Small Test Exact Solution Spousal Shocks

This is the example vignette for function: **snw_vfi_main_bisec_vec** from the **PrjOptiSNW Package.** This function solves for policy function with vectorized bisection. Small Solution Analysis, husband 5 shocks, wife 3 shocks.

Test SNW_VFI_MAIN Defaults Small

Call the function with default parameters.

```
mp_param = snw_mp_param('default_small53');
[V_VFI,ap_VFI,cons_VFI,mp_valpol_more] = snw_vfi_main_bisec_vec(mp_param);
```

```
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:18 of 17, time-this-age:0.10593
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:17 of 17, time-this-age:0.086471
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:16 of 17, time-this-age:0.079532
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:15 of 17, time-this-age:0.095977
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:14 of 17, time-this-age:0.081549
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:13 of 17, time-this-age:0.08703
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:12 of 17, time-this-age:0.089059
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:11 of 17, time-this-age:0.094402
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:10 of 17, time-this-age:0.10011
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:9 of 17, time-this-age:0.093424
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:8 of 17, time-this-age:0.095447
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:7 of 17, time-this-age:0.10832
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:6 of 17, time-this-age:0.089896
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:5 of 17, time-this-age:0.09249
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:4 of 17, time-this-age:0.094699
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:3 of 17, time-this-age:0.087703
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:2 of 17, time-this-age:0.0939
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:1 of 17, time-this-age:0.087152
Completed SNW_VFI_MAIN_BISEC_VEC;SNW_MP_PARAM=default_small53;SNW_MP_CONTROL=default_base;time=1.7157
```

Small 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 = [19, 22:5:97, 100];
agrid = mp_param('agrid')';
eta_H_grid = mp_param('eta_H_grid')';
eta_S_grid = mp_param('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_param('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 Savings and Shocks

First, analyze Savings Levels and Shocks, Aggregate Over All Others, and do various other calculations.

```
% 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') = 'best';
mp_support_graph('bl_graph_logy') = true; % do not log
mp_support_graph('it_legend_select') = 9; % how many shock legends to show
mp_support_graph('cl_colors') = 'jet';
```

MEAN(VAL(A,Z)), MEAN(AP(A,Z)), MEAN(C(A,Z))

Tabulate value and policies along savings and shocks:

```
% Set
% NaN(n_jgrid,n_agrid,n_etagrid,n_educgrid,n_marriedgrid,n_kidsgrid);
ar_permute = [1,4,5,6,3,2];
% Value Function
tb_az_v = ff_summ_nd_array("MEAN(VAL(A,Z))", V_VFI, true, ["mean"], 4, 1, cl_mp_datasetdesc, ar
```

```
xxx  MEAN(VAL(A,Z))  xxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	savings	mean_eta_1	mean_eta_2	mean_eta_3	mean_eta_4	mean_eta_5	mean_eta_6	mean_e
1	0	-24.423	-14.383	-9.0838	-6.1681	-4.6368	-21.16	-12.
2	0.0097656	-23.655	-14.141	-8.9428	-6.0477	-4.521	-20.721	-12.
3	0.078125	-20.274	-12.864	-8.2087	-5.441	-3.9447	-18.597	-11.
4	0.26367	-16.052	-10.951	-7.1333	-4.627	-3.2033	-15.258	-10.
5	0.625	-12.169	-8.9647	-6.0525	-3.918	-2.6128	-11.753	-8
6	1.2207	-8.9956	-7.1143	-5.0287	-3.3224	-2.17	-8.7621	-6.
7	2.1094	-6.6026	-5.5315	-4.126	-2.8111	-1.8354	-6.4689	-5.4
8	3.3496	-4.8705	-4.2629	-3.3542	-2.3677	-1.5738	-4.7931	-4.1
9	5	-3.6341	-3.2853	-2.7087	-1.9911	-1.3595	-3.5888	-3.2
10	7.1191	-2.7516	-2.5471	-2.1826	-1.6748	-1.1772	-2.7246	-2.5
11	9.7656	-2.1163	-1.9932	-1.7614	-1.4073	-1.0193	-2.0999	-1.
12	12.998	-1.653	-1.5768	-1.4275	-1.1818	-0.88344	-1.6428	-1.5
13	16.875	-1.3103	-1.2619	-1.1642	-0.99332	-0.76691	-1.3038	-1.2
14	21.455	-1.0532	-1.0216	-0.95651	-0.83698	-0.66655	-1.0489	-1.0
15	26.797	-0.85714	-0.83614	-0.79193	-0.7076	-0.57964	-0.85429	-0.83
16	32.959	-0.7057	-0.69138	-0.66083	-0.60072	-0.50456	-0.70375	-0.6
17	40	-0.58719	-0.57722	-0.55573	-0.51237	-0.43988	-0.58583	-0.57
18	47.979	-0.49334	-0.48626	-0.47088	-0.43924	-0.38431	-0.49239	-0.48
19	56.953	-0.41818	-0.41306	-0.40187	-0.37849	-0.33661	-0.41749	-0.4
20	66.982	-0.35736	-0.35359	-0.34532	-0.32783	-0.29568	-0.35685	-0.35
21	78.125	-0.30764	-0.30483	-0.29864	-0.28541	-0.26055	-0.30727	-0.30
22	90.439	-0.26663	-0.26451	-0.25982	-0.24971	-0.23034	-0.26635	-0.2
23	103.98	-0.23253	-0.23091	-0.22732	-0.21951	-0.20431	-0.23232	-0.23
24	118.82	-0.20396	-0.20271	-0.19994	-0.19386	-0.18184	-0.2038	-0.20
25	135	-0.17985	-0.17888	-0.17671	-0.17193	-0.16238	-0.17973	-0.17

```
% Aprime Choice
tb_az_ap = ff_summ_nd_array("MEAN(AP(A,Z))", ap_VFI, true, ["mean"], 4, 1, cl_mp_datasetdesc, a
```

```
xxx  MEAN(AP(A,Z))  xxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	savings	mean_eta_1	mean_eta_2	mean_eta_3	mean_eta_4	mean_eta_5	mean_eta_6	mean_e

1	0	3.2159e-05	0.0024668	0.032046	0.17185	0.75713	0.0035503	0.0057
2	0.0097656	0.00055365	0.0039513	0.034103	0.17524	0.76251	0.0051645	0.0082
3	0.078125	0.015815	0.020023	0.052271	0.20181	0.8015	0.036634	0.037
4	0.26367	0.094638	0.094808	0.12856	0.29193	0.91314	0.14372	0.15
5	0.625	0.31851	0.32442	0.35753	0.52484	1.1543	0.39249	0.40
6	1.2207	0.75143	0.75176	0.79303	0.95962	1.5772	0.8339	0.84
7	2.1094	1.4241	1.4284	1.4709	1.6269	2.2293	1.5113	1.5
8	3.3496	2.3733	2.3796	2.421	2.5737	3.1535	2.4564	2.4
9	5	3.6394	3.6466	3.6884	3.8506	4.3901	3.7225	3.7
10	7.1191	5.2875	5.2955	5.3372	5.5015	5.9876	5.3719	5.3
11	9.7656	7.3153	7.3234	7.3642	7.5288	8.0042	7.4069	7.4
12	12.998	9.7556	9.7616	9.8006	9.967	10.49	9.8338	9.8
13	16.875	12.766	12.773	12.807	12.97	13.562	12.844	12.
14	21.455	16.338	16.342	16.377	16.524	17.139	16.426	16
15	26.797	20.401	20.403	20.431	20.57	21.185	20.487	20.
16	32.959	25.088	25.095	25.124	25.248	25.842	25.176	25.
17	40	30.463	30.471	30.51	30.633	31.193	30.54	30.
18	47.979	36.558	36.567	36.609	36.754	37.274	36.633	36.
19	56.953	43.57	43.576	43.612	43.757	44.279	43.643	43.
20	66.982	51.378	51.387	51.429	51.567	52.101	51.457	51.
21	78.125	59.666	59.675	59.721	59.878	60.41	59.76	59.
22	90.439	69.02	69.027	69.069	69.228	69.775	69.1	69.
23	103.98	79.509	79.516	79.557	79.706	80.27	79.589	79.
24	118.82	90.88	90.887	90.929	91.074	91.625	90.956	90.
25	135	103.23	103.23	103.27	103.42	103.97	103.31	103

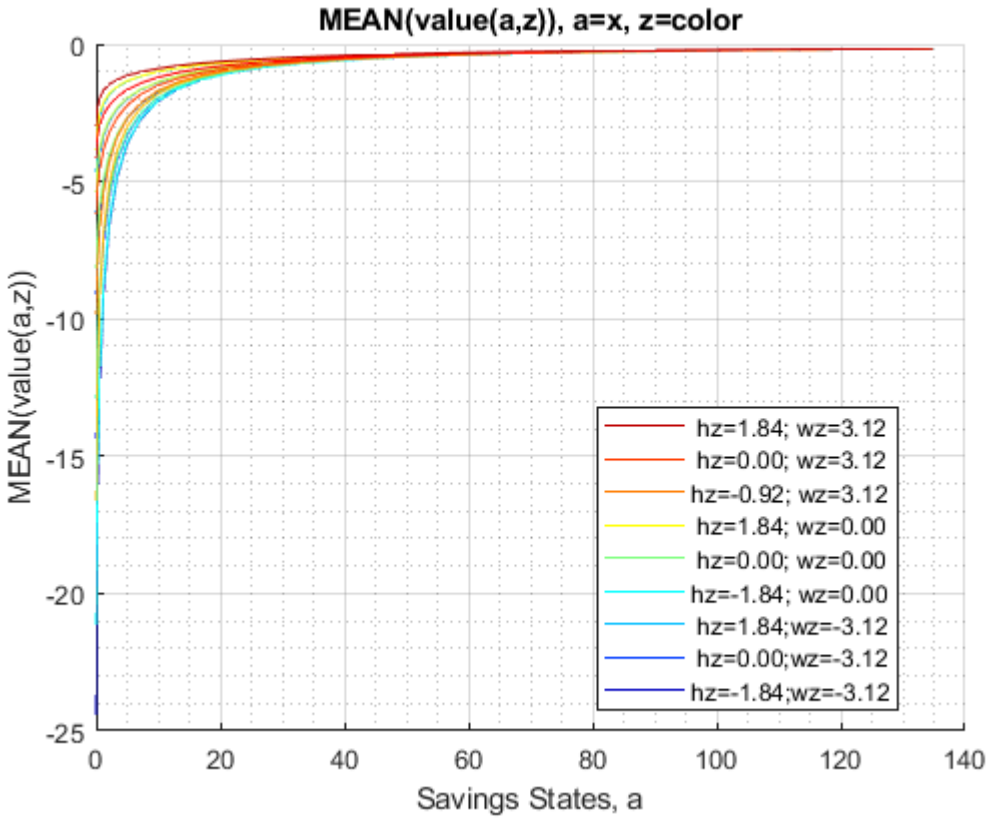
```
% Consumption Choices
tb_az_c = ff_summ_nd_array("MEAN(C(A,Z))", cons_VFI, true, ["mean"], 4, 1, cl_mp_datasetdesc, a
```

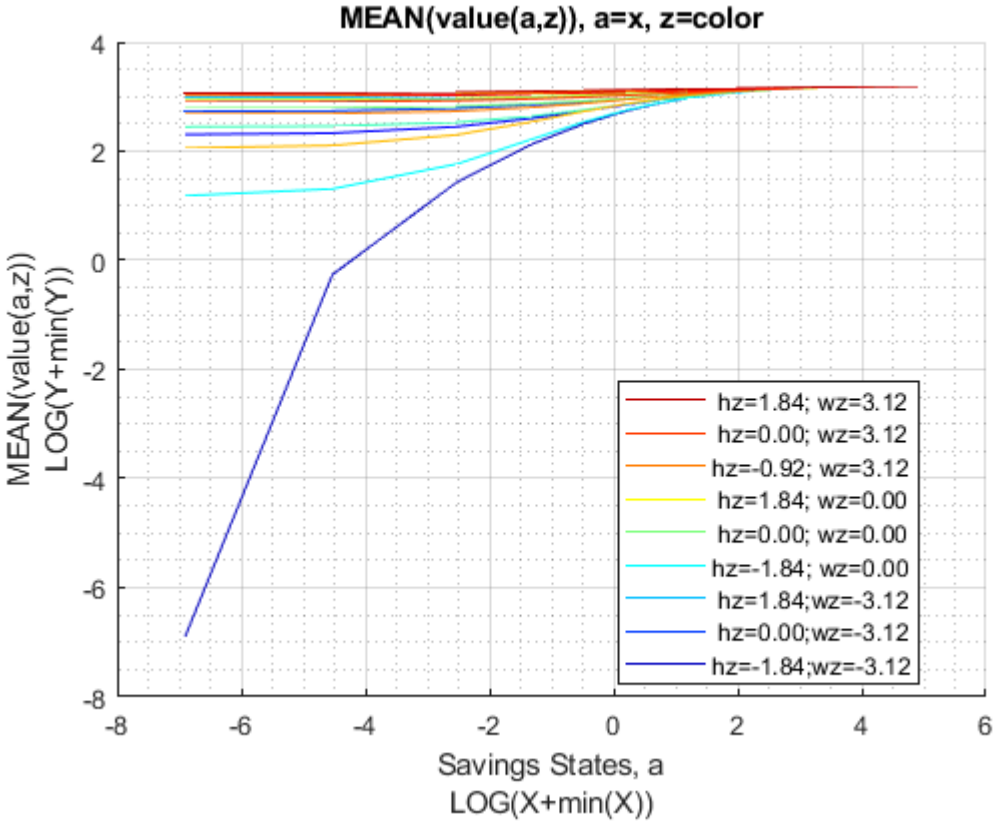
```
xxx  MEAN(C(A,Z))  xxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	savings	mean_eta_1	mean_eta_2	mean_eta_3	mean_eta_4	mean_eta_5	mean_eta_6	mean_e
1	0	0.16881	0.29125	0.55695	1.1299	2.3014	0.29922	0.428
2	0.0097656	0.17988	0.30127	0.56634	1.1379	2.3074	0.30913	0.437
3	0.078125	0.24566	0.36575	0.62833	1.1912	2.3483	0.35831	0.488
4	0.26367	0.38648	0.50942	0.76949	1.318	2.4533	0.4699	0.59
5	0.625	0.58919	0.70456	0.96359	1.5071	2.6337	0.64619	0.762
6	1.2207	0.85722	0.97603	1.2247	1.7675	2.9054	0.9039	1.01
7	2.1094	1.2268	1.3395	1.5846	2.1362	3.2884	1.2668	1.37
8	3.3496	1.7279	1.837	2.0808	2.6338	3.8076	1.7706	1.87
9	5	2.3875	2.4944	2.7359	3.2775	4.4904	2.4289	2.53
10	7.1191	3.2081	3.3133	3.5534	4.0911	5.3563	3.2473	3.
11	9.7656	4.2601	4.3643	4.6042	5.1402	6.4149	4.2913	4.39
12	12.998	5.5783	5.6843	5.9251	6.4581	7.684	5.6225	5.72
13	16.875	7.0733	7.1787	7.4234	7.9594	9.1154	7.1181	7.22
14	21.455	8.823	8.9302	9.1737	9.7243	10.857	8.8568	8.96
15	26.797	10.964	11.073	11.324	11.882	13.013	10.999	11.1
16	32.959	13.433	13.538	13.787	14.36	15.511	13.467	13.5
17	40	16.233	16.337	16.576	17.149	18.335	16.278	16.3
18	47.979	19.402	19.505	19.741	20.291	21.516	19.449	19.5
19	56.953	22.81	22.914	23.156	23.707	24.93	22.858	22.9
20	66.982	26.645	26.747	26.982	27.54	28.75	26.687	26.7
21	78.125	31.292	31.394	31.626	32.165	33.377	31.319	31.4
22	90.439	36.234	36.338	36.573	37.11	38.307	36.274	36.3
23	103.98	41.468	41.572	41.808	42.355	43.535	41.509	41.6
24	118.82	47.317	47.421	47.656	48.207	49.4	47.362	47.4
25	135	53.752	53.857	54.095	54.642	55.842	53.796	53.9

Graph Mean Values:

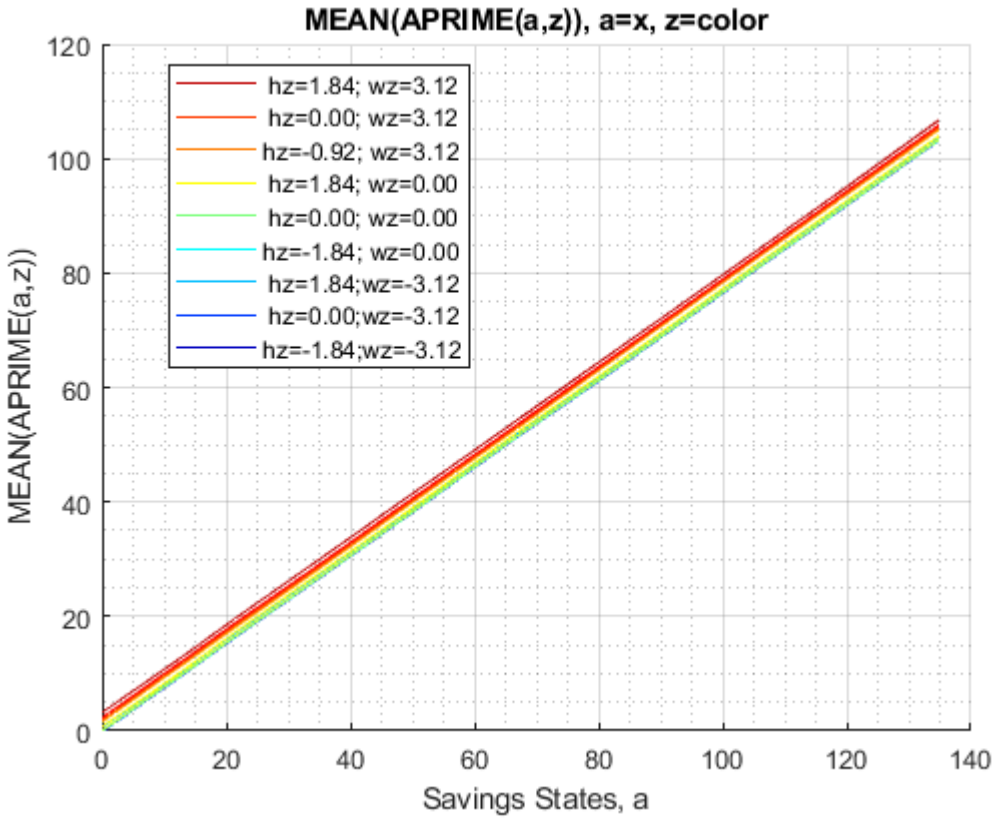
```
mp_support_graph('cl_st_graph_title') = {'MEAN(value(a,z)), a=x, z=color'};
mp_support_graph('cl_st_ytitle') = {'MEAN(value(a,z))'};
ff_graph_grid((tb_az_v{1:end, 3:end})', ar_st_eta_HS_grid, agrid, mp_support_graph);
```

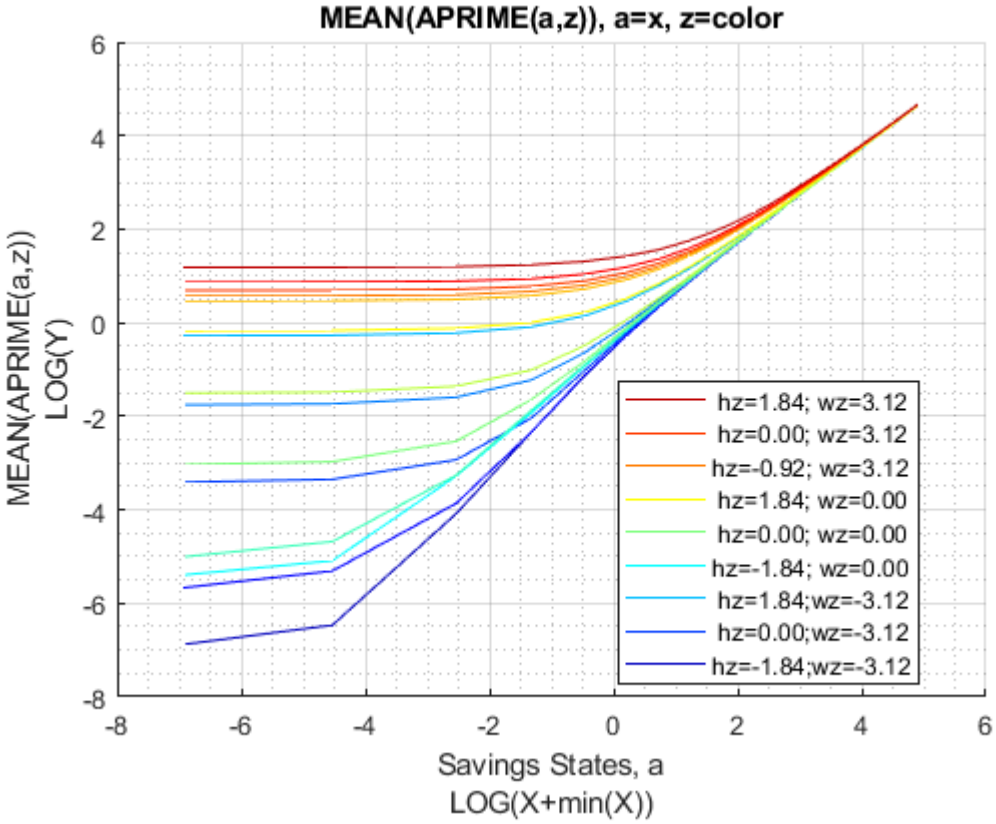




Graph Mean Savings Choices:

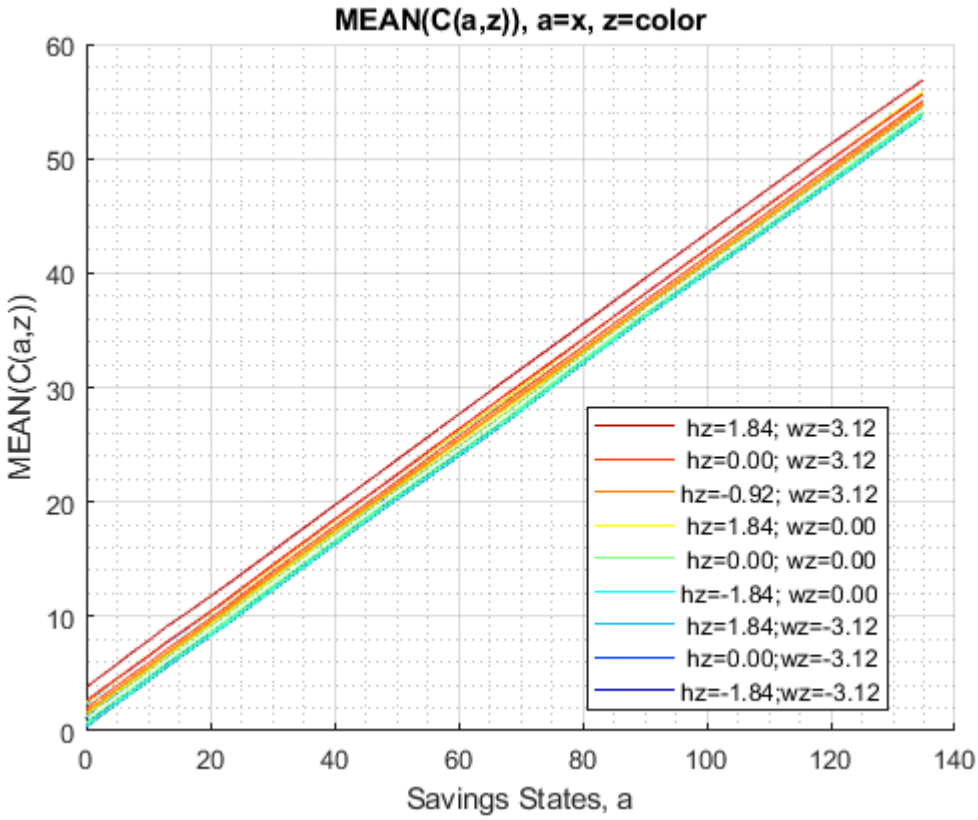
```
mp_support_graph('cl_st_graph_title') = {'MEAN(APRIME(a,z)), a=x, z=color'};
mp_support_graph('cl_st_ytitle') = {'MEAN(APRIME(a,z))'};
ff_graph_grid((tb_az_ap{1:end, 3:end})', ar_st_eta_HS_grid, agrid, mp_support_graph);
```

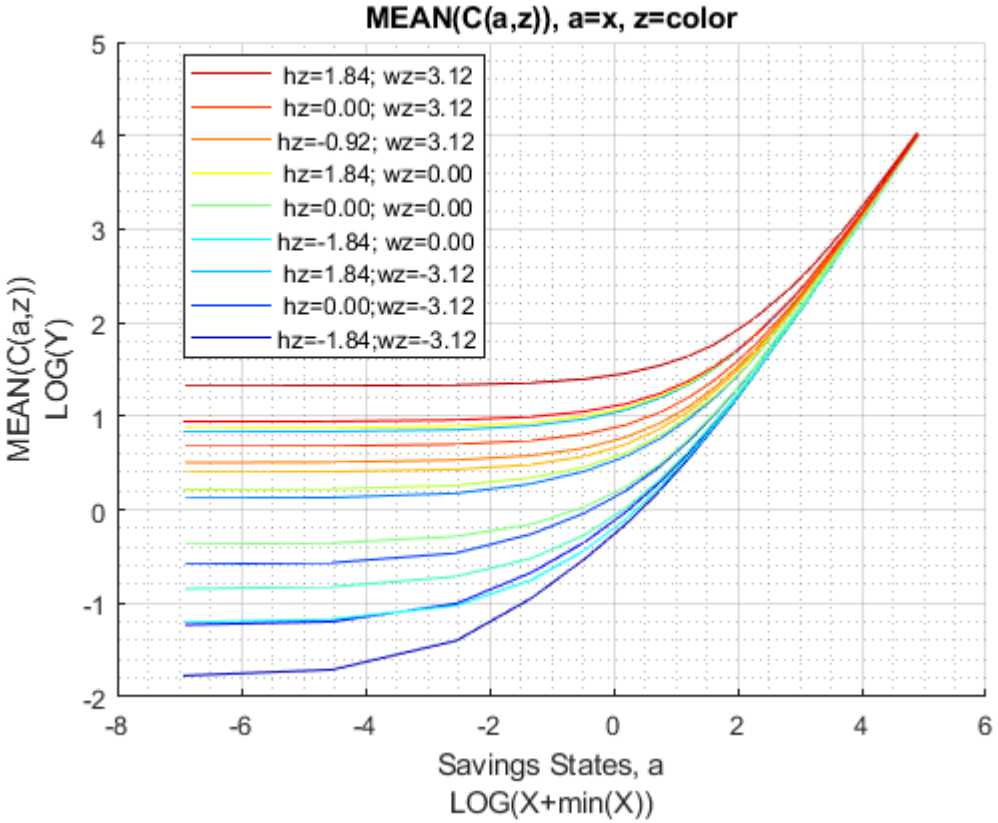




Graph Mean Consumption:

```
mp_support_graph('cl_st_graph_title') = {'MEAN(C(a,z)), a=x, z=color'};
mp_support_graph('cl_st_ytitle') = {'MEAN(C(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", "k0M1", "K1M1", "K2M1"];
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', 'o', 'd', 's'};
mp_support_graph('cl_colors') = {'red', 'red', 'red', '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
tb_az_v = ff_summ_nd_array("MEAN(VAL(KM,J))", V_VFI, true, ["mean"], 3, 1, cl_mp_datasetdesc, a
```

```
xxx  MEAN(VAL(KM,J))  xxxxxxxxxxxxxxxxxxxxxxxxxx
    group    kids    marry    mean_age_19    mean_age_22    mean_age_27    mean_age_32    mean_age_37    mean_age_42
    _____    ____    _____    ___________    ___________    ___________    ___________    ___________    ___________

      1       1        0        -4.7384        -4.2839        -3.9125        -3.6403        -3.4202        -3.2286
      2       2        0        -6.2307        -5.5732         -5.014        -4.5943        -4.2483        -3.9542
      3       3        0        -6.9818        -6.3368        -5.7685        -5.3334        -4.9708        -4.6532
      4       1        1        -3.4759        -3.1424        -2.8538        -2.6272        -2.4359        -2.2663
      5       2        1         -4.325        -3.9032        -3.5196        -3.2101        -2.9428        -2.7083
      6       3        1        -4.7282        -4.3225        -3.9432        -3.6317        -3.3597        -3.1133
```

```
% Aprime Choice
tb_az_ap = ff_summ_nd_array("MEAN(AP(KM,J))", ap_VFI, true, ["mean"], 3, 1, cl_mp_datasetdesc,
```

```
xxx  MEAN(AP(KM,J))  xxxxxxxxxxxxxxxxxxxxxxxxxx
    group    kids    marry    mean_age_19    mean_age_22    mean_age_27    mean_age_32    mean_age_37    mean_age_42
    _____    ____    _____    ___________    ___________    ___________    ___________    ___________    ___________

      1       1        0         34.931         34.726         34.665         34.554         34.362         34.077
      2       2        0         34.603         34.334         34.198         33.995         33.692         33.286
      3       3        0         34.187         33.968         33.877         33.705         33.427         33.033
      4       1        1         35.713         35.611           35.7         35.727          35.66         35.493
      5       2        1         35.368         35.246         35.284         35.242         35.101         34.849
      6       3        1         34.903          34.81          34.86         34.834           34.7         34.447
```

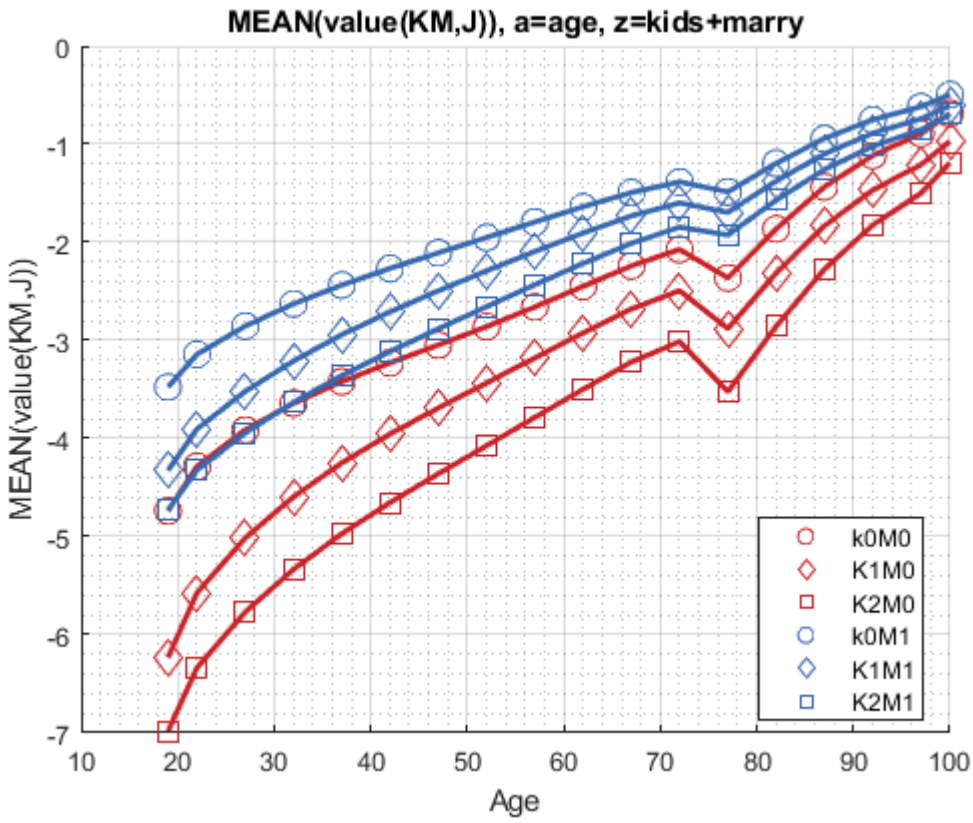
```
% Consumption Choices
tb_az_c = ff_summ_nd_array("MEAN(C(KM,J))", cons_VFI, true, ["mean"], 3, 1, cl_mp_datasetdesc,
```

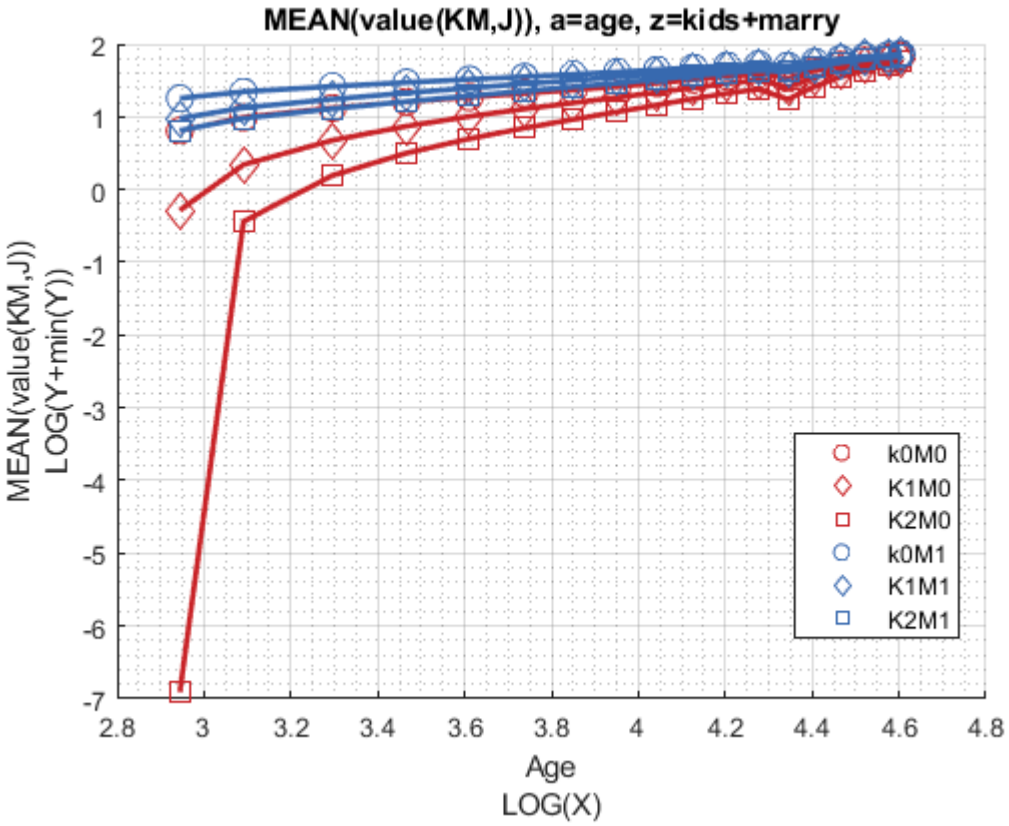
```
xxx  MEAN(C(KM,J))  xxxxxxxxxxxxxxxxxxxxxxxxxx
    group    kids    marry    mean_age_19    mean_age_22    mean_age_27    mean_age_32    mean_age_37    mean_age_42
    _____    ____    _____    ___________    ___________    ___________    ___________    ___________    ___________

      1       1        0         6.8531         7.1729         7.4988         7.8167         8.1435         8.4993
      2       2        0          7.182         7.5653         7.9659         8.3756          8.813         9.2907
      3       3        0         7.5973          7.931         8.2872         8.6657         9.0783         9.5438
```

4	1	1	7.7992	8.182	8.5624	8.9321	9.311	9.7148
5	2	1	7.879	8.2553	8.6555	9.0645	9.4908	9.9535
6	3	1	8.1608	8.4911	8.8566	9.2297	9.6299	10.077

Graph Mean Values:

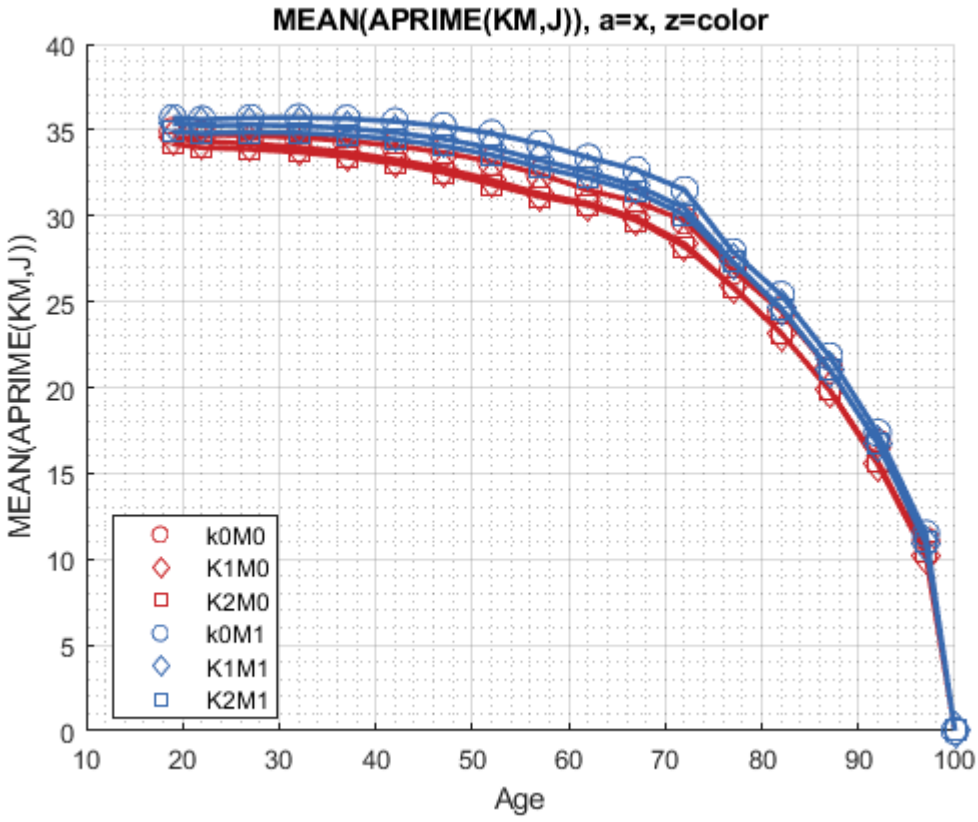
```
mp_support_graph('cl_st_graph_title') = {'MEAN(value(KM,J)), a=age, z=kids+marry'};
mp_support_graph('cl_st_ytitle') = {'MEAN(value(KM,J))'};
ff_graph_grid((tb_az_v{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```

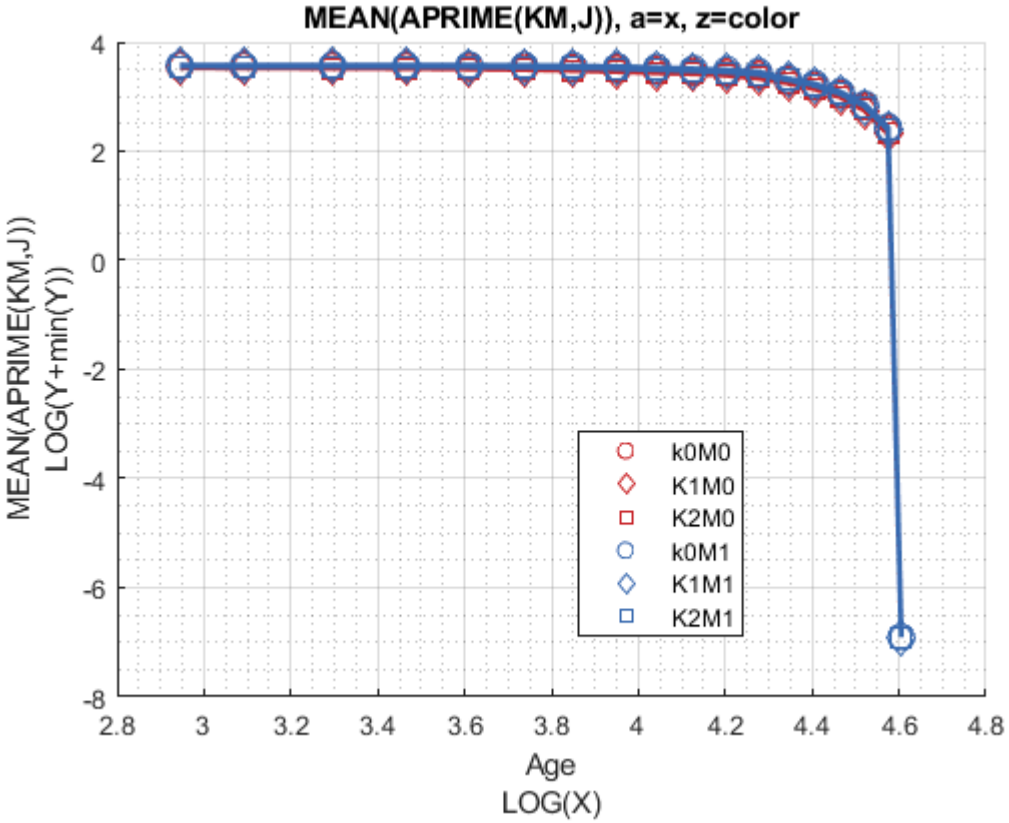




Graph Mean Savings Choices:

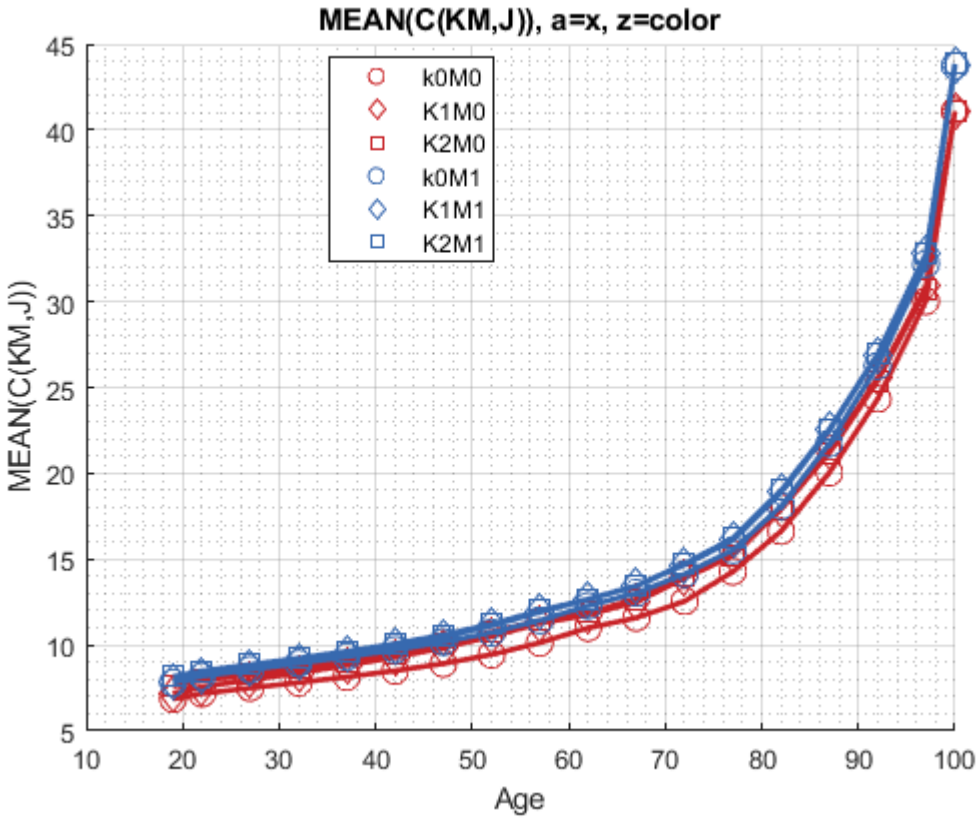
```
mp_support_graph('cl_st_graph_title') = {'MEAN(APRIME(KM,J)), a=x, z=color'};
mp_support_graph('cl_st_ytitle') = {'MEAN(APRIME(KM,J))'};
ff_graph_grid((tb_az_ap{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```

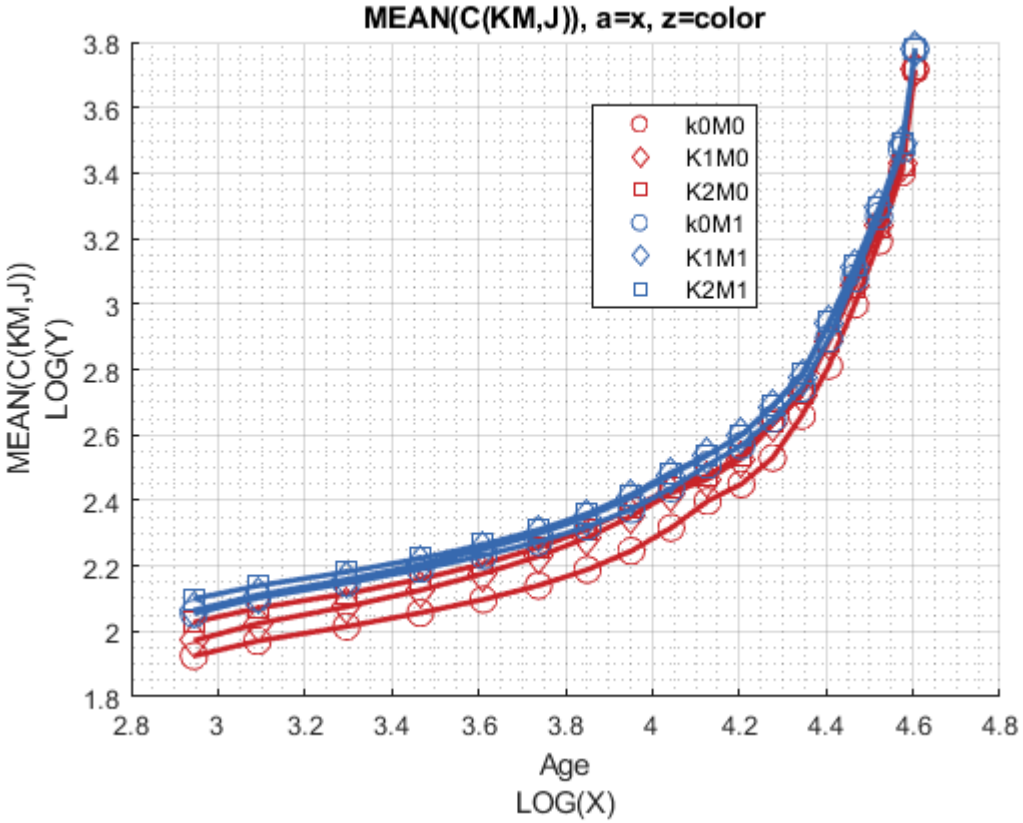




Graph Mean Consumption:

```
mp_support_graph('cl_st_graph_title') = {'MEAN(C(KM,J)), a=x, z=color'};
mp_support_graph('cl_st_ytitle') = {'MEAN(C(KM,J))'};
ff_graph_grid((tb_az_c{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```





Analyze Education 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 = ["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(EKM,J)), MEAN(AP(EKM,J)), MEAN(C(EKM,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
tb_az_v = ff_summ_nd_array("MEAN(VAL(EKM,J))", V_VFI, true, ["mean"], 3, 1, cl_mp_datasetdesc,
```

xxx MEAN(VAL(EKM,J)) xxxxxxxxxxxxxxxxxxxxxxxxxxx

group	edu	marry	mean_age_19	mean_age_22	mean_age_27	mean_age_32	mean_age_37	mean_age_42
1	0	0	-6.4015	-5.8666	-5.3879	-4.9966	-4.6557	-4.3525
2	1	0	-5.5658	-4.9294	-4.4088	-4.0487	-3.7705	-3.5382
3	0	1	-4.4764	-4.1029	-3.7581	-3.4622	-3.1968	-2.9557
4	1	1	-3.8764	-3.4759	-3.1196	-2.8504	-2.6288	-2.4363

```
% Aprime Choice
tb_az_ap = ff_summ_nd_array("MEAN(AP(EKM,J))", ap_VFI, true, ["mean"], 3, 1, cl_mp_datasetdesc,
```

xxx MEAN(AP(EKM,J)) xxxxxxxxxxxxxxxxxxxxxxxxxxx

group	edu	marry	mean_age_19	mean_age_22	mean_age_27	mean_age_32	mean_age_37	mean_age_42
1	0	0	34.682	34.444	34.272	34.048	33.753	33.374
2	1	0	34.465	34.241	34.222	34.121	33.901	33.556
3	0	1	35.363	35.234	35.193	35.099	34.934	34.686
4	1	1	35.293	35.21	35.37	35.437	35.374	35.174

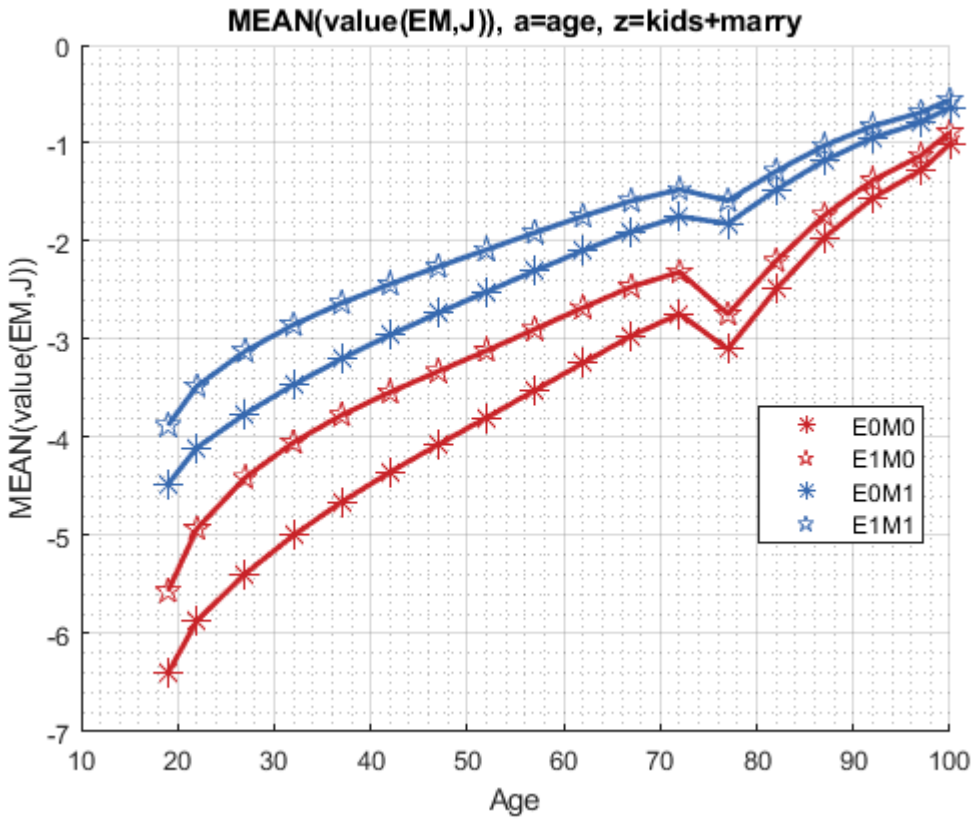
```
% Consumption Choices
tb_az_c = ff_summ_nd_array("MEAN(C(EKM,J))", cons_VFI, true, ["mean"], 3, 1, cl_mp_datasetdesc,
```

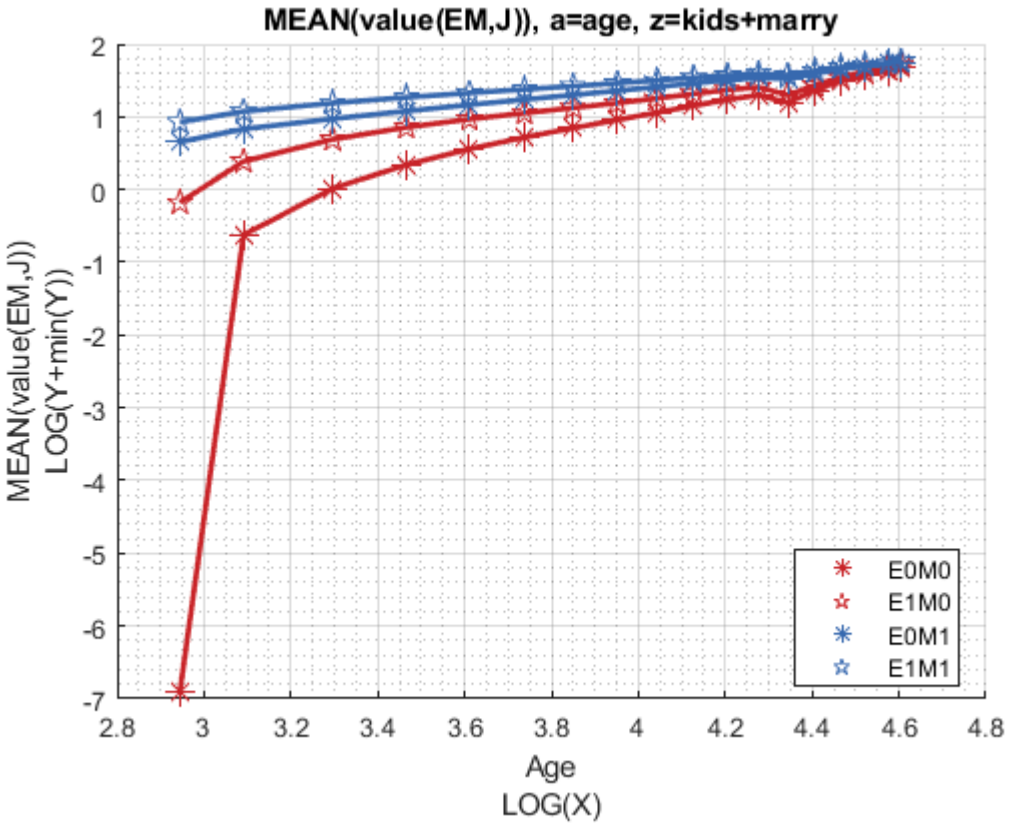
xxx MEAN(C(EKM,J)) xxxxxxxxxxxxxxxxxxxxxxxxxxx

group	edu	marry	mean_age_19	mean_age_22	mean_age_27	mean_age_32	mean_age_37	mean_age_42
1	0	0	7.1022	7.4087	7.7357	8.0845	8.4713	8.9105
2	1	0	7.3195	7.7041	8.0988	8.4875	8.8852	9.312
3	0	1	7.7587	8.0743	8.4083	8.7618	9.1489	9.5822
4	1	1	8.134	8.5446	8.9747	9.3891	9.8055	10.248

Graph Mean Values:

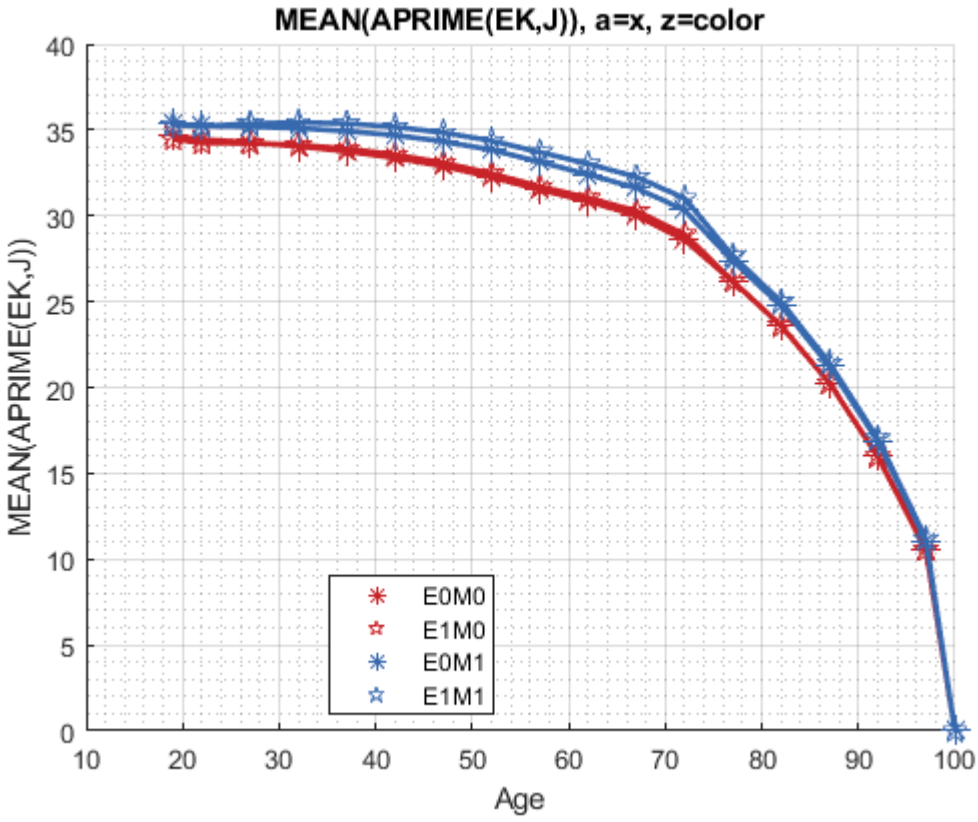
```
mp_support_graph('cl_st_graph_title') = {'MEAN(value(EM,J)), a=age, z=kids+marry'};
mp_support_graph('cl_st_ytitle') = {'MEAN(value(EM,J))'};
ff_graph_grid((tb_az_v{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```

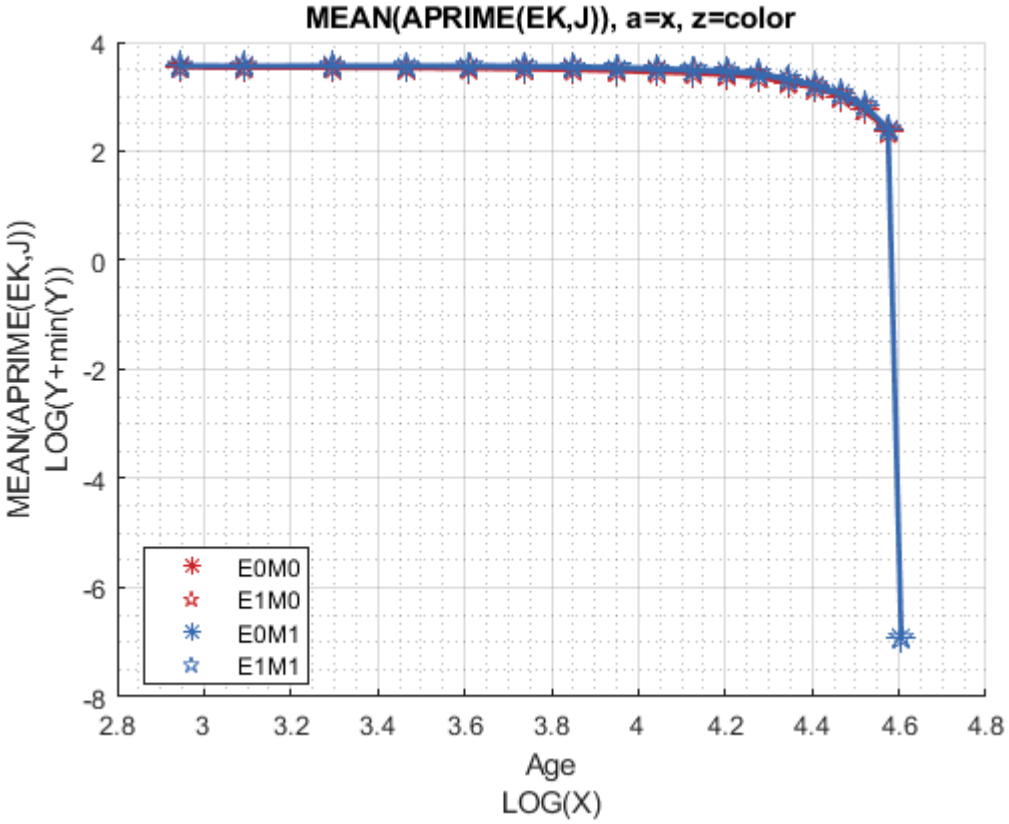




Graph Mean Savings Choices:

```
mp_support_graph('cl_st_graph_title') = {'MEAN(APRIME(EK,J)), a=x, z=color'};
mp_support_graph('cl_st_ytitle') = {'MEAN(APRIME(EK,J))'};
ff_graph_grid((tb_az_ap{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```





Graph Mean Consumption:

```
mp_support_graph('cl_st_graph_title') = {'MEAN(C(EK,J)), a=x, z=color'};
mp_support_graph('cl_st_ytitle') = {'MEAN(C(EK,J))'};
ff_graph_grid((tb_az_c{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```