

Life Cycle Dynamic Programming with Marital Status, Children and Savings

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. Value function during COVIDless year.

Test SNW_VFI_MAIN_BISECT_VEC Defaults

Call the function with defaults.

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

```
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:83 of 82, time-this-age:4.8333  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:82 of 82, time-this-age:3.5522  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:81 of 82, time-this-age:3.562  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:80 of 82, time-this-age:3.5482  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:79 of 82, time-this-age:3.603  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:78 of 82, time-this-age:3.566  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:77 of 82, time-this-age:3.587  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:76 of 82, time-this-age:3.5763  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:75 of 82, time-this-age:3.5899  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:74 of 82, time-this-age:3.5638  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:73 of 82, time-this-age:3.5816  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:72 of 82, time-this-age:3.5953  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:71 of 82, time-this-age:3.5487  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:70 of 82, time-this-age:3.5608  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:69 of 82, time-this-age:3.5752  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:68 of 82, time-this-age:3.5654  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:67 of 82, time-this-age:3.5772  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:66 of 82, time-this-age:3.559  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:65 of 82, time-this-age:3.5818  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:64 of 82, time-this-age:3.5676  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:63 of 82, time-this-age:3.5591  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:62 of 82, time-this-age:3.5857  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:61 of 82, time-this-age:3.5505  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:60 of 82, time-this-age:3.599  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:59 of 82, time-this-age:3.5761  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:58 of 82, time-this-age:3.5793  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:57 of 82, time-this-age:3.5776  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:56 of 82, time-this-age:3.543  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:55 of 82, time-this-age:3.6012  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:54 of 82, time-this-age:3.5452  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:53 of 82, time-this-age:3.5613  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:52 of 82, time-this-age:3.5813  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:51 of 82, time-this-age:3.5609  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:50 of 82, time-this-age:3.536  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:49 of 82, time-this-age:3.5886  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:48 of 82, time-this-age:3.566  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:47 of 82, time-this-age:3.7808  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:46 of 82, time-this-age:3.7661  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:45 of 82, time-this-age:3.7932  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:44 of 82, time-this-age:3.8033  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:43 of 82, time-this-age:3.7945  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:42 of 82, time-this-age:3.7732  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:41 of 82, time-this-age:3.9226  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:40 of 82, time-this-age:3.8366  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:39 of 82, time-this-age:3.8564  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:38 of 82, time-this-age:3.8009  
SNW_VFI_MAIN_BISECT_VEC: Finished Age Group:37 of 82, time-this-age:3.7941
```

```

SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:36 of 82, time-this-age:4.5804
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:35 of 82, time-this-age:3.8404
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:34 of 82, time-this-age:4.7106
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:33 of 82, time-this-age:3.8021
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:32 of 82, time-this-age:3.8057
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:31 of 82, time-this-age:3.7965
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:30 of 82, time-this-age:3.8032
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:29 of 82, time-this-age:3.7654
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:28 of 82, time-this-age:3.7559
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:27 of 82, time-this-age:3.7947
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:26 of 82, time-this-age:3.7678
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:25 of 82, time-this-age:3.7811
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:24 of 82, time-this-age:3.7676
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:23 of 82, time-this-age:3.7898
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:22 of 82, time-this-age:3.7599
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:21 of 82, time-this-age:3.8708
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:20 of 82, time-this-age:4.153
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:19 of 82, time-this-age:3.8598
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:18 of 82, time-this-age:3.7762
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:17 of 82, time-this-age:3.7936
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:16 of 82, time-this-age:3.8078
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:15 of 82, time-this-age:3.8384
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:14 of 82, time-this-age:3.8247
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:13 of 82, time-this-age:3.8612
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:12 of 82, time-this-age:3.7894
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:11 of 82, time-this-age:3.8057
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:10 of 82, time-this-age:3.7815
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:9 of 82, time-this-age:3.7954
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:8 of 82, time-this-age:3.8034
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:7 of 82, time-this-age:3.82
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:6 of 82, time-this-age:4.665
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:5 of 82, time-this-age:3.8131
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:4 of 82, time-this-age:3.7714
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:3 of 82, time-this-age:3.7764
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:2 of 82, time-this-age:3.8035
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:1 of 82, time-this-age:3.7918
Completed SNW_VFI_MAIN_BISEC_VEC;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_base;time=311.802

```

Define Parameters

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_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=%3.2f;')], 'wz=%3.2f;'));
edu_grid = [0,1];
marry_grid = [0,1];
kids_grid = (1:1:mp_param('n_kidsgrid'))';
% NaN(n_jgrid,n_agrid,n_etagrid,n_eduagrid,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') = '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(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, and
```

xxx	MEAN(VAL(A,Z))	xxxxxxxxxxxxxxxxxxxxxxxxxxxx							
group	savings	mean_eta_1	mean_eta_2	mean_eta_3	mean_eta_4	mean_eta_5	mean_eta_6	mean_eta_7	mean_eta_8
1	0	-103.74	-100.83	-97.586	-94.14	-90.628	-87.143	-83.718	-80.306
2	0.00051498	-103.59	-100.7	-97.463	-94.031	-90.531	-87.056	-83.631	-80.218
3	0.0041199	-102.58	-99.796	-96.656	-93.308	-89.883	-86.475	-83.068	-79.661
4	0.013905	-100.29	-97.718	-94.774	-91.606	-88.347	-85.088	-81.729	-78.371
5	0.032959	-96.882	-94.566	-91.879	-88.957	-85.929	-82.883	-79.837	-76.791
6	0.064373	-92.787	-90.727	-88.306	-85.65	-82.877	-80.073	-77.269	-74.465

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

xxx	MEAN(AP(A,Z))	xxxxxxxxxxxxxxxxxxxxxxxxxxxx							
group	savings	mean_eta_1	mean_eta_2	mean_eta_3	mean_eta_4	mean_eta_5	mean_eta_6	mean_eta_7	mean_eta_8
1	0	0	0	0	0	0	0	6.640e-07	1.685e-06
2	0.00051498	0	0	0	3.2355e-07	8.8303e-07	1.3402e-06	1.685e-06	7.290e-06
3	0.0041199	2.1751e-05	4.5233e-05	7.0015e-05	8.0443e-05	8.1722e-05	7.8394e-05	7.290e-06	0.00014591
4	0.013905	0.0013265	0.0013801	0.0014236	0.0014497	0.0014591	0.0014589	0.0014589	0.0014589
5	0.032959	0.0055555	0.005738	0.0058748	0.0059489	0.005964	0.0059453	0.0059453	0.0059453
6	0.064373	0.015298	0.015639	0.015844	0.015934	0.015945	0.015905	0.015905	0.015905

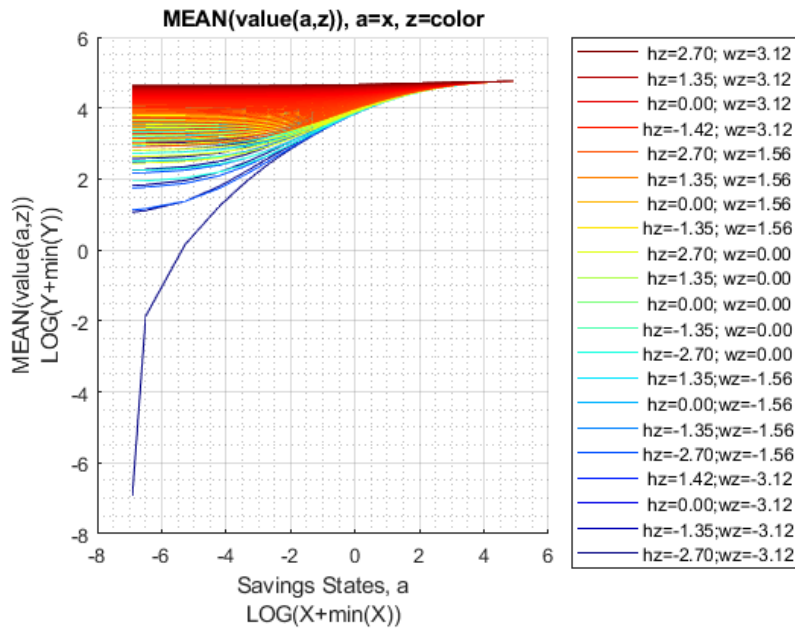
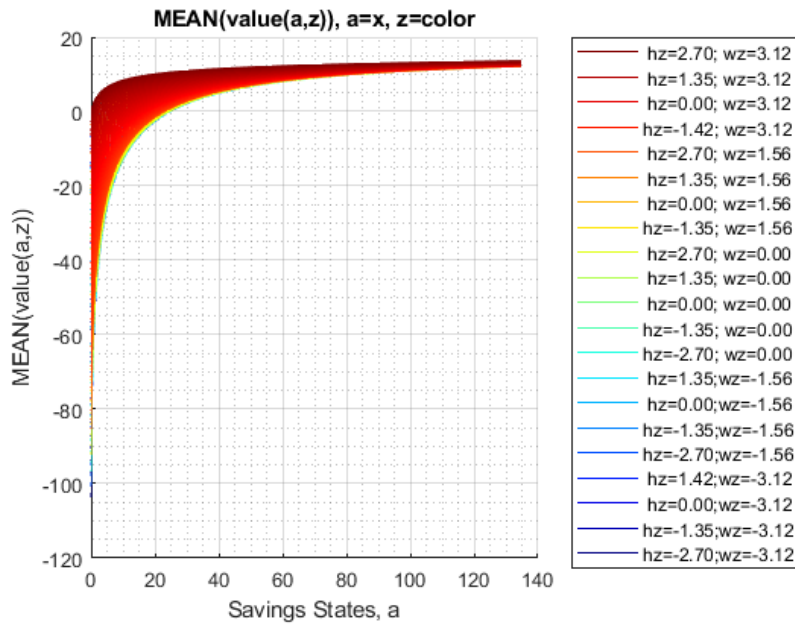
```
% Consumption Choices
tb_az_c = ff_summ_nd_array("MEAN(C(A,Z))", cons_VFI, true, ["mean"], 4, 1, cl_mp_datasetdesc, and
```

xxx	MEAN(C(A,Z))	xxxxxxxxxxxxxxxxxxxxxxxxxxxx							
group	savings	mean_eta_1	mean_eta_2	mean_eta_3	mean_eta_4	mean_eta_5	mean_eta_6	mean_eta_7	mean_eta_8
1	0	0.14271	0.14506	0.14755	0.15021	0.15304	0.15606	0.15929	0.16271

2	0.00051498	0.14324	0.14559	0.14808	0.15074	0.15358	0.15659	0.1
3	0.0041199	0.14695	0.14927	0.15175	0.15439	0.15722	0.16024	0.16
4	0.013905	0.15578	0.15807	0.16052	0.16315	0.16597	0.16899	0.1
5	0.032959	0.17127	0.17343	0.17579	0.17837	0.18119	0.18422	0.18
6	0.064373	0.19405	0.19605	0.19833	0.2009	0.20371	0.20676	0.21

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);
```

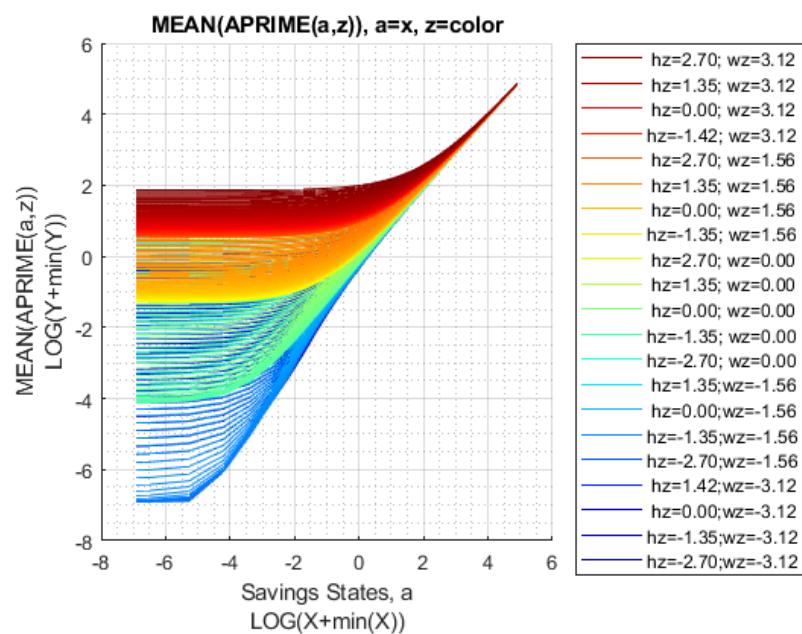
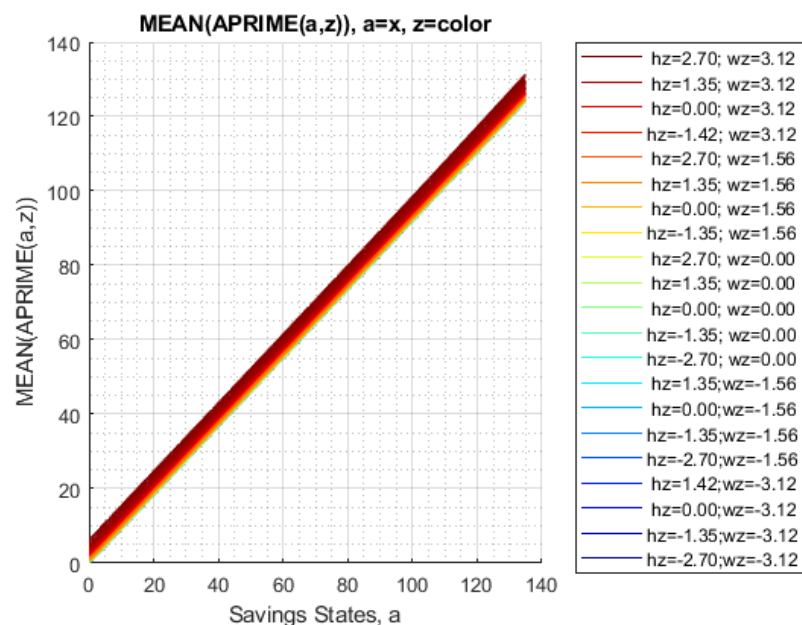


Graph Mean Savings Choices:

```

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);

```

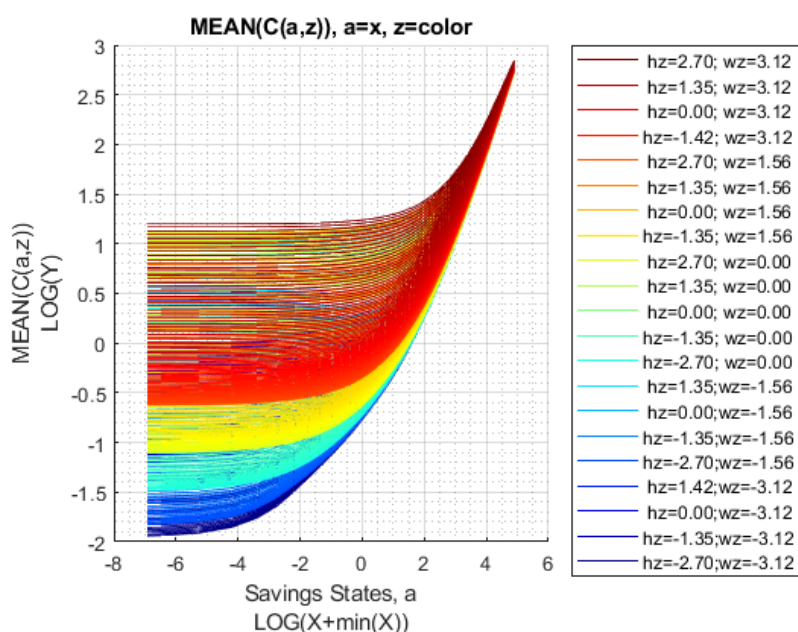
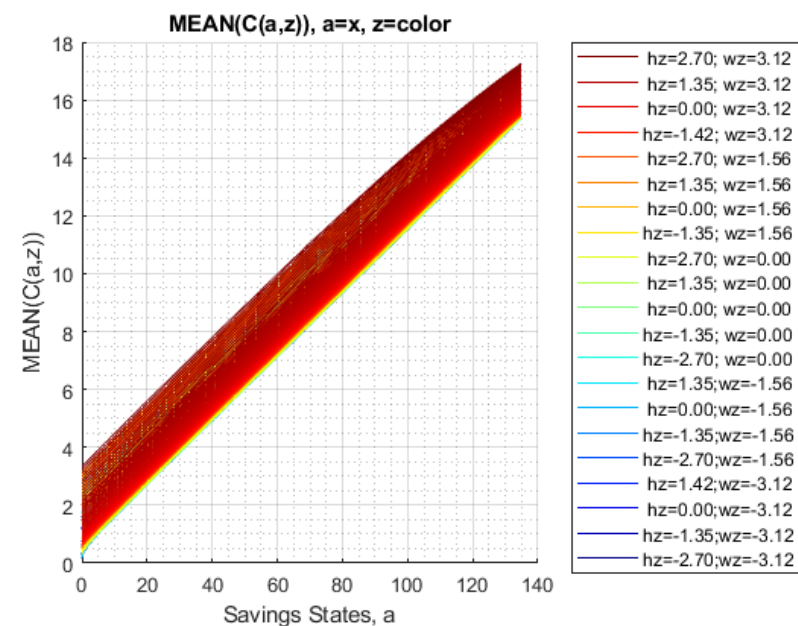


Graph Mean Consumption:

```

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", "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
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))  xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
group  kids  marry  mean_age_18  mean_age_19  mean_age_20  mean_age_21  mean_age_22  mean_age_23
-----
1      1      0      -9.6123      -8.574      -7.5952      -6.6749      -5.8609      -5.1427
2      2      0      -17.183     -15.851     -14.558     -13.309     -12.171     -11.137
3      3      0      -20.909     -19.563     -18.242     -16.949     -15.768     -14.686
4      4      0      -24.758     -23.406     -22.06      -20.727     -19.5       -18.369
5      5      0      -27.561     -26.288     -25.009     -23.73      -22.552     -21.464
6      1      1       2.1559      3.0013      3.7773      4.4944      5.1268      5.6806
7      2      1      -2.4375     -1.4691     -0.55596    0.31118     1.0968     1.8059
8      3      1      -4.6483     -3.672      -2.7454     -1.8583     -1.0517     -0.32031
9      4      1      -7.2434     -6.2806     -5.3574     -4.4633     -3.6454     -2.8983
10     5      1      -9.2948     -8.3935     -7.5263     -6.6822     -5.9134     -5.2138

```

```

% 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))  xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
group  kids  marry  mean_age_18  mean_age_19  mean_age_20  mean_age_21  mean_age_22  mean_age_23
-----
1      1      0      34.494      34.456      34.416      34.452      34.489      34.527
2      2      0       34.3       34.256      34.21      34.238      34.268      34.298
3      3      0      34.146      34.101      34.055      34.082      34.11      34.139
4      4      0      34.053      34.01      33.964      33.991      34.02      34.048
5      5      0      33.97      33.929      33.885      33.915      33.946      33.976
6      1      1      35.208      35.246      35.285      35.413      35.545      35.678
7      2      1      34.951      34.976      35        35.11      35.222      35.335
8      3      1      34.708      34.724      34.739      34.838      34.939      35.041
9      4      1      34.506      34.516      34.523      34.613      34.704      34.796
10     5      1      34.221      34.218      34.212      34.286      34.363      34.44

```

```

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

```

```

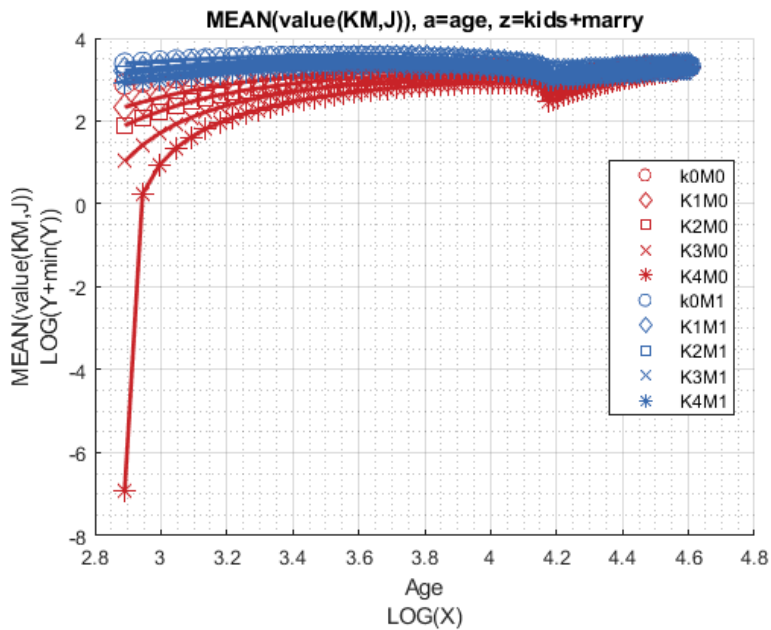
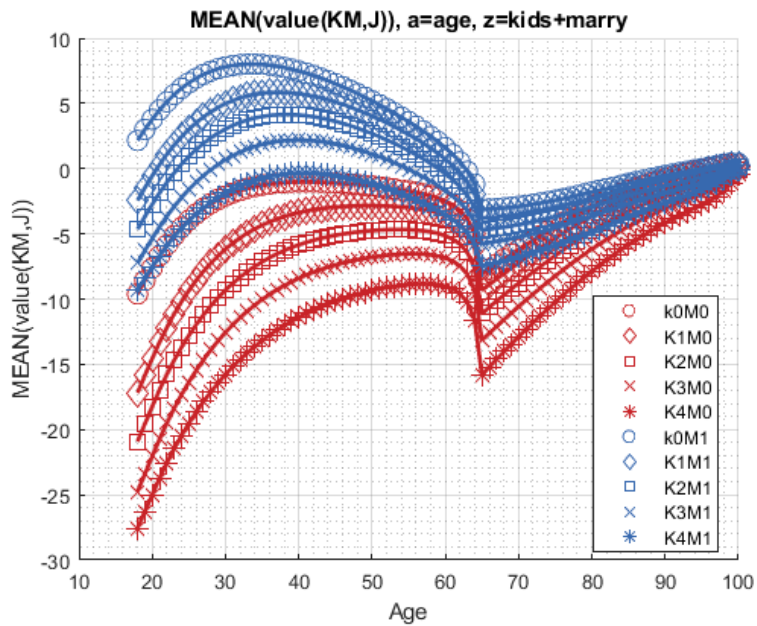
xxx  MEAN(C(KM,J))  xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
group  kids  marry  mean_age_18  mean_age_19  mean_age_20  mean_age_21  mean_age_22  mean_age_23
-----
1      1      0      2.0632      2.102      2.1418      2.184      2.2244      2.2628
2      2      0      2.2579      2.3019      2.348      2.3975      2.4457      2.4924

```

3	3	0	2.4119	2.4563	2.503	2.5537	2.6031	2.6511
4	4	0	2.5046	2.5481	2.594	2.6445	2.6938	2.7418
5	5	0	2.5877	2.6287	2.6724	2.7207	2.7678	2.8136
6	1	1	2.6183	2.6787	2.7402	2.8051	2.8674	2.9269
7	2	1	2.681	2.7395	2.8002	2.8656	2.9293	2.991
8	3	1	2.7896	2.8462	2.9054	2.9698	3.0325	3.0933
9	4	1	2.8528	2.9056	2.9612	3.0222	3.0816	3.1393
10	5	1	2.9174	2.966	3.0172	3.0737	3.1281	3.1806

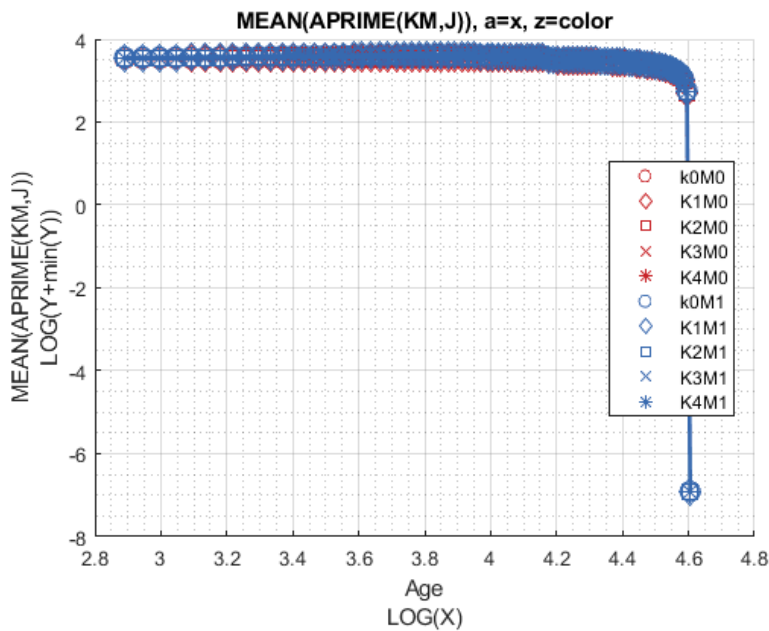
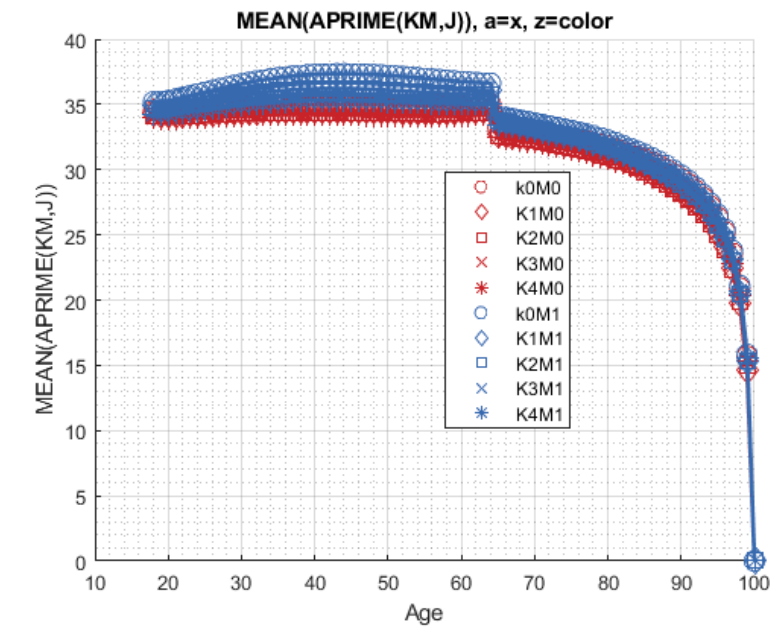
Graph Mean Values:

```
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);
```



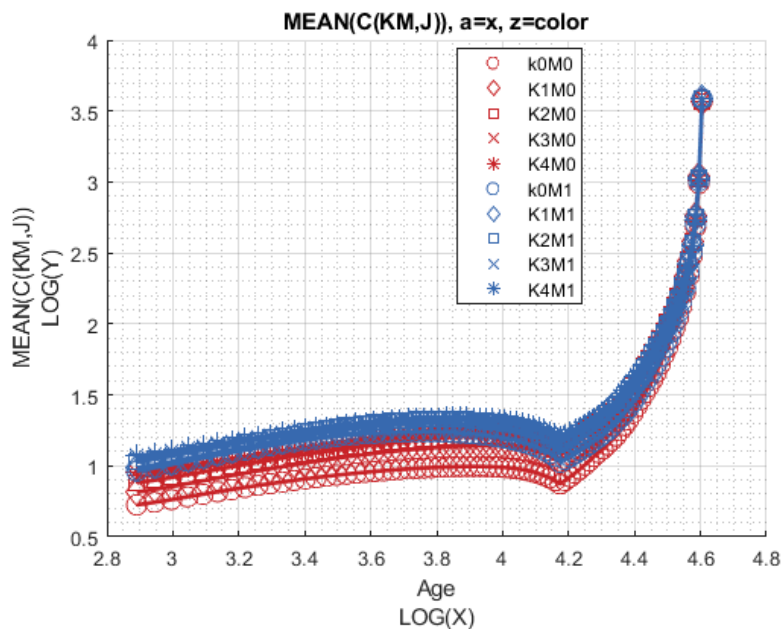
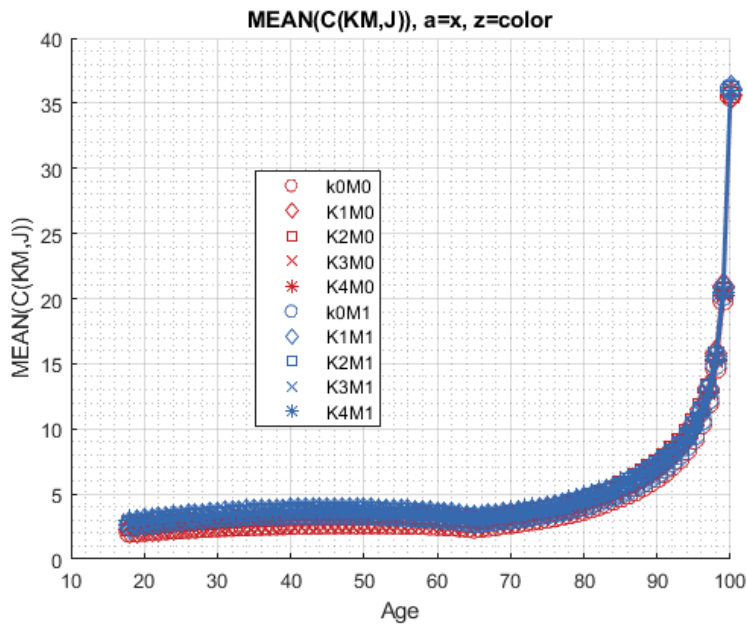
Graph Mean Savings Choices:

```
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)) xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
group   edu   marry   mean_age_18   mean_age_19   mean_age_20   mean_age_21   mean_age_22   mean_age_23
-----
1       0     0       -23.27       -22.094       -20.941       -19.811       -18.761       -17.785
2       1     0       -16.739      -15.379       -14.045       -12.745       -11.58        -10.535
3       0     1       -6.6189      -5.6779       -4.7885       -3.9435       -3.1707       -2.4661
4       1     1       -1.9684      -1.0477       -0.17465      0.66417       1.4159        2.0877
```

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

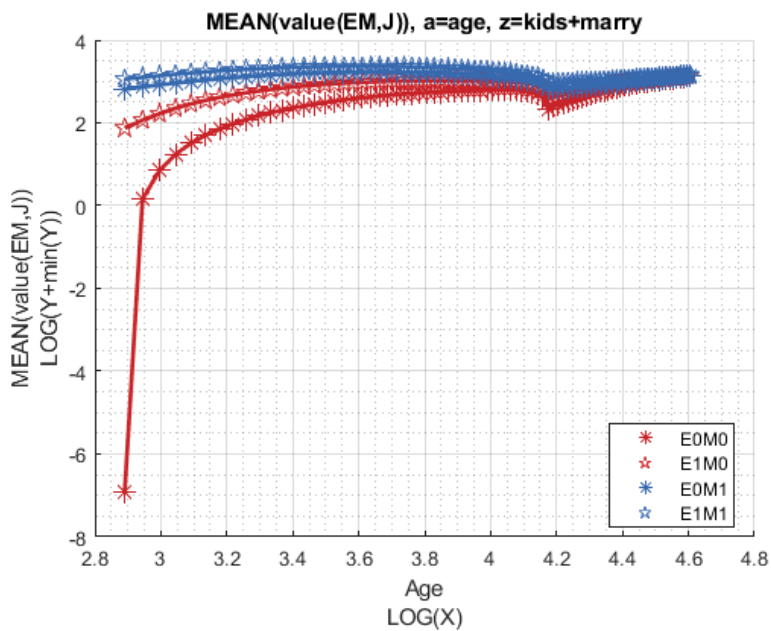
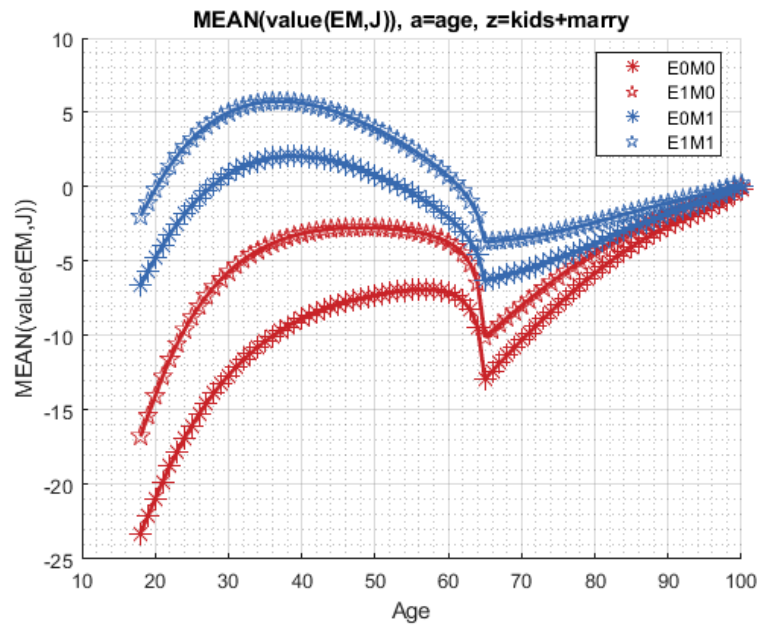
```
xxx MEAN(AP(EKM,J)) xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
group   edu   marry   mean_age_18   mean_age_19   mean_age_20   mean_age_21   mean_age_22   mean_age_23
-----
1       0     0       34.294       34.261       34.226       34.237       34.247       34.256
2       1     0       34.091       34.04        33.986       34.035       34.087       34.139
3       0     1       34.769       34.789       34.809       34.88        34.951       35.023
4       1     1       34.669       34.683       34.695       34.824       34.958       35.094
```

```
% 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)) xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
group   edu   marry   mean_age_18   mean_age_19   mean_age_20   mean_age_21   mean_age_22   mean_age_23
-----
1       0     0       2.2635       2.2969       2.3317       2.3683       2.4043       2.4395
2       1     0       2.4666       2.5178       2.572        2.6319       2.6896       2.7452
3       0     1       2.6261       2.6712       2.7175       2.7661       2.8135       2.8598
4       1     1       2.9175       2.9832       3.0522       3.1285       3.202        3.2726
```

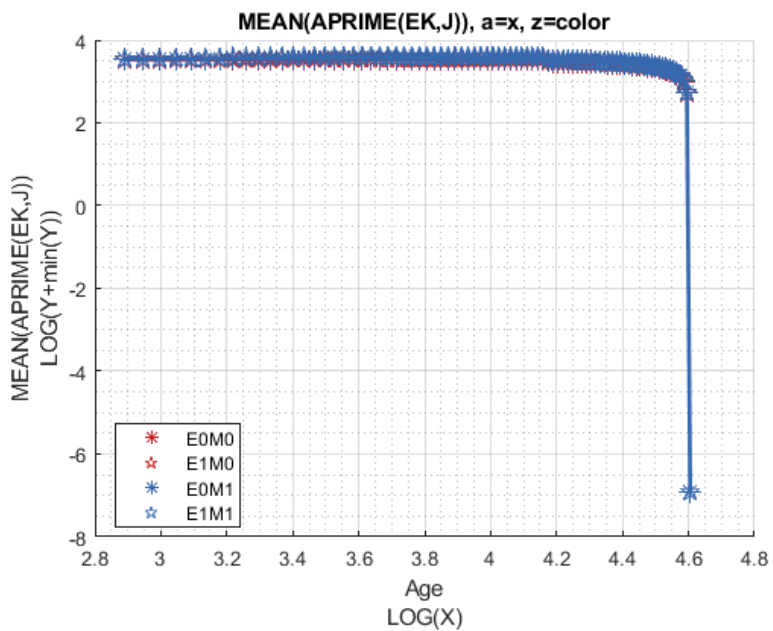
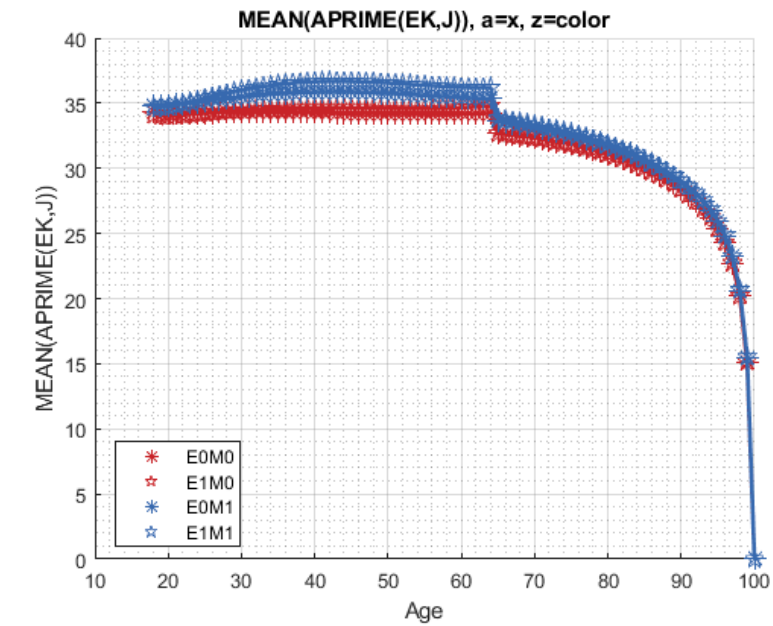
Graph Mean Values:

```
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);
```

