.337	13.638	1
r4	0.038144	0.038678	0.042314	0.048449	0.054031	13	13.289	13.584	13.883	1
r5	0.039534	0.040068	0.043802	0.049839	0.055635	13.236	13.525	13.821	14.116	1
r79	0.19737	0.19791	0.20163	0.21175	0.23145	35.811	37.362	39.409	41.7	4
r80	0.19737	0.19791	0.20163	0.21175	0.23145	40.752	42.953	45.286	47.946	5
r81	0.19737	0.19791	0.20163	0.21175	0.23145	48.909	52.039	55.022	57.919	6
r82	0.19737	0.19791	0.20163	0.21175	0.23145	66.71	69.193	72.375	77.007	
r83	0.19737	0.19791	0.20163	0.21175	0.23145	116.82	122.65	128.66	134.88	1

```
% Solve unemployment, different income than under ss due to income losses
mp_params('xi') = 0.50;
mp_params('b') = 0.50;
```

```
[V_unemp_2020,~,cons_unemp_2020,~] = snw_vfi_main_bisec_vec(mp_params, mp_controls, V_ss);
```

```
Completed SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_outcomes ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

	i	idx	ndim	numel	rowN	colN	sum	mean	std	coefvari
V_VFI	1	1	6	4.37e+07	83	5.265e+05	-6.7567e+08	-15.462	22.251	-1.4391
ap_VFI	2	2	6	4.37e+07	83	5.265e+05	1.3783e+09	31.541	36.36	1.1528
cons_VFI	3	3	6	4.37e+07	83	5.265e+05	2.3114e+08	5.2893	8.4402	1.5957

```
xxx TABLE:V_VFI xxxxxxxxxxxxxxxxx
```

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499
r1	-302.8	-302.11	-297.97	-290.4	-280.12	-4.3991	-4.3032	-4.2086	-4.1151
r2	-293.25	-292.57	-288.43	-280.86	-270.8	-4.2921	-4.1998	-4.1086	-4.0185
r3	-283.7	-283.02	-278.88	-271.34	-261.75	-4.1826	-4.094	-4.0063	-3.9196
r4	-273.72	-273.09	-269.23	-262.13	-253.1	-4.0721	-3.987	-3.9028	-3.8196
r5	-264.7	-264.11	-260.51	-253.79	-245.27	-3.9679	-3.8861	-3.8051	-3.725
r79	-13.642	-13.628	-13.535	-13.298	-12.896	-0.22191	-0.21148	-0.20167	-0.19245
r80	-12.283	-12.269	-12.176	-11.939	-11.537	-0.17053	-0.16249	-0.1549	-0.14776
r81	-10.605	-10.591	-10.498	-10.261	-9.8589	-0.11764	-0.11208	-0.10686	-0.10194
r82	-8.3494	-8.3358	-8.2424	-8.0055	-7.6035	-0.065608	-0.062497	-0.059592	-0.056839
r83	-5.0665	-5.0529	-4.9595	-4.7226	-4.3206	-0.021056	-0.020052	-0.019111	-0.018227

```
xxx TABLE:ap_VFI xxxxxxxxxxxxxxxxx
```

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499	c526500
r1	0	0	0	0.0011815	0.013905	109.98	115.52	121.26	127.18	133.29
r2	0	0	0	0.00090277	0.013905	109.95	115.49	121.22	127.14	133.26
r3	0	0	0	0.00051498	0.013905	109.9	115.45	121.18	127.1	133.21
r4	0	0	0	0.00051498	0.013905	110.34	115.88	121.61	127.53	133.65
r5	0	0	0	0.00048777	0.013905	110.79	116.33	122.06	127.98	134.1
r79	0	0	0	0	0	80.974	84.852	88.823	92.746	96.836
r80	0	0	0	0	0	75.619	79.241	82.926	86.481	90.439
r81	0	0	0	0	0	67.445	70.139	73.173	76.669	81.091
r82	0	0	0	0	0	50.126	53.467	55.806	57.389	60.587
r83	0	0	0	0	0	0	0	0	0	0

```
xxx TABLE:cons_VFI xxxxxxxxxxxxxxxxx
```

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499	c
r1	0.027723	0.028258	0.031999	0.040974	0.048028	11.989	12.265	12.55	12.844	1
r2	0.027723	0.028258	0.031999	0.041253	0.048028	12.223	12.501	12.787	13.082	1
r3	0.027723	0.028258	0.031999	0.041641	0.048028	12.476	12.755	13.042	13.337	1
r4	0.028805	0.029339	0.033081	0.042722	0.049108	12.72	13	13.289	13.584	1
r5	0.029859	0.030394	0.034135	0.043802	0.050161	12.955	13.236	13.525	13.821	1
r79	0.19737	0.19791	0.20163	0.21175	0.23145	35.417	37.362	39.409	41.7	4
r80	0.19737	0.19791	0.20163	0.21175	0.23145	40.752	42.953	45.286	47.946	5
r81	0.19737	0.19791	0.20163	0.21175	0.23145	48.909	52.039	55.022	57.741	5
r82	0.19737	0.19791	0.20163	0.21175	0.23145	66.215	68.697	72.375	77.007	8
r83	0.19737	0.19791	0.20163	0.21175	0.23145	116.33	122.15	128.17	134.39	

```
[Phi_true] = snw_ds_main(mp_params, mp_controls, ap_ss, cons_emp_2020, mp_valpol_more_ss);
```

```
Completed SNW_DS_MAIN;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=1473.2344
```

```
% Get Matrixes
```

```
cl_st_precompute_list = {'a', ...
    'inc', 'inc_unemp', 'spouse_inc', 'spouse_inc_unemp', 'ref_earn_wageind_grid',...
    'ar_z_ctr_amz'};
% cl_st_precompute_list = {'a', ...
%     'inc', 'inc_unemp', 'spouse_inc', 'spouse_inc_unemp', 'ref_earn_wageind_grid',...
%     'ap_idx_lower_ss', 'ap_idx_higher_ss', 'ap_idx_lower_weight_ss'};
mp_controls('bl_print_precompute_verbose') = false;
[mp_precompute_res] = snw_hh_precompute(mp_params, mp_controls, cl_st_precompute_list, ap_ss, P
```

```
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=279.4135
```

Solve for 2019 Evuvw With 0 and 2 Checks

Solve for 0 and 2 checks, by finding the increase to asset state-space that is equivalent to the check increase, so that the problem can be solved without increasing the state-space.

```
% Call Function
welf_checks = 0;
[ev19_jaeemk_check0, ec19_jaeemk_check0, ev20_jaeemk_check0, ec20_jaeemk_check0] = snw_evuvw19_
    welf_checks, st_solu_type, mp_params, mp_controls, ...
    V_emp_2020, ap_ss, cons_emp_2020, V_unemp_2020, cons_unemp_2020, mp_precompute_res);
```

```
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=0.5;b=0.5;SNW_MP_PARAM=default_docdense;SNW_MP_CON
Completed SNW_EVUVW20_JAEEMK;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;timeEUEC=8.3561
Completed SNW_EVUVW19_JAEEMK_FOC;st_biden_or_trump=bidenchk;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_tes
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_outcomes ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

	i	idx	ndim	numel	rowN	colN	sum	mean	std	coefva
ec19_jaeemk	1	1	6	4.3173e+07	82	5.265e+05	1.9673e+08	4.5568	5.3248	1.168
ec20_jaeemk	2	2	6	4.37e+07	83	5.265e+05	2.3259e+08	5.3225	8.4421	1.586
ev19_jaeemk	3	3	6	4.3173e+07	82	5.265e+05	-6.4971e+08	-15.049	21.201	-1.408
ev20_jaeemk	4	4	6	4.37e+07	83	5.265e+05	-6.683e+08	-15.293	21.999	-1.438

```
xxx TABLE:ec19_jaeemk xxxxxxxxxxxxxxxxxx
```

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499	c
r1	0.036494	0.036494	0.037029	0.041925	0.048857	12.017	12.289	12.569	12.857	1
r2	0.036494	0.036494	0.037029	0.041745	0.049665	12.261	12.534	12.815	13.104	1
r3	0.037912	0.037912	0.038127	0.041994	0.050655	12.495	12.77	13.052	13.341	1
r4	0.039293	0.039293	0.039401	0.043382	0.052052	12.753	13.028	13.311	13.599	1
r5	0.040635	0.040635	0.04064	0.044725	0.053494	13.002	13.278	13.56	13.846	1
r78	0.19737	0.19737	0.19737	0.19737	0.19791	27.77	28.769	29.78	30.961	3
r79	0.19737	0.19737	0.19737	0.19737	0.19737	30.426	31.659	32.732	33.953	3
r80	0.19737	0.19737	0.19737	0.19737	0.19737	33.678	35.498	37.364	38.952	4
r81	0.19737	0.19737	0.19737	0.19737	0.19737	40.112	41.394	43.173	45.605	4
r82	0.19737	0.19737	0.19737	0.19737	0.19737	52.096	55.537	58.457	60.087	6

```
xxx TABLE:ec20_jaeemk xxxxxxxxxxxxxxxxxx
```

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499	c
r1	0.033462	0.033996	0.037408	0.043215	0.048855	12.242	12.527	12.819	13.12	1
r2	0.033462	0.033996	0.037408	0.043883	0.049712	12.478	12.763	13.057	13.358	1

r3	0.033462	0.033996	0.037604	0.045059	0.050801	12.731	13.018	13.313	13.613	1
r4	0.034763	0.035298	0.038972	0.046376	0.052249	12.977	13.265	13.56	13.858	1
r5	0.036032	0.036566	0.040303	0.047654	0.053654	13.213	13.501	13.796	14.092	1
r79	0.19737	0.19791	0.20163	0.21175	0.23145	35.811	37.362	39.409	41.7	4
r80	0.19737	0.19791	0.20163	0.21175	0.23145	40.752	42.953	45.286	47.946	5
r81	0.19737	0.19791	0.20163	0.21175	0.23145	48.909	52.039	55.022	57.919	6
r82	0.19737	0.19791	0.20163	0.21175	0.23145	66.71	69.193	72.375	77.007	
r83	0.19737	0.19791	0.20163	0.21175	0.23145	116.82	122.65	128.66	134.88	1

xxx TABLE:ev19_jaeemk xxxxxxxxxxxxxxxxxx

	c1	**c2**	**c3**	**c4**	**c5**	**c526496**	**c526497**	**c526498**	**c526499**
r1	-284.04	-284.04	-283.59	-279.25	-271.39	-4.3825	-4.288	-4.1947	-4.1025
r2	-273.99	-273.99	-273.54	-269.79	-262.27	-4.2743	-4.1834	-4.0935	-4.0047
r3	-263.81	-263.81	-263.65	-260.8	-253.57	-4.1639	-4.0766	-3.9902	-3.9047
r4	-254.62	-254.62	-254.55	-251.83	-245.12	-4.05	-3.9664	-3.8835	-3.8015
r5	-246.32	-246.32	-246.31	-243.7	-237.45	-3.9424	-3.8621	-3.7826	-3.7036
r78	-13.649	-13.649	-13.649	-13.649	-13.635	-0.27318	-0.26108	-0.24974	-0.23894
r79	-12.29	-12.29	-12.29	-12.29	-12.29	-0.21858	-0.20783	-0.19878	-0.19059
r80	-10.611	-10.611	-10.611	-10.611	-10.611	-0.16128	-0.15409	-0.14735	-0.14136
r81	-8.3555	-8.3555	-8.3555	-8.3555	-8.3555	-0.10114	-0.097402	-0.093444	-0.089432
r82	-5.0715	-5.0715	-5.0715	-5.0715	-5.0715	-0.044205	-0.041465	-0.039418	-0.038353

xxx TABLE:ev20_jaeemk xxxxxxxxxxxxxxxxxx

	c1	**c2**	**c3**	**c4**	**c5**	**c526496**	**c526497**	**c526498**	**c526499**
r1	-297.16	-296.66	-293.58	-287.23	-277.75	-4.3618	-4.2675	-4.1744	-4.0824
r2	-287.62	-287.12	-284.04	-277.74	-268.53	-4.2552	-4.1645	-4.0747	-3.9861
r3	-278.06	-277.57	-274.51	-268.33	-259.57	-4.1462	-4.059	-3.9728	-3.8876
r4	-268.3	-267.84	-264.99	-259.19	-250.96	-4.0343	-3.9508	-3.8681	-3.7863
r5	-259.47	-259.05	-256.38	-250.92	-243.16	-3.9288	-3.8486	-3.7691	-3.6904
r79	-13.642	-13.628	-13.535	-13.298	-12.896	-0.22092	-0.21058	-0.20086	-0.19173
r80	-12.283	-12.269	-12.176	-11.939	-11.537	-0.16979	-0.16182	-0.1543	-0.14722
r81	-10.605	-10.591	-10.498	-10.261	-9.8589	-0.11712	-0.11163	-0.10646	-0.10157
r82	-8.3494	-8.3358	-8.2424	-8.0055	-7.6035	-0.065333	-0.062242	-0.05936	-0.056635
r83	-5.0665	-5.0529	-4.9595	-4.7226	-4.3206	-0.020968	-0.019972	-0.019038	-0.018161

```
% Call Function
welf_checks = 2;
[ev19_jaeemk_check2, ec19_jaeemk_check2, ev20_jaeemk_check2, ec20_jaeemk_check2] = snw_evuvw19_
    welf_checks, st_solu_type, mp_params, mp_controls, ...
    V_emp_2020,  ap_ss, cons_emp_2020, V_unemp_2020, cons_unemp_2020, mp_precompute_res);
```

```
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=0.5;b=0.5;SNW_MP_PARAM=default_docdense;SNW_MP_CON
Completed SNW_EVUVW20_JAEEMK;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;timeEUEC=7.9626
Completed SNW_EVUVW19_JAEEMK_FOC;st_biden_or_trump=bidenchk;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_tes
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_outcomes ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

	i	**idx**	**ndim**	**numel**	**rowN**	**colN**	**sum**	**mean**	**std**	**coefva**
ec19_jaeemk	1	1	6	4.3173e+07	82	5.265e+05	1.9675e+08	4.5574	5.3248	1.168
ec20_jaeemk	2	2	6	4.37e+07	83	5.265e+05	2.3261e+08	5.323	8.4422	1.58
ev19_jaeemk	3	3	6	4.3173e+07	82	5.265e+05	-6.4916e+08	-15.036	21.153	-1.406
ev20_jaeemk	4	4	6	4.37e+07	83	5.265e+05	-6.6772e+08	-15.28	21.948	-1.436

xxx TABLE:ec19_jaeemk xxxxxxxxxxxxxxxxxx

	c1	**c2**	**c3**	**c4**	**c5**	**c526496**	**c526497**	**c526498**	**c526499**	**c**

r1	0.039371	0.039371	0.03984	0.043617	0.0497	12.017	12.289	12.569	12.858	1
r2	0.039522	0.039522	0.040022	0.043796	0.050541	12.261	12.534	12.815	13.104	1
r3	0.040961	0.040961	0.041164	0.044279	0.051563	12.496	12.77	13.052	13.342	1
r4	0.042361	0.042361	0.042463	0.045683	0.05298	12.753	13.028	13.311	13.599	1
r5	0.043704	0.043704	0.043709	0.04707	0.054441	13.002	13.278	13.561	13.846	1
r78	0.20057	0.20057	0.20057	0.20057	0.20111	27.771	28.77	29.781	30.962	3
r79	0.20057	0.20057	0.20057	0.20057	0.20057	30.427	31.66	32.733	33.955	3
r80	0.20057	0.20057	0.20057	0.20057	0.20057	33.68	35.5	37.365	38.953	4
r81	0.20057	0.20057	0.20057	0.20057	0.20057	40.114	41.396	43.176	45.607	4
r82	0.20057	0.20057	0.20057	0.20057	0.20057	52.099	55.54	58.46	60.09	6

xxx TABLE:ec20_jaeemk xxxxxxxxxxxxxxxxx

	c1	**c2**	**c3**	**c4**	**c5**	**c526496**	**c526497**	**c526498**	**c526499**	**c**
r1	0.036428	0.036915	0.039238	0.044128	0.049481	12.243	12.527	12.82	13.12	1
r2	0.036428	0.036915	0.039449	0.044827	0.050406	12.478	12.763	13.057	13.358	1
r3	0.036567	0.037083	0.039954	0.045988	0.051564	12.732	13.018	13.313	13.613	1
r4	0.037916	0.038441	0.041306	0.047327	0.053041	12.977	13.265	13.56	13.858	1
r5	0.03923	0.039763	0.04262	0.048625	0.054472	13.213	13.502	13.797	14.092	1
r79	0.20057	0.20111	0.20483	0.21495	0.23328	35.812	37.363	39.41	41.702	4
r80	0.20057	0.20111	0.20483	0.21495	0.23328	40.753	42.954	45.288	47.948	
r81	0.20057	0.20111	0.20483	0.21495	0.23328	48.911	52.041	55.024	57.92	6
r82	0.20057	0.20111	0.20483	0.21495	0.23352	66.711	69.194	72.378	77.009	8
r83	0.20057	0.20111	0.20483	0.21495	0.23465	116.83	122.65	128.67	134.88	

xxx TABLE:ev19_jaeemk xxxxxxxxxxxxxxxxx

	c1	**c2**	**c3**	**c4**	**c5**	**c526496**	**c526497**	**c526498**	**c526499**
r1	-281.59	-281.59	-281.18	-277.52	-270.11	-4.3824	-4.288	-4.1946	-4.1024
r2	-271.55	-271.55	-271.16	-268.06	-261.04	-4.2742	-4.1833	-4.0934	-4.0046
r3	-261.56	-261.56	-261.41	-259.11	-252.39	-4.1639	-4.0766	-3.9902	-3.9047
r4	-252.52	-252.52	-252.45	-250.24	-244	-4.0499	-3.9663	-3.8835	-3.8014
r5	-244.35	-244.35	-244.35	-242.21	-236.39	-3.9423	-3.8621	-3.7825	-3.7036
r78	-13.568	-13.568	-13.568	-13.568	-13.555	-0.27317	-0.26107	-0.24974	-0.23893
r79	-12.209	-12.209	-12.209	-12.209	-12.209	-0.21857	-0.20783	-0.19877	-0.19059
r80	-10.531	-10.531	-10.531	-10.531	-10.531	-0.16127	-0.15408	-0.14735	-0.14135
r81	-8.2749	-8.2749	-8.2749	-8.2749	-8.2749	-0.10114	-0.097398	-0.09344	-0.089428
r82	-4.991	-4.991	-4.991	-4.991	-4.991	-0.044202	-0.041463	-0.039416	-0.038351

xxx TABLE:ev20_jaeemk xxxxxxxxxxxxxxxxx

	c1	**c2**	**c3**	**c4**	**c5**	**c526496**	**c526497**	**c526498**	**c526499**
r1	-294.47	-294.03	-291.58	-285.7	-276.56	-4.3618	-4.2675	-4.1743	-4.0824
r2	-284.93	-284.49	-282.06	-276.25	-267.39	-4.2552	-4.1644	-4.0747	-3.9861
r3	-275.39	-274.95	-272.56	-266.91	-258.48	-4.1462	-4.059	-3.9728	-3.8875
r4	-265.81	-265.4	-263.16	-257.86	-249.93	-4.0343	-3.9507	-3.8681	-3.7862
r5	-257.15	-256.77	-254.66	-249.67	-242.18	-3.9287	-3.8486	-3.7691	-3.6904
r79	-13.561	-13.548	-13.46	-13.233	-12.841	-0.22091	-0.21058	-0.20085	-0.19173
r80	-12.203	-12.189	-12.101	-11.874	-11.482	-0.16978	-0.16181	-0.1543	-0.14722
r81	-10.524	-10.511	-10.423	-10.196	-9.8048	-0.11712	-0.11163	-0.10645	-0.10157
r82	-8.2689	-8.2556	-8.1674	-7.9402	-7.5499	-0.065331	-0.062241	-0.059358	-0.056634
r83	-4.9861	-4.9727	-4.8846	-4.6573	-4.2682	-0.020967	-0.019972	-0.019038	-0.01816

Differences between Checks in Expected Value and Expected Consumption

```
mn_V_U_gain_check = ev19_jaeemk_check2 - ev19_jaeemk_check0;
mn_MPC_U_gain_share_check = (ec19_jaeemk_check2 - ec19_jaeemk_check0)./(welf_checks*mp_params('
```

Param Results Define Frames

Define the matrix dimensions names and dimension vector values. Policy and Value Functions share the same ND dimensional structure.

```
% Grids:
age_grid = 18:99;
agrid = mp_params('agrid')';
eta_H_grid = mp_params('eta_H_grid')';
eta_S_grid = mp_params('eta_S_grid')';
ar_st_eta_HS_grid = string(cellstr([num2str(eta_H_grid', 'hz=%3.2f;'), num2str(eta_S_grid', 'wz
edu_grid = [0,1];
marry_grid = [0,1];
kids_grid = (1:1:mp_params('n_kidsgrid'))';
% NaN(n_jgrid,n_agrid,n_etagrid,n_educgrid,n_marriedgrid,n_kidsgrid);
cl_mp_datasetdesc = {};
cl_mp_datasetdesc{1} = containers.Map({'name', 'labval'}, {'age', age_grid});
cl_mp_datasetdesc{2} = containers.Map({'name', 'labval'}, {'savings', agrid});
cl_mp_datasetdesc{3} = containers.Map({'name', 'labval'}, {'eta', 1:length(eta_H_grid)});
cl_mp_datasetdesc{4} = containers.Map({'name', 'labval'}, {'edu', edu_grid});
cl_mp_datasetdesc{5} = containers.Map({'name', 'labval'}, {'marry', marry_grid});
cl_mp_datasetdesc{6} = containers.Map({'name', 'labval'}, {'kids', kids_grid});
```

Analyze Difference in V and C with Check

The difference between V and V with Check, marginal utility gain given the check.

```
% Generate some Data
mp_support_graph = containers.Map('KeyType', 'char', 'ValueType', 'any');
mp_support_graph('cl_st_xtitle') = {'Savings States, a'};
mp_support_graph('st_legend_loc') = 'eastoutside';
mp_support_graph('bl_graph_logy') = true; % do not log
mp_support_graph('it_legend_select') = 21; % how many shock legends to show
mp_support_graph('cl_colors') = 'jet';
```

MEAN(MN_V_GAIN_CHECK(A,Z))

Tabulate value and policies along savings and shocks:

```
% Set
ar_permute = [1,4,5,6,3,2];
% Value Function
st_title = ['MEAN(MN_V_U_GAIN_CHECK(A,Z)), welf_checks=' num2str(welf_checks) ', TR=' num2str(m
tb_az_v = ff_summ_nd_array(st_title, mn_V_U_gain_check, true, ["mean"], 4, 1, cl_mp_datasetdesc
```

```
xxx  MEAN(MN_V_U_GAIN_CHECK(A,Z)), welf_checks=2, TR=0.0015999  xxxxxxxxxxxxxxxxxxxxxxxxxxxx
    group      savings      mean_eta_1    mean_eta_2    mean_eta_3    mean_eta_4    mean_eta_5    mean_eta_6    mean_
    _____    _________    __________    __________    __________    __________    __________    __________    ____

      1              0       0.56295       0.52208       0.47698       0.43181       0.38933        0.3507       0.
      2     0.00051498       0.56295       0.52208       0.47698       0.43181       0.38933        0.3507       0.
      3      0.0041199       0.56193       0.52054         0.475       0.42987       0.38768       0.34937       0.
      4       0.013905       0.46781        0.4349       0.40085       0.36671       0.33426       0.30434       0.
      5       0.032959       0.36797       0.34609       0.32201       0.29764       0.27416       0.25219       0.
      6       0.064373       0.29936       0.28324       0.26551       0.24731       0.22949       0.21256       0.
```

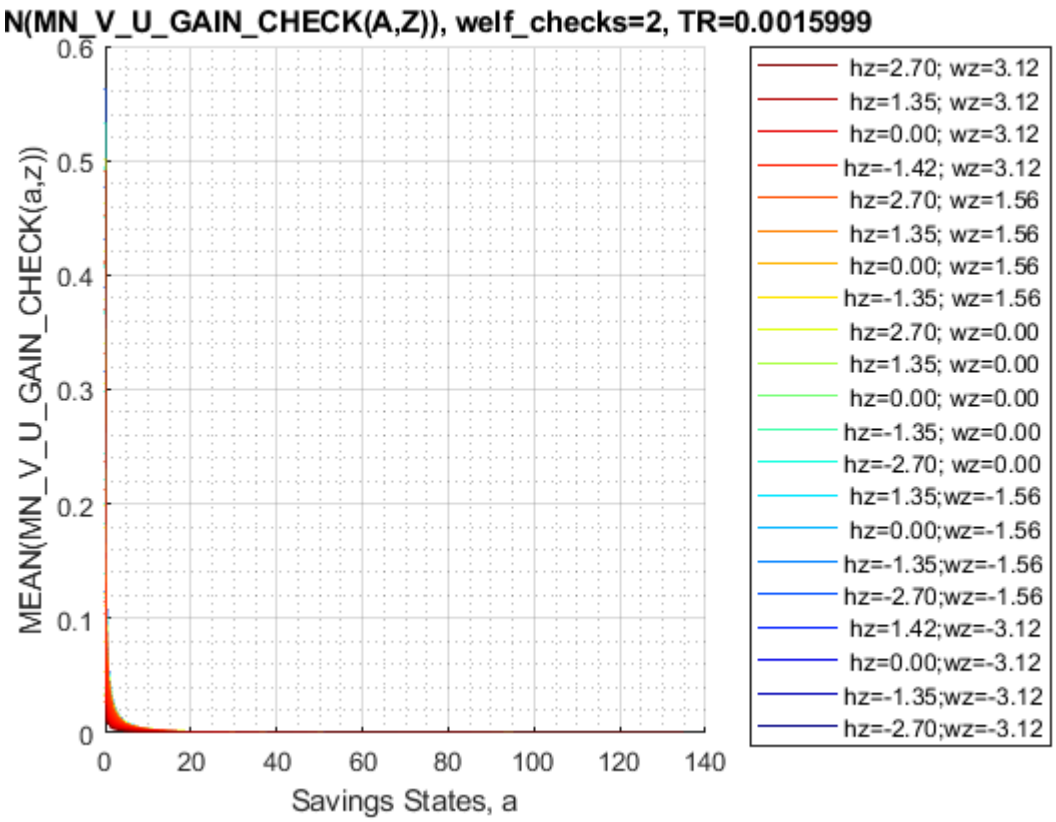
```
% Consumption
st_title = ['MEAN(MN_MPC_U_GAIN_CHECK(A,Z)), welf_checks=' num2str(welf_checks) ', TR=' num2str
tb_az_c = ff_summ_nd_array(st_title, mn_MPC_U_gain_share_check, true, ["mean"], 4, 1, cl_mp_dat
```

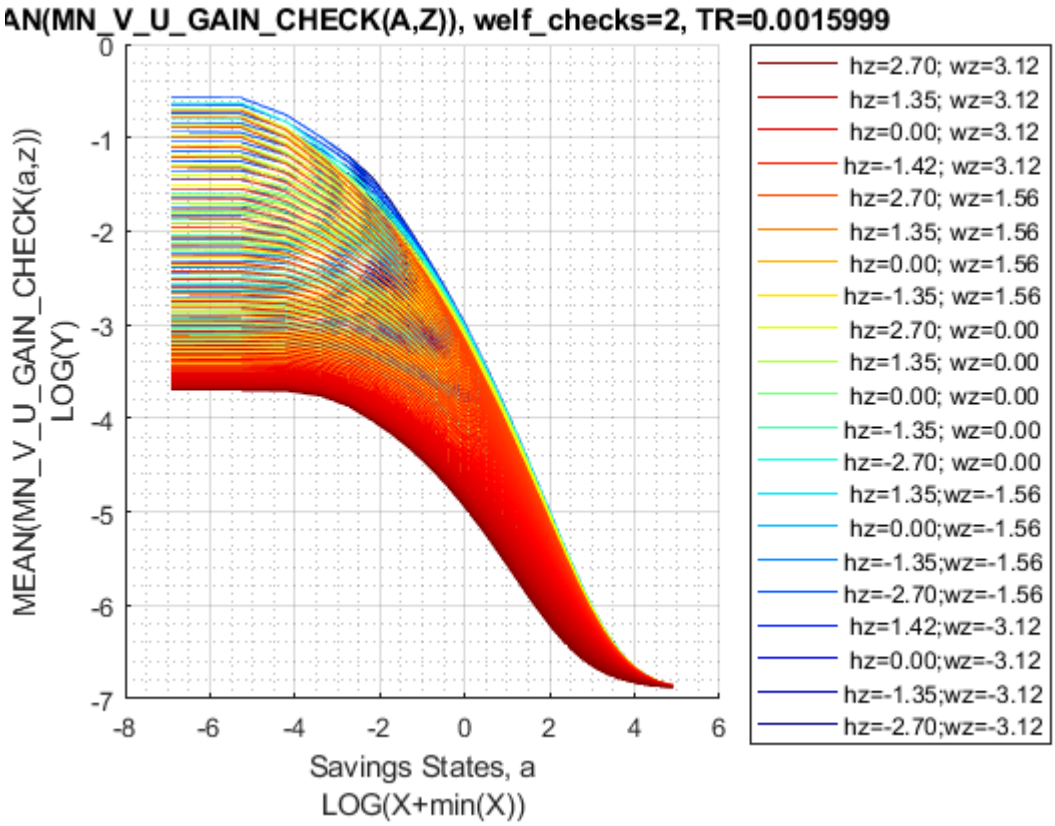
```
xxx  MEAN(MN_MPC_U_GAIN_CHECK(A,Z)), welf_checks=2, TR=0.0015999  xxxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	savings	mean_eta_1	mean_eta_2	mean_eta_3	mean_eta_4	mean_eta_5	mean_eta_6	mean_
1	0	0.81275	0.81268	0.81262	0.81251	0.81229	0.81192	0.81
2	0.00051498	0.81275	0.81268	0.81262	0.81251	0.81229	0.81192	0.81
3	0.0041199	0.81254	0.81219	0.8118	0.8115	0.81123	0.81087	0.81
4	0.013905	0.74117	0.73709	0.73619	0.73592	0.736	0.73628	0.73
5	0.032959	0.65341	0.6534	0.65431	0.65624	0.65879	0.66152	0.66
6	0.064373	0.5566	0.55625	0.55661	0.55771	0.55943	0.56158	0.56

Graph Mean Values:

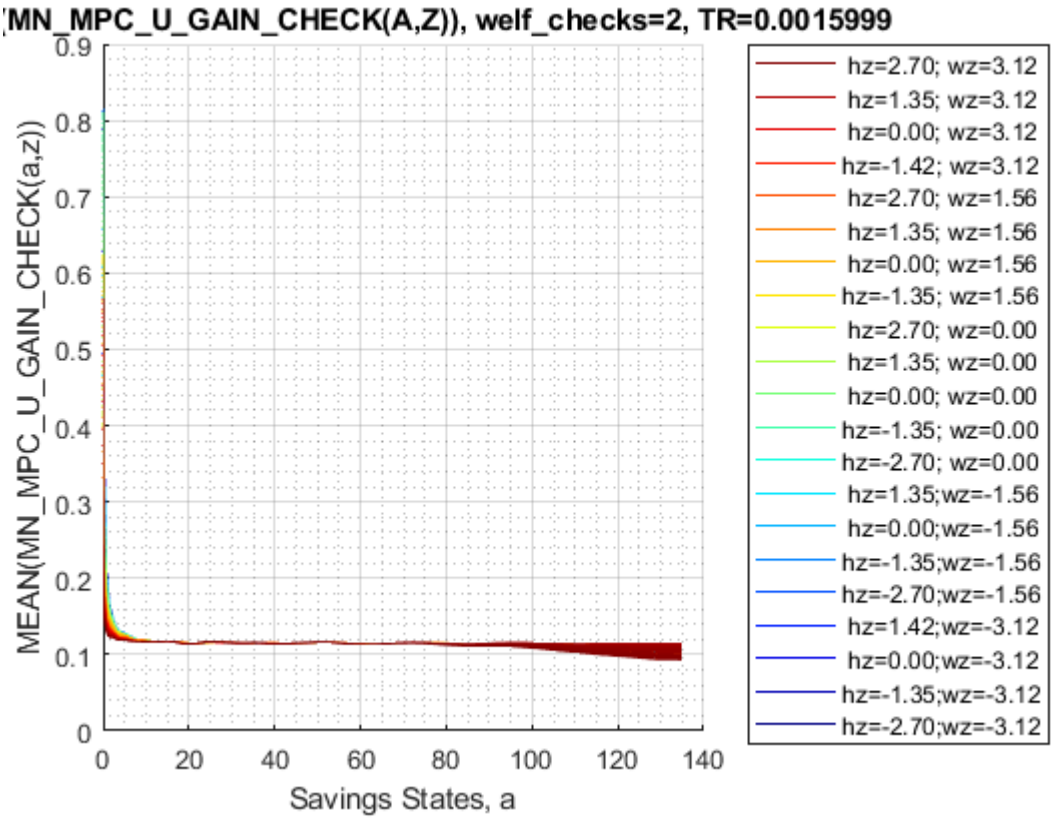
```
st_title = ['MEAN(MN\_V\_U\_GAIN\_CHECK(A,Z)), welf\_checks=' num2str(welf_checks) ', TR=' num2
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_V\_U\_GAIN\_CHECK(a,z))'};
ff_graph_grid((tb_az_v{1:end, 3:end})', ar_st_eta_HS_grid, agrid, mp_support_graph);
```

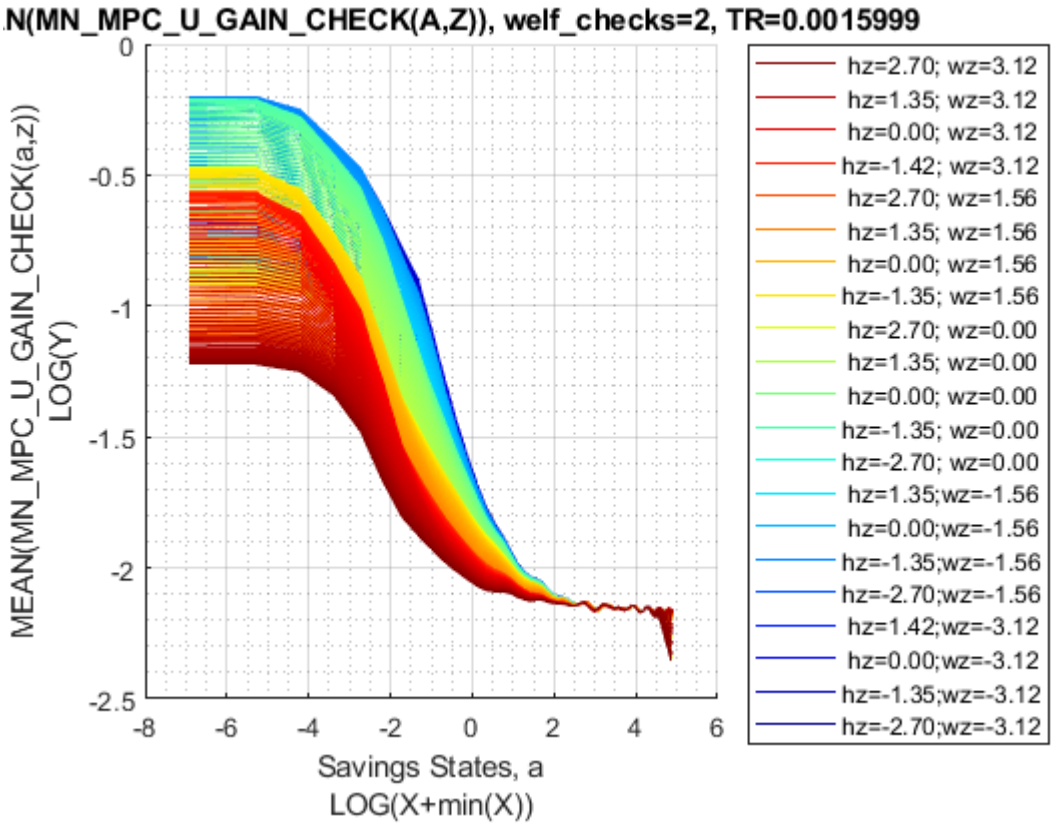




Graph Mean Consumption (***MPC: Share of Check Consumed***):

```
st_title = ['MEAN(MN\_MPC\_U\_GAIN\_CHECK(A,Z)), welf\_checks=' num2str(welf_checks) ', TR=' nu
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_MPC\_U\_GAIN\_CHECK(a,z))'};
ff_graph_grid((tb_az_c{1:end, 3:end})', ar_st_eta_HS_grid, agrid, mp_support_graph);
```





Analyze Marginal Value and MPC over Y(a,eta), Conditional On Kids, Marry, Age, Education

Income is generated by savings and shocks, what are the income levels generated by all the shock and savings points conditional on kids, marital status, age and educational levels. Plot on the Y axis MPC, and plot on the X axis income levels, use colors to first distinguish between different a levels, then use colors to distinguish between different eta levles.

Set Up date, Select Age 37vn

, unmarried, no kids, lower education:

```
% NaN(n_jgrid,n_agrid,n_etagrid,n_educgrid,n_marriedgrid,n_kidsgrid);
% 38 year old, unmarried, no kids, lower educated
% Only Household Head Shock Matters so select up to 'n_eta_H_grid'
mn_total_inc_jemk = total_inc_VFI(19,:,1:mp_params('n_eta_H_grid'),1,1,1);
mn_V_W_gain_check_use = ev19_jaeemk_check2 - ev19_jaeemk_check0;
mn_C_W_gain_check_use = ec19_jaeemk_check2 - ec19_jaeemk_check0;
```

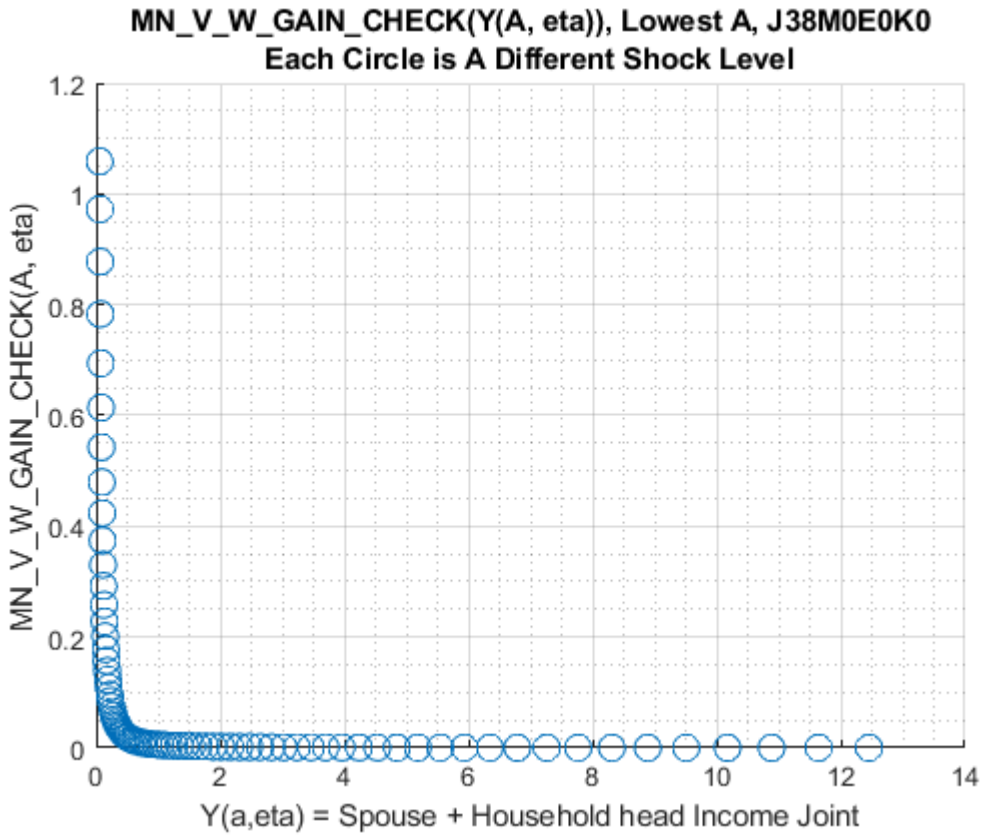
Select Age, Education, Marital, Kids Count:s

```
% Selections
it_age = 21; % +18
it_marital = 1; % 1 = unmarried
it_kids = 1; % 1 = kids is zero
it_educ = 1; % 1 = lower education
% Select: NaN(n_jgrid,n_agrid,n_etagrid,n_educgrid,n_marriedgrid,n_kidsgrid);
mn_C_W_gain_check_jemk = mn_C_W_gain_check_use(it_age, :, 1:mp_params('n_eta_H_grid'), it_educ,
mn_V_W_gain_check_jemk = mn_V_W_gain_check_use(it_age, :, 1:mp_params('n_eta_H_grid'), it_educ,
% Reshape, so shock is the first dim, a is the second
mt_total_inc_jemk = permute(mn_total_inc_jemk,[3,2,1]);
mt_C_W_gain_check_jemk = permute(mn_C_W_gain_check_jemk,[3,2,1]);
mt_C_W_gain_check_jemk(mt_C_W_gain_check_jemk<=1e-10) = 1e-10;
mt_V_W_gain_check_jemk = permute(mn_V_W_gain_check_jemk,[3,2,1]);
mt_V_W_gain_check_jemk(mt_V_W_gain_check_jemk<=1e-10) = 1e-10;
% Generate meshed a and shock grid
[mt_eta_H, mt_a] = ndgrid(eta_H_grid(1:mp_params('n_eta_H_grid')), agrid);
```

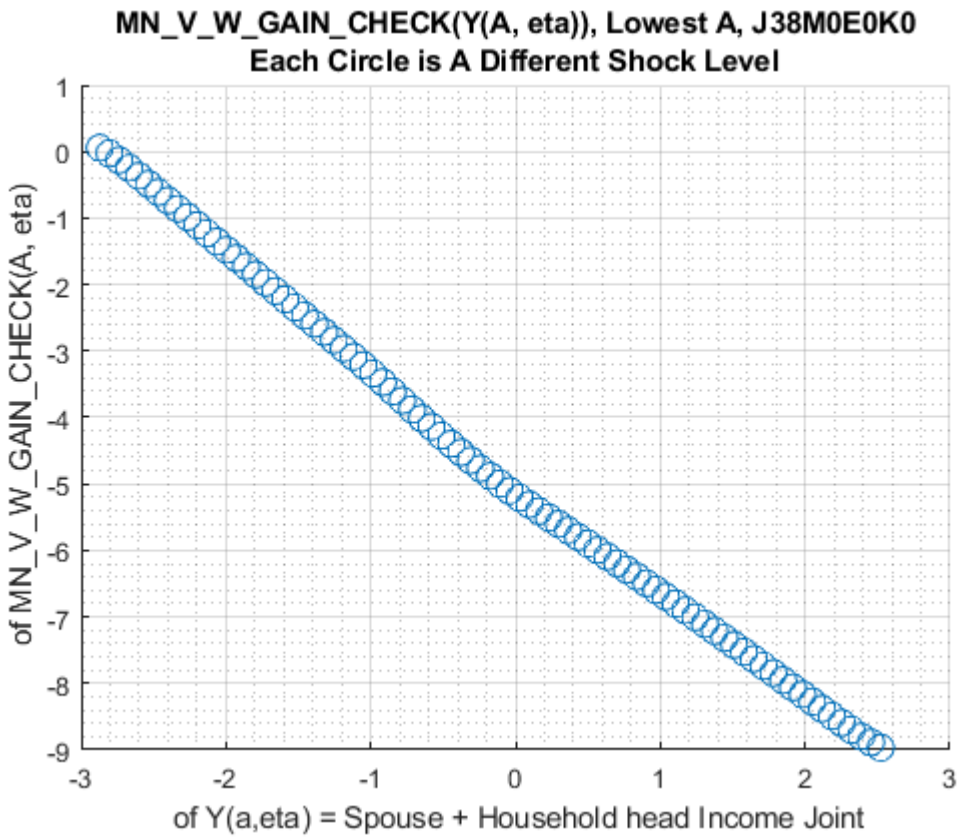
Marginal Value Gains, Color as Shock, Conditional on Age, Marital, Kids, and Education

How do shocks and a impact marginal value. First plot one asset level, variation comes only from increasingly higher shocks:

```
figure();
it_a = 1;
scatter((mt_total_inc_jemk(:,it_a)), (mt_V_W_gain_check_jemk(:,it_a)), 100);
title({'MN\_V\_W\_GAIN\_CHECK(Y(A, eta)), Lowest A, J38M0E0K0', ...
    'Each Circle is A Different Shock Level'});
xlabel('Y(a,eta) = Spouse + Household head Income Joint');
ylabel('MN\_V\_W\_GAIN\_CHECK(A, eta)');
grid on;
grid minor;
```

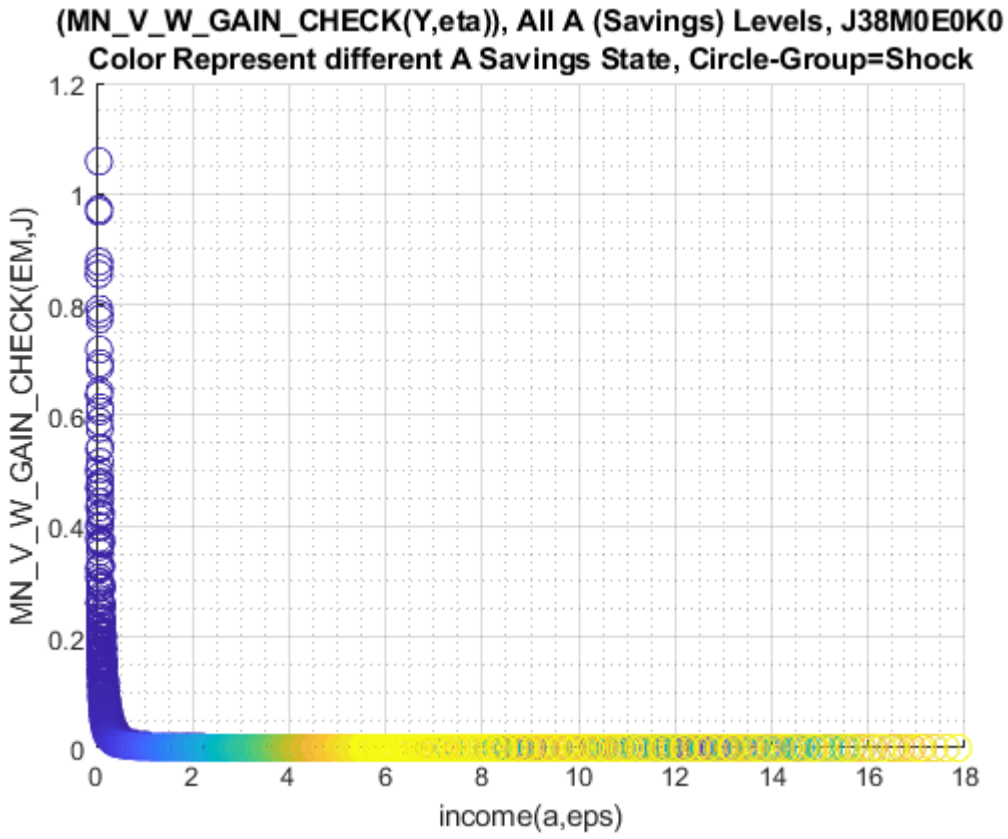



```
figure();
it_shock = 1;
scatter(log(mt_total_inc_jemk(:,it_a)), log(mt_V_W_gain_check_jemk(:,it_a)), 100);
title({'MN\_V\_W\_GAIN\_CHECK(Y(A, eta)), Lowest A, J38M0E0K0', ...
    'Each Circle is A Different Shock Level'});
xlabel(' of Y(a,eta) = Spouse + Household head Income Joint');
ylabel(' of MN\_V\_W\_GAIN\_CHECK(A, eta)');
grid on;
grid minor;
```

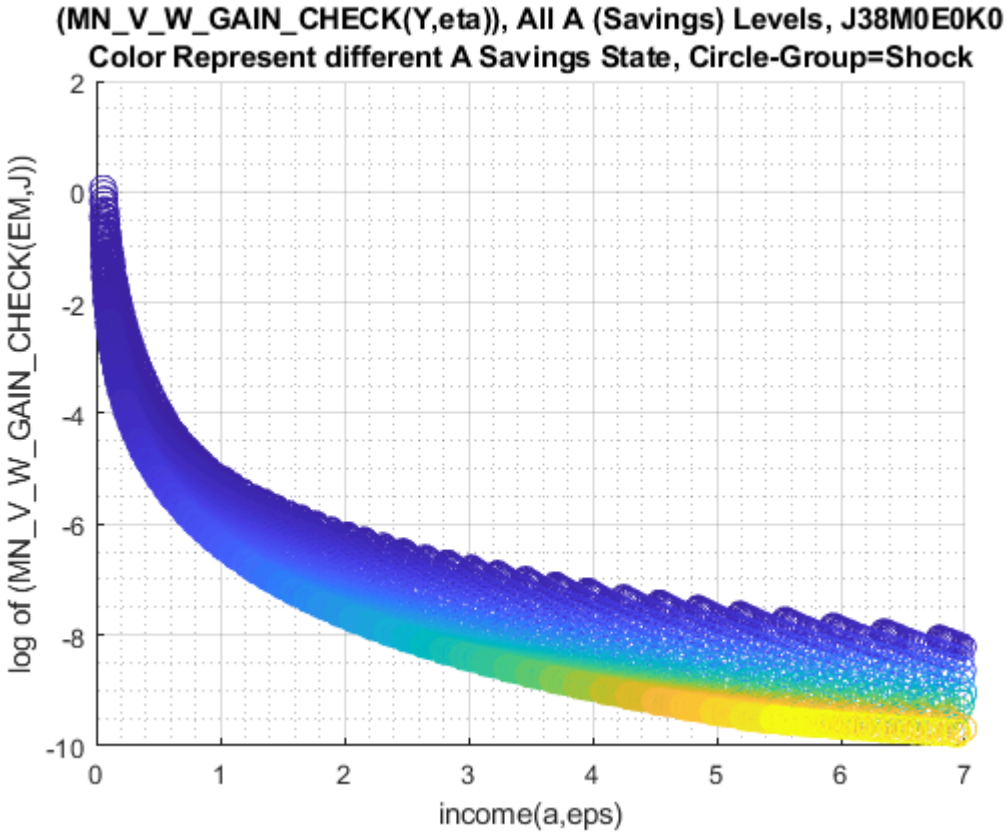


Plot all asset levels:

```
figure();
scatter((mt_total_inc_jemk(:)), (mt_V_W_gain_check_jemk(:)), 100, mt_a(:));
title({'(MN\_V\_W\_GAIN\_CHECK(Y,eta)), All A (Savings) Levels, J38M0E0K0', ...
    'Color Represent different A Savings State, Circle-Group=Shock'});
xlabel('income(a,eps)');
ylabel('MN\_V\_W\_GAIN\_CHECK(EM,J)');
grid on;
grid minor;
```



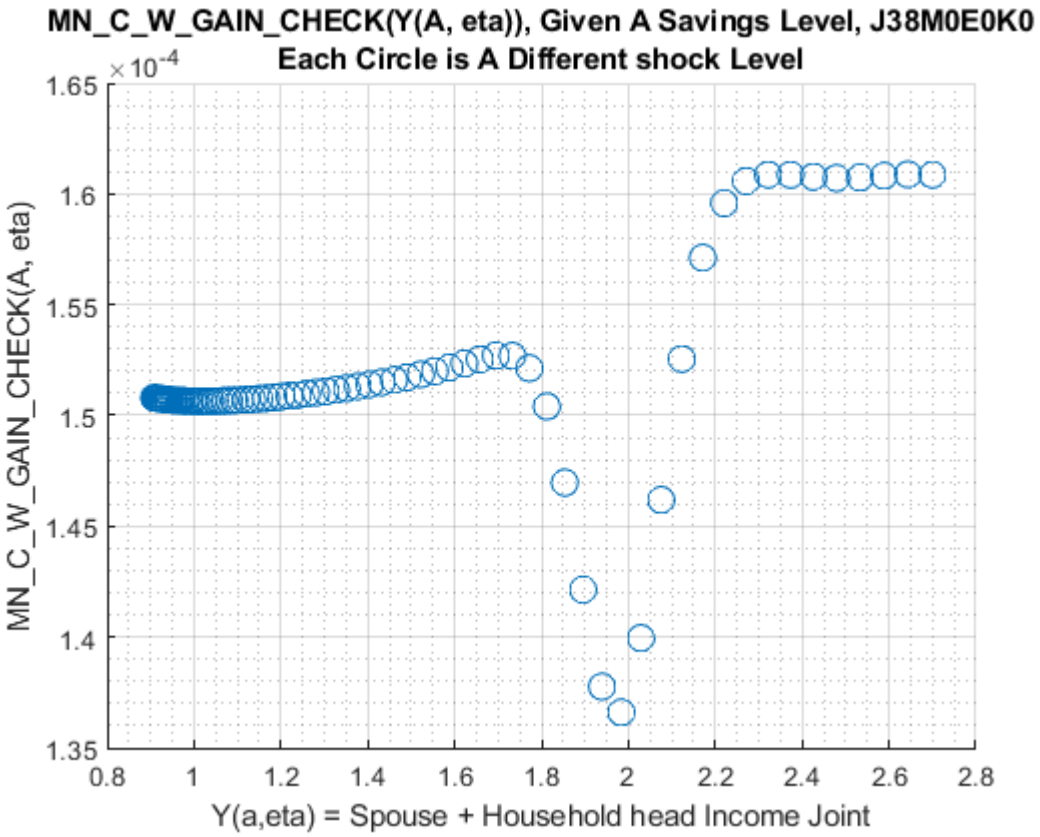

```
figure();
scatter((mt_total_inc_jemk(:)), log(mt_V_W_gain_check_jemk(:)), 100, mt_a(:));
title({'(MN\_V\_W\_GAIN\_CHECK(Y,eta)), All A (Savings) Levels, J38M0E0K0', ...
    'Color Represent different A Savings State, Circle-Group=Shock'});
xlabel('income(a,eps)');
ylabel('log of (MN\_V\_W\_GAIN\_CHECK(EM,J))');
xlim([0,7]);
grid on;
grid minor;
```



Marginal Consumption Gains, Color as Shock, Conditional on Age, Marital, Kids, and Education

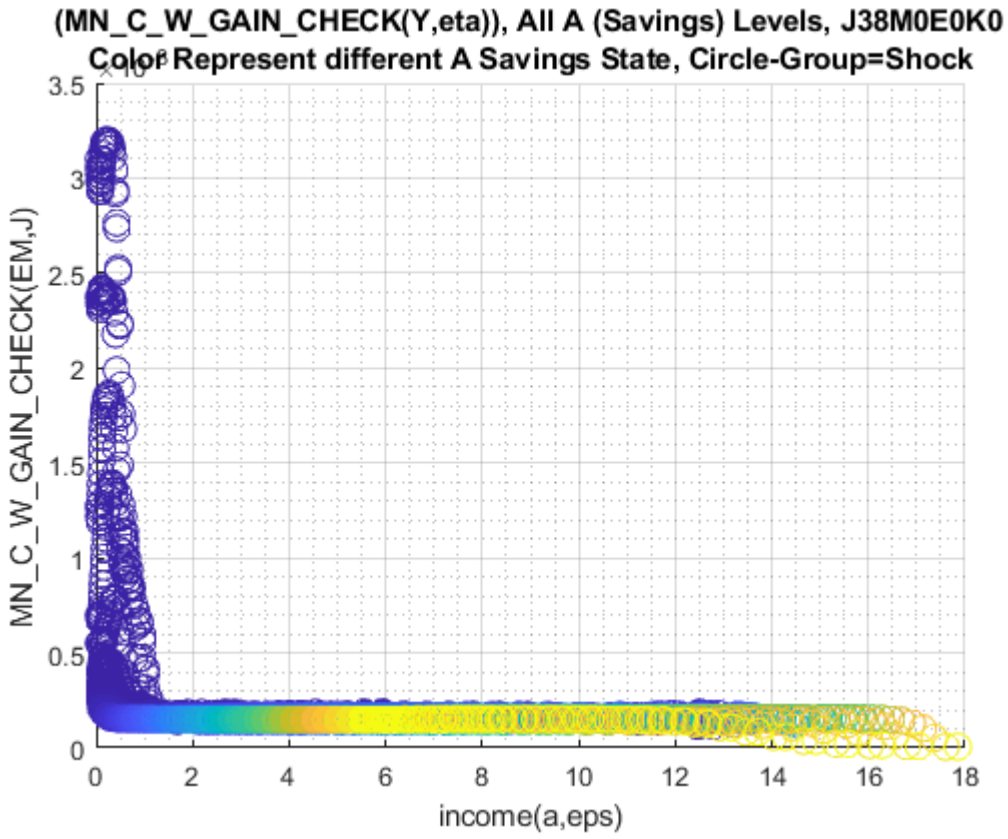
How do shocks and a impact marginal value. First plot one asset level, variation comes only from increasingly higher shocks:

```
figure();
it_a = 50;
scatter(log(mt_total_inc_jemk(:,it_a)), mt_C_W_gain_check_jemk(:,it_a), 100);
title({'MN\_C\_W\_GAIN\_CHECK(Y(A, eta)), Given A Savings Level, J38M0E0K0', ...
    'Each Circle is A Different shock Level'});
xlabel('Y(a,eta) = Spouse + Household head Income Joint');
ylabel('MN\_C\_W\_GAIN\_CHECK(A, eta)');
grid on;
grid minor;
```

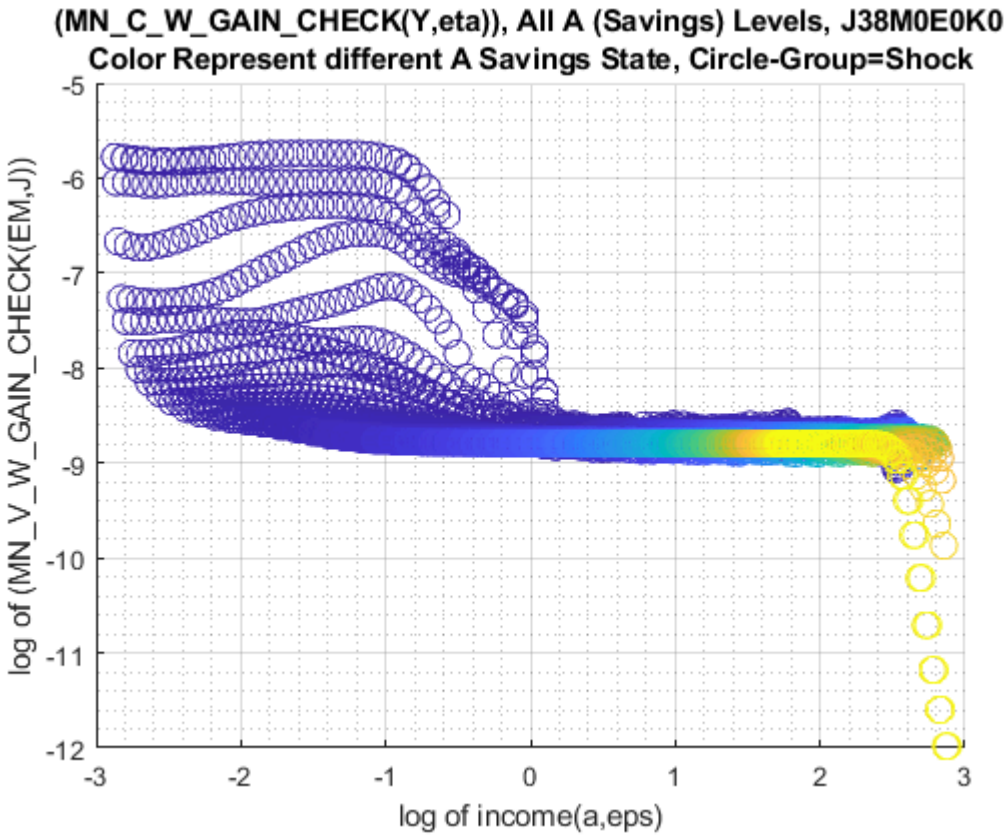


Plot all asset levels:

```
figure();
scatter((mt_total_inc_jemk(:)), (mt_C_W_gain_check_jemk(:)), 100, mt_a(:));
title({'(MN\_C\_W\_GAIN\_CHECK(Y,eta)), All A (Savings) Levels, J38M0E0K0', ...
    'Color Represent different A Savings State, Circle-Group=Shock'});
xlabel('income(a,eps)');
ylabel('MN\_C\_W\_GAIN\_CHECK(EM,J)');
grid on;
grid minor;
```




```
figure();
scatter(log(mt_total_inc_jemk(:)), log(mt_C_W_gain_check_jemk(:)), 100, mt_a(:));
title({'(MN\_C\_W\_GAIN\_CHECK(Y,eta)), All A (Savings) Levels, J38M0E0K0', ...
    'Color Represent different A Savings State, Circle-Group=Shock'});
xlabel('log of income(a,eps)');
ylabel('log of (MN\_V\_W\_GAIN\_CHECK(EM,J))');
grid on;
grid minor;
```



Analyze Kids and Marriage and Age

Aggregating over education, savings, and shocks, what are the differential effects of Marriage and Age.

```
% Generate some Data
mp_support_graph = containers.Map('KeyType', 'char', 'ValueType', 'any');
ar_row_grid = [...
    "k0M0", "K1M0", "K2M0", "K3M0", "K4M0", ...
    "k0M1", "K1M1", "K2M1", "K3M1", "K4M1"];
mp_support_graph('cl_st_xtitle') = {'Age'};
mp_support_graph('st_legend_loc') = 'best';
mp_support_graph('bl_graph_logy') = true; % do not log
mp_support_graph('st_rounding') = '6.2f'; % format shock legend
mp_support_graph('cl_scatter_shapes') = {...
    'o', 'd' ,'s', 'x', '*', ...
    'o', 'd', 's', 'x', '*'};
mp_support_graph('cl_colors') = {...
    'red', 'red', 'red', 'red', 'red'...
    'blue', 'blue', 'blue', 'blue', 'blue'};
```

MEAN(VAL(KM,J)), MEAN(AP(KM,J)), MEAN(C(KM,J))

Tabulate value and policies:

```
% Set
% NaN(n_jgrid,n_agrid,n_etagrid,n_educgrid,n_marriedgrid,n_kidsgrid);
ar_permute = [2,3,4,1,6,5];
```

```
% Value Function
st_title = ['MEAN(MN_V_U_GAIN_CHECK(KM,J)), welf_checks=' num2str(welf_checks) ', TR=' num2str(
tb_az_v = ff_summ_nd_array(st_title, mn_V_U_gain_check, true, ["mean"], 3, 1, cl_mp_datasetdesc
```

```
xxx  MEAN(MN_V_U_GAIN_CHECK(KM,J)), welf_checks=2, TR=0.0015999  xxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	kids	marry	mean_age_18	mean_age_19	mean_age_20	mean_age_21	mean_age_22	mean_age_23
1	1	0	0.030027	0.029309	0.027141	0.024832	0.022901	0.021272
2	2	0	0.04151	0.04055	0.037518	0.034247	0.031504	0.029182
3	3	0	0.048832	0.047813	0.043942	0.040179	0.037025	0.034356
4	4	0	0.055554	0.054443	0.050039	0.045784	0.042216	0.039197
5	5	0	0.0609	0.05977	0.054981	0.05038	0.046522	0.043258
6	1	1	0.0055093	0.0051081	0.0046334	0.0041967	0.0038272	0.0035138
7	2	1	0.0077846	0.0072287	0.0065562	0.0059314	0.0054057	0.004957
8	3	1	0.0094266	0.008771	0.0079723	0.0072201	0.0065859	0.00605
9	4	1	0.011763	0.010976	0.009988	0.0090498	0.0082597	0.0075823
10	5	1	0.014764	0.013879	0.012683	0.011539	0.010569	0.0097415

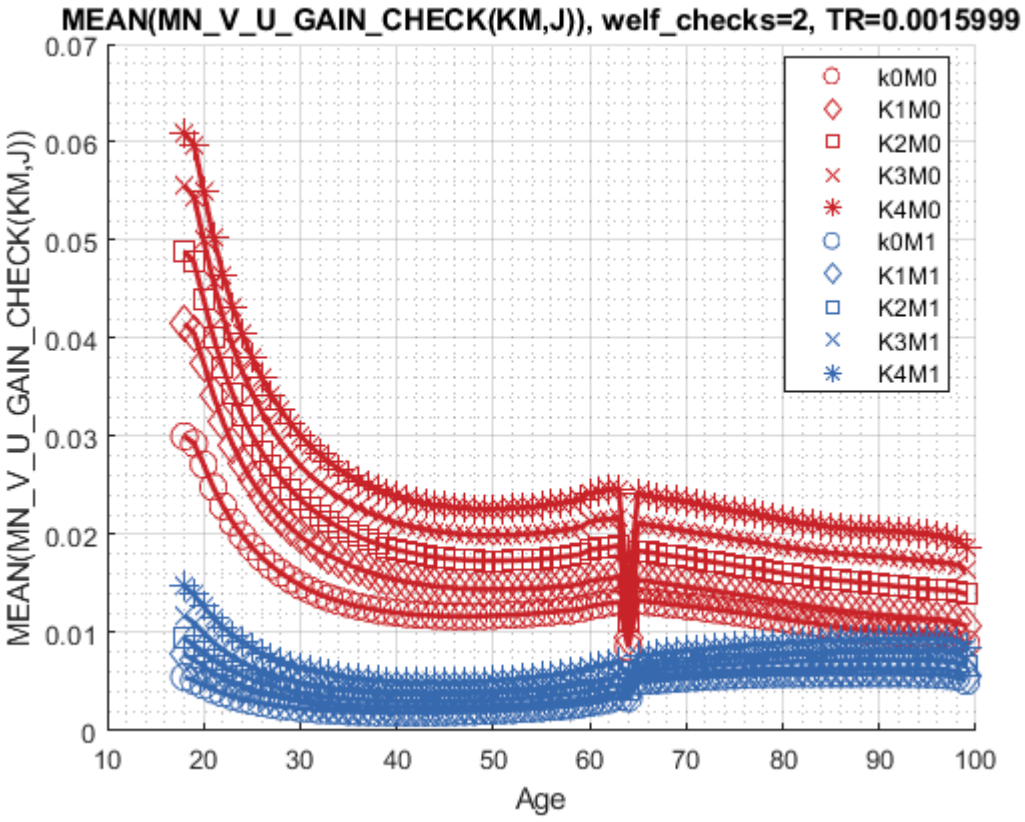
```
% Consumption Function
st_title = ['MEAN(MN_MPC_U_GAIN_CHECK(KM,J)), welf_checks=' num2str(welf_checks) ', TR=' num2st
tb_az_c = ff_summ_nd_array(st_title, mn_MPC_U_gain_share_check, true, ["mean"], 3, 1, cl_mp_dat
```

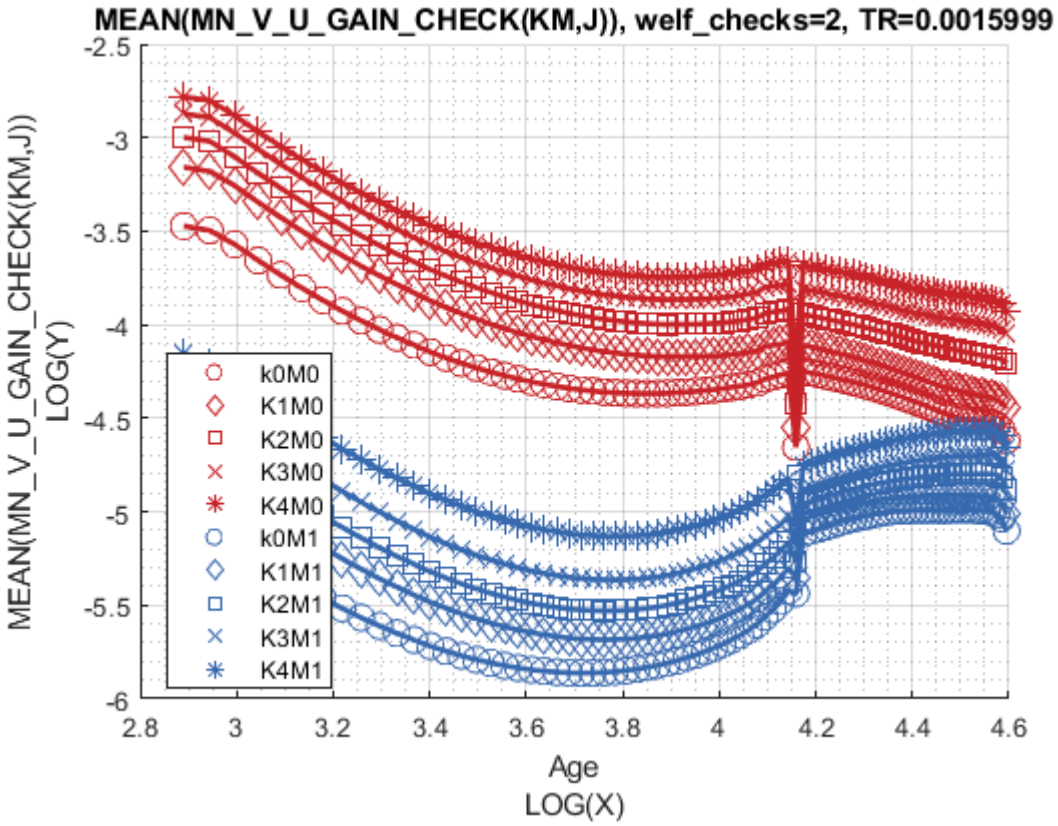
```
xxx  MEAN(MN_MPC_U_GAIN_CHECK(KM,J)), welf_checks=2, TR=0.0015999  xxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	kids	marry	mean_age_18	mean_age_19	mean_age_20	mean_age_21	mean_age_22	mean_age_23
1	1	0	0.08445	0.099691	0.10757	0.10468	0.10247	0.09965
2	2	0	0.096015	0.11123	0.12103	0.11789	0.11535	0.11281
3	3	0	0.10769	0.12614	0.13451	0.13081	0.12755	0.1248
4	4	0	0.11389	0.13321	0.14167	0.1377	0.13399	0.13108
5	5	0	0.1198	0.14051	0.14851	0.144	0.13992	0.13604
6	1	1	0.096558	0.10433	0.1066	0.10427	0.1019	0.099557
7	2	1	0.10023	0.10921	0.11152	0.10928	0.10824	0.10482
8	3	1	0.10587	0.11747	0.1188	0.11732	0.11596	0.11315
9	4	1	0.11202	0.12194	0.12444	0.1225	0.11996	0.11812
10	5	1	0.12325	0.13304	0.13672	0.13148	0.12849	0.12885

Graph Mean Values:

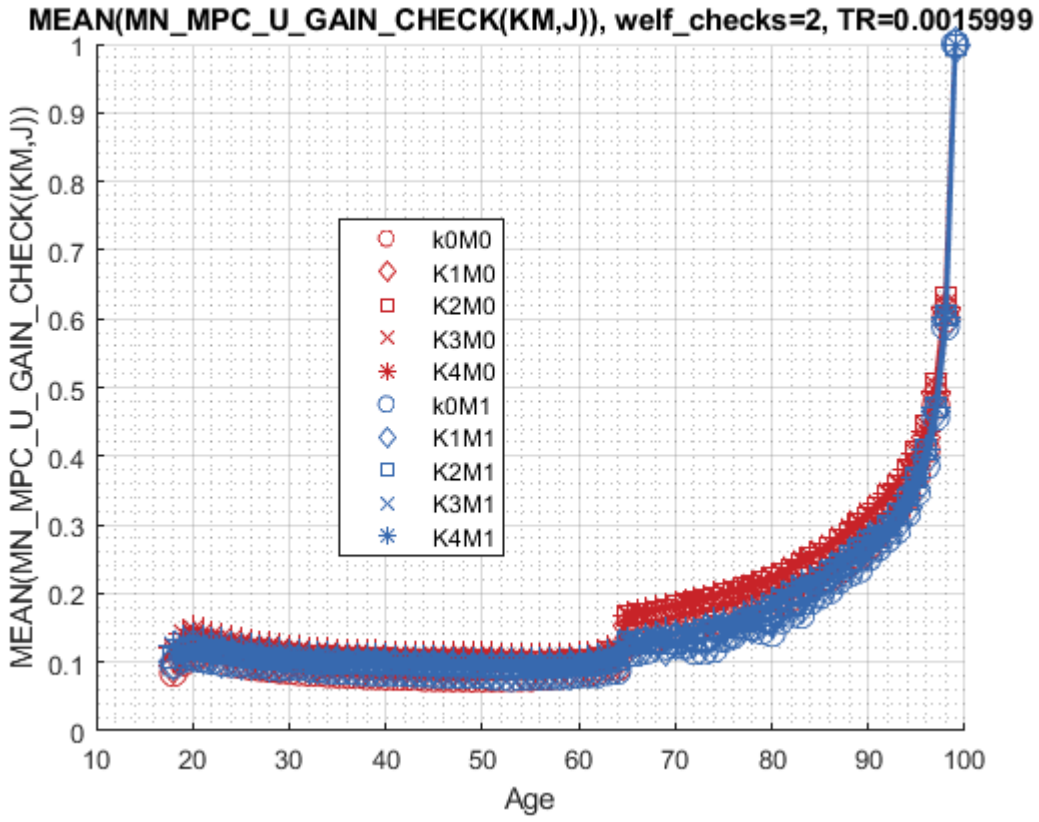
```
st_title = ['MEAN(MN\_V\_U\_GAIN\_CHECK(KM,J)), welf\_checks=' num2str(welf_checks) ', TR=' num
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_V\_U\_GAIN\_CHECK(KM,J))'};
ff_graph_grid((tb_az_v{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```

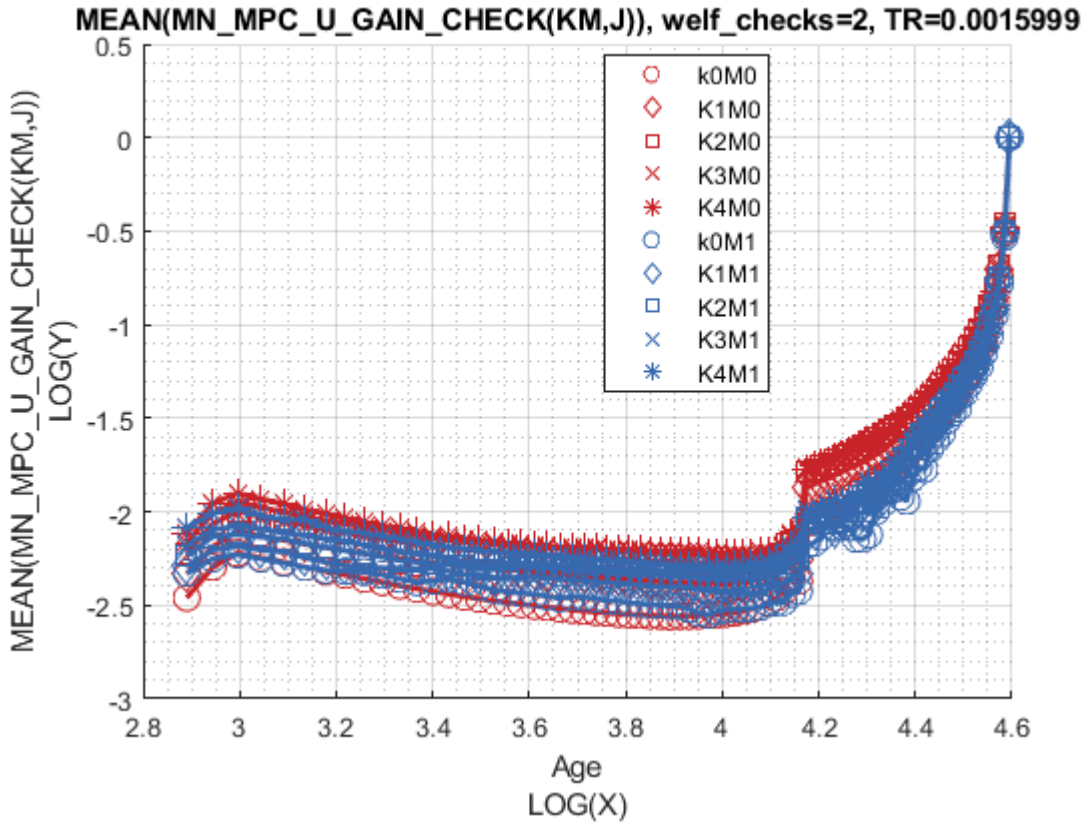




Graph Mean Consumption (***MPC: Share of Check Consumed***):

```
st_title = ['MEAN(MN\_MPC\_U\_GAIN\_CHECK(KM,J)), welf\_checks=' num2str(welf_checks) ', TR=' r
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_MPC\_U\_GAIN\_CHECK(KM,J))'};
ff_graph_grid((tb_az_c{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```





Analyze Education and Marriage

Aggregating over education, savings, and shocks, what are the differential effects of Marriage and Age.

```
% Generate some Data
mp_support_graph = containers.Map('KeyType', 'char', 'ValueType', 'any');
ar_row_grid = ["E0M0", "E1M0", "E0M1", "E1M1"];
mp_support_graph('cl_st_xtitle') = {'Age'};
mp_support_graph('st_legend_loc') = 'best';
mp_support_graph('bl_graph_logy') = true; % do not log
mp_support_graph('st_rounding') = '6.2f'; % format shock legend
mp_support_graph('cl_scatter_shapes') = {'*', 'p', '*','p' };
mp_support_graph('cl_colors') = {'red', 'red', 'blue', 'blue'};
```

MEAN(VAL(EM,J)), MEAN(AP(EM,J)), MEAN(C(EM,J))

Tabulate value and policies:

```
% Set
% NaN(n_jgrid,n_agrid,n_etagrid,n_educgrid,n_marriedgrid,n_kidsgrid);
ar_permute = [2,3,6,1,4,5];
% Value Function
st_title = ['MEAN(MN_V_U_GAIN_CHECK(EM,J)), welf_checks=' num2str(welf_checks) ', TR=' num2str(
tb_az_v = ff_summ_nd_array(st_title, mn_V_U_gain_check, true, ["mean"], 3, 1, cl_mp_datasetdesc
```

```
xxx  MEAN(MN_V_U_GAIN_CHECK(EM,J)), welf_checks=2, TR=0.0015999  xxxxxxxxxxxxxxxxxxxxxxxxxxx
    group     edu     marry     mean_age_18     mean_age_19     mean_age_20     mean_age_21     mean_age_22     mean_age_23
    _____     ___     _____     ____________    ____________    ____________    ____________    ____________    ____________
```

1	0	0	0.04847	0.04767	0.045314	0.042735	0.040445	0.0384
2	1	0	0.04626	0.045083	0.040135	0.035433	0.031622	0.028506
3	0	1	0.010726	0.010058	0.0092963	0.0085699	0.0079386	0.0073873
4	1	1	0.0089734	0.0083275	0.0074368	0.0066048	0.0059203	0.0053506

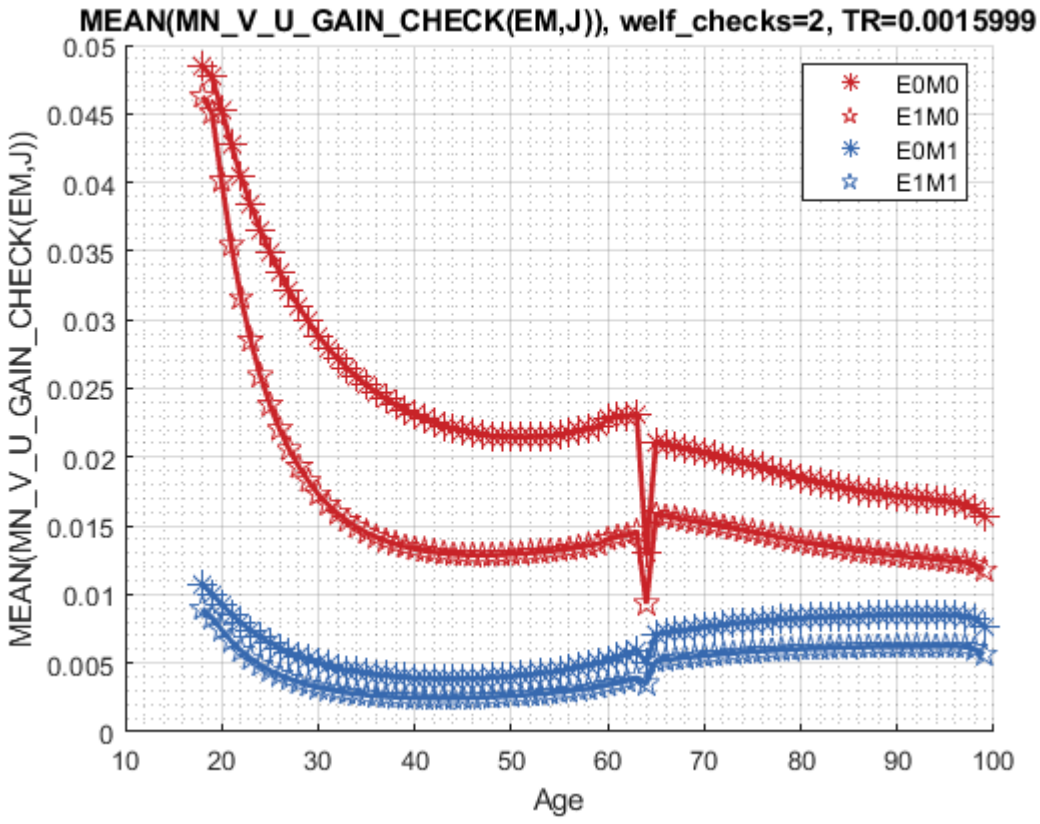
```
% Consumption
st_title = ['MEAN(MN_MPC_U_GAIN_CHECK(EM,J)), welf_checks=' num2str(welf_checks) ', TR=' num2st
tb_az_c = ff_summ_nd_array(st_title, mn_MPC_U_gain_share_check, true, ["mean"], 3, 1, cl_mp_dat
```

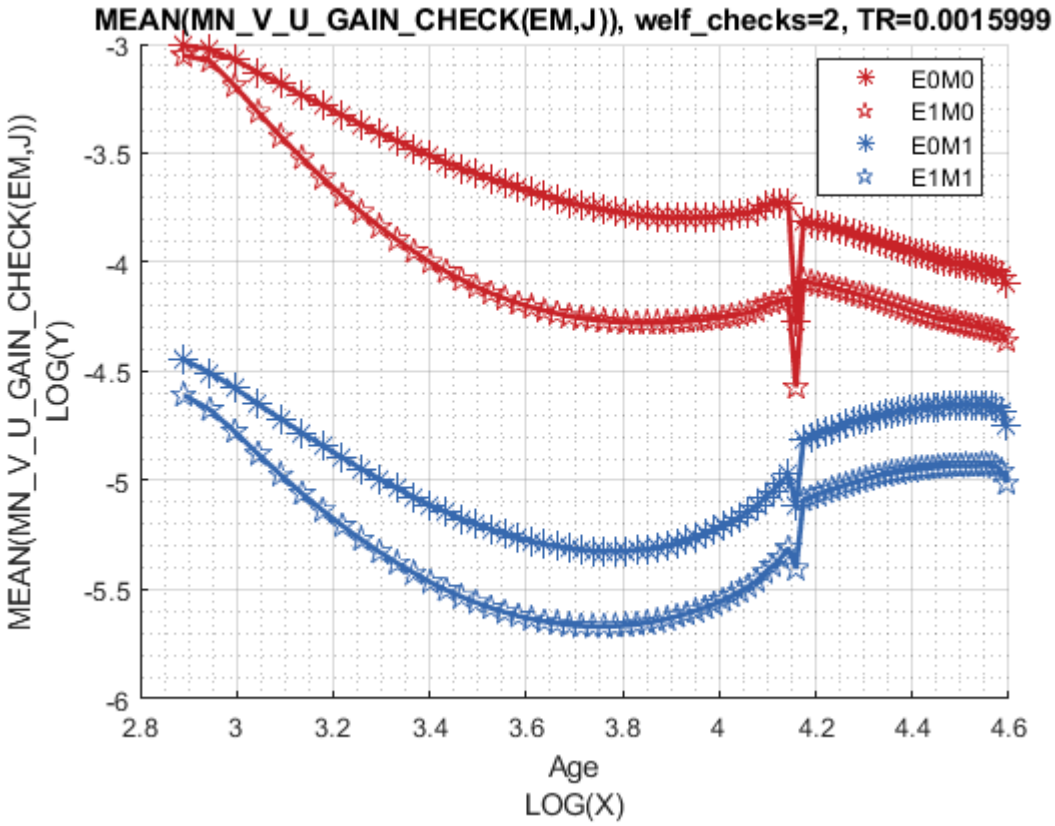
```
xxx  MEAN(MN_MPC_U_GAIN_CHECK(EM,J)), welf_checks=2, TR=0.0015999  xxxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	edu	marry	mean_age_18	mean_age_19	mean_age_20	mean_age_21	mean_age_22	mean_age_23
1	0	0	0.092366	0.10262	0.1087	0.10789	0.10721	0.10648
2	1	0	0.11637	0.1417	0.15261	0.14614	0.1405	0.13527
3	0	1	0.098134	0.10328	0.1058	0.10505	0.10409	0.10299
4	1	1	0.11704	0.13112	0.13343	0.12889	0.12573	0.12281

Graph Mean Values:

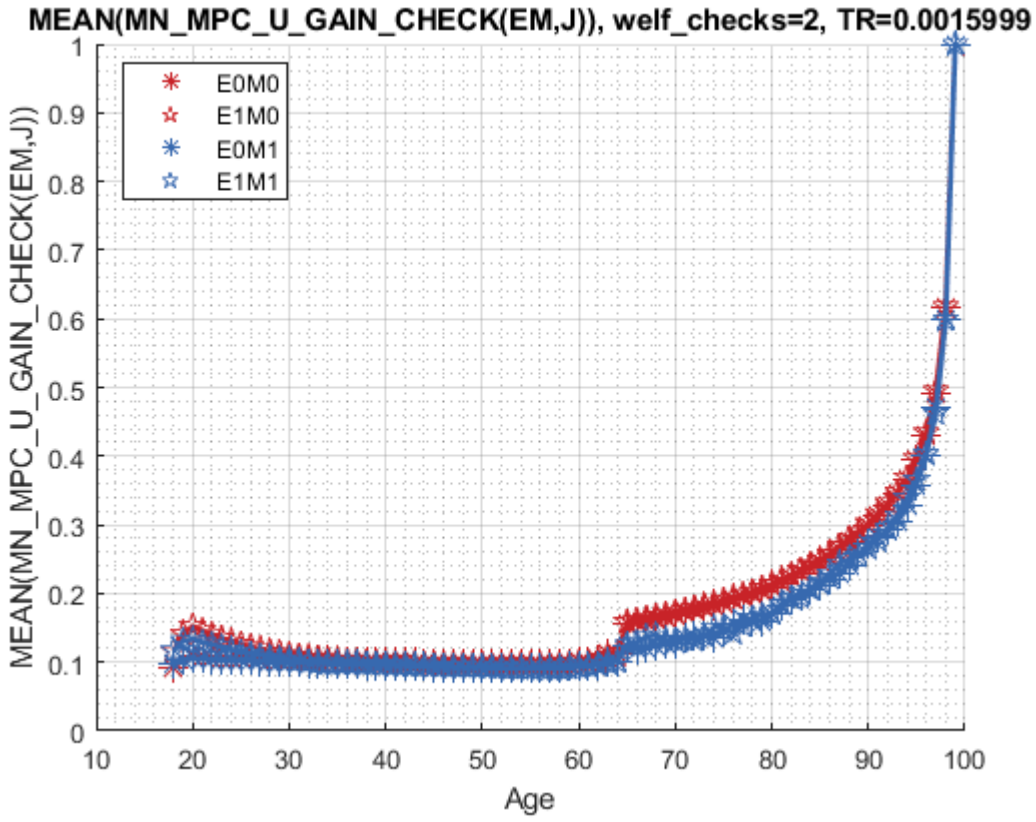
```
st_title = ['MEAN(MN\_V\_U\_GAIN\_CHECK(EM,J)), welf\_checks=' num2str(welf_checks) ', TR=' num
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_V\_U\_GAIN\_CHECK(EM,J))'};
ff_graph_grid((tb_az_v{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```

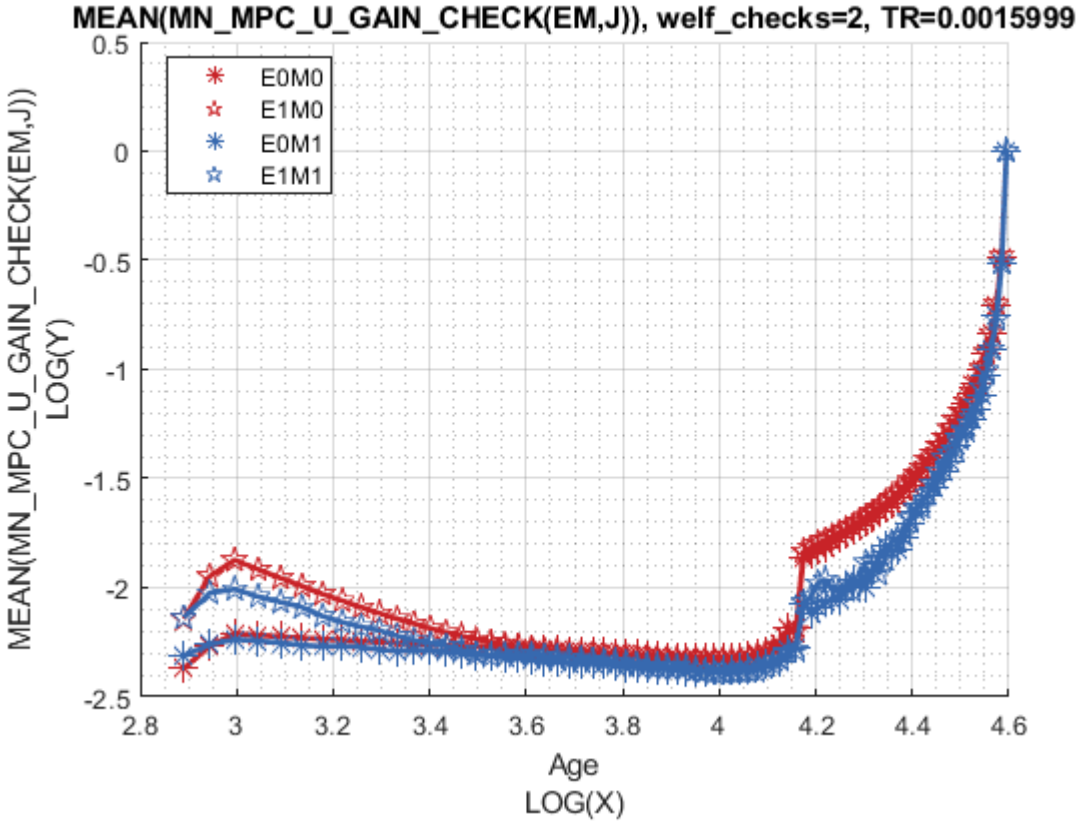




Graph Mean Consumption (***MPC: Share of Check Consumed***):

```
st_title = ['MEAN(MN\_MPC\_U\_GAIN\_CHECK(EM,J)), welf\_checks=' num2str(welf_checks) ', TR=' r
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_MPC\_U\_GAIN\_CHECK(EM,J))'};
ff_graph_grid((tb_az_c{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```


MEAN(MN_MPC_U_GAIN_CHECK(EM,J)), welf_checks=2, TR=0.0015999
E0M0
E1M0
E0M1
E1M1
MEAN(MN_MPC_U_GAIN_CHECK(EM,J))
Age


MEAN(MN_MPC_U_GAIN_CHECK(EM,J)), welf_checks=2, TR=0.0015999
E0M0
E1M0
E0M1
E1M1
MEAN(MN_MPC_U_GAIN_CHECK(EM,J))
LOG(Y)
Age
LOG(X)