SNW_PARAM Tiny Solution Analysis

back to Fan's Intro Math for Econ, Matlab Examples, or Dynamic Asset Repositories

This is the example vignette for function: **snw_vfi_main** from the **PrjOptiSNW Package.** This function solves for policy function fully iteratively using matlab minimizer.

Test SNW_VFI_MAIN Defaults

Call the function with defaults.

```
mp_param = snw_mp_param('default_tiny');
[V_VFI,ap_VFI,cons_VFI,exitflag_VFI] = snw_vfi_main(mp_param);
```

```
SNW_VFI_MAIN: Finished Age Group:7 of 7
SNW_VFI_MAIN: Finished Age Group:6 of 7
SNW_VFI_MAIN: Finished Age Group:5 of 7
SNW_VFI_MAIN: Finished Age Group:4 of 7
SNW_VFI_MAIN: Finished Age Group:3 of 7
SNW_VFI_MAIN: Finished Age Group:2 of 7
SNW_VFI_MAIN: Finished Age Group:1 of 7
Elapsed time is 71.571416 seconds.
Completed SNW_VFI_MAIN;SNW_MP_PARAM=;default_tiny;SNW_MP_CONTROL=;default_base
```

Tiny 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, 28:16:92, 100];
agrid = mp_param('agrid')';
eta_grid = mp_param('eta_grid')';
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'}, {'shock', eta_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('st_rowvar_name') = 'z=';
mp_support_graph('it_legend_select') = 3; % how many shock legends to show
mp_support_graph('st_rounding') = '6.2f'; % format shock legend
```

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	mn_shock__1_4213	mn_shock__0_71067	mn_shock_0	mn_shock_0_71067	mn_shock_1_4213
1	0	-14.118	-9.758	-6.587	-4.1655	-2.7048
2	0.068587	-10.475	-7.6844	-5.1246	-2.9746	-1.6159
3	0.5487	-2.9549	-2.3258	-1.5774	-0.69134	0.24233
4	1.8519	0.33712	0.45768	0.6411	0.88767	1.208
5	4.3896	1.515	1.5432	1.5917	1.6685	1.7774
6	8.5734	1.9909	1.9991	2.0142	2.0405	2.0821
7	14.815	2.2087	2.2115	2.2169	2.2268	2.2441
8	23.525	2.3213	2.3224	2.3245	2.3286	2.3362
9	35.117	2.3852	2.3857	2.3867	2.3886	2.3922
10	50	2.4237	2.4239	2.4244	2.4253	2.4271

```
% 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	mn_shock__1_4213	mn_shock__0_71067	mn_shock_0	mn_shock_0_71067	mn_shock_1_4213
1	0	0.011833	0.031836	0.089931	0.20088	0.46185
2	0.068587	0.042291	0.06668	0.14585	0.24846	0.5052
3	0.5487	0.37391	0.37579	0.41283	0.60556	0.87798
4	1.8519	1.2791	1.2814	1.2891	1.3757	1.7712
5	4.3896	2.9474	2.9505	2.9617	3.0032	3.2433
6	8.5734	5.8431	5.8561	5.8717	5.906	6.0361
7	14.815	10.082	10.103	10.141	10.21	10.316
8	23.525	16.28	16.311	16.373	16.485	16.671
9	35.117	24.717	24.748	24.812	24.941	25.174
10	50	33.61	33.632	33.675	33.762	33.937

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

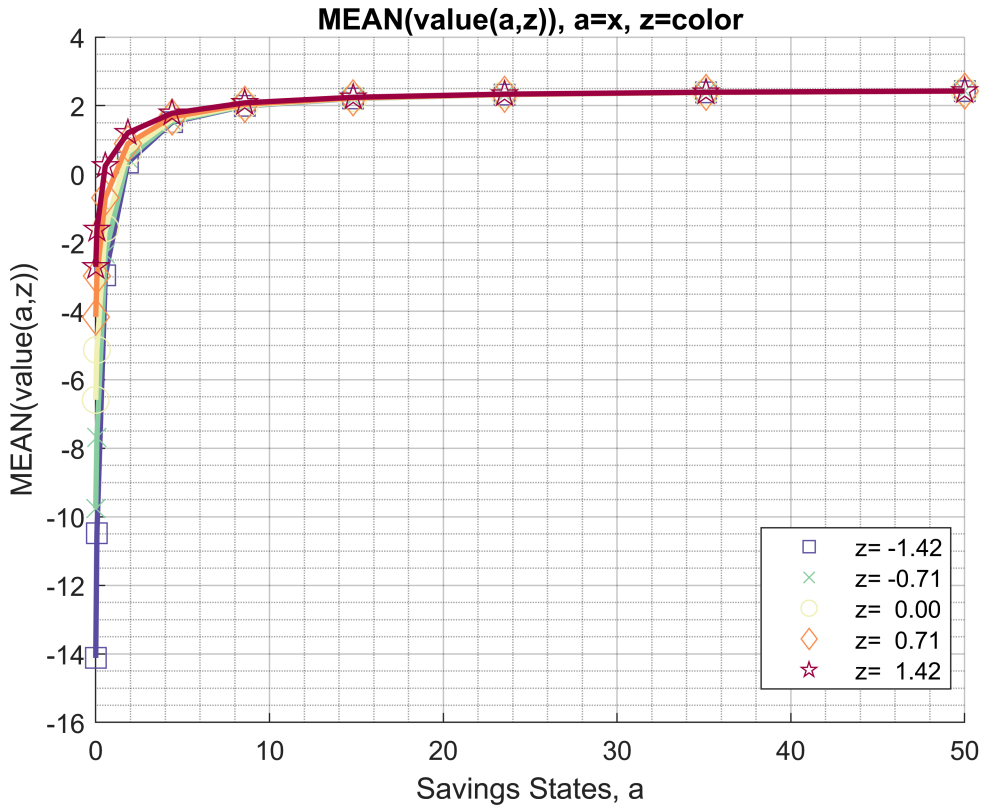
```
xxx  MEAN(C(A,Z))  xxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	savings	mn_shock__1_4213	mn_shock__0_71067	mn_shock_0	mn_shock_0_71067	mn_shock_1_4213
1	0	0.21328	0.27374	0.37302	0.57536	0.94495
2	0.068587	0.29796	0.35348	0.43132	0.64179	1.0155
3	0.5487	0.76521	0.84173	0.96038	1.0798	1.4374
4	1.8519	2.0138	2.0892	2.2362	2.4609	2.6948
5	4.3896	4.5305	4.605	4.7482	5.0177	5.4064

6	8.5734	8.5305	8.595	8.7339	9.0102	9.5089
7	14.815	14.577	14.633	14.75	14.992	15.514
8	23.525	22.733	22.779	22.871	23.07	23.513
9	35.117	33.396	33.442	33.533	33.714	34.109
10	50	49.026	49.083	49.193	49.417	49.871

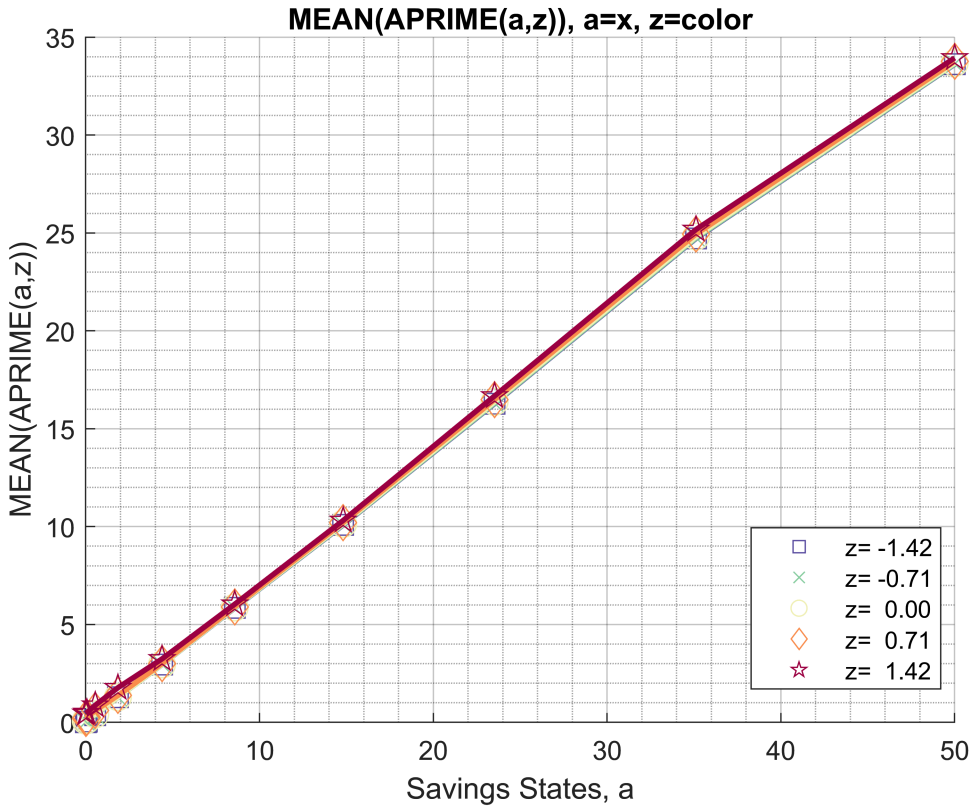
Graph Mean Values:

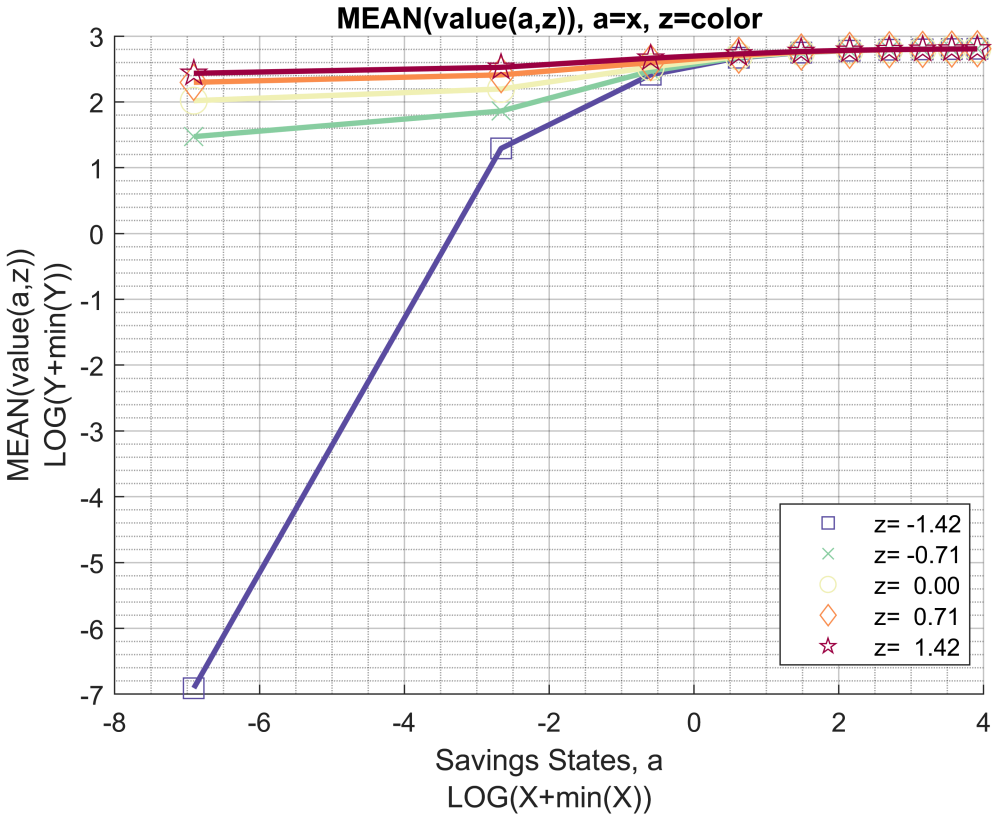
```
mp_support_graph('cl_st_graph_title') = {'MEAN(value(a,z)), a=x, z=color'};
mp_support_graph('cl_st_ytitle') = {'MEAN(value(a,z))'};
ff_graph_grid((tb_az_v{1:end, 3:end})', eta_grid, agrid, mp_support_graph);
```

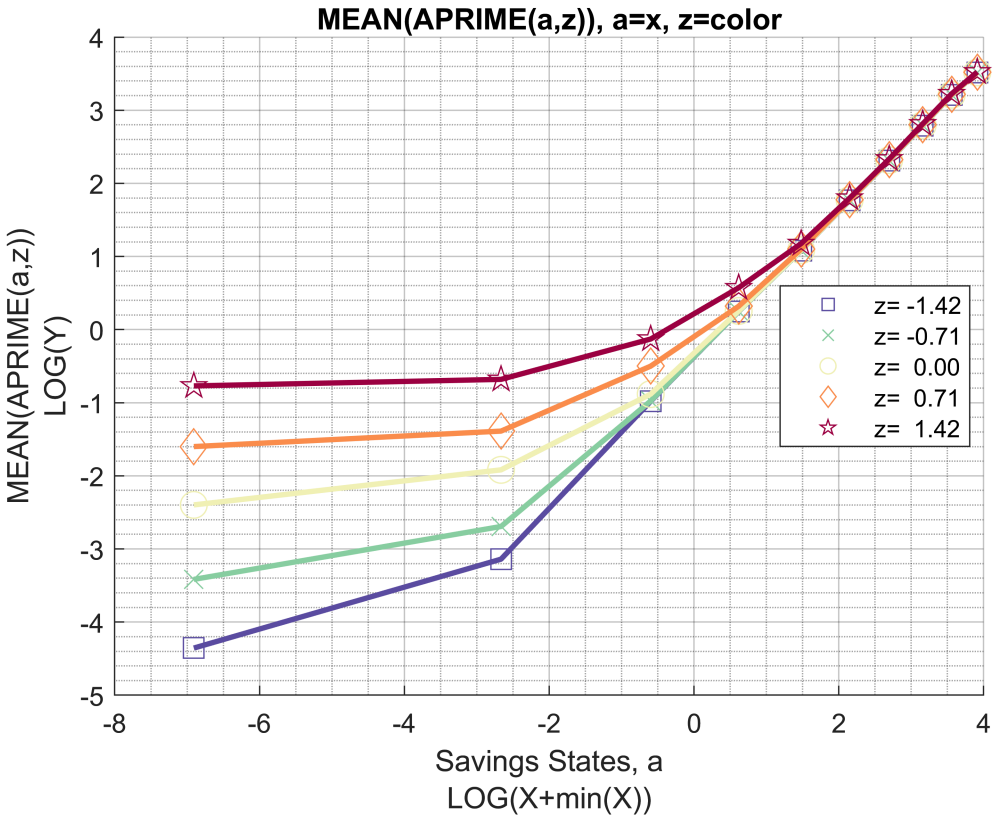


Graph Mean Savings Choices:

```
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})', eta_grid, agrid, mp_support_graph);
```

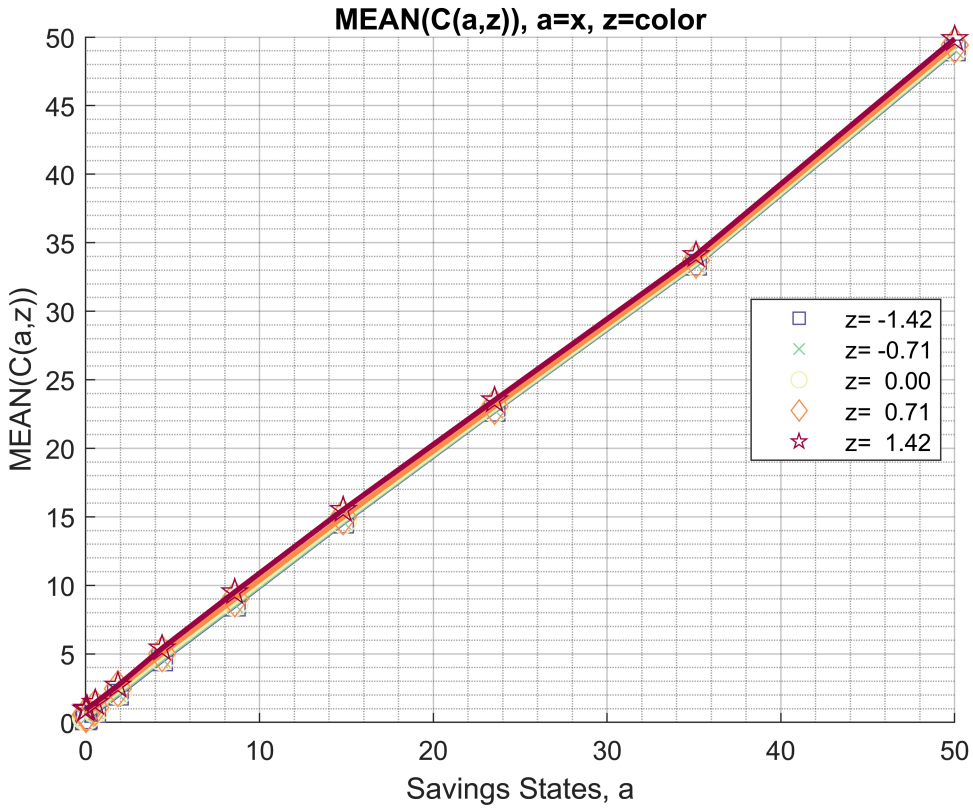

MEAN(APRIME(a,z)), a=x, z=color
MEAN(APRIME(a,z))
Savings States, a
z= -1.42
z= -0.71
z= 0.00
z= 0.71
z= 1.42

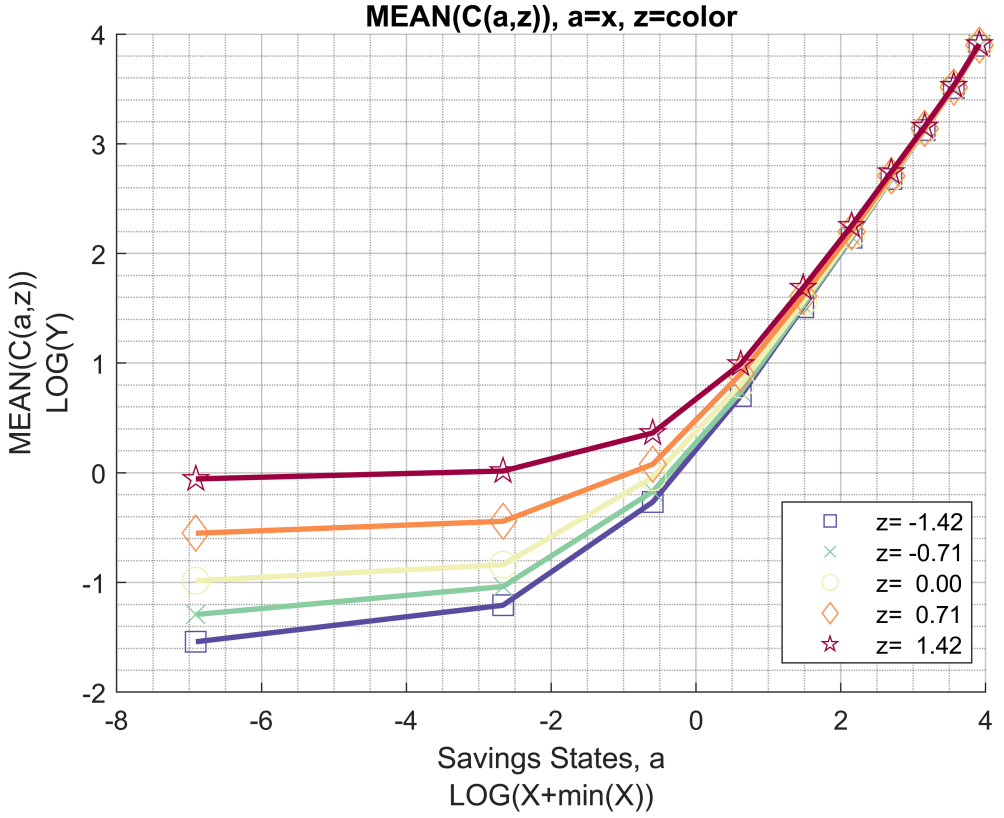

MEAN(value(a,z)), a=x, z=color
MEAN(value(a,z))
LOG(Y+min(Y))
Savings States, a
LOG(X+min(X))
z= -1.42
z= -0.71
z= 0.00
z= 0.71
z= 1.42



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})', eta_grid, agrid, mp_support_graph);
```





Analyze Kids and Marriage and Age

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');
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
```

MEAN(VAL(KM,J)), MEAN(AP(KM,J)), MEAN(C(KM,J))

Tabulate value and policies along savings and shocks:

```
% 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))  xxxxxxxxxxxxxxxxxxxxxxxxxxx
    group    kids    marry    mn_age_19    mn_age_28    mn_age_44    mn_age_60    mn_age_76    mn_age_92    mn_age_1
    _____    ____    _____    _________    _________    _________    _________    _________    _________    ________

      1       1        0         1.0028       0.97835        0.875       0.53944    -0.082596      0.07178       0.100
      2       2        0        0.75355      0.093263      0.29247       0.11013     -0.55156     -0.30898     -0.2718
      3       3        0       0.014837      -0.54118      -0.2695      -0.37216      -1.0405     -0.61178     -0.5576
      4       1        1        0.89829       0.89662      0.74249       0.32797      -0.7484     -0.32562     -0.2718
      5       2        1        0.78932       0.18846      0.26312     -0.023526      -1.1357     -0.62019     -0.5576
      6       3        1        0.11062      -0.26305     -0.17656       -0.4218      -1.5469     -0.87523      -0.798
```

```
% 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))  xxxxxxxxxxxxxxxxxxxxxxxxxxx
    group    kids    marry    mn_age_19    mn_age_28    mn_age_44    mn_age_60    mn_age_76    mn_age_92    mn_age_1
    _____    ____    _____    _________    _________    _________    _________    _________    _________    ________

      1       1        0         15.268       14.443       14.038       13.577       9.0943       2.7328           0
      2       2        0         14.219       14.129       14.001       12.536       8.4692       2.3788           0
      3       3        0         14.106       13.976       13.995       12.488        8.503       2.4392           0
      4       1        1         15.312         14.5       14.079       13.693       9.0943       2.7303           0
      5       2        1         14.628       14.377        14.05       13.231       8.8625       2.6195           0
      6       3        1          14.57       14.161       14.034       13.121       8.8401       2.6189           0
```

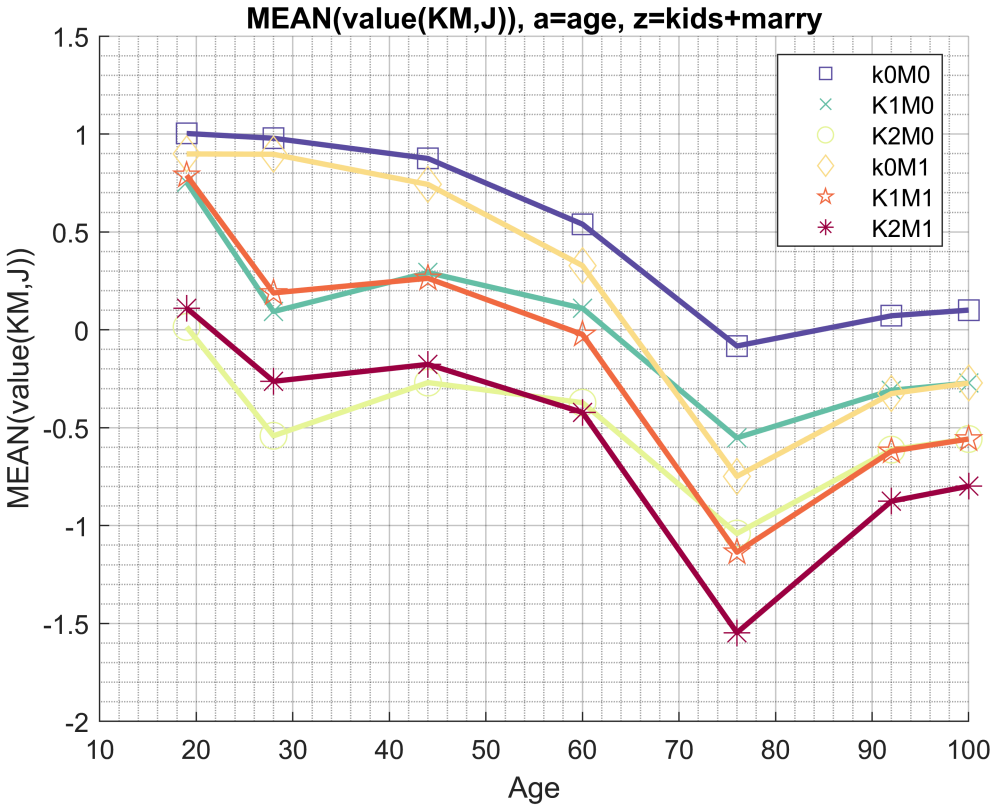
```
% Consumption Choices
tb_az_c = ff_summ_nd_array("MEAN(C(KM,J))", cons_VFI, true, ["mean"], 3, 1, cl_mp_datasetdesc,
```

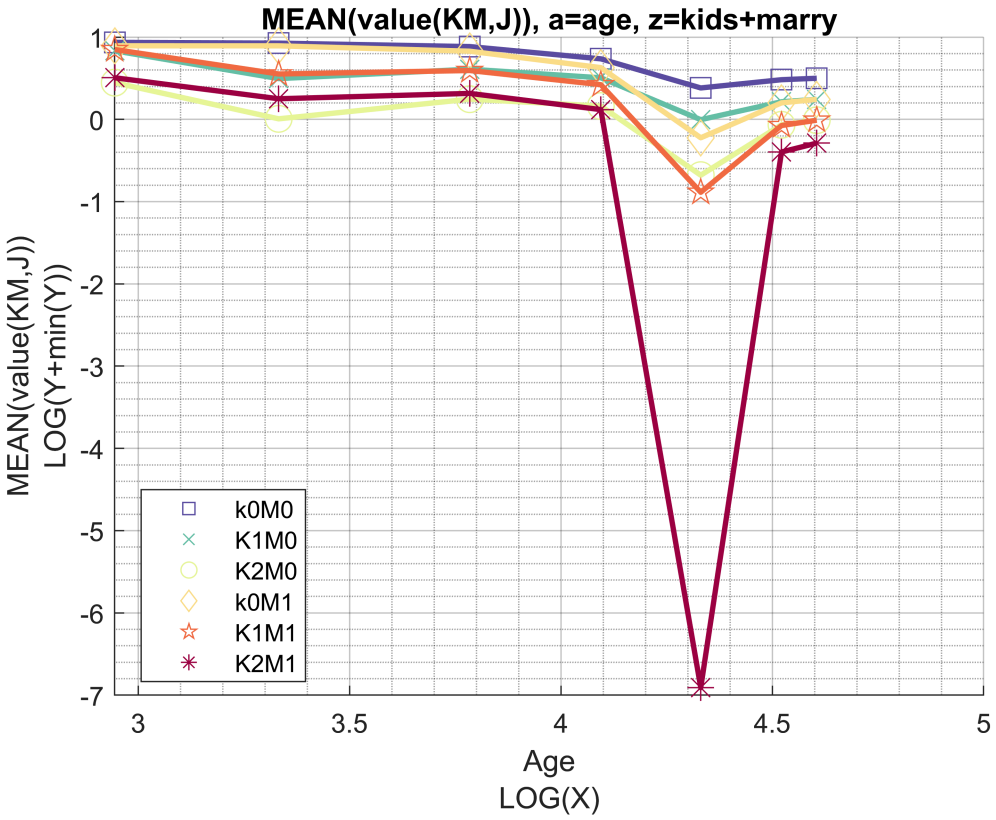
```
xxx  MEAN(C(KM,J))  xxxxxxxxxxxxxxxxxxxxxxxxxxx
    group    kids    marry    mn_age_19    mn_age_28    mn_age_44    mn_age_60    mn_age_76    mn_age_92    mn_age_1
    _____    ____    _____    _________    _________    _________    _________    _________    _________    ________

      1       1        0         8.3708       9.1952       9.8322       10.263       14.029       20.391       23.124
      2       2        0         9.4191       9.5092       9.8695       11.303       14.654       20.745       23.124
      3       3        0         9.5323       9.6623       9.8753       11.351       14.621       20.684       23.124
      4       1        1         8.4841       9.3329       10.031       10.427       14.029       20.393       23.124
      5       2        1         9.1439       9.4258       10.023       10.846       14.261       20.504       23.124
```

```
     6     3     1    9.1812    9.6167   10.008    10.919    14.284    20.505    23.124
```

Graph Mean Values:

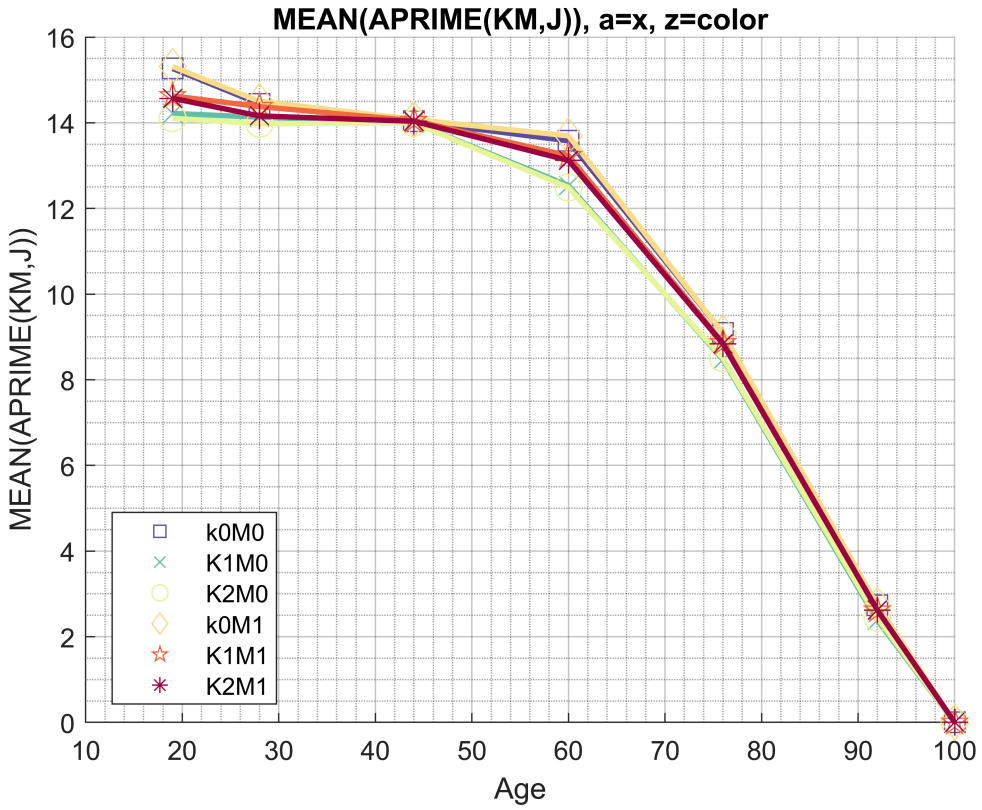
```
mp_support_graph('cl_st_graph_title') = {'MEAN(value(KM,J)), a=age, z=kids+marry'};
mp_support_graph('cl_st_ytitle') = {'MEAN(value(KM,J))'};
ff_graph_grid((tb_az_v{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```

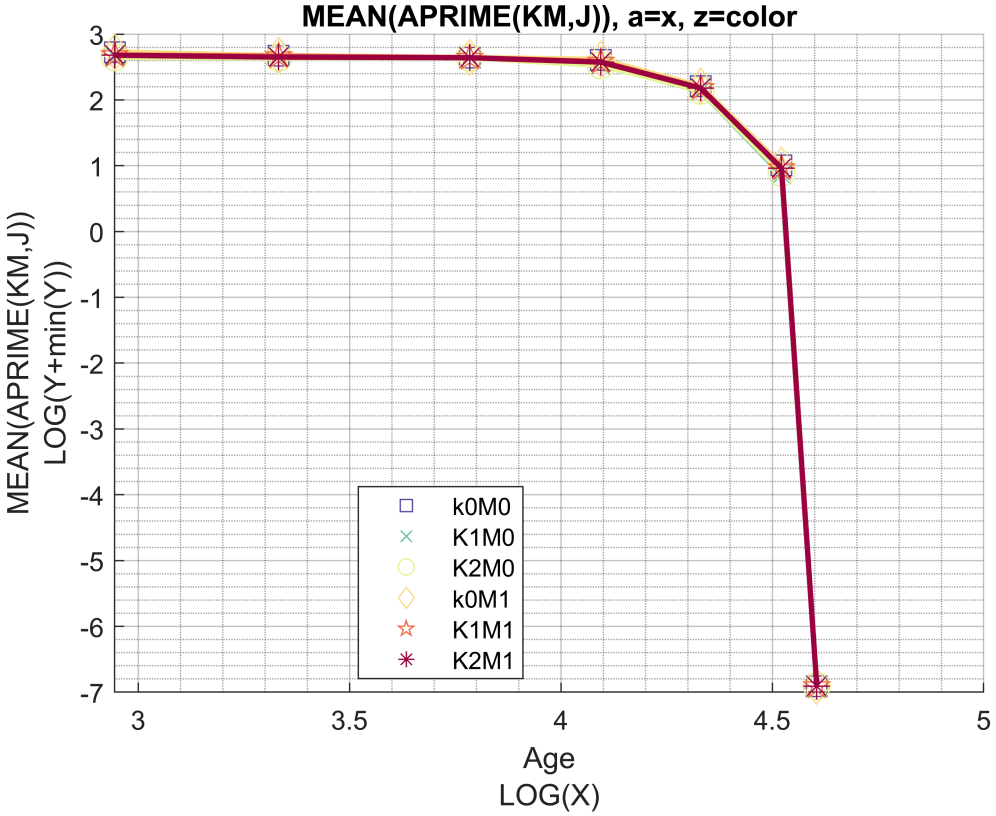




Graph Mean Savings Choices:

```
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);
```

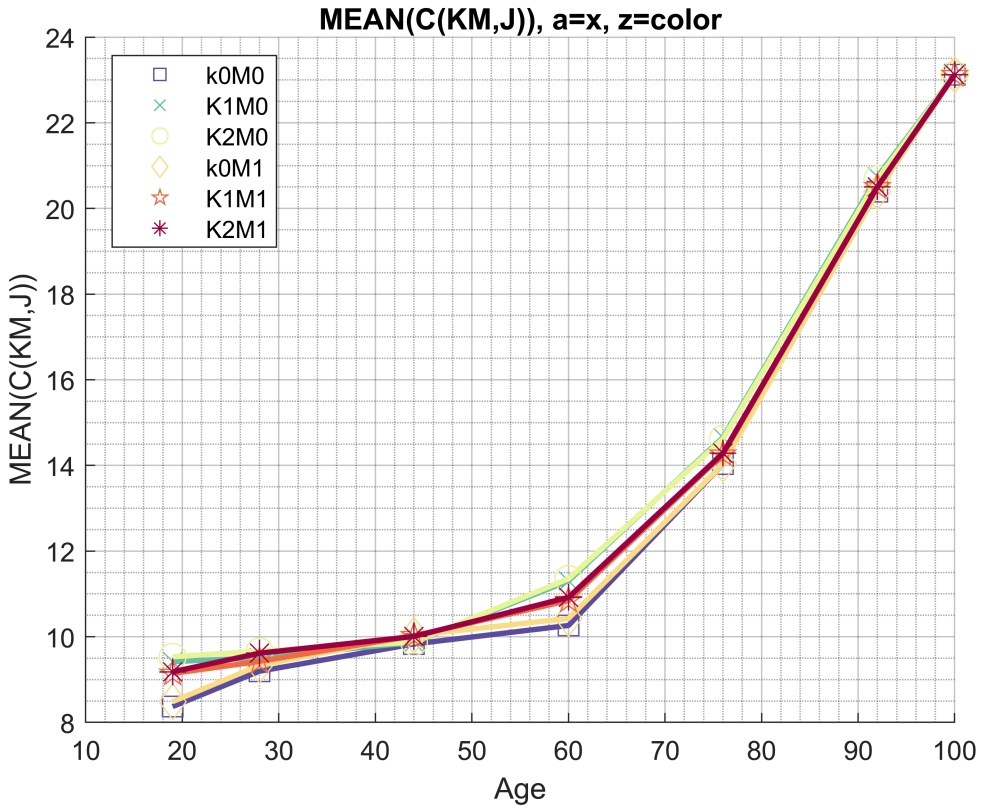


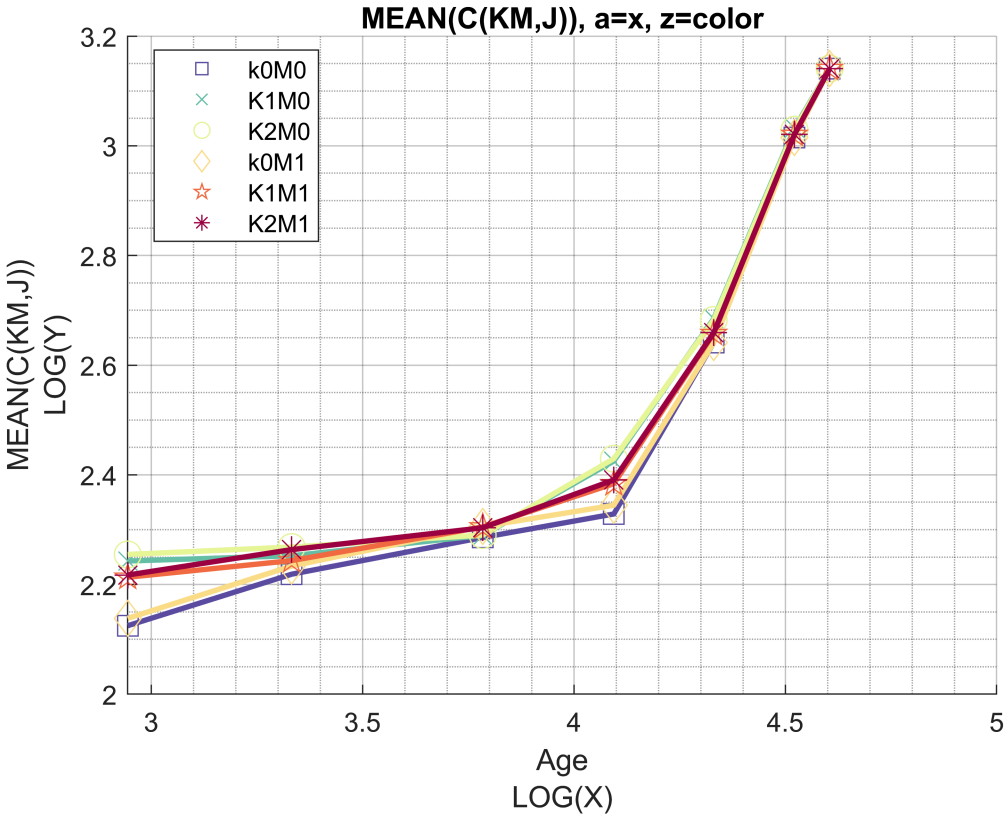


Graph Mean Consumption:

```
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);
```





MEAN(VAL(EKM,J)), MEAN(AP(EKM,J)), MEAN(C(EKM,J))

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

```
xxx  MEAN(VAL(KM,J))  xxxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	kids	marry	edu	mn_age_19	mn_age_28	mn_age_44	mn_age_60	mn_age_76	mn_age_92	m
1	1	0	0	0.647	0.68432	0.64012	0.37366	-0.18412	0.011538	
2	2	0	0	0.37557	-0.29005	-0.006668	-0.098321	-0.68385	-0.3933	
3	3	0	0	-0.43352	-0.98802	-0.6298	-0.62796	-1.2039	-0.71513	
4	1	1	0	0.53999	0.60295	0.50336	0.14317	-0.89198	-0.41082	
5	2	1	0	0.42171	-0.17267	-0.024078	-0.24001	-1.3045	-0.72397	
6	3	1	0	-0.31935	-0.66748	-0.50933	-0.67616	-1.7417	-0.99504	
7	1	0	1	1.3585	1.2724	1.1099	0.70522	0.018932	0.13202	
8	2	0	1	1.1315	0.47658	0.59162	0.31859	-0.41928	-0.22466	
9	3	0	1	0.46319	-0.094343	0.090812	-0.11635	-0.87713	-0.50843	
10	1	1	1	1.2566	1.1903	0.98161	0.51277	-0.60481	-0.24041	
11	2	1	1	1.1569	0.54959	0.55032	0.19296	-0.96696	-0.51642	
12	3	1	1	0.54059	0.14137	0.15622	-0.16743	-1.352	-0.75543	

```
% Aprime Choice
tb_az_ap = ff_summ_nd_array("MEAN(AP(KM,J))", ap_VFI, true, ["mean"], 2, 1, cl_mp_datasetdesc,
```

```
xxx  MEAN(AP(KM,J))  xxxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	kids	marry	edu	mn_age_19	mn_age_28	mn_age_44	mn_age_60	mn_age_76	mn_age_92	m
1	1	0	0	15.248	14.435	13.996	13.524	9.0992	2.74	
2	2	0	0	14.21	14.125	13.968	12.465	8.4757	2.3956	
3	3	0	0	14.099	13.974	13.965	12.417	8.5102	2.4537	
4	1	1	0	15.287	14.486	14.029	13.62	9.0992	2.7399	
5	2	1	0	14.614	14.366	14.008	13.154	8.8682	2.6281	
6	3	1	0	14.558	14.153	13.995	13.046	8.8462	2.6275	
7	1	0	1	15.287	14.451	14.08	13.631	9.0894	2.7256	
8	2	0	1	14.229	14.133	14.033	12.608	8.4628	2.3619	
9	3	0	1	14.113	13.978	14.025	12.56	8.4959	2.4247	
10	1	1	1	15.336	14.514	14.129	13.766	9.0893	2.7206	
11	2	1	1	14.641	14.388	14.093	13.309	8.8567	2.611	
12	3	1	1	14.582	14.168	14.074	13.196	8.834	2.6103	

```
% Consumption Choices
tb_az_c = ff_summ_nd_array("MEAN(C(KM,J))", cons_VFI, true, ["mean"], 2, 1, cl_mp_datasetdesc,
```

```
xxx  MEAN(C(KM,J))  xxxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	kids	marry	edu	mn_age_19	mn_age_28	mn_age_44	mn_age_60	mn_age_76	mn_age_92	m
1	1	0	0	8.3021	9.115	9.7116	10.169	14.006	20.366	
2	2	0	0	9.3402	9.4252	9.7391	11.227	14.63	20.71	
3	3	0	0	9.4513	9.5762	9.7424	11.276	14.595	20.652	
4	1	1	0	8.4019	9.236	9.8887	10.318	14.006	20.366	
5	2	1	0	9.0536	9.3291	9.8776	10.747	14.237	20.477	
6	3	1	0	9.092	9.5197	9.8632	10.822	14.259	20.478	
7	1	0	1	8.4395	9.2754	9.9527	10.357	14.052	20.416	
8	2	0	1	9.4981	9.5932	9.9999	11.38	14.679	20.78	
9	3	0	1	9.6132	9.7485	10.008	11.427	14.646	20.717	
10	1	1	1	8.5662	9.4299	10.174	10.536	14.052	20.421	
11	2	1	1	9.2342	9.5226	10.168	10.944	14.285	20.531	
12	3	1	1	9.2704	9.7136	10.152	11.016	14.308	20.532	