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=503.886
----------------------------------------
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	-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

```
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	-6.8822e+08	-15.749	22.879	-1.4527
ap_VFI	2	2	6	4.37e+07	83	5.265e+05	1.3605e+09	31.134	36.294	1.1657
cons_VFI	3	3	6	4.37e+07	83	5.265e+05	2.2887e+08	5.2375	8.4438	1.6122

xxx TABLE:V_VFI xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499
r1	-320.42	-318.92	-310.39	-296.97	-284.58	-4.4406	-4.3429	-4.2464	-4.1513
r2	-310.88	-309.38	-300.85	-287.43	-275.14	-4.3331	-4.239	-4.1461	-4.0543
r3	-301.33	-299.83	-291.3	-277.88	-265.85	-4.2231	-4.1327	-4.0433	-3.955
r4	-290.68	-289.29	-281.32	-268.6	-257.1	-4.1145	-4.0276	-3.9417	-3.8567
r5	-281.05	-279.76	-272.29	-260.2	-249.16	-4.0121	-3.9284	-3.8457	-3.7638
r79	-13.642	-13.628	-13.535	-13.298	-12.896	-0.22291	-0.21238	-0.20247	-0.19317
r80	-12.283	-12.269	-12.176	-11.939	-11.537	-0.17128	-0.16316	-0.15551	-0.1483
r81	-10.605	-10.591	-10.498	-10.261	-9.8589	-0.11815	-0.11254	-0.10726	-0.10231
r82	-8.3494	-8.3358	-8.2424	-8.0055	-7.6035	-0.065887	-0.062757	-0.059823	-0.057044
r83	-5.0665	-5.0529	-4.9595	-4.7226	-4.3206	-0.021146	-0.020134	-0.019185	-0.018294

xxx TABLE:ap_VFI xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499	c526500
r1	0	0	0	0	0.0083625	107.54	113.09	118.82	124.74	130.86
r2	0	0	0	0	0.0074731	107.45	112.99	118.72	124.64	130.75
r3	0	0	0	0	0.0058503	107.33	112.88	118.61	124.52	130.64
r4	0	0	0	0	0.0049981	107.54	113.08	118.81	124.73	130.85
r5	0	0	0	0	0.004174	107.76	113.3	119.03	124.95	131.07
r79	0	0	0	0	0	80.462	84.34	88.311	92.234	96.324

r80	0	0	0	0	0	75.113	78.736	82.42	85.975	90.439
r81	0	0	0	0	0	66.945	69.639	72.673	76.669	81.091
r82	0	0	0	0	0	50.126	53.467	55.311	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	11.989	12.265	12.55	12.844	1
r2	0.018623	0.019158	0.022901	0.033062	0.045375	12.223	12.501	12.787	13.082	1
r3	0.018623	0.019158	0.022901	0.033062	0.046998	12.476	12.755	13.042	13.337	1
r4	0.019354	0.019888	0.023632	0.033792	0.048579	12.72	13	13.289	13.584	1
r5	0.020066	0.020601	0.024344	0.034504	0.050114	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	4
r81	0.19737	0.19791	0.20163	0.21175	0.23145	48.909	52.039	55.022	57.241	5
r82	0.19737	0.19791	0.20163	0.21175	0.23145	65.719	68.202	72.375	76.948	7
r83	0.19737	0.19791	0.20163	0.21175	0.23145	115.84	121.66	127.68	133.89	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	2.2891e+08	5.2382	8.443
C_U_minus_C_unemp	2	2	6	4.37e+07	83	5.265e+05	31259	0.00071531	0.0009611
V_U	3	3	6	4.37e+07	83	5.265e+05	-6.8723e+08	-15.726	22.76
V_U_minus_V_unemp	4	4	6	4.37e+07	83	5.265e+05	9.9746e+05	0.022825	0.1989
mn_MPC_unemp	5	5	6	4.37e+07	83	5.265e+05	9.0737e+06	0.20764	0.27

```
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        3.2784        2.9257          2.61        2.3278        2.0757        1.8506        1
      2     0.00051498        3.2041        2.8634        2.5579        2.2842        2.0392        1.8201        1
      3      0.0041199        2.1902        1.9954        1.8159        1.6508        1.4992        1.3604        1
      4       0.013905        1.1932        1.1135        1.0371       0.96452       0.89587       0.83112       0.
      5       0.032959       0.63789       0.60403       0.56908       0.53453       0.50132       0.46985       0.
      6       0.064373          0.39       0.37239       0.35301       0.33291         0.313        0.2939       0.
```

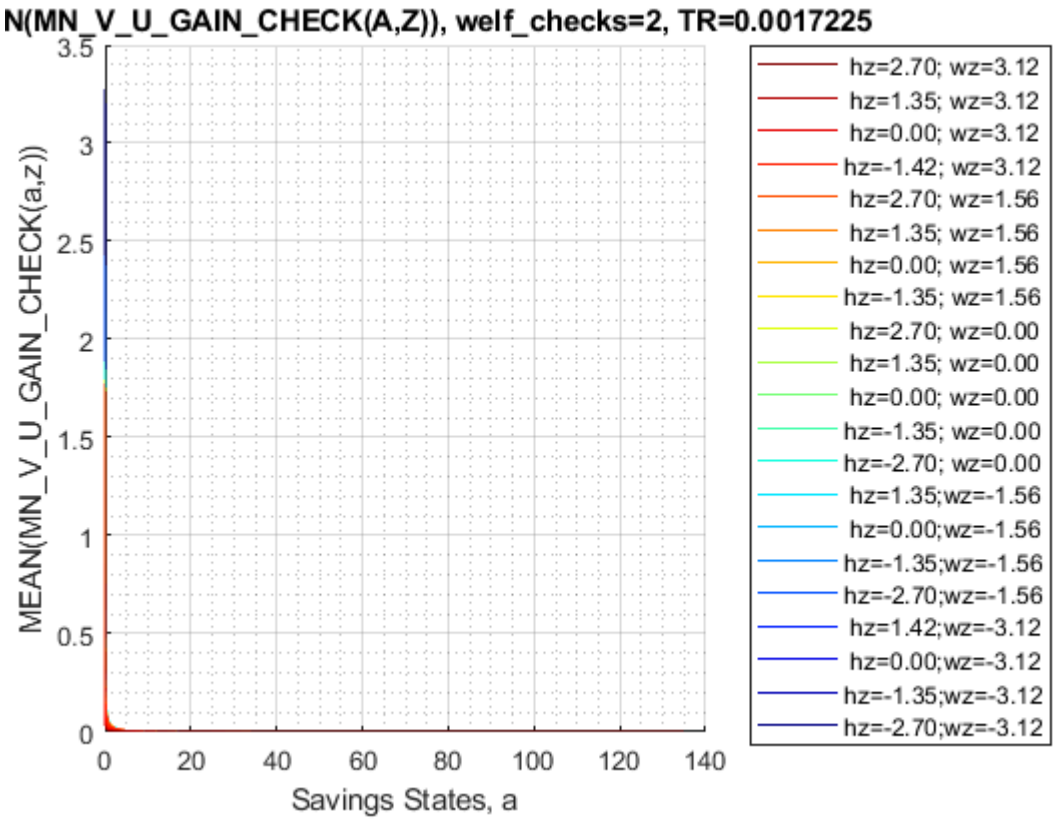
```
% Consumption
st_title = ['MEAN(MN_MPC_U_GAIN_CHECK(A,Z)), welf_checks=' num2str(welf_checks) ', TR=' num2str
tb_az_c = ff_summ_nd_array(st_title, mn_MPC_U_gain_share_check, true, ["mean"], 4, 1, cl_mp_dat
```

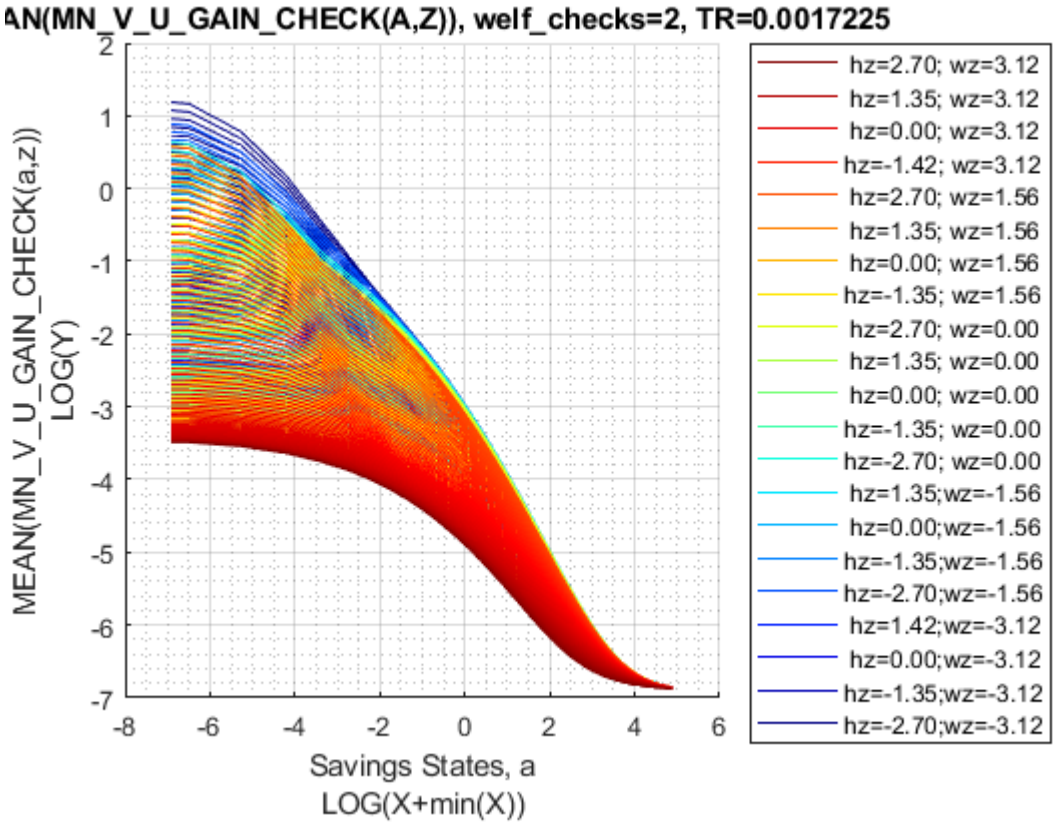
```
xxx  MEAN(MN_MPC_U_GAIN_CHECK(A,Z)), welf_checks=2, TR=0.0017225  xxxxxxxxxxxxxxxxxxxxxxxxxxxx
    group     savings      mean_eta_1    mean_eta_2    mean_eta_3    mean_eta_4    mean_eta_5    mean_eta_6    mean_
    _____    _________    __________    __________    __________    __________    __________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

      1              0       0.99949       0.99949       0.99949       0.99949       0.99948       0.99948       0.99
      2     0.00051498       0.99938       0.99938       0.99938       0.99938       0.99938       0.99938       0.99
      3      0.0041199       0.98911       0.98911        0.9891        0.9891        0.9891        0.9891        0.9
      4       0.013905       0.93195       0.93379       0.93628       0.93882       0.94099       0.94265       0.94
      5       0.032959       0.76077       0.76569       0.77526       0.78753       0.79755       0.80608       0.82
      6       0.064373       0.66432       0.66455       0.66497       0.66658       0.67161       0.67687       0.67
```

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))'};
```

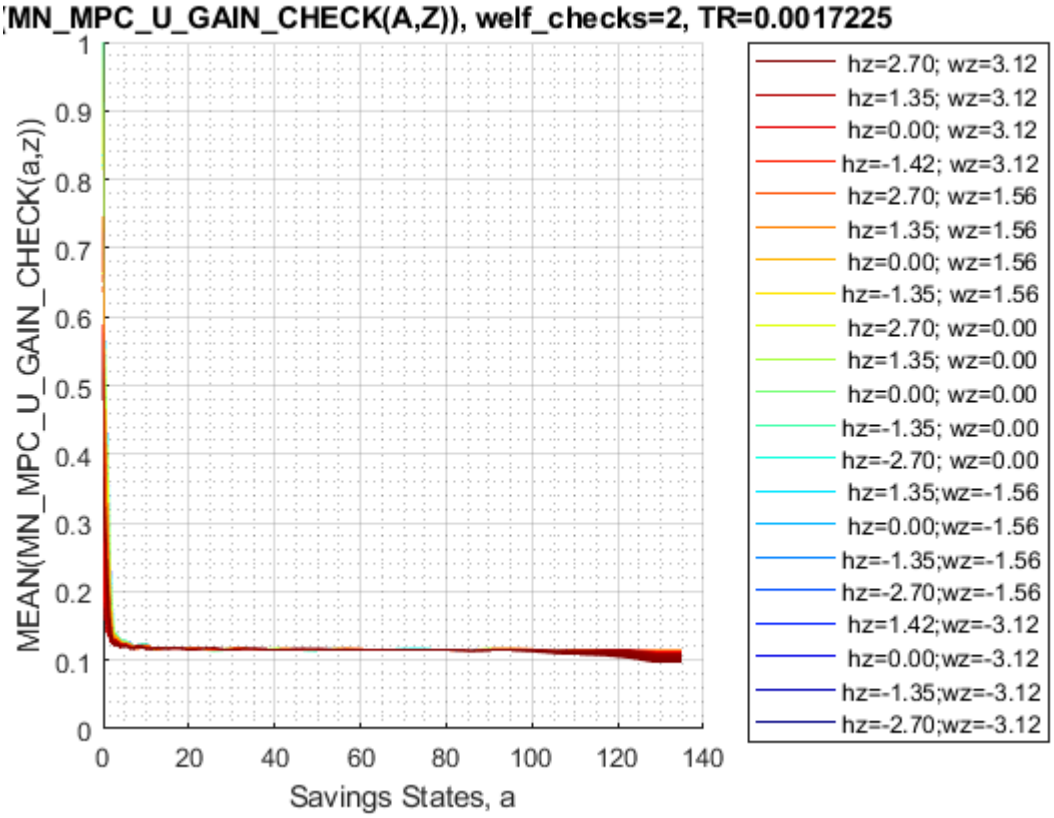
```
ff_graph_grid((tb_az_v{1:end, 3:end})', ar_st_eta_HS_grid, agrid, mp_support_graph);
```

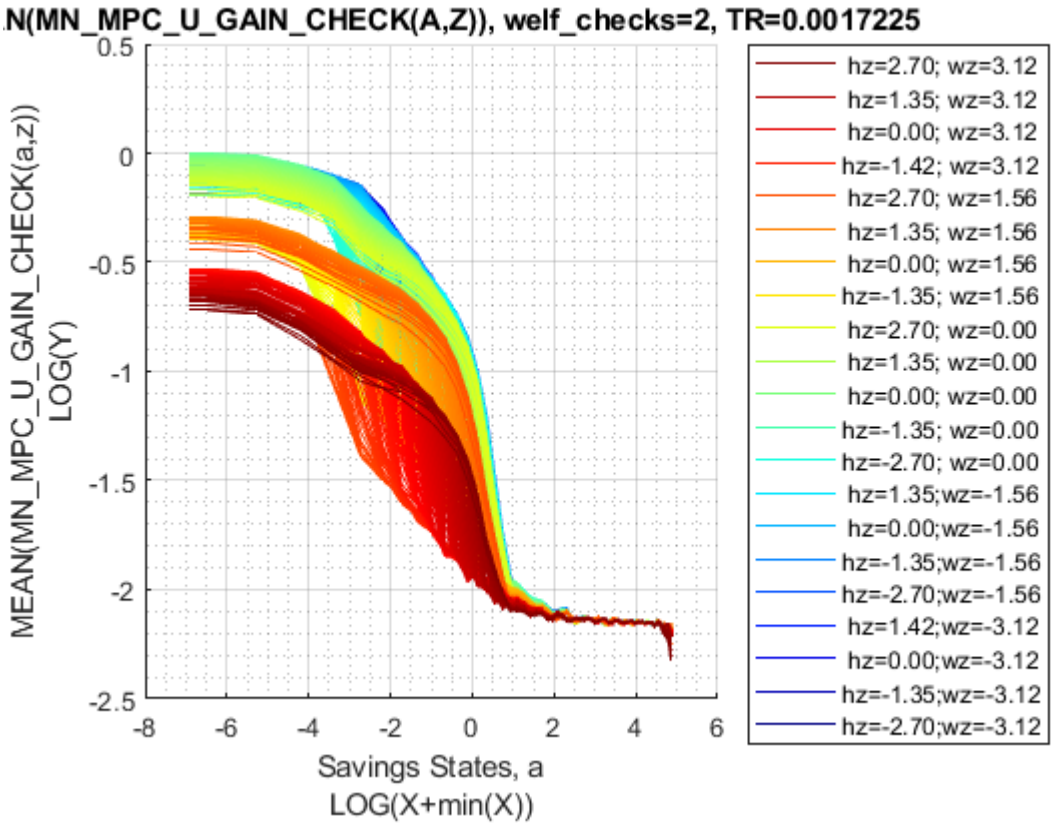




Graph Mean Consumption (***MPC: Share of Check Consumed***):

```
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	0.05653	0.055715	0.054794	0.04982	0.045679	0.042203
2	2	0	0.078925	0.077839	0.076575	0.069564	0.063719	0.058807
3	3	0	0.094952	0.093819	0.09245	0.084005	0.076969	0.071057
4	4	0	0.10891	0.1077	0.1062	0.09651	0.088441	0.081662
5	5	0	0.12087	0.11965	0.11809	0.10735	0.098413	0.090907
6	1	1	0.020237	0.019467	0.018733	0.016911	0.015385	0.014097
7	2	1	0.026775	0.025778	0.024831	0.02242	0.020395	0.018688
8	3	1	0.032414	0.031263	0.030161	0.027239	0.024791	0.022728
9	4	1	0.038629	0.037309	0.036028	0.032548	0.029638	0.027181
10	5	1	0.047127	0.045665	0.044235	0.039997	0.03645	0.033474

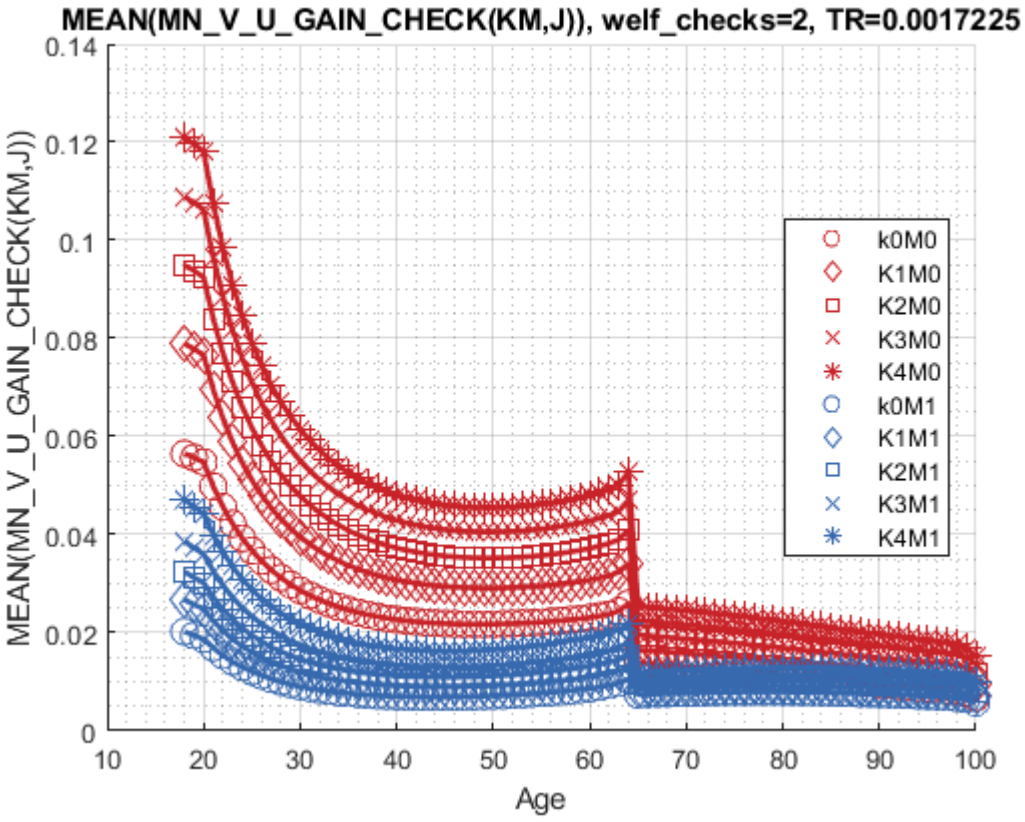
```
% Consumption Function
st_title = ['MEAN(MN_MPC_U_GAIN_CHECK(KM,J)), welf_checks=' num2str(welf_checks) ', TR=' num2st
tb_az_c = ff_summ_nd_array(st_title, mn_MPC_U_gain_share_check, true, ["mean"], 3, 1, cl_mp_dat
```

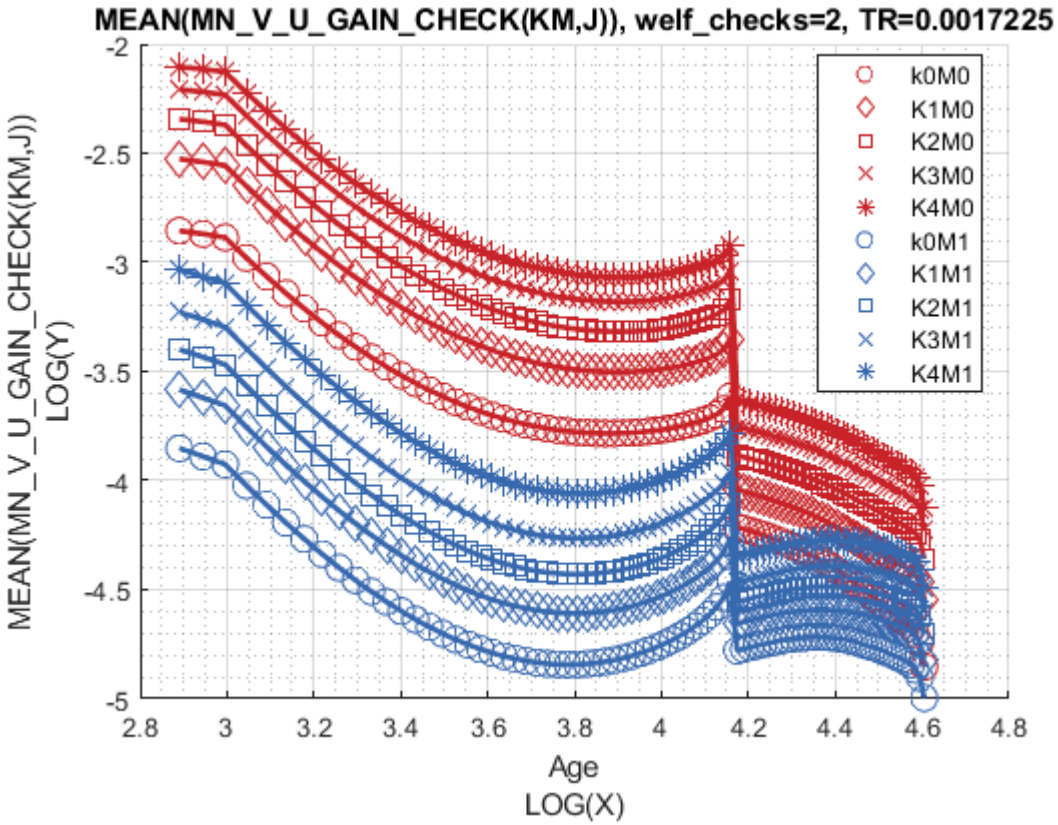
```
xxx  MEAN(MN_MPC_U_GAIN_CHECK(KM,J)), welf_checks=2, TR=0.0017225  xxxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	kids	marry	mean_age_18	mean_age_19	mean_age_20	mean_age_21	mean_age_22	mean_age_23
1	1	0	0.16534	0.16905	0.17306	0.17381	0.17437	0.17474
2	2	0	0.1737	0.17744	0.18164	0.18288	0.18395	0.18489
3	3	0	0.18114	0.18464	0.18867	0.18992	0.19103	0.192
4	4	0	0.18485	0.18821	0.19215	0.19339	0.19447	0.19543
5	5	0	0.18839	0.19152	0.19526	0.19638	0.19735	0.19819
6	1	1	0.16189	0.16482	0.1704	0.16811	0.17036	0.17027
7	2	1	0.16399	0.1672	0.1718	0.17073	0.17219	0.17292
8	3	1	0.16993	0.17298	0.17649	0.17652	0.17818	0.17822
9	4	1	0.17337	0.17752	0.17974	0.17989	0.18201	0.18061
10	5	1	0.18363	0.18473	0.18799	0.18953	0.18894	0.18789

Graph Mean Values:

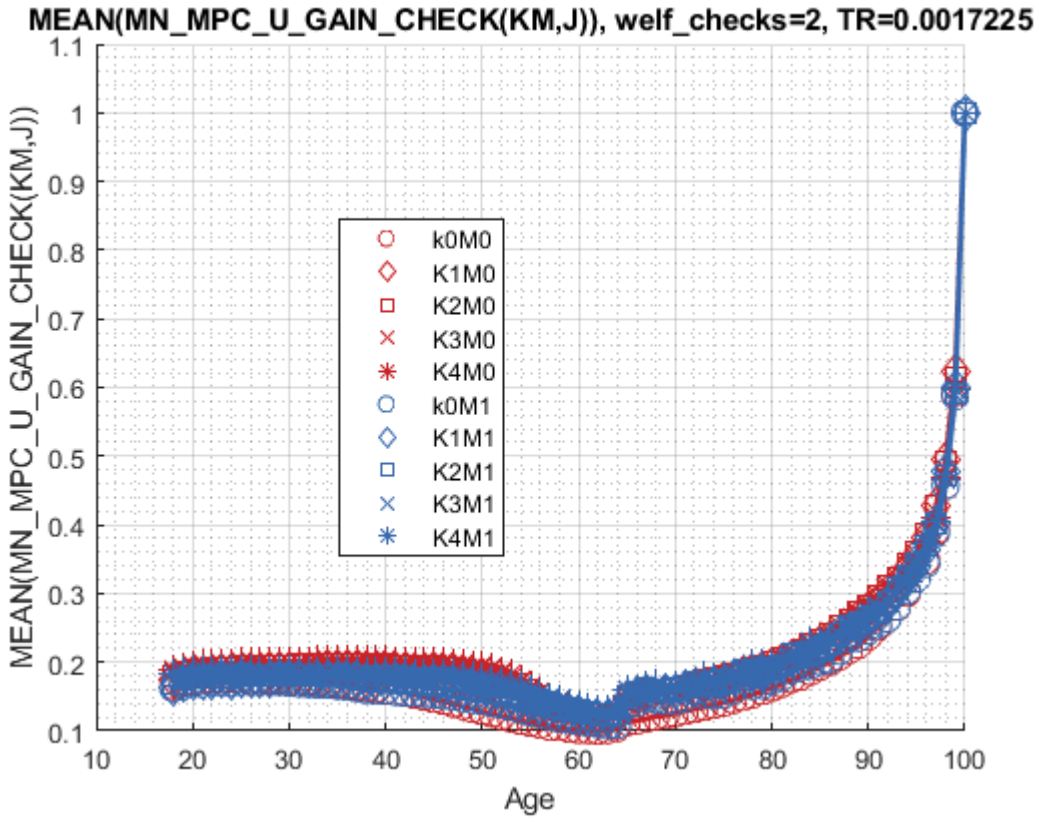
```
st_title = ['MEAN(MN\_V\_U\_GAIN\_CHECK(KM,J)), welf\_checks=' num2str(welf_checks) ', TR=' num
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_V\_U\_GAIN\_CHECK(KM,J))'};
ff_graph_grid((tb_az_v{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);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

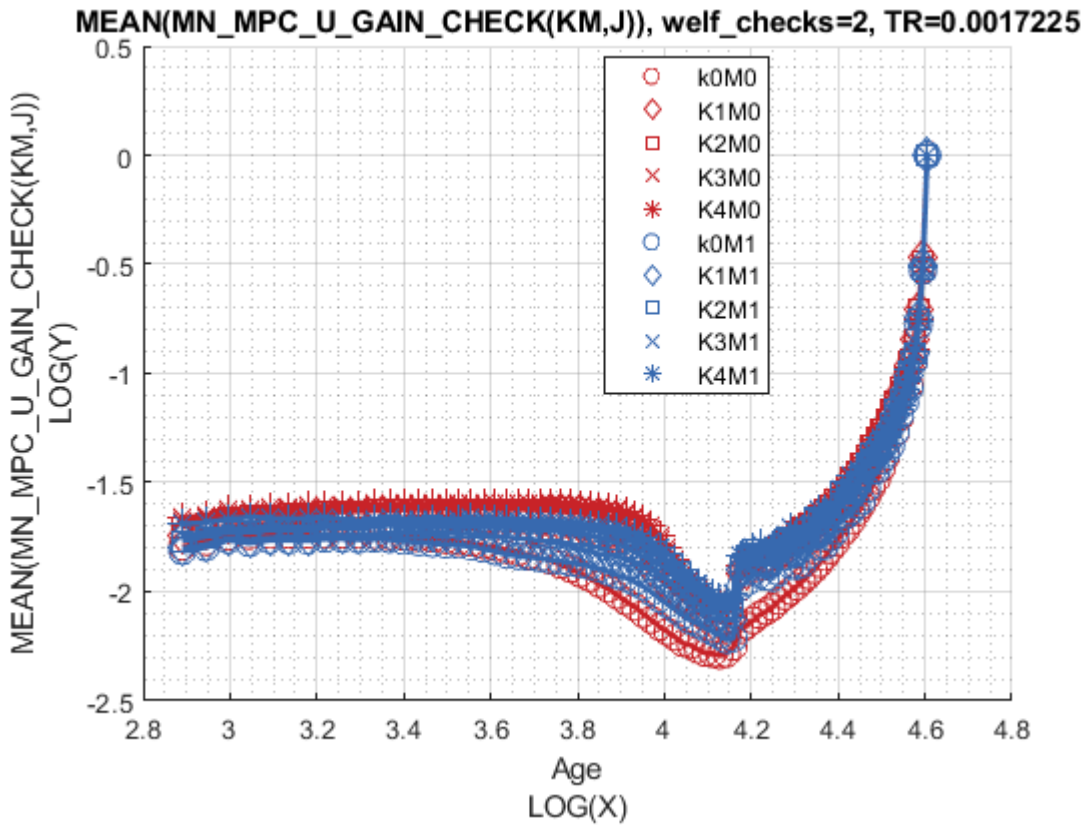




Graph Mean Consumption (***MPC: Share of Check Consumed***):

```
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	0.0932	0.092347	0.091343	0.086009	0.081278	0.077067
2	1	0	0.090875	0.089539	0.087898	0.076892	0.068011	0.060788
3	0	1	0.034609	0.033465	0.032367	0.030037	0.027999	0.026213
4	1	1	0.031464	0.030328	0.029228	0.025609	0.022664	0.020254

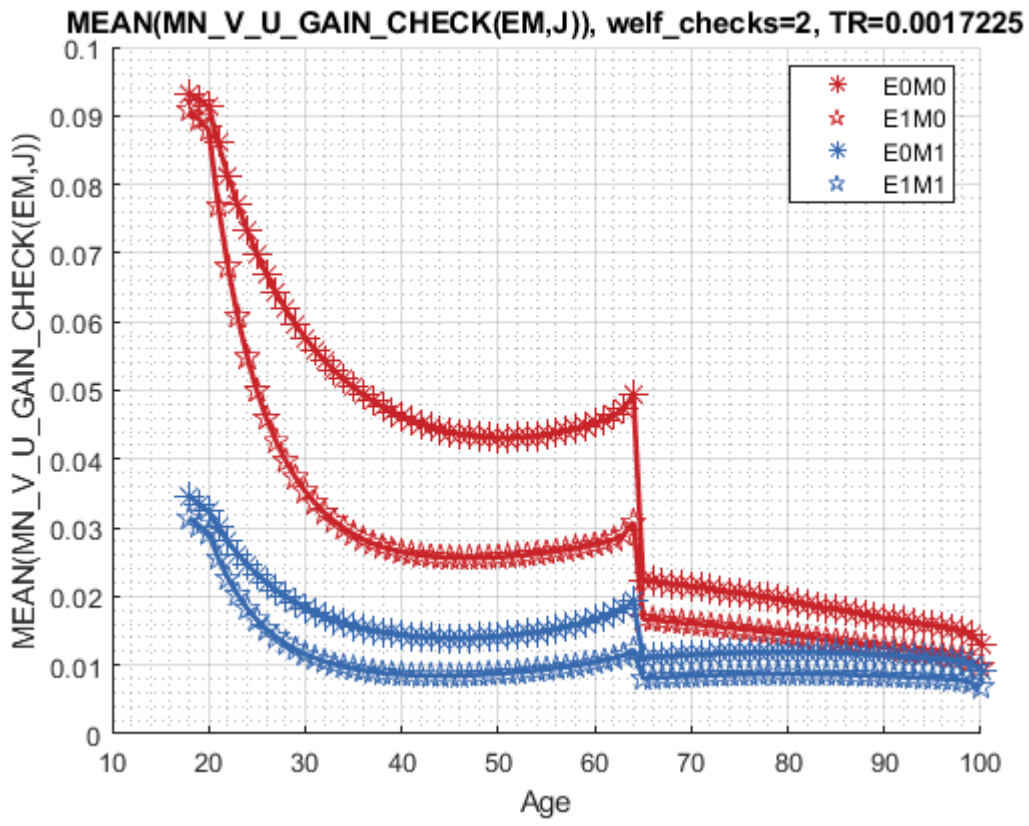
```
% Consumption
st_title = ['MEAN(MN_MPC_U_GAIN_CHECK(EM,J)), welf_checks=' num2str(welf_checks) ', TR=' num2st
tb_az_c = ff_summ_nd_array(st_title, mn_MPC_U_gain_share_check, true, ["mean"], 3, 1, cl_mp_dat
```

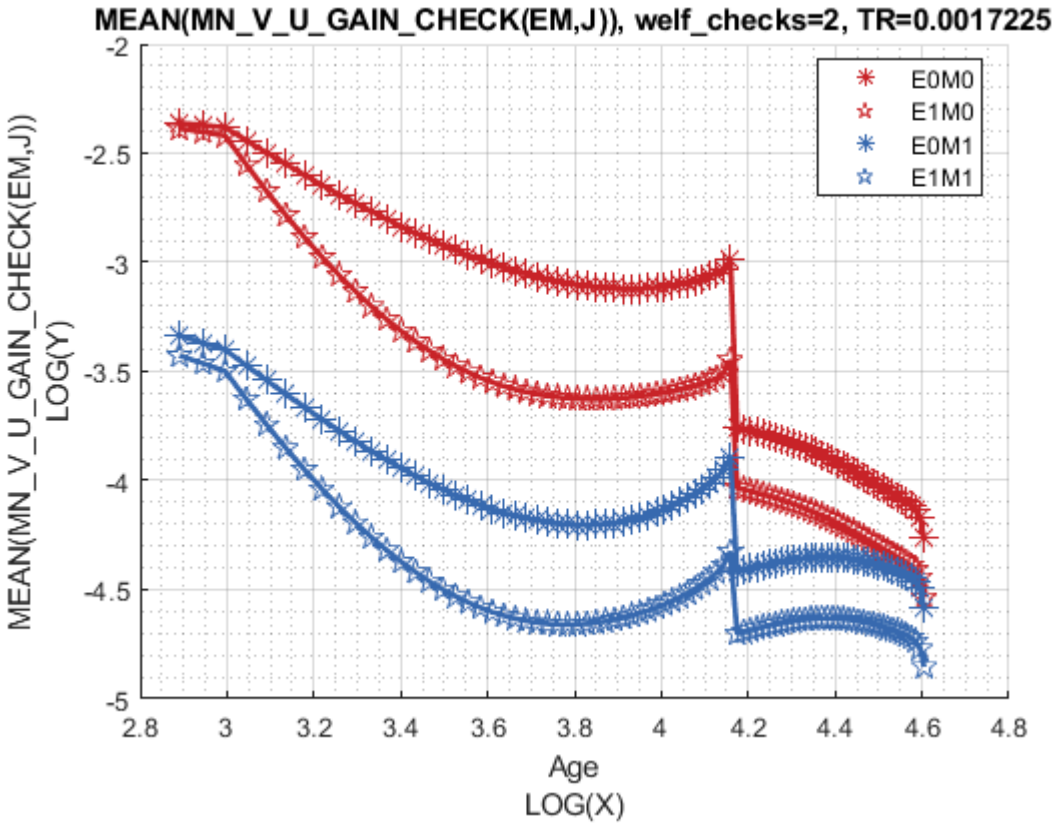
```
xxx  MEAN(MN_MPC_U_GAIN_CHECK(EM,J)), welf_checks=2, TR=0.0017225  xxxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	edu	marry	mean_age_18	mean_age_19	mean_age_20	mean_age_21	mean_age_22	mean_age_23
1	0	0	0.17201	0.17468	0.17758	0.17848	0.17931	0.18009
2	1	0	0.18536	0.18966	0.19474	0.19608	0.19716	0.19801
3	0	1	0.16432	0.16694	0.16991	0.16969	0.17077	0.17046
4	1	1	0.1768	0.17996	0.18466	0.18422	0.1859	0.1855

Graph Mean Values:

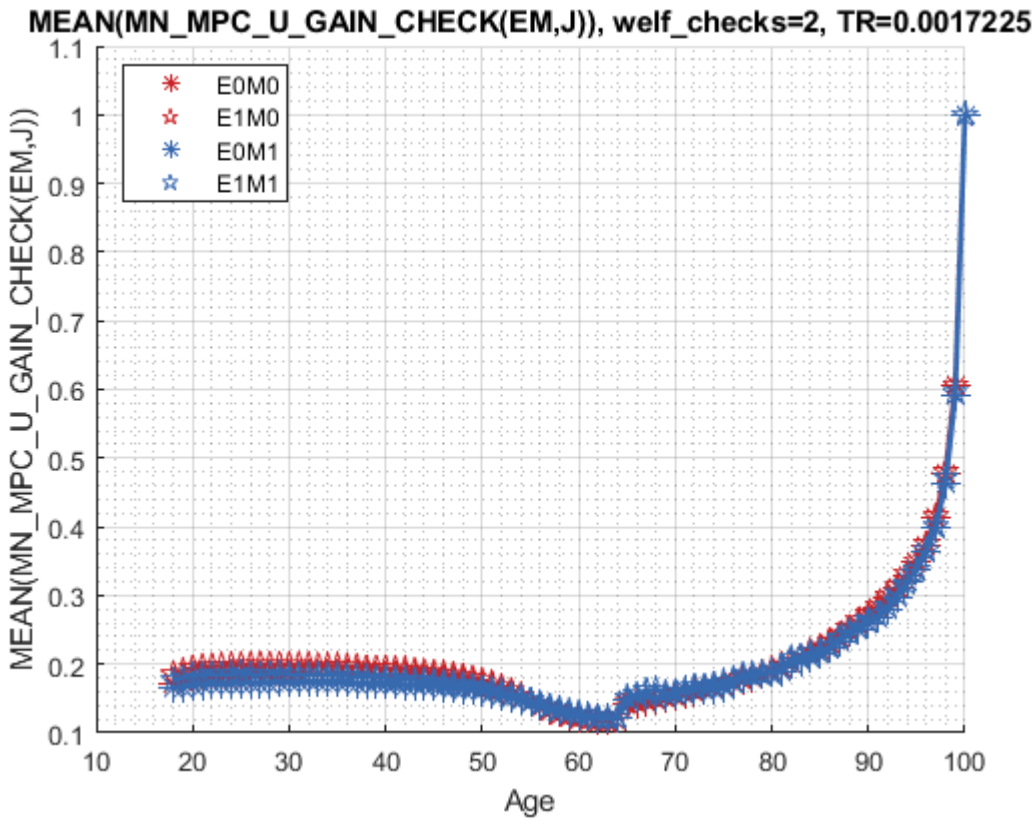
```
st_title = ['MEAN(MN\_V\_U\_GAIN\_CHECK(EM,J)), welf\_checks=' num2str(welf_checks) ', TR=' num
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_V\_U\_GAIN\_CHECK(EM,J))'};
ff_graph_grid((tb_az_v{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);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

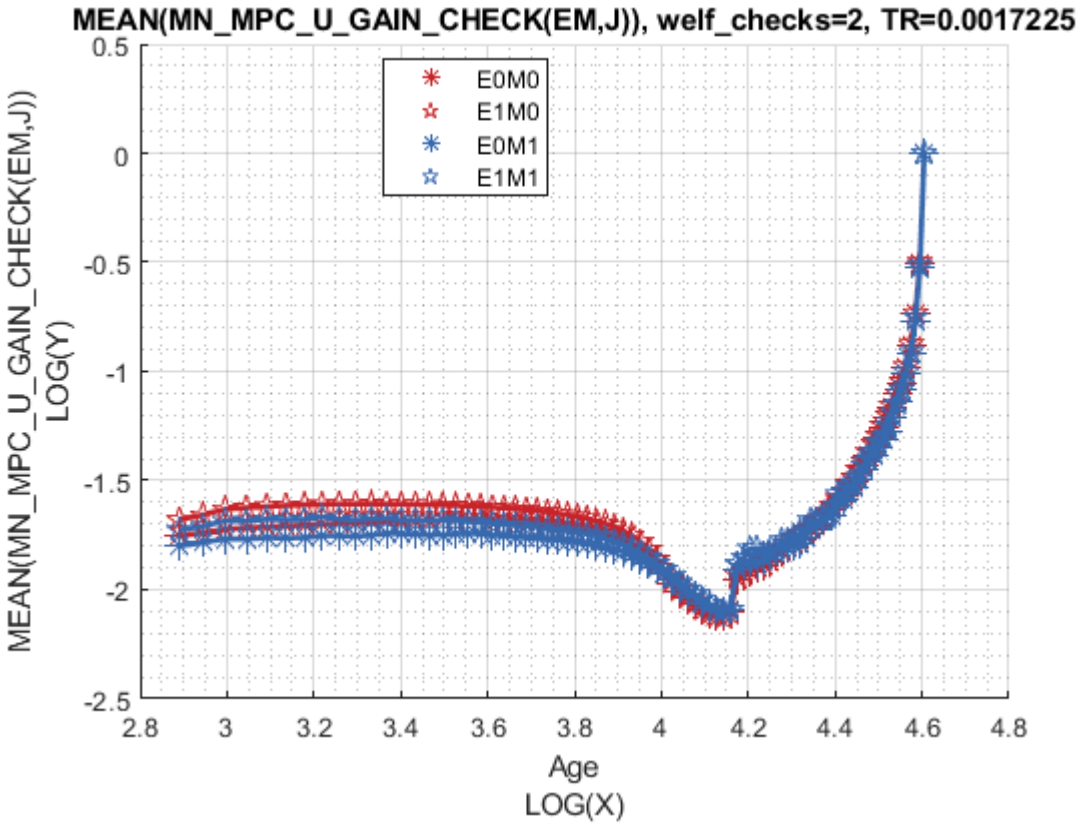




Graph Mean Consumption (***MPC: Share of Check Consumed***):

```
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