Value and Consumption Low vs Higher Unemployment Insurance Comparison

This is the example vignette for function: **snw_vfi_main_bisec_vec** from the **PrjOptiSNW Package.** This function solves for the V(states, unemployed) assuming individuals suffer from unemployment spell, but with different UI (unemployment benefits). Higher UI benefits leads to value/welfare and also higher consumption.

Solve the Steady-State non-unemployment Problem

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_dense');
mp_params = snw_mp_param('default_docdense');
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=491.2252
----------------------------------------
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 xxxxxxxxxxxxxxxxxx

	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 Problem in MIT Unemployed State with High and Low Unemployment Insurance

Shared xi value, 50 percent income loss. This is a one-time MIT shock that changes choices today in the sense of changing the resource state-space, but does not change forward expectations.

```
xi=0.5; % xi=0 full income loss from covid shock, xi=1, no covid income losses
```

Solve for $b = 0$, no unemployment insurane.

```
fl_b_lower = 0.0;
fl_b_higher= 0.5;
b=fl_b_lower; % b=0 means no UI benefits compensating COVID, b=1 if full income replacement
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_b_0p0,~,cons_unemp_b_0p0,~] = 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
---------------------------------------
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 xxxxxxxxxxxxxxxxxx

	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

Solve for $b = 0.5$, 50 percent unemployment insurance, meaning 50 percent of lost income is recovered.

```
b=fl_b_higher; % b=0 means no UI benefits compensating COVID, b=1 if full income replacement
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_b_0p5,~,cons_unemp_b_0p5,~] = 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
----------------------------------------
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	-6.7567e+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	

Generate UI Comparison Matrixes

Find the deviation in value and consumption between higher and lower UI world. Welfare is converted to units in fixed life-time consumption.

```
gamma = mp_params('gamma');
mn_V_U_gain_moreUI = snw_hh_welfare(V_unemp_b_0p5, gamma) - snw_hh_welfare(V_unemp_b_0p0, gamma
mn_C_U_gain_moreUI = cons_unemp_b_0p5 - cons_unemp_b_0p0;
```

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 Higher and Lower UI

The difference between V and C with higher and ower UI.

```
% 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(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(A,Z)), b\_lower=' num2str(fl_b_lower) ', b\_higher=' num2str(fl_b
tb_az_v = ff_summ_nd_array(st_title, mn_V_U_gain_moreUI, true, ["mean"], 4, 1, cl_mp_datasetdes
```

xxx MEAN(MN_V_U_GAIN(A,Z)), b_lower=0, b_higher=0.5 xxxxxxxxxxxxxxxxxxxxxxxxxxx

group	savings	mean_eta_1	mean_eta_2	mean_eta_3	mean_eta_4	mean_eta_5	mean_eta_6	mean_
1	0	0.00064445	0.00064585	0.00064898	0.0006533	0.00065831	0.00066363	0.000
2	0.00051498	0.00063531	0.00063705	0.00064049	0.00064511	0.00065039	0.00065598	0.000
3	0.0041199	0.00057709	0.00058077	0.00058599	0.00059228	0.00059918	0.00060635	0.000
4	0.013905	0.00045712	0.00046361	0.00047138	0.00048007	0.00048933	0.00049886	0.000
5	0.032959	0.00031724	0.00032482	0.00033328	0.00034248	0.00035224	0.00036242	0.000
6	0.064373	0.00020749	0.00021431	0.00022165	0.00022943	0.00023758	0.00024613	0.000

```
% Consumption
st_title = ['MEAN(MN_C_U_GAIN(A,Z)), b\_lower=' num2str(fl_b_lower) ', b\_higher=' num2str(fl_b
tb_az_c = ff_summ_nd_array(st_title, mn_C_U_gain_moreUI, true, ["mean"], 4, 1, cl_mp_datasetdes
```

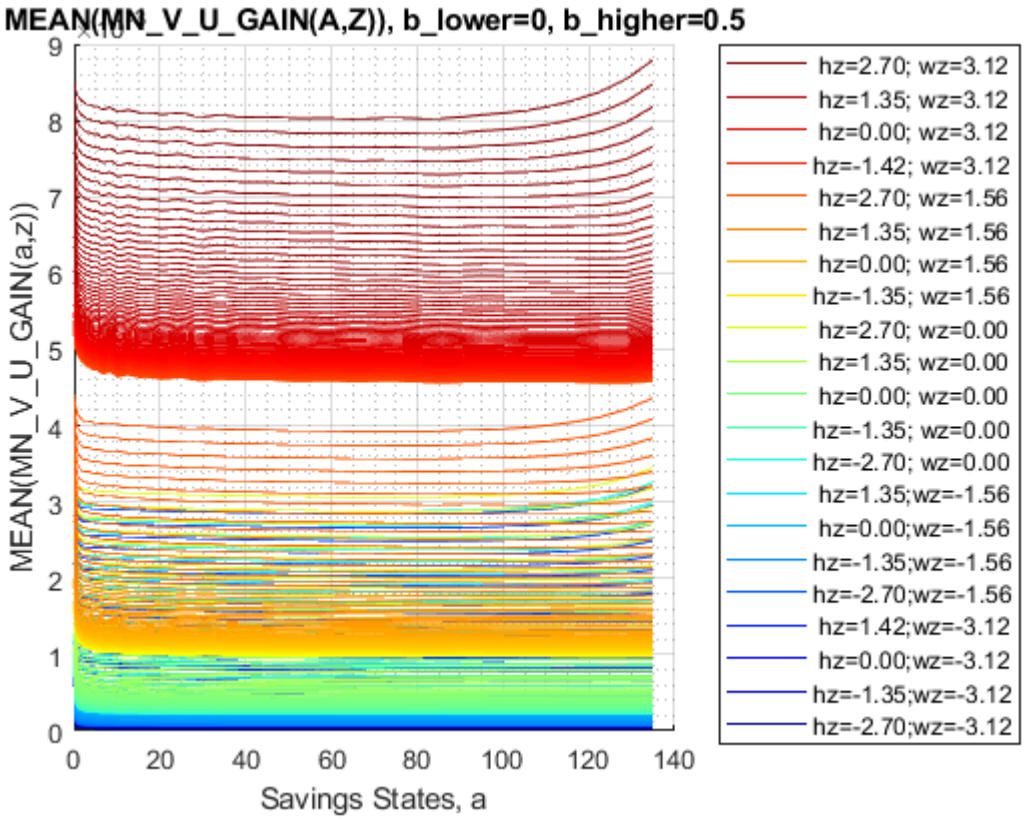
xxx MEAN(MN_C_U_GAIN(A,Z)), b_lower=0, b_higher=0.5 xxxxxxxxxxxxxxxxxxxxxxxxxxx

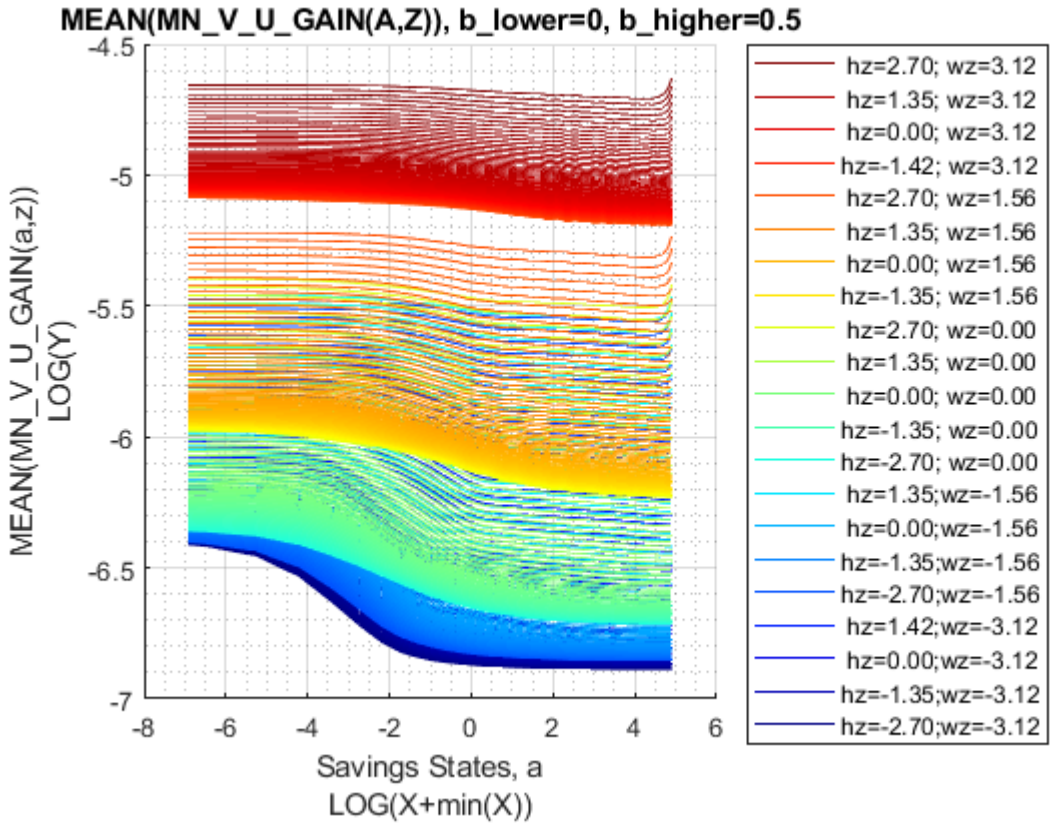
group	savings	mean_eta_1	mean_eta_2	mean_eta_3	mean_eta_4	mean_eta_5	mean_eta_6	mean_
1	0	0.0097329	0.010306	0.010916	0.011565	0.012255	0.01299	0.0
2	0.00051498	0.0097327	0.010306	0.010915	0.011564	0.012255	0.01299	0.0
3	0.0041199	0.0097314	0.010304	0.010914	0.011563	0.012253	0.012988	0.
4	0.013905	0.0097157	0.010288	0.010899	0.011551	0.012243	0.012981	0.0
5	0.032959	0.0081866	0.0087007	0.0093519	0.010139	0.011012	0.011899	0.0

```
    6         0.064373       0.0066453       0.0069797       0.0073187       0.0077166       0.0083191       0.0090933       0.00
```

Graph Mean Values:

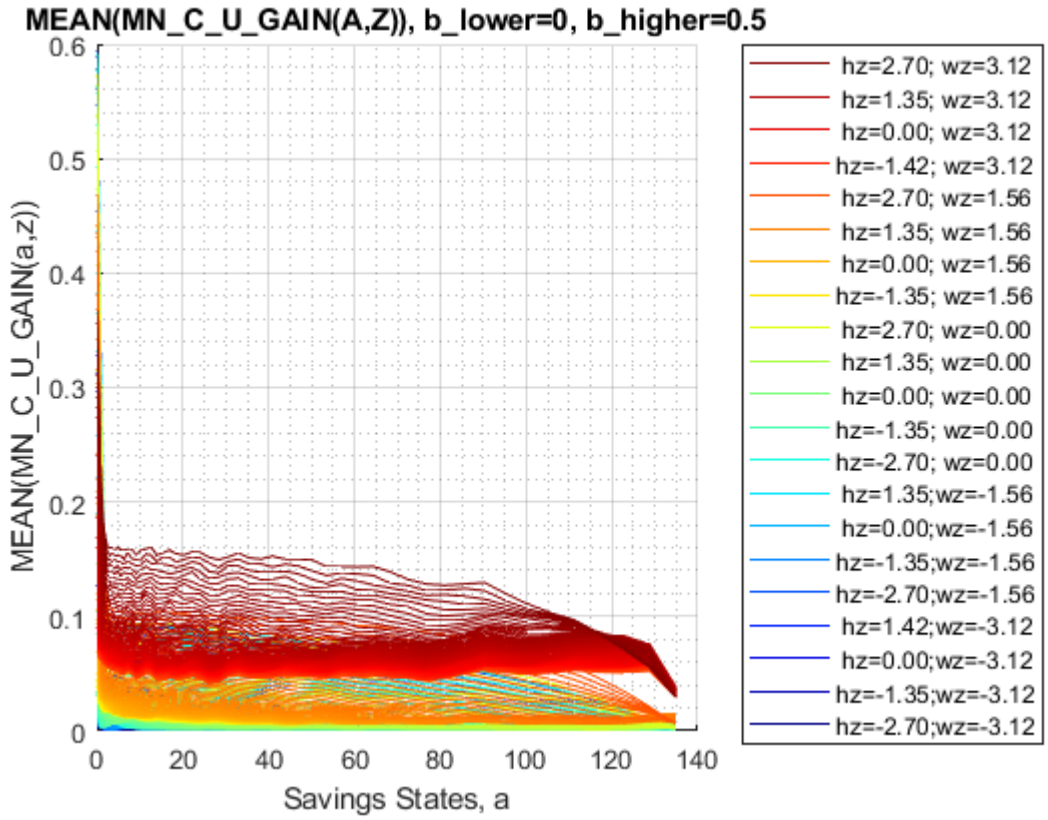
```
st_title = ['MEAN(MN\_V\_U\_GAIN(A,Z)), b\_lower=' num2str(fl_b_lower) ', b\_higher=' num2str(f
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_V\_U\_GAIN(a,z))'};
ff_graph_grid((tb_az_v{1:end, 3:end})', ar_st_eta_HS_grid, agrid, mp_support_graph);
```

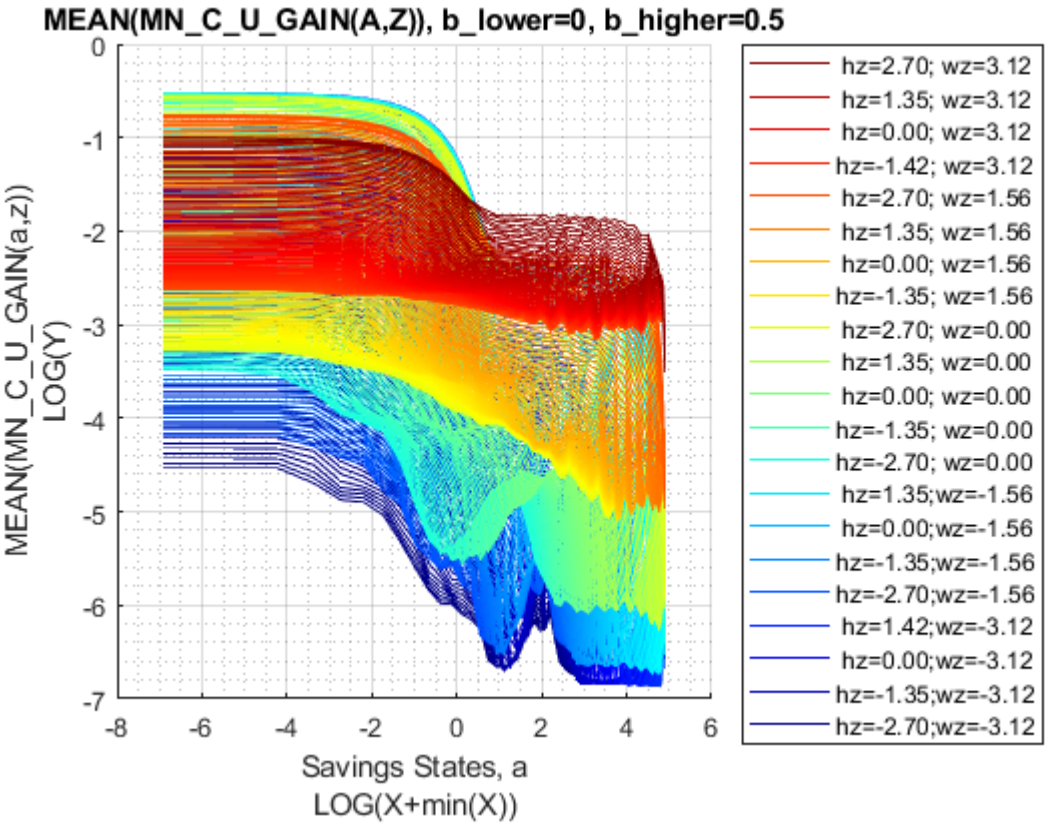




Graph Mean Consumption:

```
st_title = ['MEAN(MN\_C\_U\_GAIN(A,Z)), b\_lower=' num2str(fl_b_lower) ', b\_higher=' num2str(f
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_C\_U\_GAIN(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(KM,J)), b\_lower=' num2str(fl_b_lower) ', b\_higher=' num2str(fl_
tb_az_v = ff_summ_nd_array(st_title, mn_V_U_gain_moreUI, true, ["mean"], 3, 1, cl_mp_datasetdes
```

```
xxx  MEAN(MN_V_U_GAIN(KM,J)), b\_lower=0, b\_higher=0.5  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	0.00055672	0.00057552	0.00059522	0.00063544	0.00067622	0.00071737
2	2	0	0.00048244	0.00050035	0.00051966	0.00055508	0.00059141	0.00062848
3	3	0	0.00046167	0.00047833	0.00049636	0.00052804	0.00056045	0.00059347
4	4	0	0.00043771	0.00045259	0.00046877	0.00049707	0.00052603	0.00055556
5	5	0	0.00042439	0.00043747	0.00045169	0.0004768	0.00050238	0.00052835
6	1	1	0.0008562	0.00090669	0.00095849	0.0010295	0.0011022	0.0011763
7	2	1	0.00071993	0.00075882	0.00079903	0.00085585	0.00091452	0.00097487
8	3	1	0.00066704	0.00070046	0.00073484	0.00078384	0.0008343	0.00088607
9	4	1	0.00061227	0.00064001	0.00066838	0.00070987	0.00075249	0.00079613
10	5	1	0.00055284	0.00057485	0.000597	0.00063042	0.00066449	0.00069912

```
% Consumption Function
st_title = ['MEAN(MN_C_U_GAIN(KM,J)), b\_lower=' num2str(fl_b_lower) ', b\_higher=' num2str(fl_
tb_az_c = ff_summ_nd_array(st_title, mn_C_U_gain_moreUI, true, ["mean"], 3, 1, cl_mp_datasetdes
```

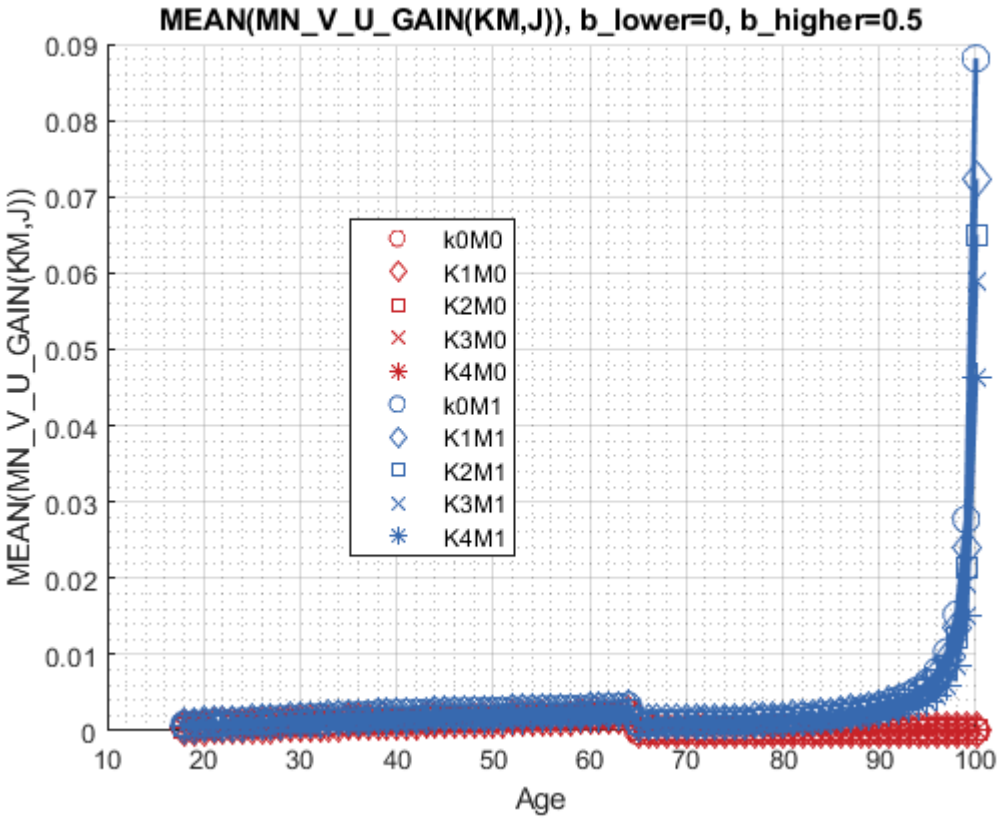
```
xxx  MEAN(MN_C_U_GAIN(KM,J)), b\_lower=0, b\_higher=0.5  xxxxxxxxxxxxxxxxxxxxxxxxxx
```

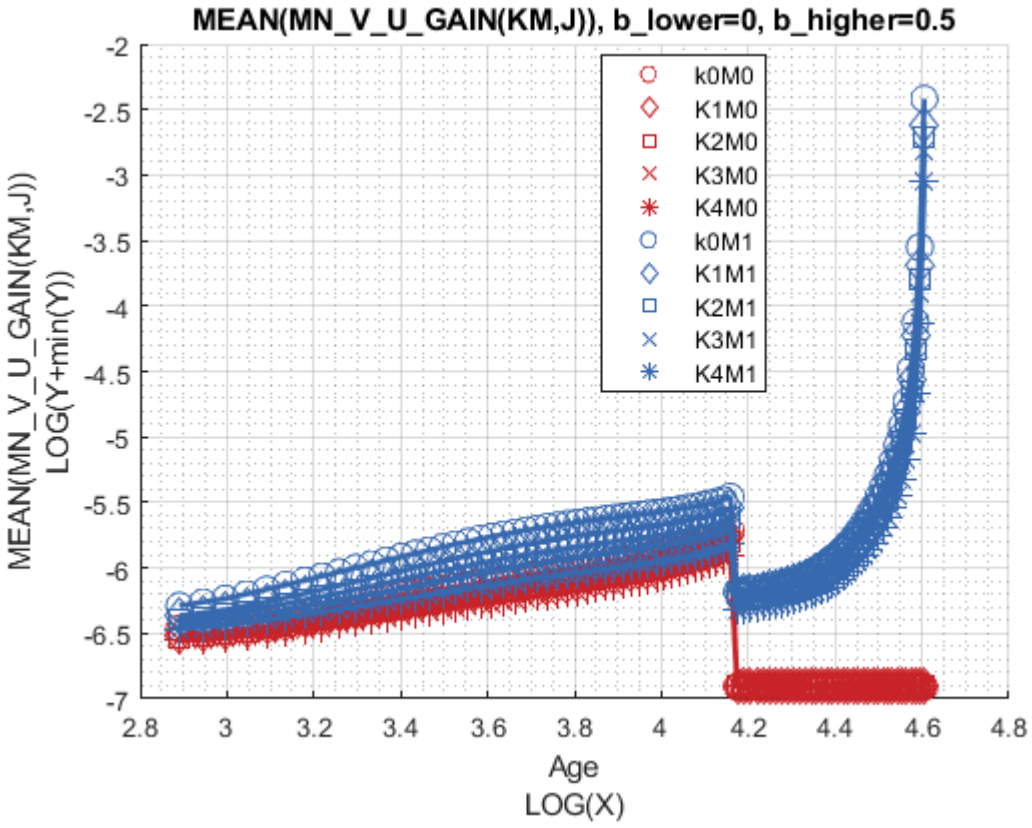
group	kids	marry	mean_age_18	mean_age_19	mean_age_20	mean_age_21	mean_age_22	mean_age_23
1	1	0	0.045263	0.048116	0.050981	0.053114	0.054711	0.055763
2	2	0	0.052245	0.055222	0.058311	0.061472	0.064326	0.066747
3	3	0	0.05831	0.061181	0.064294	0.06802	0.071488	0.074588
4	4	0	0.061725	0.064563	0.067634	0.07166	0.075434	0.078921
5	5	0	0.065016	0.067757	0.070896	0.07514	0.079088	0.082659
6	1	1	0.07018	0.073094	0.076227	0.079837	0.083882	0.087691

7	2	1	0.075602	0.078727	0.081843	0.085263	0.088392	0.091094
8	3	1	0.079512	0.083393	0.087172	0.091625	0.095741	0.099238
9	4	1	0.078346	0.082109	0.086013	0.091418	0.096514	0.101
10	5	1	0.076598	0.080189	0.084089	0.089192	0.09394	0.098526

Graph Mean Values:

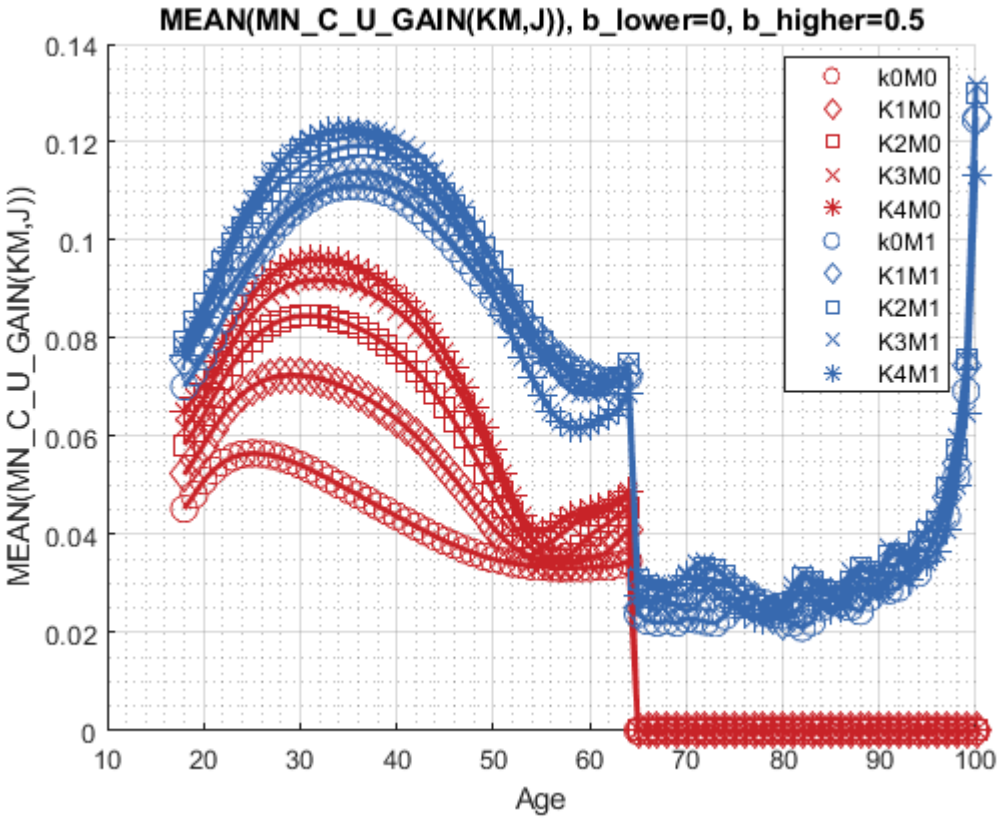
```
st_title = ['MEAN(MN\_V\_U\_GAIN(KM,J)), b\_lower=' num2str(fl_b_lower) ', b\_higher=' num2str(
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_V\_U\_GAIN(KM,J))'};
ff_graph_grid((tb_az_v{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```

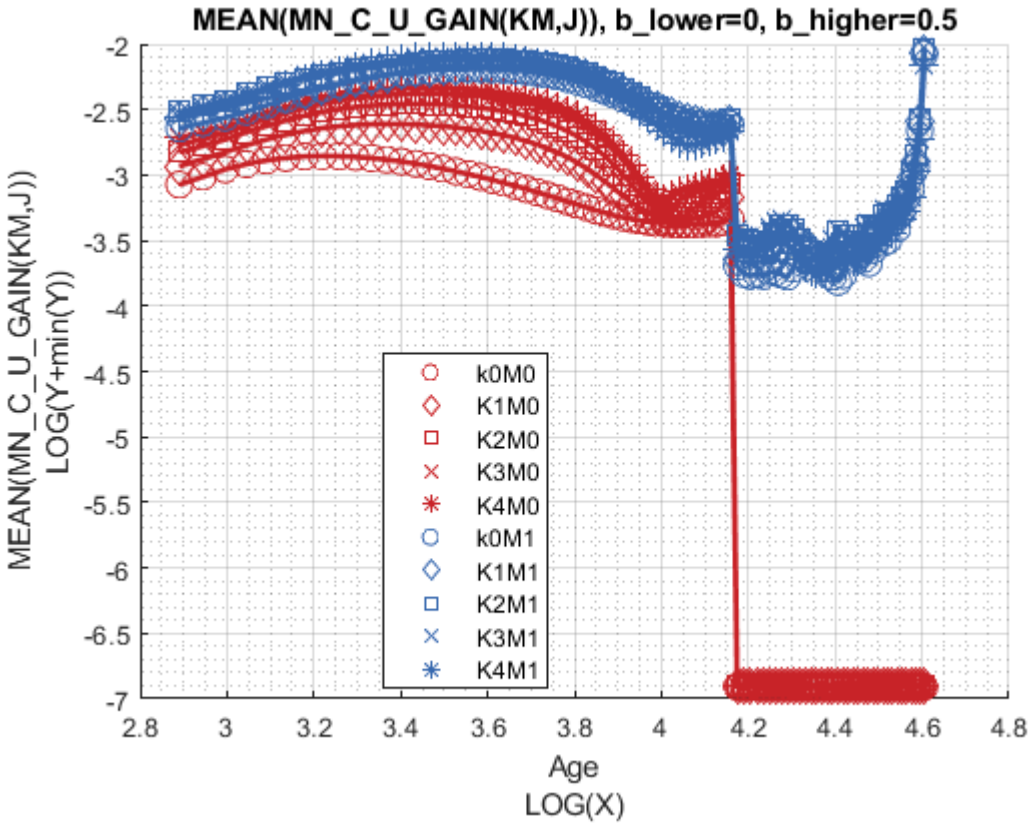




Graph Mean Consumption:

```
st_title = ['MEAN(MN\_C\_U\_GAIN(KM,J)), b\_lower=' num2str(fl_b_lower) ', b\_higher=' num2str(
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_C\_U\_GAIN(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(EM,J)), b\_lower=' num2str(fl_b_lower) ', b\_higher=' num2str(fl_
tb_az_v = ff_summ_nd_array(st_title, mn_V_U_gain_moreUI, true, ["mean"], 3, 1, cl_mp_datasetdes
```

xxx MEAN(MN_V_U_GAIN(EM,J)), b_lower=0, b_higher=0.5 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	0.00044711	0.00045939	0.00047231	0.00049626	0.00052045	0.00054482
2	1	0	0.00049806	0.00051832	0.00054037	0.00058072	0.00062215	0.00066447
3	0	1	0.00062246	0.00065265	0.00068378	0.00072512	0.00076731	0.00081022
4	1	1	0.00074086	0.00077968	0.00081932	0.00087866	0.0009399	0.0010028

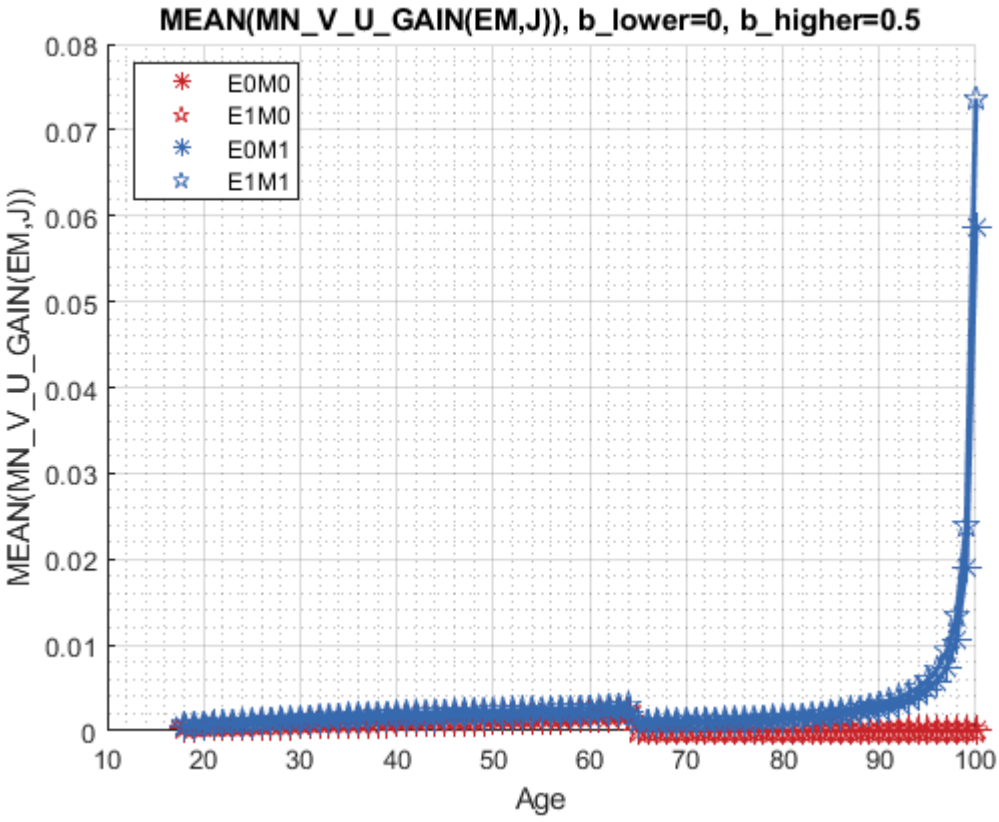
```
% Consumption
st_title = ['MEAN(MN_C_U_GAIN(EM,J)), b\_lower=' num2str(fl_b_lower) ', b\_higher=' num2str(fl_
tb_az_c = ff_summ_nd_array(st_title, mn_C_U_gain_moreUI, true, ["mean"], 3, 1, cl_mp_datasetdes
```

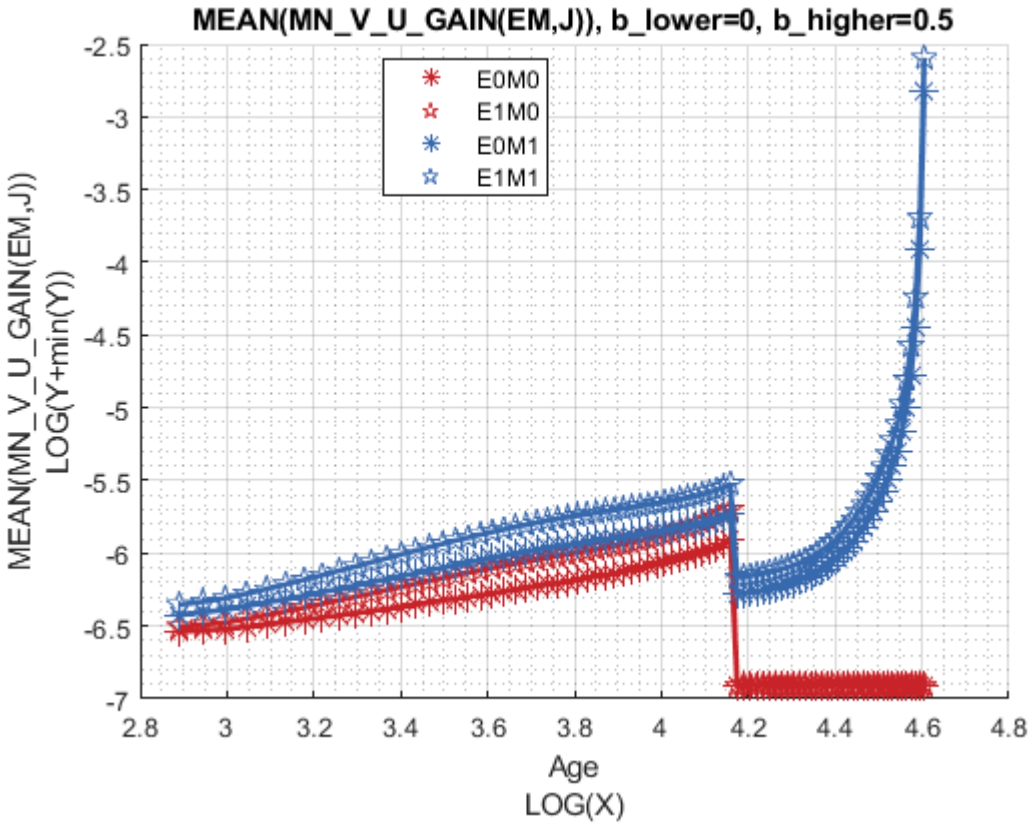
xxx MEAN(MN_C_U_GAIN(EM,J)), b_lower=0, b_higher=0.5 xxxxxxxxxxxxxxxxxxxxxxxxxxx

group	edu	marry	mean_age_18	mean_age_19	mean_age_20	mean_age_21	mean_age_22	mean_age_23
1	0	0	0.047852	0.050213	0.052704	0.054124	0.05542	0.056592
2	1	0	0.065172	0.068522	0.072143	0.077638	0.082599	0.086879
3	0	1	0.06735	0.070027	0.072677	0.075227	0.077714	0.080007
4	1	1	0.084746	0.088978	0.093461	0.099707	0.10567	0.11101

Graph Mean Values:

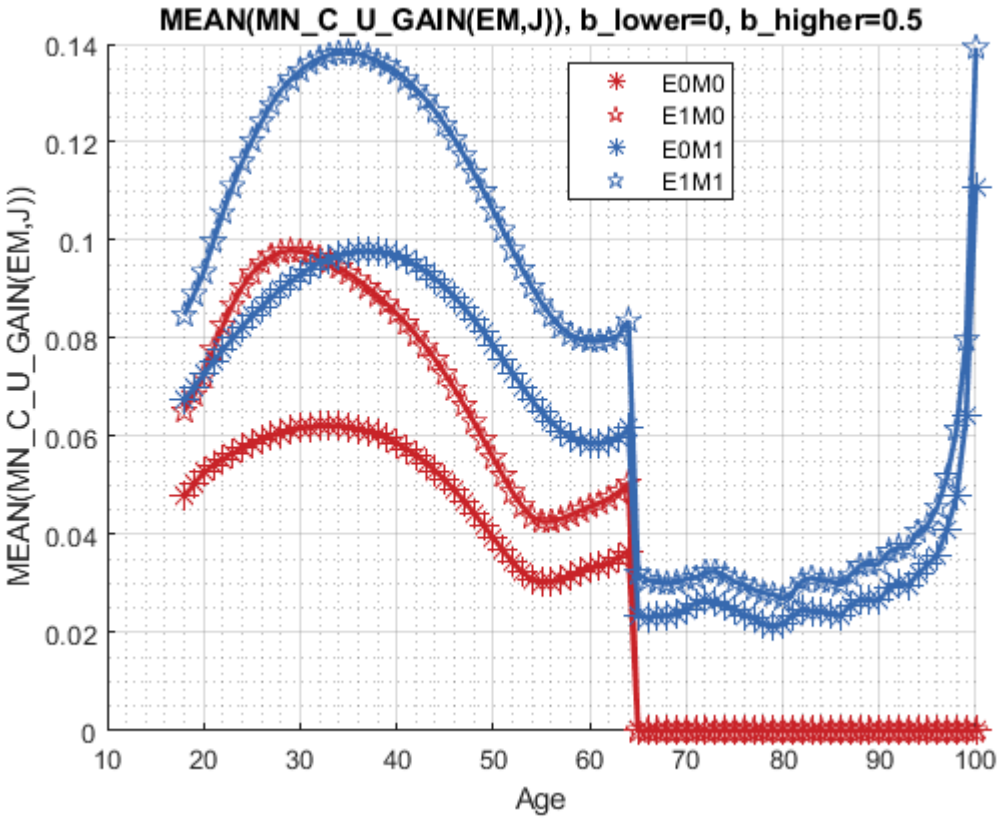
```
st_title = ['MEAN(MN\_V\_U\_GAIN(EM,J)), b\_lower=' num2str(fl_b_lower) ', b\_higher=' num2str(
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_V\_U\_GAIN(EM,J))'};
ff_graph_grid((tb_az_v{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```

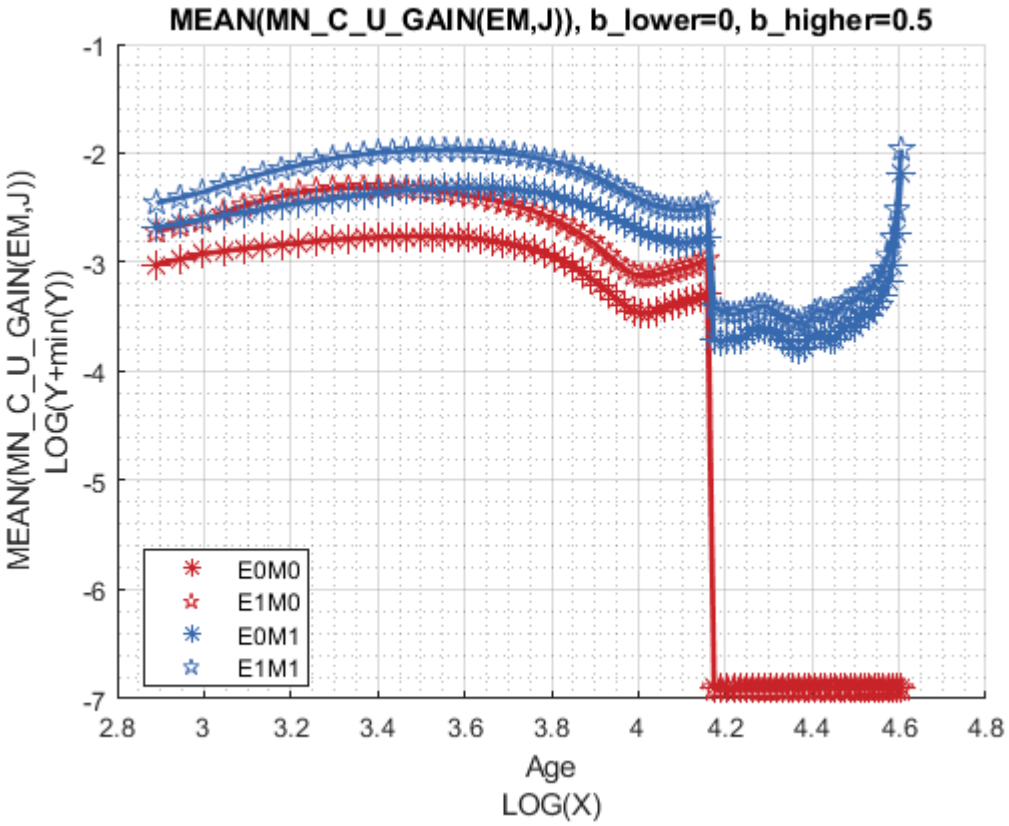




Graph Mean Consumption:

```
st_title = ['MEAN(MN\_C\_U\_GAIN(EM,J)), b\_lower=' num2str(fl_b_lower) ', b\_higher=' num2str(
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_C\_U\_GAIN(EM,J))'};
ff_graph_grid((tb_az_c{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```




MEAN(MN_C_U_GAIN(EM,J)), b_lower=0, b_higher=0.5
MEAN(MN_C_U_GAIN(EM,J))
LOG(Y+min(Y))
-1
-2
-3
-4
-5
-6
-7
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
Age
LOG(X)
E0M0
E1M0
E0M1
E1M1