Life Cycle Dynamic Programming under Unemployment Shock

This is the example vignette for function: **snw_vfi_main_bisec_vec** from the **PrjOptiSNW Package.** This function solves for policy function using Exact Vectorized Solution. Value in 2020 with surprise COVID unemployment Shock, with non-covid year Value as the continuation function. The file focuses on the change in value function, asset choice, and consumption choice given a one period unemployment shock (that does not reappear in the future again).

Test SNW_VFI_UNEMP

Solve the Regular Value and Also the Unemployment Value.

First, solve for value without unemployment issue (use the vectorized code that was previously tested):

```
mp_params = snw_mp_param('default_docdense');
mp_controls = snw_mp_control('default_test');
[V_VFI_ss,ap_VFI_ss,cons_VFI_ss,mp_valpol_more_ss] = ...
    snw_vfi_main_bisec_vec(mp_params, mp_controls);
```

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SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:83 of 82, time-this-age:7.2806
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:82 of 82, time-this-age:6.1159
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:81 of 82, time-this-age:6.0063
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:80 of 82, time-this-age:6.2295
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:79 of 82, time-this-age:6.1304
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:78 of 82, time-this-age:6.177
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:77 of 82, time-this-age:5.8007
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:76 of 82, time-this-age:6.0273
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:75 of 82, time-this-age:5.8559
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:74 of 82, time-this-age:6.0667
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:73 of 82, time-this-age:5.8561
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:72 of 82, time-this-age:6.1132
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:71 of 82, time-this-age:6.1396
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:70 of 82, time-this-age:6.1117
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:69 of 82, time-this-age:5.8629
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:68 of 82, time-this-age:5.8343
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:67 of 82, time-this-age:5.9943
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:66 of 82, time-this-age:5.8672
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:65 of 82, time-this-age:6.0579
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:64 of 82, time-this-age:5.9121
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:63 of 82, time-this-age:5.9706
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:62 of 82, time-this-age:5.9034
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:61 of 82, time-this-age:5.905
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:60 of 82, time-this-age:5.9565
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:59 of 82, time-this-age:5.8889
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:58 of 82, time-this-age:5.949
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:57 of 82, time-this-age:6.1439
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:56 of 82, time-this-age:5.958
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:55 of 82, time-this-age:5.8168
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:54 of 82, time-this-age:6.0261
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:53 of 82, time-this-age:6.2686
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:52 of 82, time-this-age:5.7384
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:51 of 82, time-this-age:6.2394
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:50 of 82, time-this-age:6.2743
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:49 of 82, time-this-age:6.0433
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:48 of 82, time-this-age:6.09
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:47 of 82, time-this-age:6.359
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:46 of 82, time-this-age:6.5575
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:45 of 82, time-this-age:6.3201
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:44 of 82, time-this-age:6.4954
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SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:43 of 82, time-this-age:6.287
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:42 of 82, time-this-age:6.5716
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:41 of 82, time-this-age:6.5669
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:40 of 82, time-this-age:6.2899
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:39 of 82, time-this-age:6.2551
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:38 of 82, time-this-age:6.0935
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:37 of 82, time-this-age:6.2868
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:36 of 82, time-this-age:6.3986
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:35 of 82, time-this-age:6.2784
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:34 of 82, time-this-age:6.0975
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:33 of 82, time-this-age:6.267
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:32 of 82, time-this-age:6.3234
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:31 of 82, time-this-age:6.3169
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:30 of 82, time-this-age:6.4381
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:29 of 82, time-this-age:6.3095
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:28 of 82, time-this-age:6.3121
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:27 of 82, time-this-age:6.5318
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:26 of 82, time-this-age:6.6074
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:25 of 82, time-this-age:6.1019
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:24 of 82, time-this-age:6.4111
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:23 of 82, time-this-age:6.3014
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:22 of 82, time-this-age:6.3142
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:21 of 82, time-this-age:6.1831
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:20 of 82, time-this-age:6.3349
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:19 of 82, time-this-age:6.2361
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:18 of 82, time-this-age:5.9943
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:17 of 82, time-this-age:6.3202
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:16 of 82, time-this-age:6.3709
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:15 of 82, time-this-age:6.1958
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:14 of 82, time-this-age:6.2768
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:13 of 82, time-this-age:6.0585
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:12 of 82, time-this-age:6.1999
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:11 of 82, time-this-age:6.2195
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:10 of 82, time-this-age:6.065
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:9 of 82, time-this-age:6.4078
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:8 of 82, time-this-age:6.318
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:7 of 82, time-this-age:6.1657
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:6 of 82, time-this-age:6.3787
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:5 of 82, time-this-age:6.4714
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:4 of 82, time-this-age:6.3724
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:3 of 82, time-this-age:6.5242
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:2 of 82, time-this-age:6.1451
SNW_VFI_MAIN_BISEC_VEC: Finished Age Group:1 of 82, time-this-age:6.2021
Completed SNW_VFI_MAIN_BISEC_VEC;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=514.818
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_outcomes ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
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	i	idx	ndim	numel	rowN	colN	sum	mean	std	coefvari
V_VFI	1	1	6	4.37e+07	83	5.265e+05	-1.5339e+08	-3.5101	26.119	-7.441
ap_VFI	2	2	6	4.37e+07	83	5.265e+05	1.4159e+09	32.402	36.798	1.1357
cons_VFI	3	3	6	4.37e+07	83	5.265e+05	2.1402e+08	4.8975	8.3294	1.7007

```
xxx TABLE:V_VFI xxxxxxxxxxxxxxxxxx
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	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499	c52650
r1	-346.51	-346.12	-343.63	-337.86	-328.51	21.702	21.852	22.003	22.154	22.30
r2	-334.38	-333.99	-331.51	-325.83	-316.83	21.724	21.869	22.015	22.163	22.31
r3	-322.45	-322.06	-319.6	-314.14	-305.6	21.745	21.885	22.027	22.171	22.31
r4	-310.63	-310.27	-307.99	-302.88	-294.87	21.767	21.903	22.041	22.182	22.32
r5	-299.94	-299.6	-297.46	-292.67	-285.12	21.775	21.907	22.042	22.18	22.32
r79	-9.9437	-9.9325	-9.8557	-9.6597	-9.3232	2.5394	2.5501	2.5602	2.5696	2.578

r80	-8.9023	-8.8911	-8.8143	-8.6183	-8.2818	2.3039	2.3121	2.3198	2.327	2.333
r81	-7.6363	-7.6251	-7.5484	-7.3524	-7.0159	2.0068	2.0124	2.0176	2.0226	2.027
r82	-5.9673	-5.9561	-5.8793	-5.6833	-5.3468	1.5958	1.5989	1.6018	1.6046	1.607
r83	-3.5892	-3.578	-3.5012	-3.3052	-2.9687	0.97904	0.98004	0.98097	0.98185	0.9826

xxx TABLE:ap_VFI xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499	c526500
r1	0	0	0.0005656	0.0075134	0.022901	114.75	120.41	126.27	132.38	138.8
r2	0	0	0.00051498	0.0065334	0.021549	114.86	120.53	126.41	132.54	138.95
r3	0	0	0.00051498	0.0049294	0.019875	114.97	120.65	126.56	132.7	139.12
r4	0	0	0.00051498	0.0047937	0.019672	115.73	121.42	127.34	133.51	139.92
r5	0	0	0.00048517	0.0046683	0.019484	116.5	122.21	128.15	134.32	140.74
r79	0	0	0	0	0	81.091	85.68	90.335	94.378	98.419
r80	0	0	0	0	0	76.669	80.563	84.304	88.04	91.693
r81	0	0	0	0	0	68.313	71.534	74.475	77.832	81.11
r82	0	0	0	0	0	50.126	53.467	56.953	58.745	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	0.040426	0.04363	0.048012	9.6491	9.817	9.9649	10.073	1
r2	0.036717	0.037251	0.040477	0.04461	0.049364	9.8118	9.9685	10.101	10.191	1
r3	0.036717	0.037251	0.040477	0.046214	0.051039	9.9779	10.12	10.234	10.302	1
r4	0.038144	0.038678	0.041903	0.047776	0.052666	10.131	10.258	10.354	10.405	1
r5	0.039534	0.040068	0.043323	0.04929	0.054241	10.272	10.384	10.463	10.5	
r79	0.2179	0.21844	0.22216	0.23228	0.25197	35.858	37.092	38.455	40.627	4
r80	0.2179	0.21844	0.22216	0.23228	0.25197	40.253	42.183	44.459	46.938	
r81	0.2179	0.21844	0.22216	0.23228	0.25197	48.587	51.19	54.266	57.123	6
r82	0.2179	0.21844	0.22216	0.23228	0.25197	66.755	69.238	71.77	76.192	8
r83	0.2179	0.21844	0.22216	0.23228	0.25197	116.87	122.69	128.71	134.92	1

Second, solve for the unemployment value, use the exact-bisec result code, call the snw_vfi_main_bisec_vec.m function with a third input of existing value. xi is the share of income lost during covid year given surprise covid shock, b is the share of income loss that is covered by unemployment insurance. xi=0.5 and b=0 means will lose 50 percent of income given COVID shocks, and the loss will not be covered at all by unemployment insurance.

```
mp_params('xi') = 0.5;
mp_params('b') = 0;
mp_params('a2_covidyr') = mp_params('a2_covidyr_manna_heaven');
[V_VFI_unemp,ap_VFI_unemp,cons_VFI_unemp,mp_valpol_more_unemp] = ...
    snw_vfi_main_bisec_vec(mp_params, mp_controls, V_VFI_ss);
```

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SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 1 of 82, time-this-age:6.407
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 2 of 82, time-this-age:6.4654
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 3 of 82, time-this-age:6.0721
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 4 of 82, time-this-age:6.0621
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 5 of 82, time-this-age:6.0395
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 6 of 82, time-this-age:6.3188
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 7 of 82, time-this-age:6.4374
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 8 of 82, time-this-age:6.2474
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 9 of 82, time-this-age:6.2941
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 10 of 82, time-this-age:6.2099
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 11 of 82, time-this-age:6.3236
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 12 of 82, time-this-age:6.1787
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 13 of 82, time-this-age:6.4017
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 14 of 82, time-this-age:6.2052
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 15 of 82, time-this-age:6.2101
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SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 16 of 82, time-this-age:6.5312
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 17 of 82, time-this-age:6.304
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 18 of 82, time-this-age:6.1446
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 19 of 82, time-this-age:6.0612
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 20 of 82, time-this-age:6.3276
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 21 of 82, time-this-age:6.1777
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 22 of 82, time-this-age:6.2046
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 23 of 82, time-this-age:6.5356
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 24 of 82, time-this-age:6.2366
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 25 of 82, time-this-age:6.4665
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 26 of 82, time-this-age:6.5058
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 27 of 82, time-this-age:6.5694
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 28 of 82, time-this-age:6.2816
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 29 of 82, time-this-age:6.3323
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 30 of 82, time-this-age:6.3057
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 31 of 82, time-this-age:6.1134
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 32 of 82, time-this-age:6.344
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 33 of 82, time-this-age:6.1394
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 34 of 82, time-this-age:6.2369
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 35 of 82, time-this-age:6.2513
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 36 of 82, time-this-age:6.4391
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 37 of 82, time-this-age:6.2022
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 38 of 82, time-this-age:6.3134
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 39 of 82, time-this-age:6.4506
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 40 of 82, time-this-age:6.3451
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 41 of 82, time-this-age:6.3484
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 42 of 82, time-this-age:6.3333
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 43 of 82, time-this-age:6.0933
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 44 of 82, time-this-age:6.5014
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 45 of 82, time-this-age:6.1259
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 46 of 82, time-this-age:6.6687
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 47 of 82, time-this-age:6.4549
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 48 of 82, time-this-age:6.1216
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 49 of 82, time-this-age:6.0745
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 50 of 82, time-this-age:5.9112
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 51 of 82, time-this-age:5.9177
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 52 of 82, time-this-age:5.7121
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 53 of 82, time-this-age:5.8059
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 54 of 82, time-this-age:5.8903
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 55 of 82, time-this-age:6.0382
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 56 of 82, time-this-age:5.8965
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 57 of 82, time-this-age:6.0212
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 58 of 82, time-this-age:5.9108
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 59 of 82, time-this-age:6.0722
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 60 of 82, time-this-age:6.0056
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 61 of 82, time-this-age:5.9084
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 62 of 82, time-this-age:6.0877
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 63 of 82, time-this-age:6.2162
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 64 of 82, time-this-age:6.0062
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 65 of 82, time-this-age:5.8763
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 66 of 82, time-this-age:6.0007
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 67 of 82, time-this-age:6.0227
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 68 of 82, time-this-age:5.9848
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 69 of 82, time-this-age:6.0796
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 70 of 82, time-this-age:5.9054
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 71 of 82, time-this-age:5.8954
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 72 of 82, time-this-age:5.8211
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 73 of 82, time-this-age:5.8349
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 74 of 82, time-this-age:5.9275
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 75 of 82, time-this-age:5.8455
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 76 of 82, time-this-age:5.9703
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 77 of 82, time-this-age:6.0189
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 78 of 82, time-this-age:5.8908
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 79 of 82, time-this-age:6.1672
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 80 of 82, time-this-age:5.8195
```

```
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 81 of 82, time-this-age:5.9994
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 82 of 82, time-this-age:6.0784
SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock: Age 83 of 82, time-this-age:7.4092
Completed SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_outcomes ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

	i	idx	ndim	numel	rowN	colN	sum	mean	std	coefvari
V_VFI	1	1	6	4.37e+07	83	5.265e+05	-1.7805e+08	-4.0743	27.116	-6.6554
ap_VFI	2	2	6	4.37e+07	83	5.265e+05	1.3789e+09	31.553	36.673	1.1622
cons_VFI	3	3	6	4.37e+07	83	5.265e+05	2.1097e+08	4.8277	8.3289	1.7252

xxx TABLE:V_VFI xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499	c52650
r1	-372.97	-371.47	-362.94	-349.52	-336.96	21.573	21.728	21.882	22.036	22.19
r2	-360.84	-359.34	-350.81	-337.39	-324.98	21.595	21.745	21.894	22.044	22.19
r3	-348.91	-347.41	-338.88	-325.46	-313.34	21.617	21.762	21.906	22.052	22.20
r4	-336.09	-334.7	-326.73	-314.01	-302.44	21.633	21.772	21.913	22.056	22.20
r5	-324.48	-323.18	-315.72	-303.62	-292.54	21.634	21.77	21.907	22.046	22.18
r79	-9.9437	-9.9325	-9.8557	-9.6597	-9.3232	2.5374	2.5482	2.5584	2.568	2.57
r80	-8.9023	-8.8911	-8.8143	-8.6183	-8.2818	2.3024	2.3107	2.3185	2.3259	2.332
r81	-7.6363	-7.6251	-7.5484	-7.3524	-7.0159	2.0057	2.0114	2.0168	2.0218	2.026
r82	-5.9673	-5.9561	-5.8793	-5.6833	-5.3468	1.5952	1.5984	1.6014	1.6042	1.606
r83	-3.5892	-3.578	-3.5012	-3.3052	-2.9687	0.97886	0.97987	0.98082	0.98171	0.9825

xxx TABLE:ap_VFI xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c5	c526496	c526497	c526498	c526499	c526500
r1	0	0	0	0	0.0092181	110.06	115.71	121.55	127.62	133.93
r2	0	0	0	0	0.008238	110.03	115.68	121.54	127.62	133.95
r3	0	0	0	0	0.0066341	109.99	115.65	121.53	127.63	133.97
r4	0	0	0	0	0.0058019	110.28	115.95	121.84	127.96	134.33
r5	0	0	0	0	0.004998	110.58	116.27	122.17	128.31	134.69
r79	0	0	0	0	0	81.091	85.229	89.297	93.341	97.382
r80	0	0	0	0	0	75.865	79.539	83.28	87.016	90.669
r81	0	0	0	0	0	67.781	70.521	73.462	76.819	81.091
r82	0	0	0	0	0	50.126	53.467	56.108	57.742	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	0.04363	9.4708	9.6491	9.817	9.9649	1
r2	0.018623	0.019158	0.022901	0.033062	0.04461	9.6414	9.8118	9.9685	10.101	1
r3	0.018623	0.019158	0.022901	0.033062	0.046214	9.8179	9.9779	10.12	10.234	1
r4	0.019354	0.019888	0.023632	0.033792	0.047776	9.9825	10.131	10.258	10.354	1
r5	0.020066	0.020601	0.024344	0.034504	0.04929	10.135	10.272	10.384	10.463	
r79	0.2179	0.21844	0.22216	0.23228	0.25197	34.82	36.506	38.455	40.627	4
r80	0.2179	0.21844	0.22216	0.23228	0.25197	40.033	42.183	44.459	46.938	
r81	0.2179	0.21844	0.22216	0.23228	0.25197	48.106	51.19	54.266	57.123	5
r82	0.2179	0.21844	0.22216	0.23228	0.25197	65.751	68.234	71.611	76.192	7
r83	0.2179	0.21844	0.22216	0.23228	0.25197	115.87	121.69	127.71	133.93	1

Difference Between Value and Choices In Unemployment and Future Periods

```
V_VFI_unemp_drop = V_VFI_ss - V_VFI_unemp;
```

```
ap_VFI_unemp_drop = ap_VFI_ss - ap_VFI_unemp;
cons_VFI_unemp_drop = cons_VFI_ss - cons_VFI_unemp;
```

Define Parameter 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 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') = 15; % how many shock legends to show
mp_support_graph('cl_colors') = 'jet';
```

MEAN(VAL(A,Z) - VAL(A,Z|unemp)), MEAN(AP(A,Z) - AP(A,Z|unemp)), MEAN(C(A,Z) - C(A,Z|unemp))

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(v(A,Z) - v(A,Z|unemp))", V_VFI_unemp_drop, true, ["mean"], 4,
```

```
xxx  MEAN(v(A,Z) - v(A,Z|unemp))  xxxxxxxxxxxxxxxxxxxxxxxxxx
    group     savings      mean_eta_1    mean_eta_2    mean_eta_3    mean_eta_4    mean_eta_5    mean_eta_6    mean_
    _____    _________    __________    __________    __________    __________    __________    __________    ____

      1              0        15.753        14.805        13.912        13.072        12.281        11.536        1
      2     0.00051498        15.337        14.438        13.588        12.785        12.027        11.312        1
      3      0.0041199        12.876        12.241        11.629        11.039        10.472        9.9274        9
```

4	0.013905	8.732	8.4647	8.1866	7.9028	7.6175	7.3333	7
5	0.032959	5.3335	5.2652	5.1704	5.0584	4.9373	4.8124	4
6	0.064373	3.3899	3.3915	3.3682	3.3255	3.2698	3.2074	3

```
% Aprime Choice
tb_az_ap = ff_summ_nd_array("MEAN(AP(A,Z) - AP(A,Z|unemp))", ap_VFI_unemp_drop, true, ["mean"],
```

xxx MEAN(AP(A,Z) - AP(A,Z|unemp)) xxxxxxxxxxxxxxxxxxxxxxxxxx

group	savings	mean_eta_1	mean_eta_2	mean_eta_3	mean_eta_4	mean_eta_5	mean_eta_6	mean_
1	0	0	0	0	0	0	0	6.640
2	0.00051498	0	0	0	3.2355e-07	8.8303e-07	1.3402e-06	1.685
3	0.0041199	1.1212e-05	3.4693e-05	5.9476e-05	6.9903e-05	7.1182e-05	6.7854e-05	6.236
4	0.013905	0.0011498	0.0012034	0.0012469	0.001273	0.0012824	0.0012822	0.00
5	0.032959	0.0039015	0.0041225	0.0043159	0.0044467	0.0045114	0.0045317	0.00
6	0.064373	0.0055048	0.0060139	0.0065548	0.007121	0.007606	0.0079089	0.00

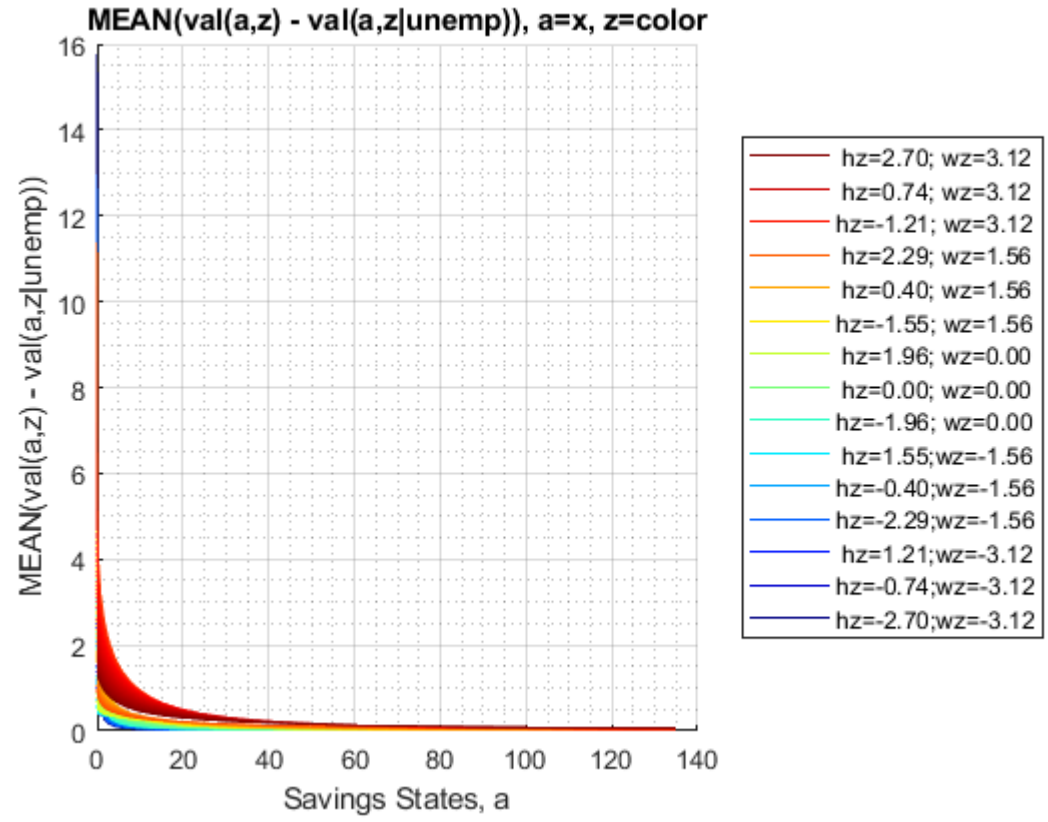
```
% Consumption Choices
tb_az_c = ff_summ_nd_array("MEAN(C(A,Z) - C(A,Z|unemp))", cons_VFI_unemp_drop, true, ["mean"],
```

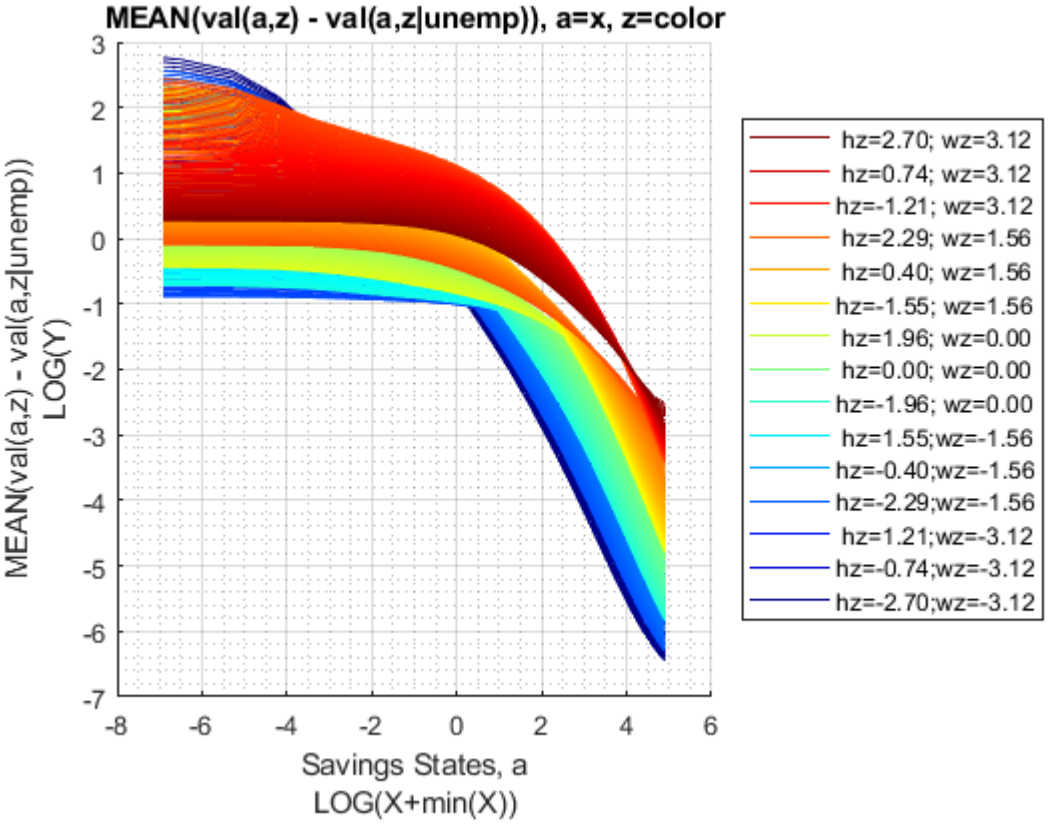
xxx MEAN(C(A,Z) - C(A,Z|unemp)) xxxxxxxxxxxxxxxxxxxxxxxxxx

group	savings	mean_eta_1	mean_eta_2	mean_eta_3	mean_eta_4	mean_eta_5	mean_eta_6	mean_
1	0	0.019317	0.020449	0.021654	0.022935	0.024299	0.02575	0.0
2	0.00051498	0.019317	0.020449	0.021653	0.022934	0.024298	0.025748	0.0
3	0.0041199	0.019303	0.020411	0.021591	0.022862	0.024224	0.025679	0.0
4	0.013905	0.018158	0.019236	0.020397	0.021652	0.023006	0.024457	0.0
5	0.032959	0.015393	0.016304	0.017314	0.018464	0.019763	0.021193	0.0
6	0.064373	0.013769	0.014391	0.015053	0.015767	0.016645	0.017792	0.0

Graph Mean Values Change:

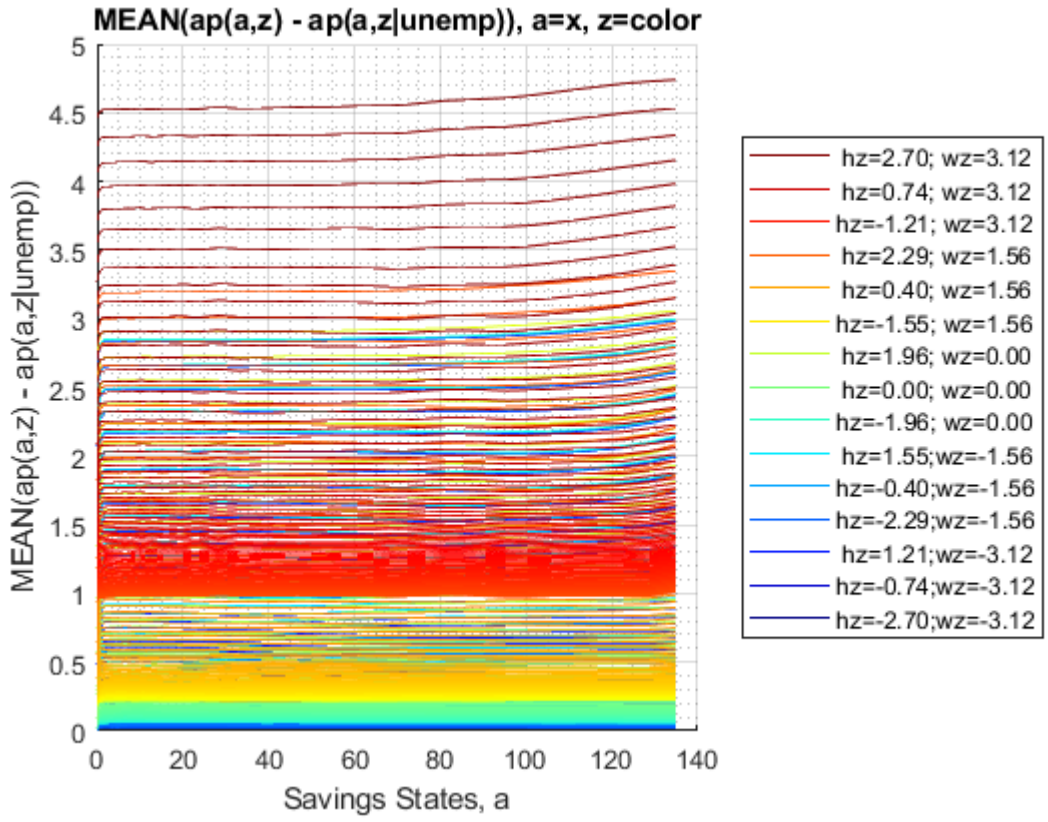
```
mp_support_graph('cl_st_graph_title') = {'MEAN(val(a,z) - val(a,z|unemp)), a=x, z=color'};
mp_support_graph('cl_st_ytitle') = {'MEAN(val(a,z) - val(a,z|unemp))'};
ff_graph_grid((tb_az_v{1:end, 3:end})', ar_st_eta_HS_grid, agrid, mp_support_graph);
```

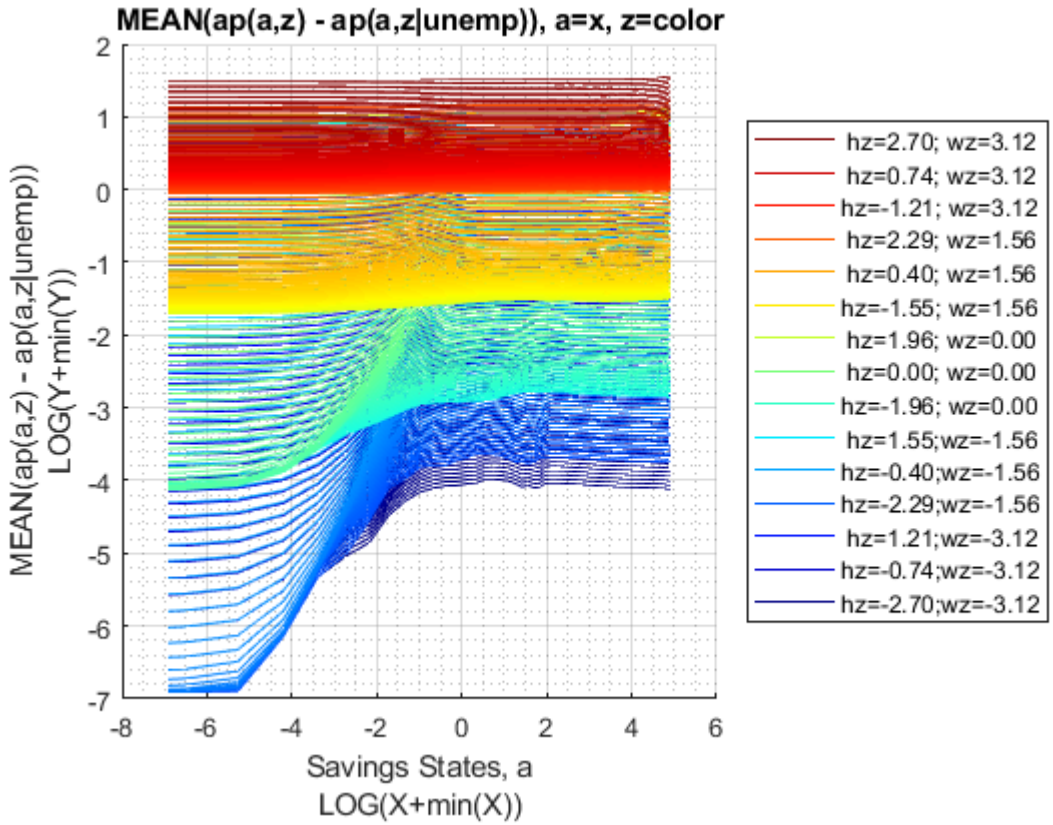




Graph Mean Savings Choices Change:

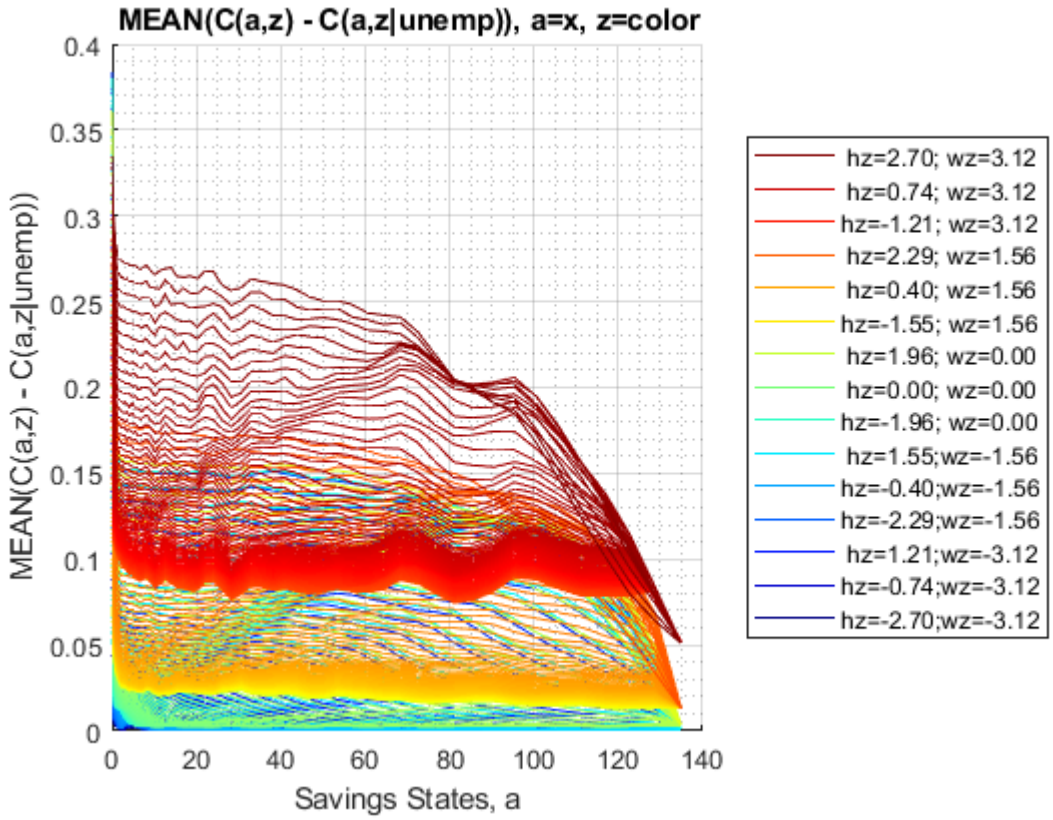
```
mp_support_graph('cl_st_graph_title') = {'MEAN(ap(a,z) - ap(a,z|unemp)), a=x, z=color'};
mp_support_graph('cl_st_ytitle') = {'MEAN(ap(a,z) - ap(a,z|unemp))'};
ff_graph_grid((tb_az_ap{1:end, 3:end})', ar_st_eta_HS_grid, agrid, mp_support_graph);
```

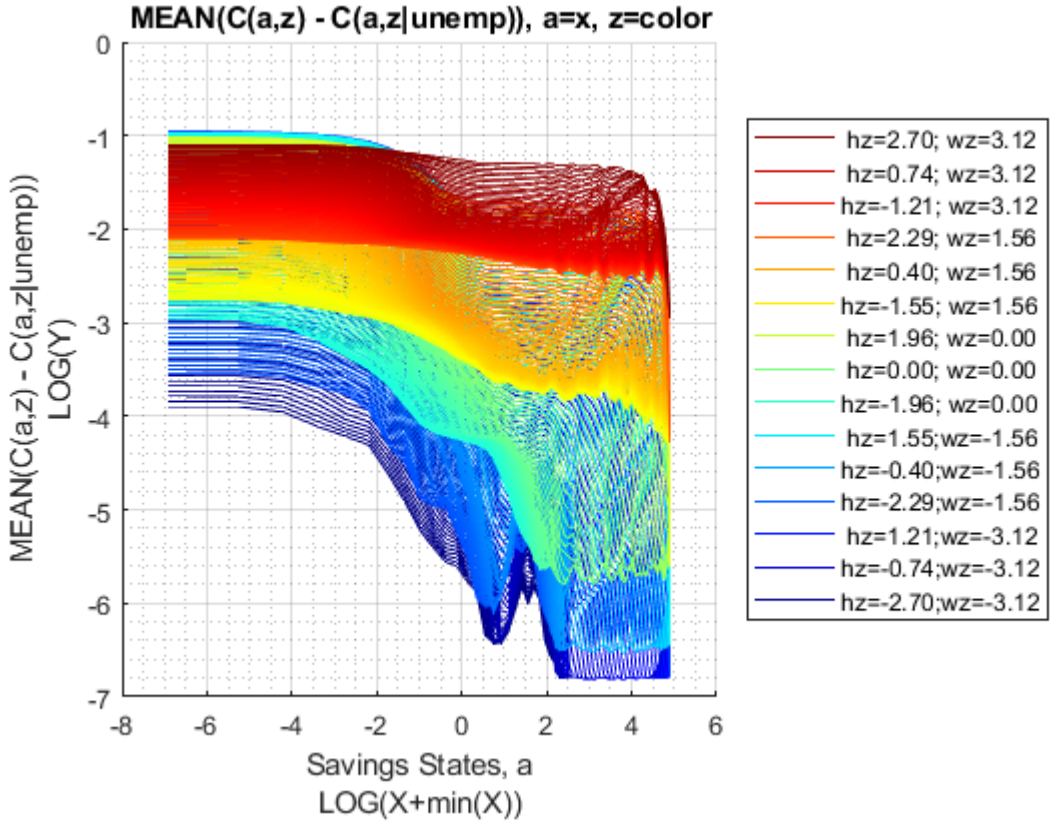




Graph Mean Consumption Change:

```
mp_support_graph('cl_st_graph_title') = {'MEAN(C(a,z) - C(a,z|unemp)), a=x, z=color'};
mp_support_graph('cl_st_ytitle') = {'MEAN(C(a,z) - C(a,z|unemp))'};
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(V(KM,J) - V(KM,J | unemp)), MEAN(ap(KM,J) - ap(KM,J | unemp)), MEAN(c(KM,J) - c(KM,J | unemp))

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(V(KM,J) - V(KM,J | unemp))", V_VFI_unemp_drop, true, ["mean"],
```

```
xxx  MEAN(V(KM,J) - V(KM,J | unemp))  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	0.61637	0.59885	0.58106	0.56498	0.55117	0.53931
2	2	0	0.82734	0.80489	0.78136	0.75704	0.73572	0.71697
3	3	0	0.96755	0.94502	0.92045	0.89136	0.86587	0.84346
4	4	0	1.0948	1.0713	1.045	1.0118	0.9827	0.95713
5	5	0	1.2011	1.1779	1.151	1.1149	1.0833	1.0556
6	1	1	0.76784	0.74924	0.73091	0.71544	0.70238	0.69155
7	2	1	0.93021	0.90698	0.88323	0.86203	0.84347	0.82724
8	3	1	1.0185	0.9941	0.96877	0.94495	0.92408	0.9058
9	4	1	1.1171	1.0915	1.0645	1.0382	1.0151	0.99478
10	5	1	1.1585	1.1346	1.1083	1.0807	1.0569	1.0362

```
% Aprime Choice
tb_az_ap = ff_summ_nd_array("MEAN(ap(KM,J) - ap(KM,J | unemp))", ap_VFI_unemp_drop, true, ["mea
```

```
xxx  MEAN(ap(KM,J) - ap(KM,J | unemp))  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	0.54429	0.54157	0.53838	0.57688	0.61527	0.6532
2	2	0	0.53828	0.53451	0.53011	0.56791	0.60562	0.64305
3	3	0	0.53173	0.52734	0.52253	0.55991	0.59734	0.63445
4	4	0	0.5276	0.523	0.51797	0.55513	0.59235	0.62931
5	5	0	0.52354	0.51894	0.51381	0.55085	0.58805	0.62503
6	1	1	1.1323	1.1757	1.2198	1.3119	1.4048	1.4978
7	2	1	1.0396	1.0753	1.1115	1.1942	1.2777	1.361
8	3	1	0.97097	1.002	1.0331	1.1097	1.187	1.2641
9	4	1	0.89591	0.92257	0.94909	1.0212	1.0937	1.1657
10	5	1	0.78017	0.79798	0.81575	0.87811	0.94079	1.0033

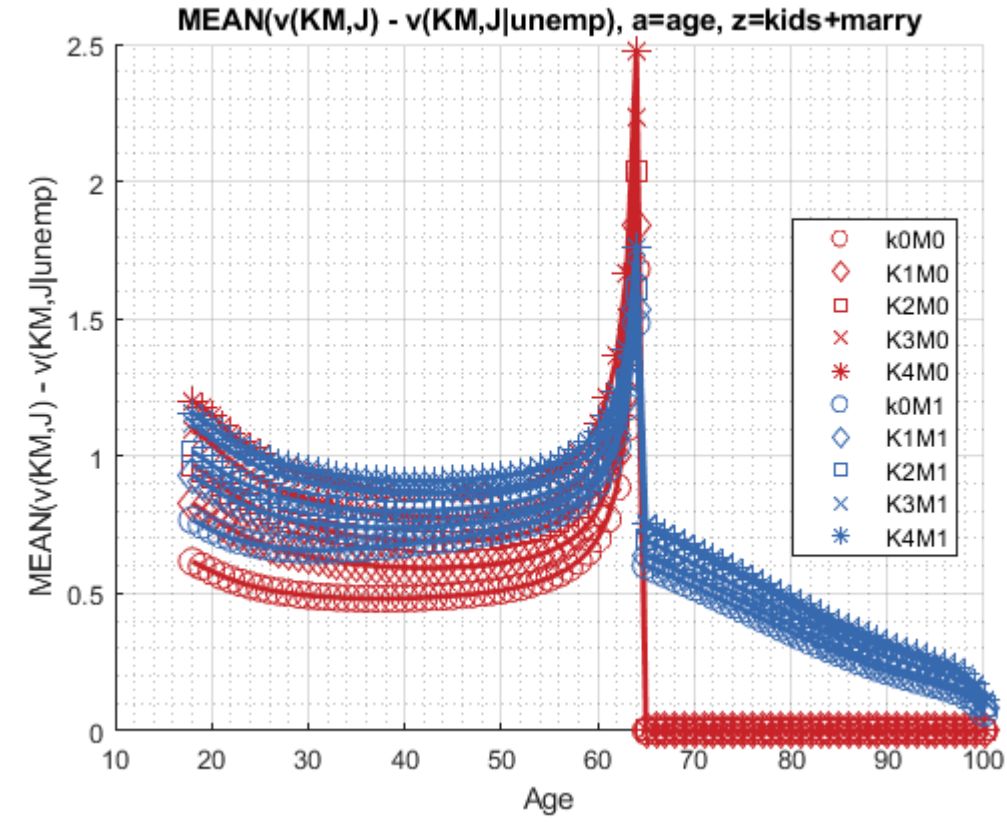
```
% Consumption Choices
tb_az_c = ff_summ_nd_array("MEAN(c(KM,J) - c(KM,J | unemp))", cons_VFI_unemp_drop, true, ["mean
```

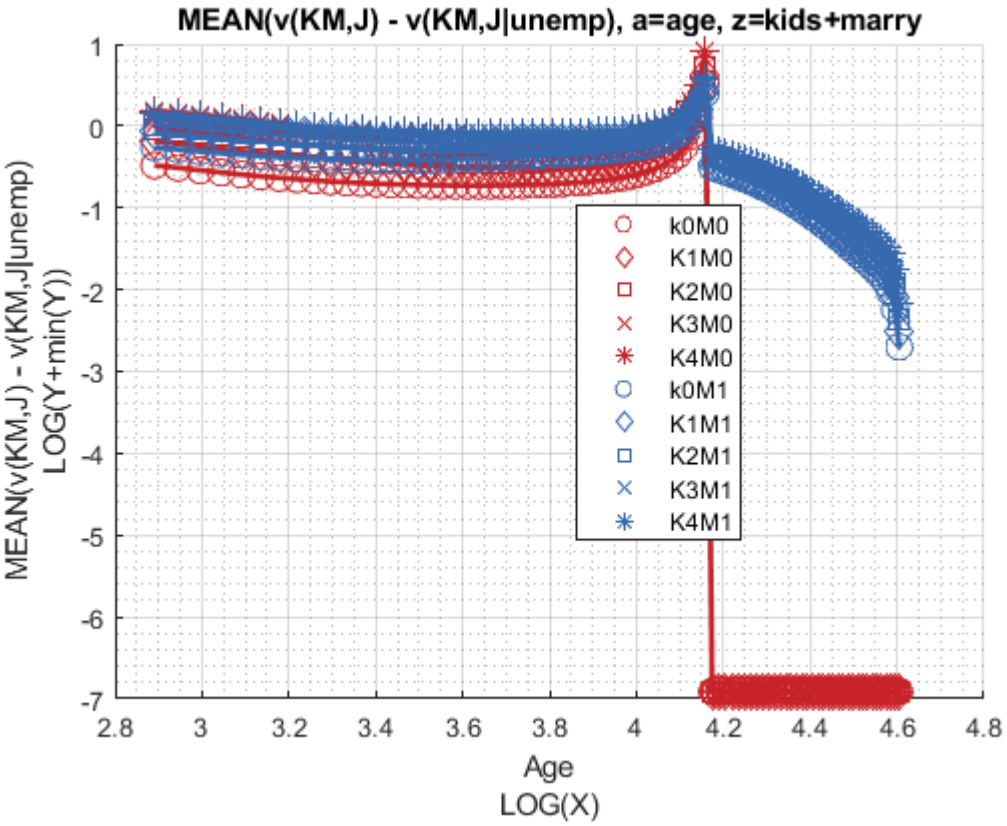
```
xxx  MEAN(c(KM,J) - c(KM,J | unemp))  xxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	kids	marry	mean_age_18	mean_age_19	mean_age_20	mean_age_21	mean_age_22	mean_age_23
1	1	0	0.050084	0.052801	0.055995	0.056344	0.056497	0.056525
2	2	0	0.056094	0.059866	0.064267	0.065317	0.06615	0.066684
3	3	0	0.062643	0.067034	0.071841	0.073312	0.074434	0.07528
4	4	0	0.06677	0.071371	0.076406	0.078097	0.079421	0.080419
5	5	0	0.07083	0.075431	0.080561	0.082377	0.083719	0.084705
6	1	1	0.091654	0.09722	0.1029	0.10693	0.11041	0.11363
7	2	1	0.087426	0.093165	0.099035	0.10362	0.10765	0.11146
8	3	1	0.089332	0.094467	0.10022	0.10478	0.10884	0.11271
9	4	1	0.095488	0.099656	0.10451	0.10733	0.10981	0.11241
10	5	1	0.1018	0.10631	0.11124	0.11381	0.11605	0.11801

Graph Mean Values Change:

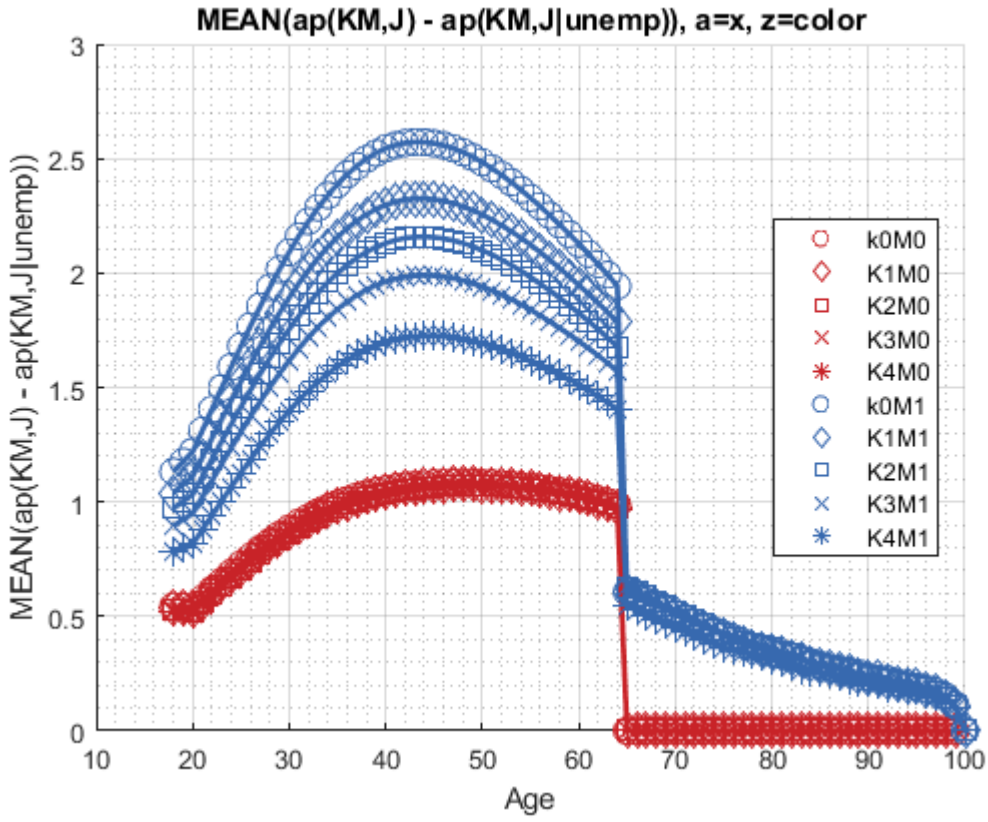
```
mp_support_graph('cl_st_graph_title') = {'MEAN(v(KM,J) - v(KM,J|unemp), a=age, z=kids+marry'};
mp_support_graph('cl_st_ytitle') = {'MEAN(v(KM,J) - v(KM,J|unemp)'};
ff_graph_grid((tb_az_v{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```

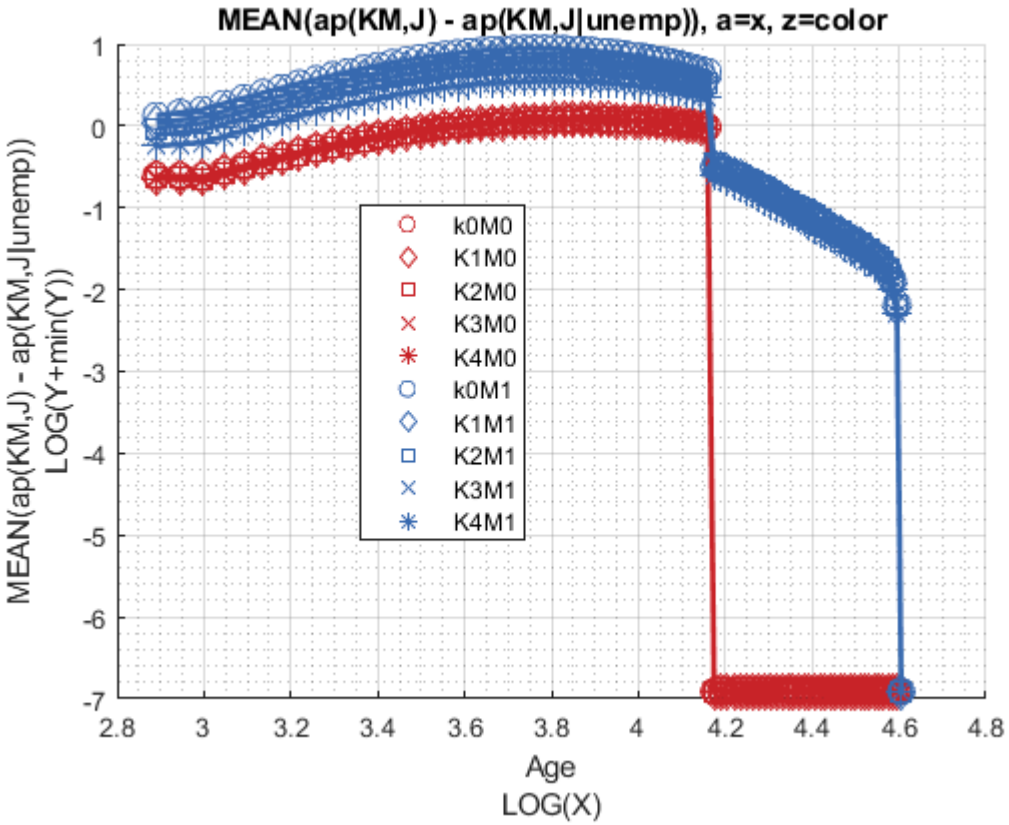




Graph Mean Savings Choices Change:

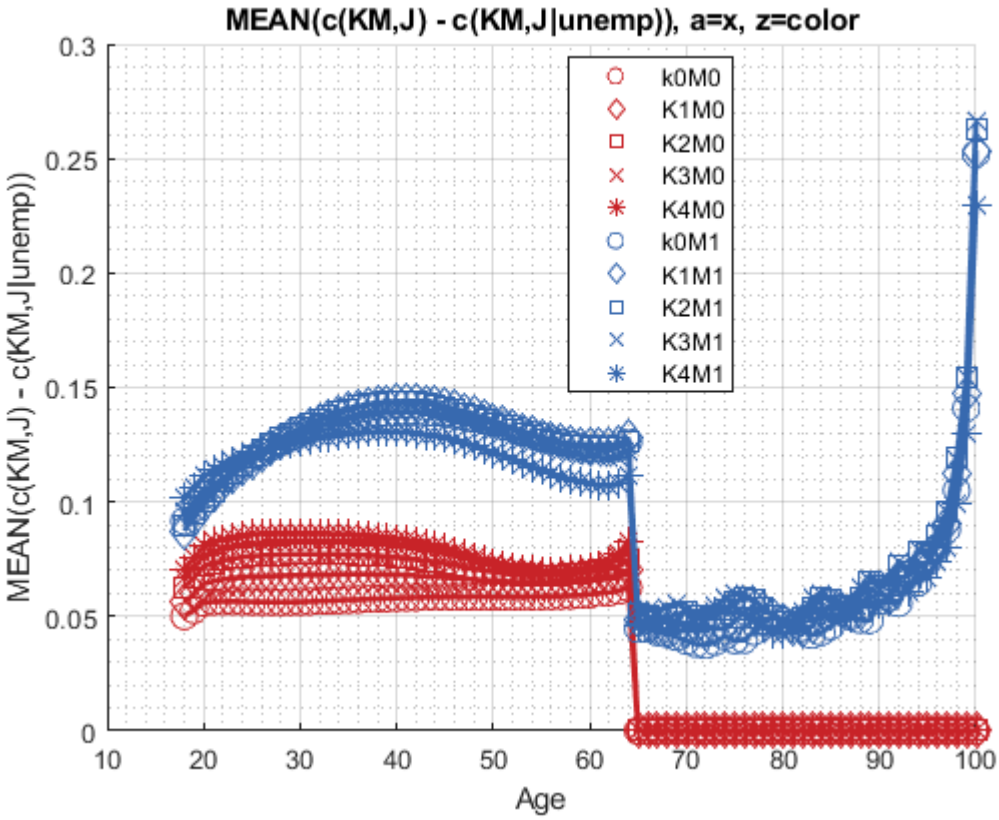
```
mp_support_graph('cl_st_graph_title') = {'MEAN(ap(KM,J) - ap(KM,J|unemp)), a=x, z=color'};
mp_support_graph('cl_st_ytitle') = {'MEAN(ap(KM,J) - ap(KM,J|unemp))'};
ff_graph_grid((tb_az_ap{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```

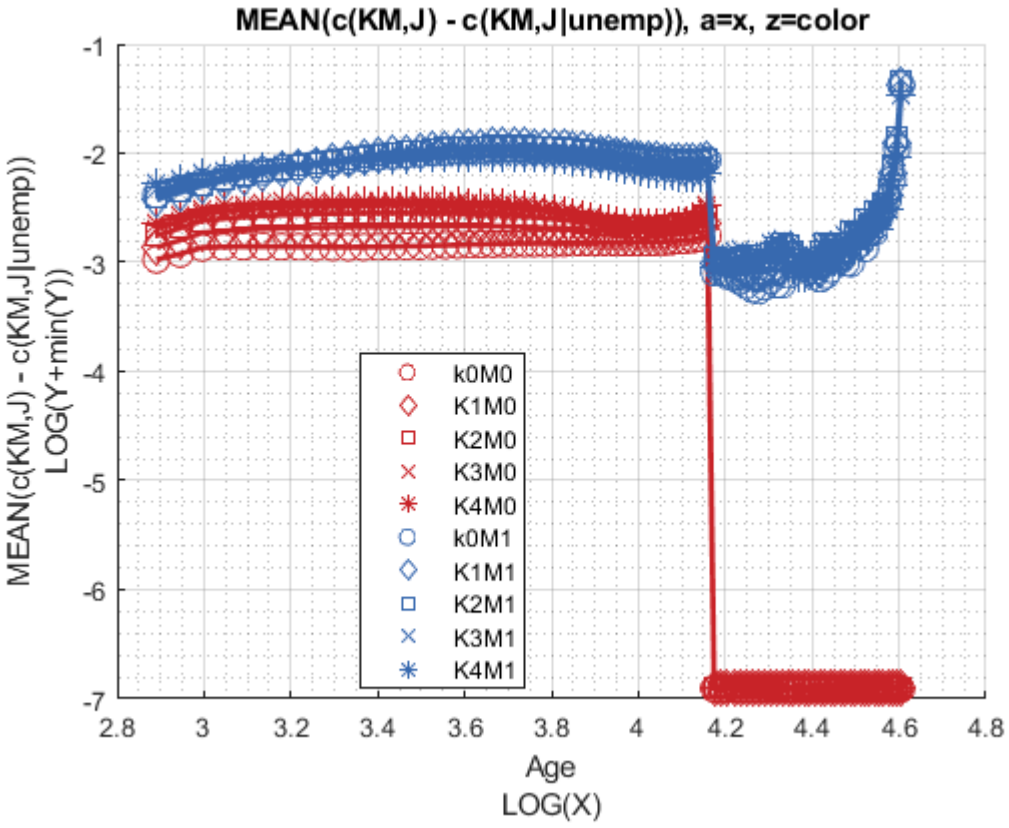




Graph Mean Consumption Change:

```
mp_support_graph('cl_st_graph_title') = {'MEAN(c(KM,J) - c(KM,J|unemp)), a=x, z=color'};
mp_support_graph('cl_st_ytitle') = {'MEAN(c(KM,J) - c(KM,J|unemp))'};
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(v(EKM,J) - v(EKM,J|unemp)), MEAN(ap(EM,J) - ap(EM,J|unemp)), MEAN(c(EM,J) - c(EM,J|unemp))

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(v(EM,J) - v(EM,J|unemp))", V_VFI_unemp_drop, true, ["mean"], 3
```

```
xxx  MEAN(v(EM,J) - v(EM,J|unemp))  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         0.98303        0.96405        0.94385        0.92458        0.90689        0.89065
```

2	1	0	0.89982	0.87513	0.84768	0.81144	0.78062	0.75436
3	0	1	1.0503	1.0306	1.0104	0.99222	0.97585	0.96111
4	1	1	0.94657	0.91993	0.89191	0.86431	0.84092	0.82113

```
% Aprime Choice
tb_az_ap = ff_summ_nd_array("MEAN(ap(EM,J) - ap(EM,J|unemp))", ap_VFI_unemp_drop, true, ["mean"
```

xxx MEAN(ap(EM,J) - ap(EM,J|unemp)) 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	0.54395	0.54191	0.53951	0.56214	0.58423	0.60576
2	1	0	0.52222	0.51623	0.50961	0.56213	0.61523	0.66826
3	0	1	0.93033	0.95904	0.98801	1.0446	1.1011	1.1571
4	1	1	0.99726	1.0304	1.0637	1.1614	1.2605	1.3597

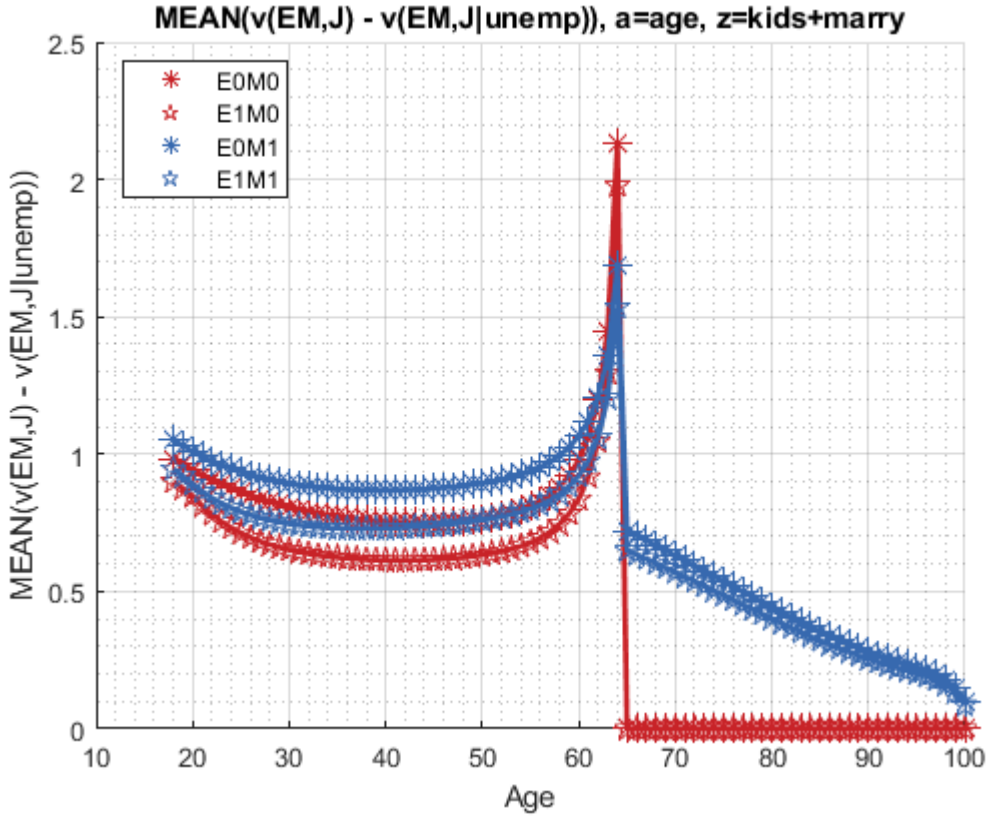
```
% Consumption Choices
tb_az_c = ff_summ_nd_array("MEAN(c(EM,J) - c(EM,J|unemp))", cons_VFI_unemp_drop, true, ["mean"]
```

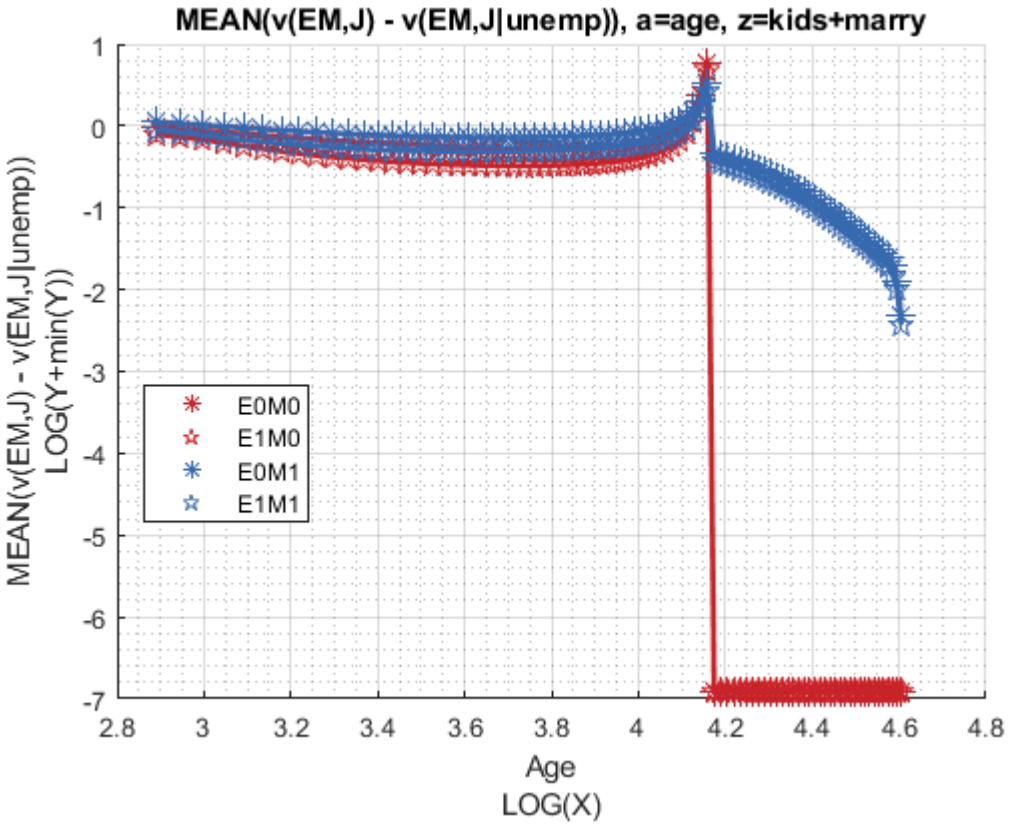
xxx MEAN(c(EM,J) - c(EM,J|unemp)) xxxxxxxxxxxxxxxxxxxxxxxxxxx

group	edu	marry	mean_age_18	mean_age_19	mean_age_20	mean_age_21	mean_age_22	mean_age_23
1	0	0	0.05042	0.052463	0.054861	0.055684	0.056488	0.05722
2	1	0	0.072148	0.078138	0.084767	0.086495	0.0876	0.088226
3	0	1	0.079245	0.082789	0.086633	0.089336	0.091941	0.094543
4	1	1	0.10704	0.11354	0.12053	0.12525	0.12917	0.13274

Graph Mean Values Change:

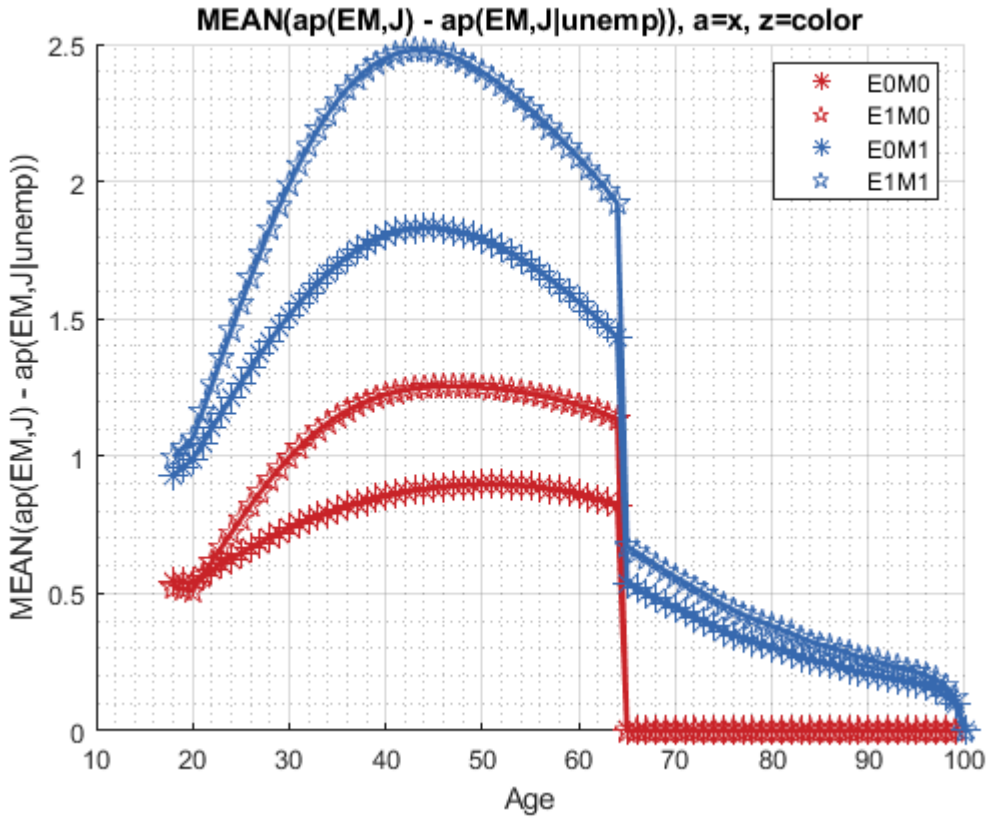
```
mp_support_graph('cl_st_graph_title') = {'MEAN(v(EM,J) - v(EM,J|unemp)), a=age, z=kids+marry'};
mp_support_graph('cl_st_ytitle') = {'MEAN(v(EM,J) - v(EM,J|unemp))'};
ff_graph_grid((tb_az_v{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```

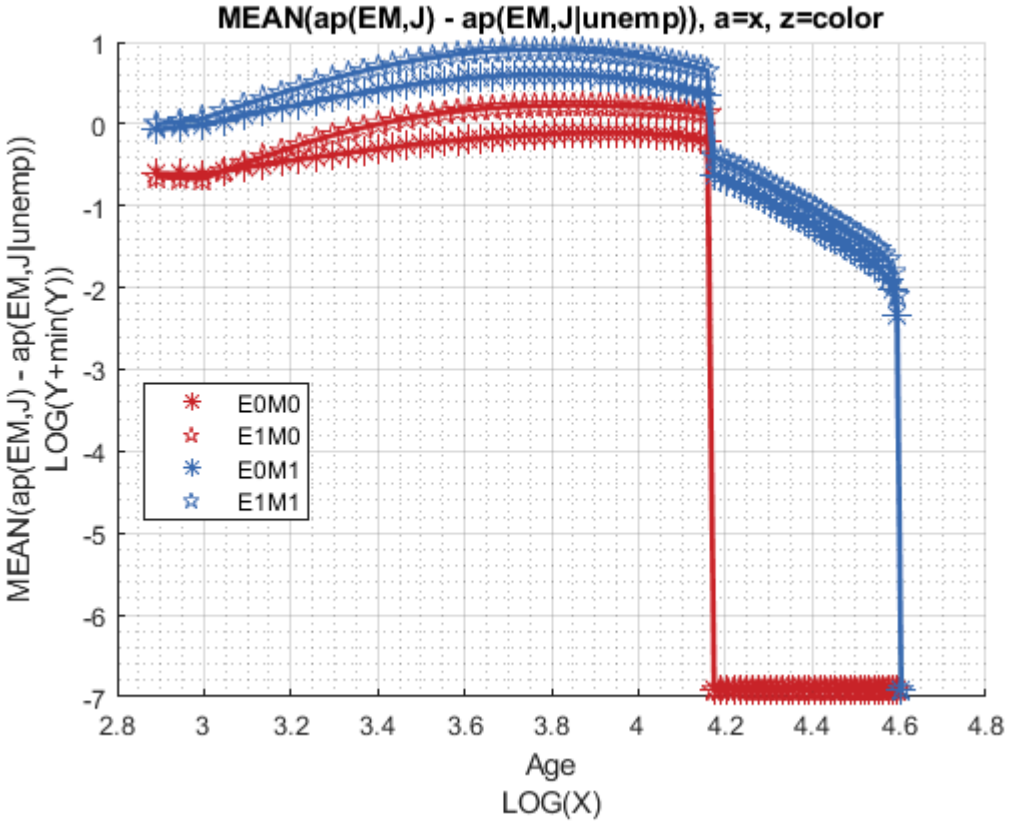




Graph Mean Savings Choices Change:

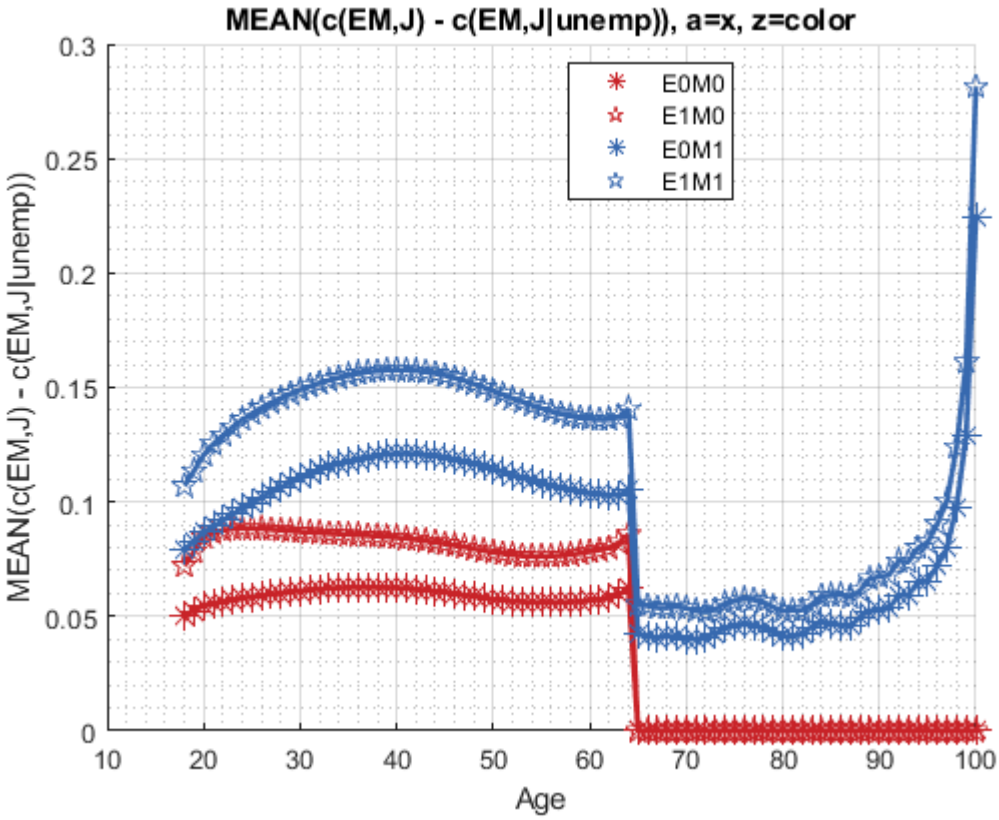
```
mp_support_graph('cl_st_graph_title') = {'MEAN(ap(EM,J) - ap(EM,J|unemp)), a=x, z=color'};
mp_support_graph('cl_st_ytitle') = {'MEAN(ap(EM,J) - ap(EM,J|unemp))'};
ff_graph_grid((tb_az_ap{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```

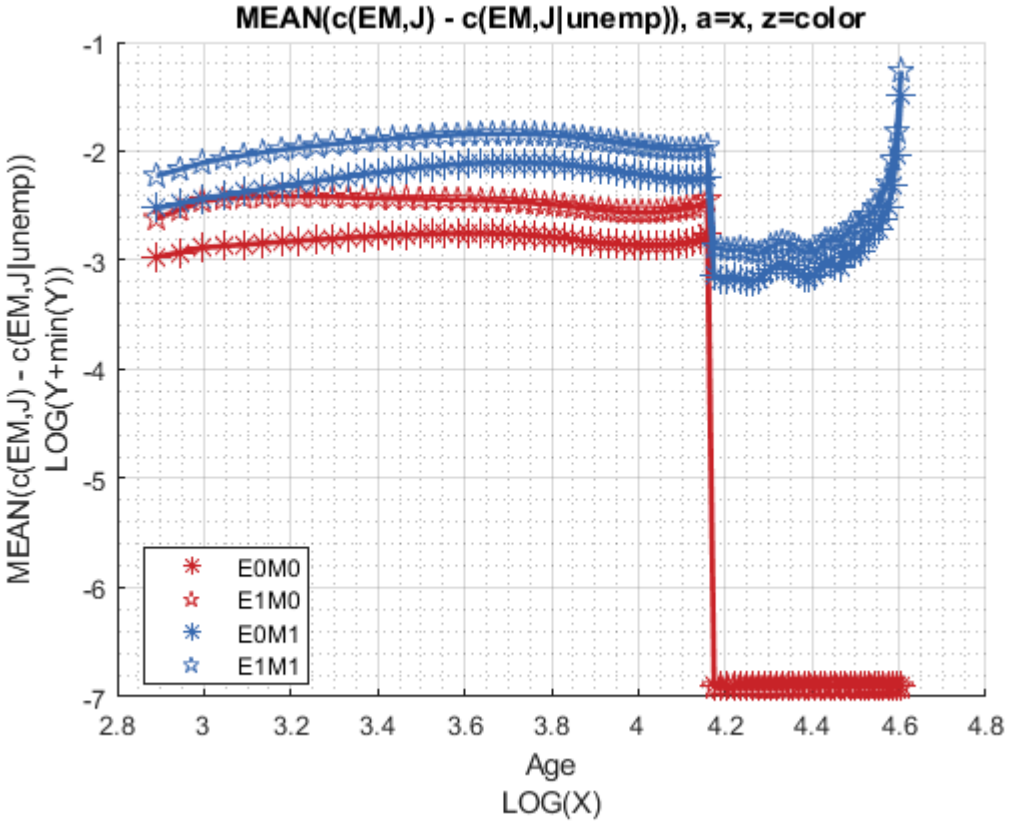




Graph Mean Consumption Change:

```
mp_support_graph('cl_st_graph_title') = {'MEAN(c(EM,J) - c(EM,J|unemp)), a=x, z=color'};
mp_support_graph('cl_st_ytitle') = {'MEAN(c(EM,J) - c(EM,J|unemp))'};
ff_graph_grid((tb_az_c{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```




MEAN(c(EM,J) - c(EM,J|unemp)), a=x, z=color
MEAN(c(EM,J) - c(EM,J|unemp))
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