2020 V and C with Unemployment

This is the example vignette for function: **snw_a4chk_unemp_bisec_vec** from the **PrjOptiSNW Package.** This function solves for the V(states, check) for individuals working. Dense solution. Bisection, most time for the test here taken to genereate the income matrixes. But these can be generated out of the check loops.

Test SNW_A4CHK_UNEMP_BISEC_VEC Defaults

Solve for Value/Policy in non-COVID years, then solve for covid year value/policy given covid shocks. COVID lasts one period.

```
mp_params = snw_mp_param('default_docdense', false, 'tauchen', true);
mp_params('beta') = 0.95;
mp_controls = snw_mp_control('default_test');
mp_controls('bl_print_vfi') = false;
mp_controls('bl_timer') = true;
[V_ss,~,cons_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=489.5799
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_outcomes ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

	i	idx	ndim	numel	rowN	colN	sum	mean	std	coefvari
V_VFI	1	1	6	4.37e+07	83	5.265e+05	-1.2728e+08	-2.9126	20.655	-7.0915
ap_VFI	2	2	6	4.37e+07	83	5.265e+05	1.3962e+09	31.95	36.423	1.14
cons_VFI	3	3	6	4.37e+07	83	5.265e+05	2.3374e+08	5.3487	8.4439	1.5787

```
xxx TABLE:V_VFI xxxxxxxxxxxxxxxxxx
```

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499	c52650
r1	-274.81	-274.42	-271.94	-266.29	-257.26	14.439	14.533	14.626	14.718	14.80
r2	-265.29	-264.9	-262.43	-256.84	-248.12	14.494	14.585	14.674	14.763	14.8
r3	-255.77	-255.38	-252.93	-247.53	-239.24	14.55	14.636	14.723	14.808	14.89
r4	-246.16	-245.8	-243.52	-238.46	-230.68	14.606	14.689	14.772	14.853	14.93
r5	-237.48	-237.14	-235.01	-230.26	-222.92	14.654	14.734	14.813	14.891	14.9
r79	-9.6662	-9.655	-9.5783	-9.3823	-9.0457	2.4698	2.4801	2.4898	2.4989	2.507
r80	-8.7031	-8.6919	-8.6152	-8.4192	-8.0826	2.253	2.261	2.2685	2.2755	2.282
r81	-7.5138	-7.5026	-7.4258	-7.2298	-6.8933	1.9749	1.9803	1.9855	1.9904	1.99
r82	-5.9155	-5.9043	-5.8275	-5.6315	-5.295	1.582	1.5851	1.588	1.5907	1.593
r83	-3.5892	-3.578	-3.5012	-3.3052	-2.9687	0.97904	0.98004	0.98097	0.98185	0.9826

```
xxx TABLE:ap_VFI xxxxxxxxxxxxxxxxxx
```

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499	c526500
r1	0	0	0.00051498	0.0066578	0.021589	112.13	117.66	123.39	129.3	135.72
r2	0	0	0.00051498	0.0057684	0.020245	112.16	117.7	123.42	129.34	135.75
r3	0	0	0.00020768	0.0041456	0.018539	112.19	117.72	123.45	129.36	135.77
r4	0	0	0.00010346	0.0041199	0.018307	112.85	118.38	124.11	130.02	136.44
r5	0	0	5.2907e-06	0.0041199	0.018091	113.53	119.06	124.78	130.7	137.11
r79	0	0	0	0	0	81.091	85.373	89.342	93.265	97.358
r80	0	0	0	0	0	76.137	79.759	83.442	86.995	90.589
r81	0	0	0	0	0	67.958	70.652	73.689	77.006	81.091
r82	0	0	0	0	0	50.126	53.467	56.319	57.902	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	12.272	12.557	12.851	13.152	1
r2	0.036717	0.037251	0.040477	0.045375	0.050668	12.508	12.794	13.089	13.391	1
r3	0.036717	0.037251	0.040784	0.046998	0.052374	12.762	13.05	13.345	13.646	1
r4	0.038144	0.038678	0.042314	0.048449	0.054031	13.008	13.297	13.593	13.891	1
r5	0.039534	0.040068	0.043802	0.049839	0.055635	13.245	13.534	13.83	14.125	1
r79	0.2179	0.21844	0.22216	0.23228	0.25197	35.858	37.4	39.448	41.74	4
r80	0.2179	0.21844	0.22216	0.23228	0.25197	40.785	42.986	45.321	47.983	5
r81	0.2179	0.21844	0.22216	0.23228	0.25197	48.942	52.071	55.052	57.95	6
r82	0.2179	0.21844	0.22216	0.23228	0.25197	66.755	69.238	72.404	77.036	8
r83	0.2179	0.21844	0.22216	0.23228	0.25197	116.87	122.69	128.71	134.92	1

```
welf_checks = 2; % 2 checks is $200 dollar of welfare checks
xi=0.5; % xi=0 full income loss from covid shock, xi=1, no covid income losses
b=0; % b=0 means no UI benefits compensating COVID, b=1 if full income replacement
TR = 100/58056;
mp_params('TR') = TR;
mp_params('xi') = xi;
mp_params('b') = b;
mp_params('a2_covidyr') = mp_params('a2_covidyr_manna_heaven');
% mp_params('a2_covidyr') = mp_params('a2_covidyr_tax_fully_pay');
[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
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xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_outcomes ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

	i	idx	ndim	numel	rowN	colN	sum	mean	std	coefvari
V_VFI	1	1	6	4.37e+07	83	5.265e+05	-1.4885e+08	-3.4063	21.649	-6.3556
ap_VFI	2	2	6	4.37e+07	83	5.265e+05	1.36e+09	31.122	36.291	1.1661
cons_VFI	3	3	6	4.37e+07	83	5.265e+05	2.2982e+08	5.2591	8.4465	1.6061

xxx TABLE:V_VFI xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499	c52650
r1	-301.27	-299.77	-291.24	-277.82	-265.42	14.357	14.455	14.551	14.646	14.7
r2	-291.76	-290.26	-281.72	-268.3	-256.02	14.413	14.507	14.6	14.692	14.78
r3	-282.23	-280.74	-272.2	-258.78	-246.76	14.469	14.56	14.649	14.737	14.82
r4	-271.61	-270.22	-262.26	-249.53	-238.04	14.522	14.609	14.695	14.78	14.86
r5	-262.02	-260.72	-253.26	-241.16	-230.13	14.567	14.65	14.733	14.815	14.89
r79	-9.6662	-9.655	-9.5783	-9.3823	-9.0457	2.4678	2.4783	2.4882	2.4974	2.506
r80	-8.7031	-8.6919	-8.6152	-8.4192	-8.0826	2.2515	2.2596	2.2673	2.2745	2.281
r81	-7.5138	-7.5026	-7.4258	-7.2298	-6.8933	1.9738	1.9794	1.9847	1.9896	1.994
r82	-5.9155	-5.9043	-5.8275	-5.6315	-5.295	1.5815	1.5846	1.5875	1.5903	1.592
r83	-3.5892	-3.578	-3.5012	-3.3052	-2.9687	0.97886	0.97987	0.98082	0.98171	0.9825

xxx TABLE:ap_VFI xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499	c526500
r1	0	0	0	0	0.0083625	107.54	113.08	118.81	124.74	130.85
r2	0	0	0	0	0.0074731	107.44	112.98	118.71	124.63	130.75
r3	0	0	0	0	0.0058503	107.32	112.87	118.6	124.52	130.63
r4	0	0	0	0	0.0049981	107.53	113.08	118.81	124.72	130.84
r5	0	0	0	0	0.004174	107.75	113.3	119.02	124.94	131.06
r79	0	0	0	0	0	80.458	84.335	88.305	92.228	96.321

r80	0	0	0	0	0	75.113	78.735	82.418	85.971	90.439
r81	0	0	0	0	0	66.945	69.639	72.676	76.669	81.091
r82	0	0	0	0	0	50.126	53.467	55.315	56.953	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	0.018623	0.019158	0.022901	0.033062	0.044486	11.996	12.272	12.557	12.851	1
r2	0.018623	0.019158	0.022901	0.033062	0.045375	12.23	12.508	12.794	13.089	1
r3	0.018623	0.019158	0.022901	0.033062	0.046998	12.483	12.762	13.05	13.345	1
r4	0.019354	0.019888	0.023632	0.033792	0.048579	12.728	13.008	13.297	13.593	1
r5	0.020066	0.020601	0.024344	0.034504	0.050114	12.963	13.245	13.534	13.83	1
r79	0.2179	0.21844	0.22216	0.23228	0.25197	35.453	37.4	39.448	41.74	4
r80	0.2179	0.21844	0.22216	0.23228	0.25197	40.785	42.986	45.321	47.983	
r81	0.2179	0.21844	0.22216	0.23228	0.25197	48.942	52.071	55.052	57.274	5
r82	0.2179	0.21844	0.22216	0.23228	0.25197	65.751	68.234	72.404	76.981	7
r83	0.2179	0.21844	0.22216	0.23228	0.25197	115.87	121.69	127.71	133.93	1

```
[V_U_2020, C_U_2020] = snw_a4chk_unemp_bisec_vec(welf_checks, V_unemp_2020, cons_unemp_2020, mp
```

```
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
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_container_map ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

	i	idx	ndim	numel	rowN	colN	sum	mean	std
C_U	1	1	6	4.37e+07	83	5.265e+05	2.2985e+08	5.2598	8.4466
C_U_minus_C_unemp	2	2	6	4.37e+07	83	5.265e+05	31447	0.00071963	0.0009649
V_U	3	3	6	4.37e+07	83	5.265e+05	-1.4789e+08	-3.3842	21.533
V_U_minus_V_unemp	4	4	6	4.37e+07	83	5.265e+05	9.6208e+05	0.022016	0.19866
mn_MPC_unemp	5	5	6	4.37e+07	83	5.265e+05	9.1286e+06	0.20889	0.28009

```
mn_V_U_gain_check = V_U_2020 - V_unemp_2020;
mn_MPC_U_gain_share_check = (C_U_2020 - cons_unemp_2020)./(welf_checks*mp_params('TR'));
```

Dense 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 = 18:100;
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=0.0017225  xxxxxxxxxxxxxxxxxxxxxxxxxxxx
    group     savings      mean_eta_1    mean_eta_2    mean_eta_3    mean_eta_4    mean_eta_5    mean_eta_6    mean_
    _____    _________    __________    __________    __________    __________    __________    __________    _____

      1              0        3.2686        2.9159        2.6002         2.318        2.0659        1.8408        1
      2     0.00051498        3.1944        2.8537        2.5482        2.2745        2.0295        1.8104        1
      3      0.0041199        2.1812        1.9865        1.8069        1.6419        1.4903        1.3515        1
      4       0.013905        1.1856        1.1059        1.0296       0.95697       0.88832       0.82357       0.
      5       0.032959       0.63189       0.59803       0.56309       0.52853       0.49533       0.46386       0.
      6       0.064373       0.38548       0.36786       0.34849       0.32838       0.30848       0.28938       0.
```

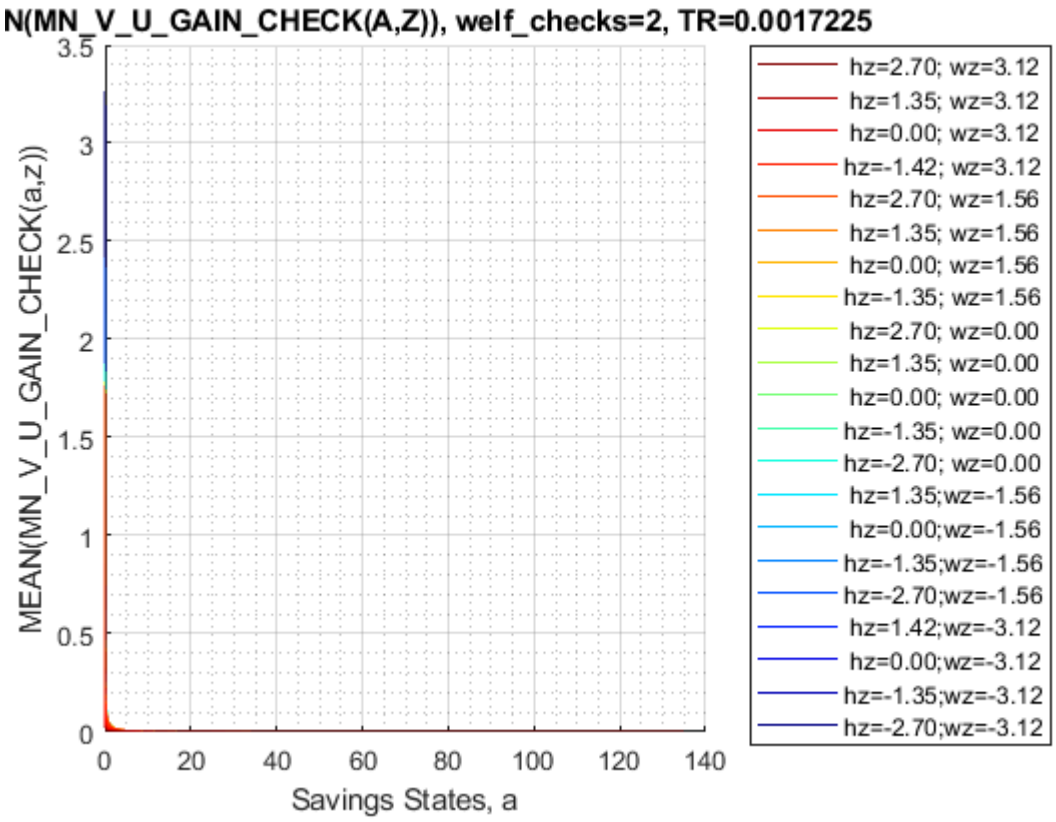
```
% Consumption
st_title = ['MEAN(MN_MPC_U_GAIN_CHECK(A,Z)), welf_checks=' num2str(welf_checks) ', TR=' num2str
tb_az_c = ff_summ_nd_array(st_title, mn_MPC_U_gain_share_check, true, ["mean"], 4, 1, cl_mp_dat
```

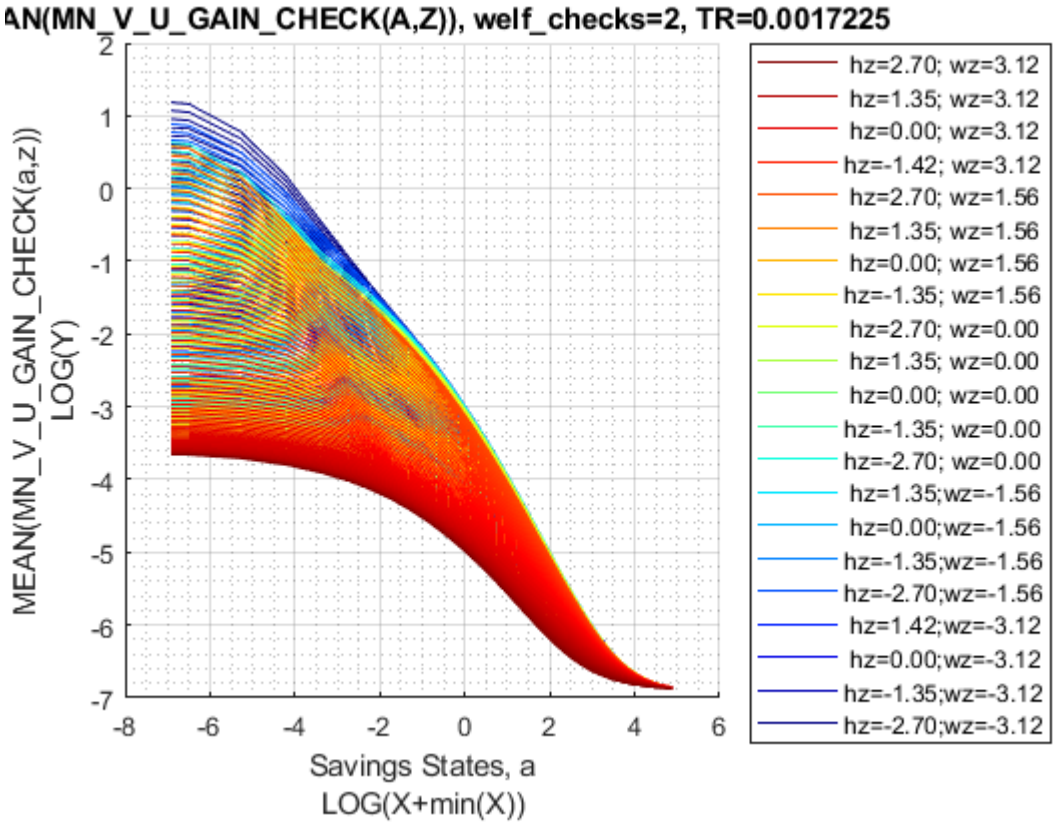
```
xxx  MEAN(MN_MPC_U_GAIN_CHECK(A,Z)), welf_checks=2, TR=0.0017225  xxxxxxxxxxxxxxxxxxxxxxxxxxxx
    group     savings      mean_eta_1    mean_eta_2    mean_eta_3    mean_eta_4    mean_eta_5    mean_eta_6    mean_
    _____    _________    __________    __________    __________    __________    __________    __________    _____

      1              0       0.99974       0.99974       0.99974       0.99974       0.99974       0.99974       0.99
      2     0.00051498       0.99968       0.99968       0.99968       0.99968       0.99968       0.99968       0.99
      3      0.0041199        0.9907        0.9907       0.99069       0.99069       0.99069       0.99069       0.99
      4       0.013905       0.93825       0.94008       0.94257       0.94511       0.94728       0.94895       0.95
      5       0.032959       0.76658        0.7715       0.78107       0.79334       0.80336       0.81189       0.82
      6       0.064373       0.66748       0.66771       0.66813       0.66974       0.67476       0.68003       0.68
```

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))'};
```

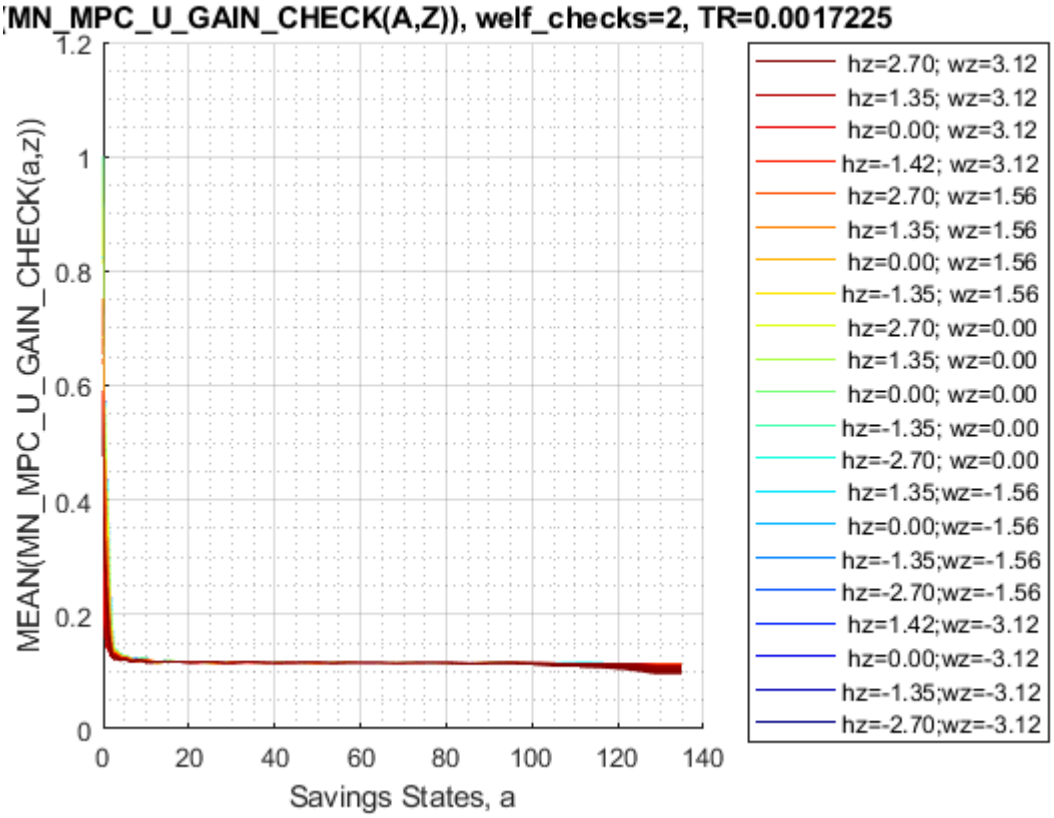
```
ff_graph_grid((tb_az_v{1:end, 3:end})', ar_st_eta_HS_grid, agrid, mp_support_graph);
```

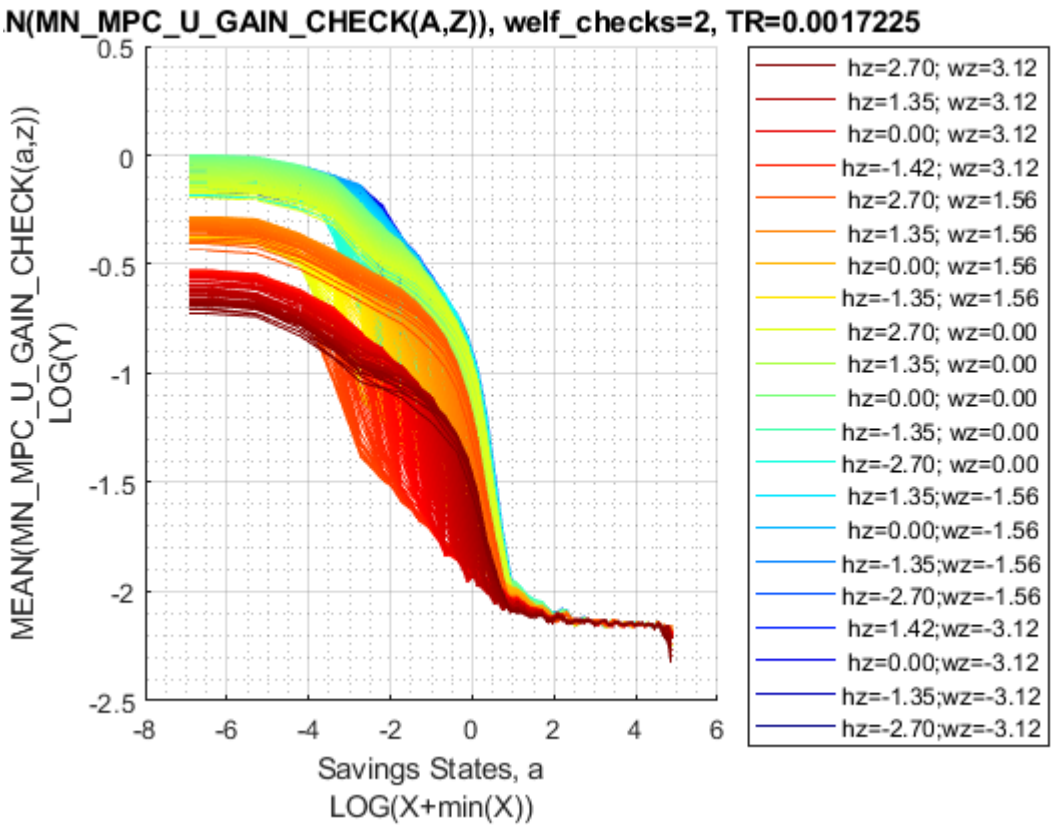




Graph Mean Consumption (***MPC: Share of Check Consumed***):

```
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 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=0.0017225  xxxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	kids	marry	mean_age_18	mean_age_19	mean_age_20	mean_age_21	mean_age_22	mean_age_23
1	1	0	0.056525	0.055709	0.054788	0.049813	0.045671	0.042195
2	2	0	0.07892	0.077833	0.076569	0.069558	0.063712	0.0588
3	3	0	0.094947	0.093814	0.092444	0.083999	0.076962	0.07105
4	4	0	0.1089	0.10769	0.10619	0.096505	0.088435	0.081656
5	5	0	0.12087	0.11964	0.11808	0.10735	0.098407	0.0909
6	1	1	0.020236	0.019466	0.018732	0.01691	0.015384	0.014096
7	2	1	0.026774	0.025777	0.02483	0.022419	0.020394	0.018686
8	3	1	0.032413	0.031262	0.03016	0.027238	0.02479	0.022727
9	4	1	0.038629	0.037308	0.036027	0.032547	0.029636	0.02718
10	5	1	0.047127	0.045664	0.044234	0.039996	0.036449	0.033473

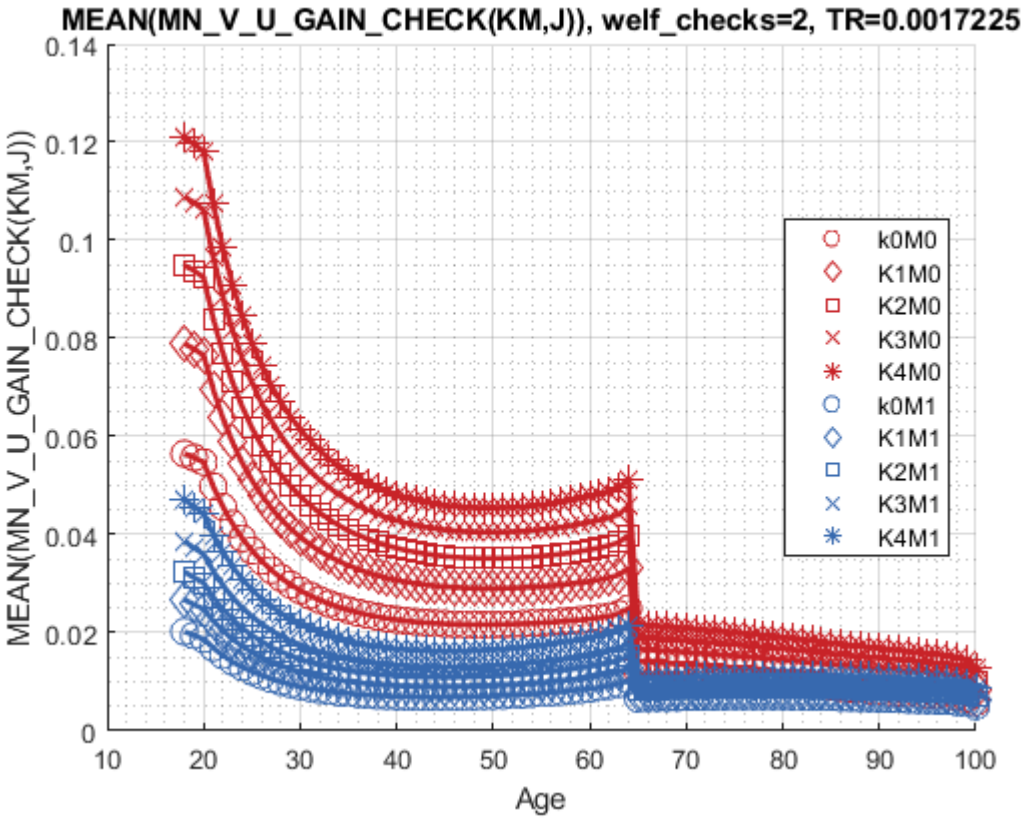
```
% Consumption Function
st_title = ['MEAN(MN_MPC_U_GAIN_CHECK(KM,J)), welf_checks=' num2str(welf_checks) ', TR=' num2st
tb_az_c = ff_summ_nd_array(st_title, mn_MPC_U_gain_share_check, true, ["mean"], 3, 1, cl_mp_dat
```

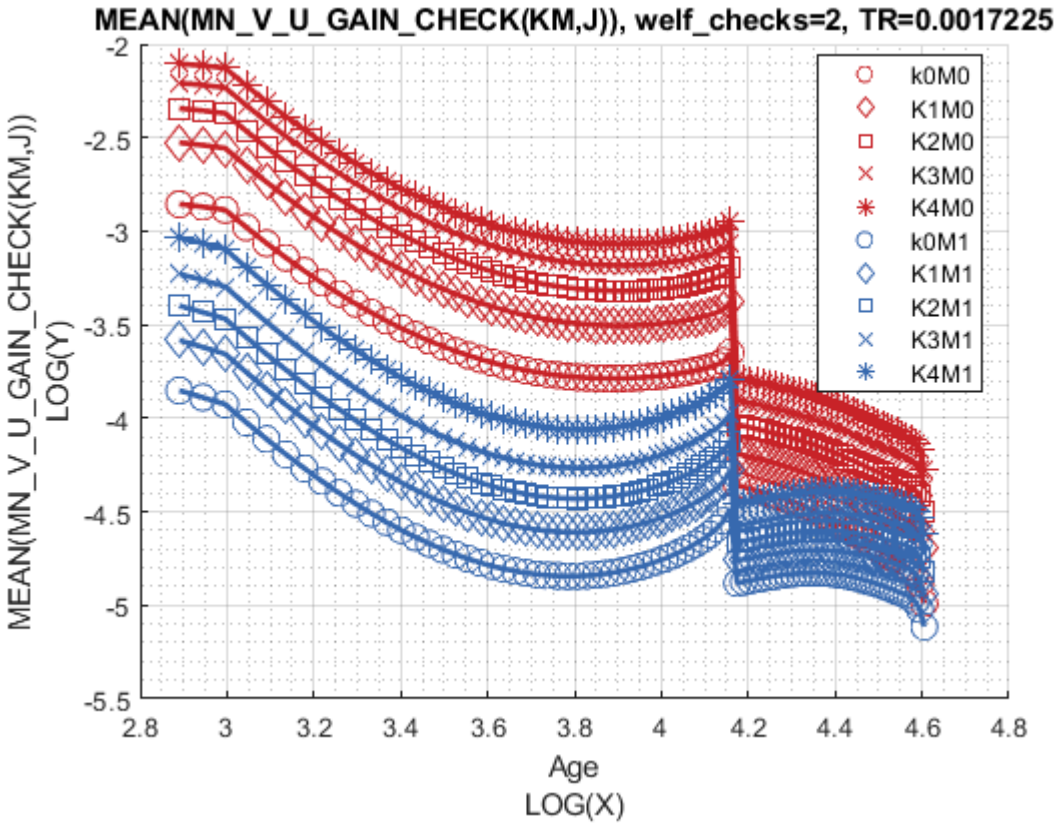
```
xxx  MEAN(MN_MPC_U_GAIN_CHECK(KM,J)), welf_checks=2, TR=0.0017225  xxxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	kids	marry	mean_age_18	mean_age_19	mean_age_20	mean_age_21	mean_age_22	mean_age_23
1	1	0	0.16549	0.16921	0.17323	0.174	0.17457	0.17496
2	2	0	0.17382	0.17757	0.18179	0.18303	0.18412	0.18508
3	3	0	0.18125	0.18476	0.1888	0.19007	0.19119	0.19218
4	4	0	0.18496	0.18833	0.19227	0.19353	0.19463	0.1956
5	5	0	0.18849	0.19163	0.19539	0.19652	0.1975	0.19835
6	1	1	0.16194	0.16488	0.17052	0.16816	0.17046	0.1704
7	2	1	0.16405	0.16731	0.17191	0.17081	0.17229	0.17306
8	3	1	0.17002	0.17304	0.17653	0.17663	0.17831	0.17831
9	4	1	0.17342	0.1776	0.1798	0.17998	0.1821	0.18066
10	5	1	0.18369	0.1848	0.18807	0.18962	0.18904	0.18801

Graph Mean Values:

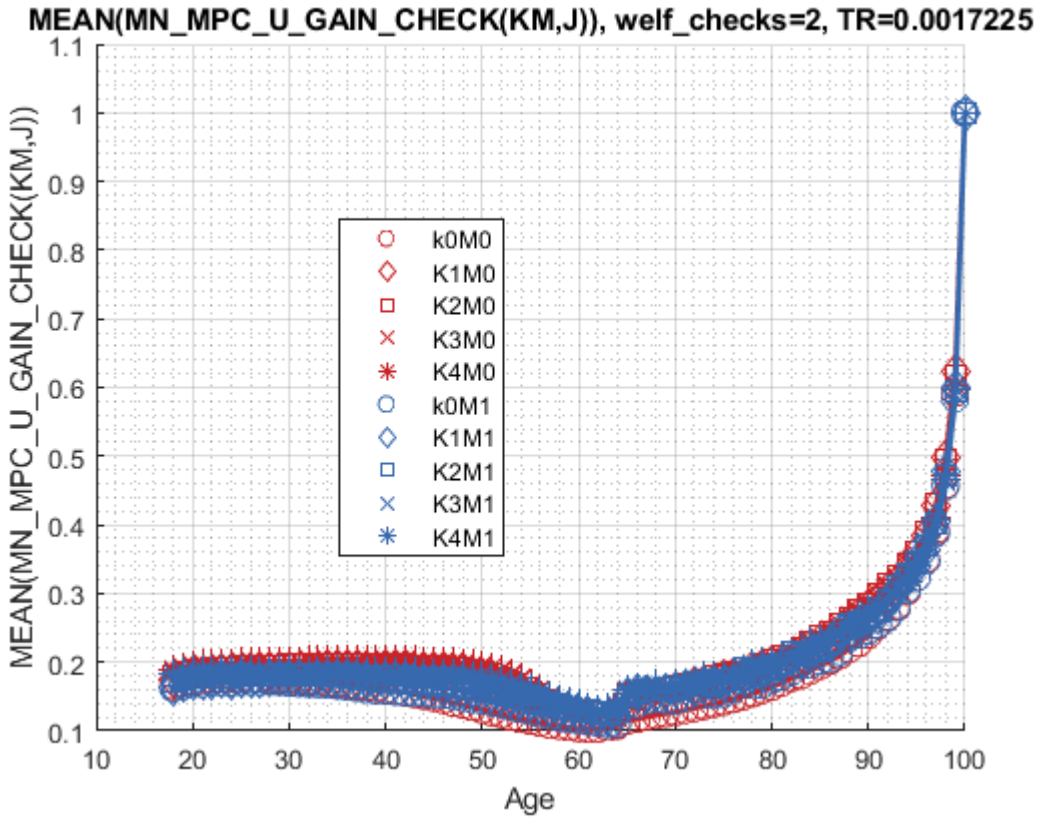
```
st_title = ['MEAN(MN\_V\_U\_GAIN\_CHECK(KM,J)), welf\_checks=' num2str(welf_checks) ', TR=' num
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_V\_U\_GAIN\_CHECK(KM,J))'};
ff_graph_grid((tb_az_v{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);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

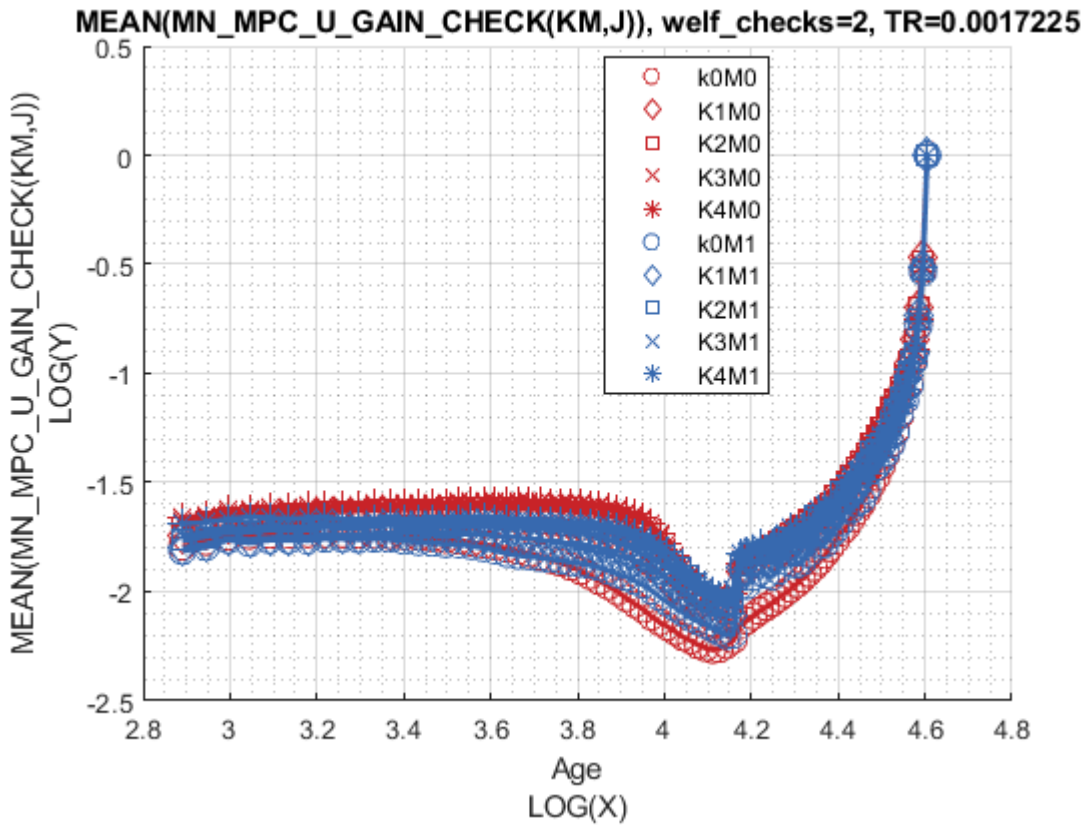




Graph Mean Consumption (***MPC: Share of Check Consumed***):

```
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=0.0017225  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	0.093194	0.09234	0.091336	0.086002	0.081269	0.077058
2	1	0	0.090871	0.089536	0.087894	0.076887	0.068006	0.060783
3	0	1	0.034608	0.033464	0.032366	0.030036	0.027998	0.026212
4	1	1	0.031464	0.030327	0.029228	0.025608	0.022663	0.020253

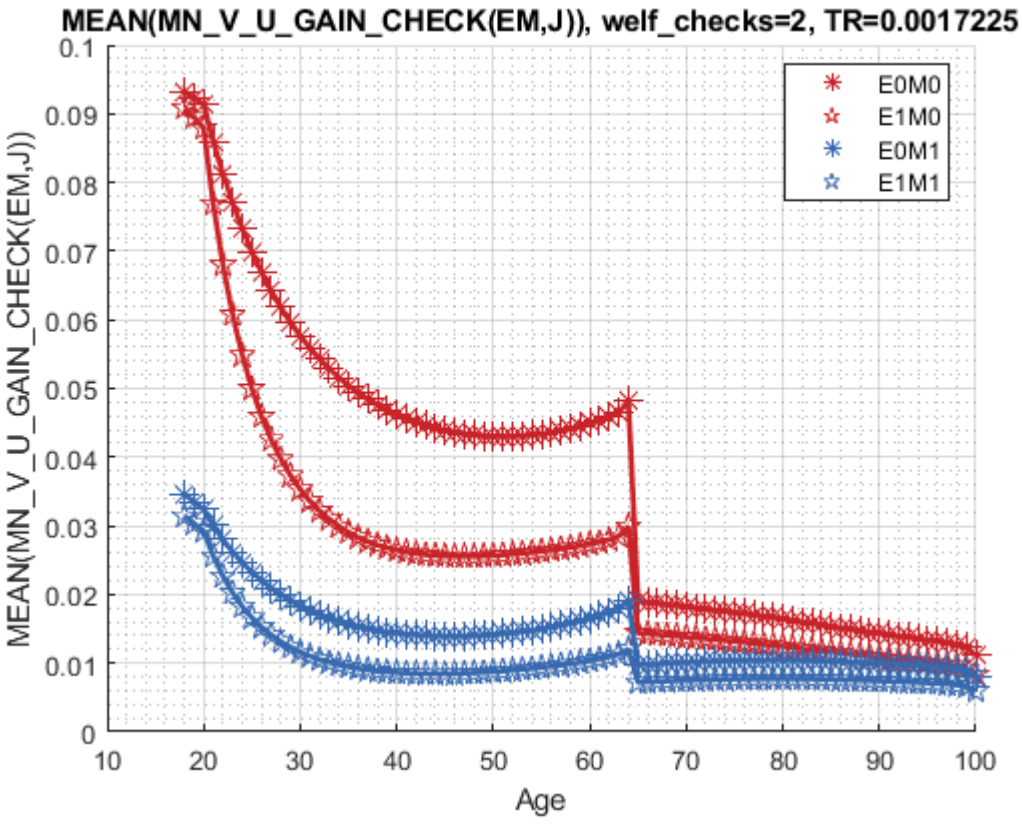
```
% Consumption
st_title = ['MEAN(MN_MPC_U_GAIN_CHECK(EM,J)), welf_checks=' num2str(welf_checks) ', TR=' num2st
tb_az_c = ff_summ_nd_array(st_title, mn_MPC_U_gain_share_check, true, ["mean"], 3, 1, cl_mp_dat
```

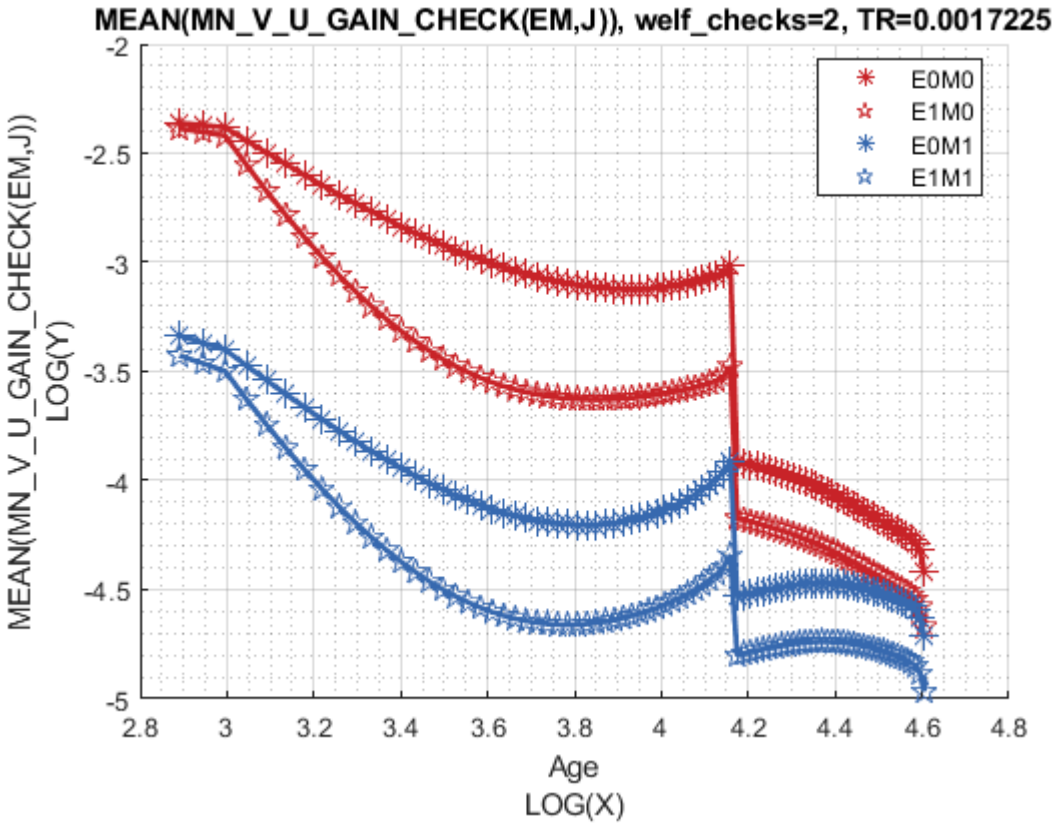
```
xxx  MEAN(MN_MPC_U_GAIN_CHECK(EM,J)), welf_checks=2, TR=0.0017225  xxxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	edu	marry	mean_age_18	mean_age_19	mean_age_20	mean_age_21	mean_age_22	mean_age_23
1	0	0	0.17215	0.17483	0.17774	0.17865	0.1795	0.18029
2	1	0	0.18545	0.18977	0.19485	0.19621	0.19731	0.19817
3	0	1	0.16439	0.16703	0.16997	0.16976	0.17088	0.17058
4	1	1	0.17686	0.18002	0.18476	0.18432	0.18599	0.1856

Graph Mean Values:

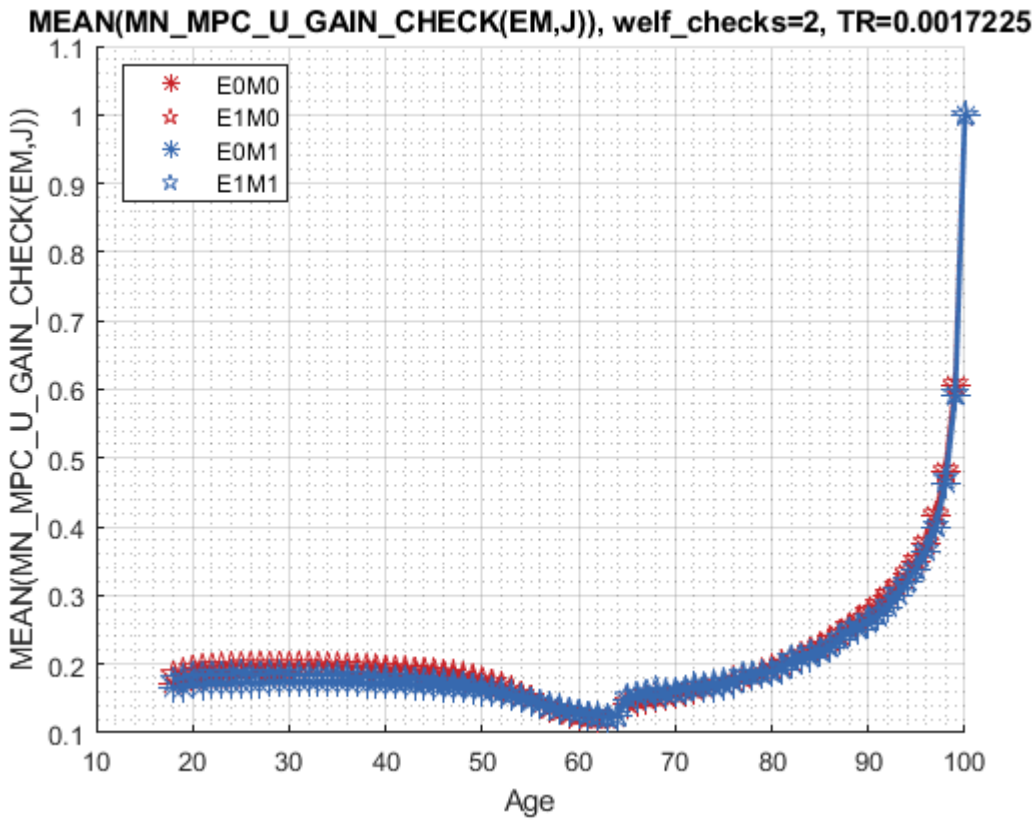
```
st_title = ['MEAN(MN\_V\_U\_GAIN\_CHECK(EM,J)), welf\_checks=' num2str(welf_checks) ', TR=' num
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_V\_U\_GAIN\_CHECK(EM,J))'};
ff_graph_grid((tb_az_v{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);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

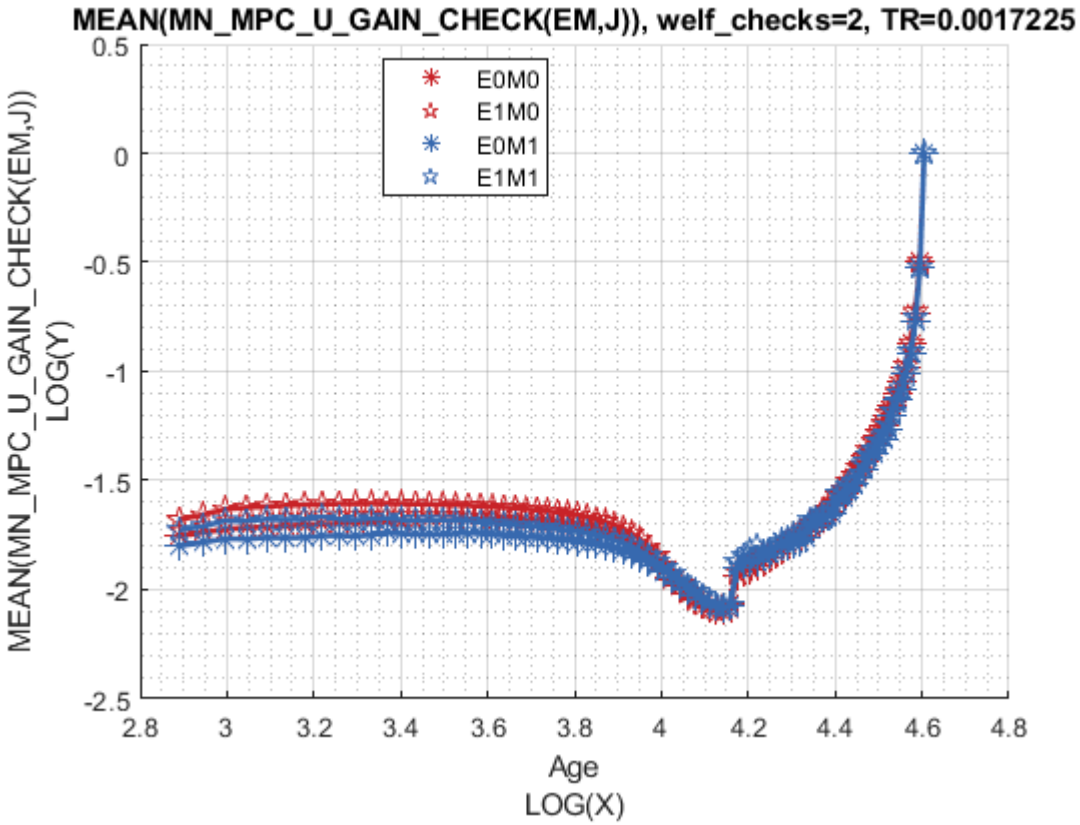




Graph Mean Consumption (***MPC: Share of Check Consumed***):

```
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=0.0017225
E0M0
E1M0
E0M1
E1M1
MEAN(MN_MPC_U_GAIN_CHECK(EM,J))
Age
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
10
20
30
40
50
60
70
80
90
100


MEAN(MN_MPC_U_GAIN_CHECK(EM,J)), welf_checks=2, TR=0.0017225
E0M0
E1M0
E0M1
E1M1
MEAN(MN_MPC_U_GAIN_CHECK(EM,J))
LOG(Y)
Age
LOG(X)
0.5
0
-0.5
-1
-1.5
-2
-2.5
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8