2020 Full States EV and EC of One Check

This is the example vignette for function: **snw_evuvw20_jaeemk** from the **PrjOptiSNW Package**. 2020 integrated over VU and VW

Test SNW_EVUVW20_JAEEMK Defaults Dense

VFI and Distribution

Call the function with defaults.

```
clear all;
st_solu_type = 'bisec_vec';

% Solve the VFI Problem and get Value Function
mp_params = snw_mp_param('default_docdense');
mp_controls = snw_mp_control('default_test');

% set Unemployment Related Variables
xi=0.5; % Proportional reduction in income due to unemployment (xi=0 refers to 0 labor income;
b=0; % Unemployment insurance replacement rate (b=0 refers to no UI benefits; b=1 refers to 100
TR=100/58056; % Value of a welfare check (can receive multiple checks). TO DO: Update with alte

mp_params('xi') = xi;
mp_params('b') = b;
mp_params('TR') = TR;

% Solve for Unemployment Values
mp_controls('bl_print_vfi') = false;
mp_controls('bl_print_ds') = false;
mp_controls('bl_print_ds_verbose') = false;
mp_controls('bl_print_precompute') = false;
mp_controls('bl_print_precompute_verbose') = false;
mp_controls('bl_print_a4chk') = false;
mp_controls('bl_print_a4chk_verbose') = false;
mp_controls('bl_print_evuvw20_jaeemk') = false;
mp_controls('bl_print_evuvw20_jaeemk_verbose') = false;

% Solve the Model to get V working and unemployed
[V_ss,ap_ss,cons_ss,mp_valpol_more_ss] = snw_vfi_main_bisec_vec(mp_params, mp_controls);
```

```
Completed SNW_VFI_MAIN_BISEC_VEC;SNW_MP_PARAM=default_dense;SNW_MP_CONTROL=default_test;time=20.6119
```

```
inc_VFI = mp_valpol_more_ss('inc_VFI');
spouse_inc_VFI = mp_valpol_more_ss('spouse_inc_VFI');
total_inc_VFI = inc_VFI + spouse_inc_VFI;
% Solve unemployment
[V_unemp,~,cons_unemp,~] = snw_vfi_main_bisec_vec(mp_params, mp_controls, V_ss);
```

```
Completed SNW_VFI_MAIN_BISEC_VEC 1 Period Unemp Shock;SNW_MP_PARAM=default_dense;SNW_MP_CONTROL=default_test;time=16
```

```
[Phi_true] = snw_ds_main(mp_params, mp_controls, ap_ss, cons_ss, mp_valpol_more_ss);
```

```
Completed SNW_DS_MAIN;SNW_MP_PARAM=default_dense;SNW_MP_CONTROL=default_test;time=51.8429
```

```
% Get Matrixes
cl_st_precompute_list = {'a', ...
    'inc', 'inc_unemp', 'spouse_inc', 'spouse_inc_unemp', 'ref_earn_wageind_grid'};
mp_controls('bl_print_precompute_verbose') = false;
[mp_precompute_res] = snw_hh_precompute(mp_params, mp_controls, cl_st_precompute_list, ap_ss, F
```

```
Wage quintile cutoffs=0.49295      0.79302       1.3138       2.1063
Completed SNW_HH_PRECOMPUTE;SNW_MP_PARAM=default_dense;SNW_MP_CONTROL=default_test;time cost=23.0315
```

Solve for 2020 Evuvw With 0 and 2 Checks

```
% Call Function
welf_checks = 0;
[ev20_jaeemk_check0, ec20_jaeemk_check0] = snw_evuvw20_jaeemk(...
    welf_checks, st_solu_type, mp_params, mp_controls, ...
    V_ss, cons_ss, V_unemp, cons_unemp, mp_precompute_res);
```

```
Completed SNW_A4CHK_UNEMP_BISEC_VEC;welf_checks=0;TR=0.0017225;xi=0.5;b=0;SNW_MP_PARAM=default_dense;SNW_MP_CONTROL=
Completed SNW_A4CHK_WRK_BISEC_VEC;welf_checks=0;TR=0.0017225;SNW_MP_PARAM=default_dense;SNW_MP_CONTROL=default_test;
Completed SNW_EVUVW20_JAEEMK;SNW_MP_PARAM=default_dense;SNW_MP_CONTROL=default_test;timeEUEC=0.64818
```

```
% Call Function
welf_checks = 2;
[ev20_jaeemk_check2, ec20_jaeemk_check2] = snw_evuvw20_jaeemk(...
    welf_checks, st_solu_type, mp_params, mp_controls, ...
    V_ss, cons_ss, V_unemp, cons_unemp, mp_precompute_res);
```

```
Completed SNW_A4CHK_UNEMP_BISEC_VEC;welf_checks=2;TR=0.0017225;xi=0.5;b=0;SNW_MP_PARAM=default_dense;SNW_MP_CONTROL=
Completed SNW_A4CHK_WRK_BISEC_VEC;welf_checks=2;TR=0.0017225;SNW_MP_PARAM=default_dense;SNW_MP_CONTROL=default_test;
Completed SNW_EVUVW20_JAEEMK;SNW_MP_PARAM=default_dense;SNW_MP_CONTROL=default_test;timeEUEC=0.44581
```

Differences between Checks in Expected Value and Expected Consumption

```
mn_V_U_gain_check = ev20_jaeemk_check2 - ev20_jaeemk_check0;
mn_MPC_U_gain_share_check = (ec20_jaeemk_check2 - ec20_jaeemk_check0)./(welf_checks*mp_params('
```

Dense Param Results Define Frames

Define the matrix dimensions names and dimension vector values. Policy and Value Functions share the same ND dimensional structure.

```
% Grids:
age_grid = 18:100;
agrid = mp_params('agrid')';
eta_H_grid = mp_params('eta_H_grid')';
eta_S_grid = mp_params('eta_S_grid')';
ar_st_eta_HS_grid = string(cellstr([num2str(eta_H_grid', 'hz=%3.2f;'), num2str(eta_S_grid', 'wz
edu_grid = [0,1];
marry_grid = [0,1];
kids_grid = (1:1:mp_params('n_kidsgrid'))';
% NaN(n_jgrid,n_agrid,n_etagrid,n_educgrid,n_marriedgrid,n_kidsgrid);
cl_mp_datasetdesc = {};
cl_mp_datasetdesc{1} = containers.Map({'name', 'labval'}, {'age', age_grid});
```

```
cl_mp_datasetdesc{2} = containers.Map({'name', 'labval'}, {'savings', agrid});
cl_mp_datasetdesc{3} = containers.Map({'name', 'labval'}, {'eta', 1:length(eta_H_grid)});
cl_mp_datasetdesc{4} = containers.Map({'name', 'labval'}, {'edu', edu_grid});
cl_mp_datasetdesc{5} = containers.Map({'name', 'labval'}, {'marry', marry_grid});
cl_mp_datasetdesc{6} = containers.Map({'name', 'labval'}, {'kids', kids_grid});
```

Analyze Difference in V and C with Check

The difference between V and V with Check, marginal utility gain given the check.

```
% Generate some Data
mp_support_graph = containers.Map('KeyType', 'char', 'ValueType', 'any');
mp_support_graph('cl_st_xtitle') = {'Savings States, a'};
mp_support_graph('st_legend_loc') = 'eastoutside';
mp_support_graph('bl_graph_logy') = true; % do not log
mp_support_graph('it_legend_select') = 21; % how many shock legends to show
mp_support_graph('cl_colors') = 'jet';
```

MEAN(MN_V_GAIN_CHECK(A,Z))

Tabulate value and policies along savings and shocks:

```
% Set
ar_permute = [1,4,5,6,3,2];
% Value Function
st_title = ['MEAN(MN_V_U_GAIN_CHECK(A,Z)), welf_checks=' num2str(welf_checks) ', TR=' num2str(m
tb_az_v = ff_summ_nd_array(st_title, mn_V_U_gain_check, true, ["mean"], 4, 1, cl_mp_datasetdesc
```

```
xxx  MEAN(MN_V_U_GAIN_CHECK(A,Z)), welf_checks=2, TR=0.0017225  xxxxxxxxxxxxxxxxxxxxxxxxxxx
    group     savings      mean_eta_1    mean_eta_2    mean_eta_3    mean_eta_4    mean_eta_5    mean_eta_6    mean_
    _____    __________    __________    __________    __________    __________    __________    __________    _____

      1               0       0.27912       0.11616      0.067433      0.053393      0.049158      0.047687       0.
      2      0.00085734       0.27485       0.11517      0.066984      0.053023      0.048799      0.047329      0.0
      3       0.0068587       0.23632       0.10481      0.062008      0.048905      0.044801       0.04335      0.0
      4        0.023148        0.1863       0.08898      0.054024      0.042348      0.038458      0.037046      0.0
      5         0.05487       0.14109      0.071528      0.044733      0.034862      0.031271      0.029909      0.0
      6         0.10717       0.10829      0.056442      0.036039      0.027915      0.024677      0.023377      0.0
      7         0.18519      0.087242      0.046352       0.02987      0.023041      0.020157      0.018927       0.
      8         0.29407      0.072208      0.039367      0.025433      0.019424      0.016782      0.015628      0.0
      9         0.43896      0.060221      0.033761      0.021874      0.016469      0.014026      0.012929      0.0
     10           0.625      0.050442      0.029129      0.018949      0.014075      0.011802      0.010759      0.0
     11         0.85734      0.042316      0.025218      0.016484      0.012083     0.0099683     0.0089837      0.00
     12          1.1411      0.035502      0.021857      0.014374      0.010409     0.0084519     0.0075155      0.00
     13          1.4815      0.029772       0.01894      0.012549     0.0089945     0.0071841     0.0063034      0.00
     14          1.8836      0.024956      0.016396      0.010963     0.0077932     0.0061208     0.0052935      0.00
     15          2.3525      0.020913      0.014175     0.0095793     0.0067677     0.0052312     0.0044577      0.00
     16          2.8935       0.01753      0.012238      0.008369     0.0058896     0.0044819      0.003759      0.00
     17          3.5117      0.014702      0.010552     0.0073101     0.0051351     0.0038505     0.0031792      0.00
     18          4.2121      0.012342     0.0090878      0.006382     0.0044849     0.0033193     0.0026984      0.00
     19               5      0.010373     0.0078203     0.0055676     0.0039231     0.0028711     0.0022965      0.00
     20          5.8805     0.0087301     0.0067252     0.0048575     0.0034361      0.002492     0.0019615       0.0
     21          6.8587     0.0073585     0.0057817      0.004238     0.0030132     0.0021701     0.0016824      0.00
     22          7.9398     0.0062131     0.0049708     0.0036966     0.0026454      0.001896     0.0014485      0.00
     23          9.1289     0.0052558     0.0042752     0.0032257     0.0023256     0.0016619     0.0012519      0.00
     24          10.431     0.0044552     0.0036794     0.0028167      0.002047     0.0014609     0.0010864     0.000
     25          11.852     0.0037847     0.0031694     0.0024609     0.0018039     0.0012875    0.00094651     0.000
     26          13.396     0.0032224     0.0027332     0.0021515     0.0015915     0.0011375    0.00082806     0.000
     27          15.069     0.0027501       0.00236     0.0018824     0.0014053     0.0010072    0.00072742     0.000
     28          16.875     0.0023527     0.0020407     0.0016483      0.001242    0.00089377    0.00064142    0.000
     29           18.82     0.0020176     0.0017673     0.0014445     0.0010993     0.0007946    0.00056753    0.000
     30           20.91     0.0017343     0.0015329     0.0012672    0.00097404    0.00070765     0.0005038    0.000
     31          23.148     0.0014944     0.0013318     0.0011128    0.00086375    0.00063126    0.00044868    0.000
     32          25.541     0.0012908     0.0011591    0.00097818    0.00076679    0.00056405    0.00040076    0.000
     33          28.093     0.0011176     0.0010105     0.0008609    0.00068159    0.00050477     0.0003589    0.000
     34           30.81    0.00096988    0.00088251    0.00075856    0.00060649    0.00045237    0.00032217    0.000
     35          33.697     0.0008436    0.00077212    0.00066925    0.00054025    0.00040595    0.00028984    0.000
     36          36.758    0.00073542    0.00067675     0.0005912    0.00048173    0.00036464    0.00026127    0.000
     37              40    0.00064253    0.00059424    0.00052296    0.00043001    0.00032792    0.00023595    0.000
     38          43.427    0.00056261    0.00052272    0.00046322    0.00038423    0.00029534    0.00021344    0.000
     39          47.044    0.00049368    0.00046065    0.00041086    0.00034368    0.00026633    0.00019338    0.000
     40          50.856    0.00043412    0.00040667    0.00036494    0.00030774     0.0002404    0.00017546    0.000
     41           54.87    0.00038251    0.00035966    0.00032459    0.00027584    0.00021718    0.00015944    0.000
     42          59.089    0.00033773    0.00031865    0.00028912    0.00024751    0.00019642    0.00014507    0.000
     43          63.519    0.00029877    0.00028279    0.00025789    0.00022233    0.00017785    0.00013216    9.401
     44          68.164    0.00026481     0.0002514    0.00023035    0.00019993    0.00016119    0.00012053    8.602
     45          73.032    0.00023517    0.00022388    0.00020604    0.00017998    0.00014624    0.00011006    7.887
     46          78.125    0.00020923    0.00019969    0.00018455     0.0001622    0.00013279    0.00010058    7.245
     47           83.45    0.00018648    0.00017841    0.00016553    0.00014633    0.00012068    9.1999e-05    6.669
     48          89.011    0.00016649    0.00015965    0.00014868    0.00013216    0.00010978    8.4257e-05    6.152
     49          94.815    0.00014891     0.0001431    0.00013373    0.00011949     9.995e-05    7.7256e-05    5.688
     50          100.87    0.00013342    0.00012846    0.00012044    0.00010816    9.1084e-05    7.0912e-05    5.275
     51          107.17    0.00011973     0.0001155    0.00010862    9.8007e-05     8.308e-05    6.5154e-05    4.909
     52          113.73    0.00010762      0.000104    9.8089e-05    8.8914e-05    7.5856e-05    5.9928e-05    4.588
     53          120.55    9.6907e-05    9.3809e-05     8.873e-05    8.0788e-05    6.9365e-05    5.5235e-05    4.315
     54          127.64    8.7567e-05    8.4918e-05    8.0546e-05    7.3655e-05     6.364e-05    5.1109e-05    4.094
     55             135    8.7567e-05    8.4918e-05    8.0546e-05    7.3656e-05    6.3641e-05    5.1109e-05    4.094
```

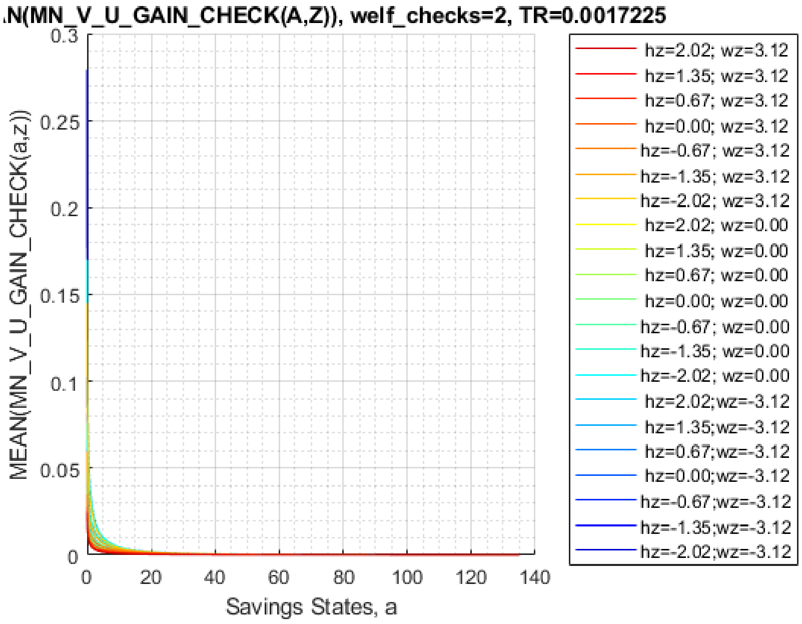
```
% Consumption
st_title = ['MEAN(MN_MPC_U_GAIN_CHECK(A,Z)), welf_checks=' num2str(welf_checks) ', TR=' num2str
tb_az_c = ff_summ_nd_array(st_title, mn_MPC_U_gain_share_check, true, ["mean"], 4, 1, cl_mp_dat
```

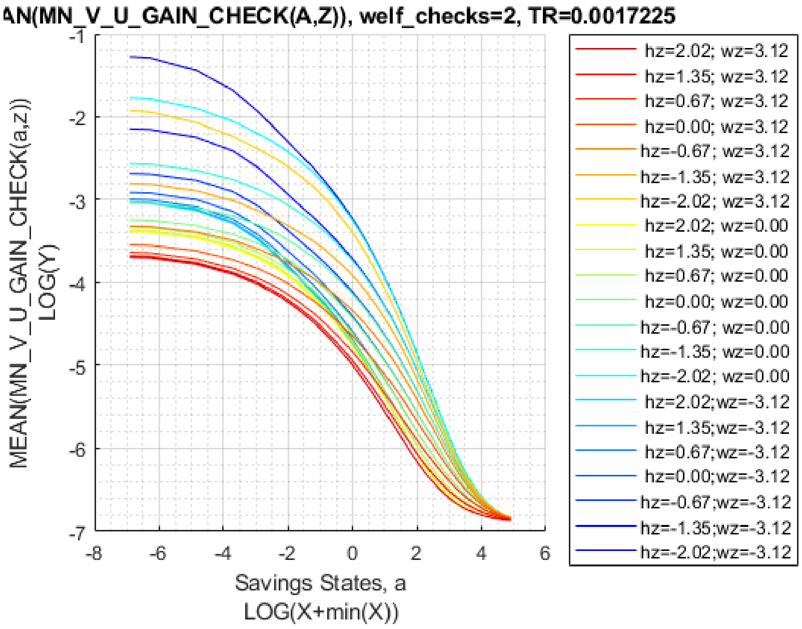
```
xxx  MEAN(MN_MPC_U_GAIN_CHECK(A,Z)), welf_checks=2, TR=0.0017225  xxxxxxxxxxxxxxxxxxxxxxxxxxx
    group     savings      mean_eta_1    mean_eta_2    mean_eta_3    mean_eta_4    mean_eta_5    mean_eta_6    mean_
    _____    __________    __________    __________    __________    __________    __________    __________    ____

      1               0       0.9469       0.94276        0.8717       0.79605        0.7222        0.6457        0.5
      2      0.00085734      0.93411        0.9349       0.86947       0.79402       0.72155       0.64512        0.5
      3       0.0068587      0.81862       0.82623       0.78945       0.74561        0.6858        0.6149        0.5
      4        0.023148      0.71821       0.72464       0.70291       0.65987       0.61284       0.55283        0.4
      5         0.05487      0.65702       0.66511       0.64788       0.60732       0.55769       0.51161        0.4
      6         0.10717      0.54356       0.56685       0.56196       0.52654       0.48344       0.43245        0.3
      7         0.18519      0.34762       0.37134        0.3935       0.38764       0.35935        0.3156        0.2
      8         0.29407      0.27014       0.27012       0.26968        0.2781       0.27577       0.25618        0.2
      9         0.43896      0.22635       0.22379       0.21808       0.21552       0.21153       0.20821        0.2
     10           0.625      0.18643       0.18323       0.18257       0.18047       0.17918       0.17475        0.1
     11         0.85734      0.16247       0.15989       0.15903       0.15917        0.1587       0.16115        0.1
     12          1.1411      0.14602       0.14447       0.14433        0.1439       0.14242       0.14773         0.
     13          1.4815      0.13936       0.13684       0.13479       0.13517       0.13698       0.13519        0.1
     14          1.8836      0.13686       0.13554       0.13207       0.13035       0.13296       0.13246        0.1
     15          2.3525      0.13507       0.13247       0.12893       0.12723       0.12724        0.1284        0.1
     16          2.8935      0.12673       0.12656       0.12382       0.12237       0.12168       0.12377        0.1
     17          3.5117      0.12256       0.12043       0.11953       0.11889       0.11806       0.11895        0.1
     18          4.2121      0.11793       0.11791       0.11793       0.11601       0.11689       0.11664        0.1
     19               5      0.11739       0.11678       0.11684       0.11637       0.11577       0.11666        0.1
     20          5.8805      0.11528       0.11487       0.11456       0.11528       0.11413       0.11533        0.1
     21          6.8587      0.11285       0.11244       0.11208       0.11157       0.11191       0.11282         0.
     22          7.9398      0.11153       0.11118       0.11088        0.1103       0.11091       0.11118        0.1
     23          9.1289       0.1122       0.11192       0.11174       0.11112       0.11192       0.11192        0.1
     24          10.431      0.11098       0.11077       0.11058       0.11009       0.11068       0.11081        0.1
     25          11.852      0.10854       0.10833       0.10817       0.10779       0.10805       0.10841         0.
     26          13.396      0.10801       0.10783       0.10765       0.10745       0.10738         0.108        0.1
     27          15.069      0.11027       0.11014       0.10997       0.10974        0.1096        0.1103        0.1
```

```
  28          16.875     0.11158       0.11146       0.11134       0.11129       0.11095       0.11166        0.1
  29           18.82     0.11001        0.1099        0.1098       0.10996        0.1093       0.11003        0.1
  30           20.91      0.1067       0.10661       0.10651       0.10645       0.10603       0.10679         0.
  31          23.148     0.10684       0.10677       0.10669       0.10658       0.10631       0.10702        0.1
  32          25.541     0.10847       0.10842       0.10835        0.1084         0.108       0.10868        0.1
  33          28.093      0.1086       0.10855       0.10851       0.10857       0.10826       0.10885        0.1
  34           30.81     0.10826       0.10822       0.10817       0.10821       0.10802       0.10841        0.1
  35          33.697     0.10867       0.10864        0.1086       0.10861       0.10855       0.10875         0.
  36          36.758     0.10953       0.10951       0.10947       0.10947       0.10941       0.10949        0.1
  37              40     0.10783        0.1078       0.10777       0.10776       0.10793       0.10764        0.1
  38          43.427     0.10628       0.10627       0.10624       0.10623        0.1065       0.10593        0.1
  39          47.044     0.10618       0.10618       0.10615       0.10614        0.1063       0.10584        0.1
  40          50.856     0.10875       0.10873       0.10871        0.1087       0.10863       0.10854        0.1
  41           54.87      0.1092       0.10918       0.10917       0.10916       0.10914       0.10898        0.1
  42          59.089     0.10782        0.1078       0.10779       0.10778       0.10797       0.10758        0.1
  43          63.519     0.10676       0.10675       0.10673       0.10673       0.10684       0.10646        0.1
  44          68.164     0.10765       0.10764       0.10763       0.10762        0.1077       0.10743        0.1
  45          73.032     0.10869       0.10868       0.10867       0.10866       0.10871       0.10864        0.1
  46          78.125     0.10779       0.10778       0.10777       0.10776        0.1078       0.10768        0.1
  47           83.45     0.10629       0.10629       0.10628       0.10627        0.1063       0.10635        0.1
  48          89.011     0.10682       0.10682       0.10681        0.1068       0.10681       0.10702         0.
  49          94.815     0.10832       0.10832       0.10831        0.1083        0.1083       0.10837        0.1
  50          100.87     0.10817       0.10817       0.10816       0.10815       0.10814       0.10815        0.1
  51          107.17     0.10742       0.10742       0.10741       0.10739       0.10736       0.10704        0.1
  52          113.73     0.10763       0.10763       0.10761       0.10757        0.1075       0.10702       0.09
  53          120.55     0.10824       0.10821       0.10815       0.10805       0.10784        0.1071       0.09
  54          127.64     0.10659       0.10646       0.10629       0.10605       0.10564       0.10453        0.0
  55             135     0.10659       0.10646       0.10629       0.10605       0.10564       0.10453        0.0
```

Graph Mean Values:

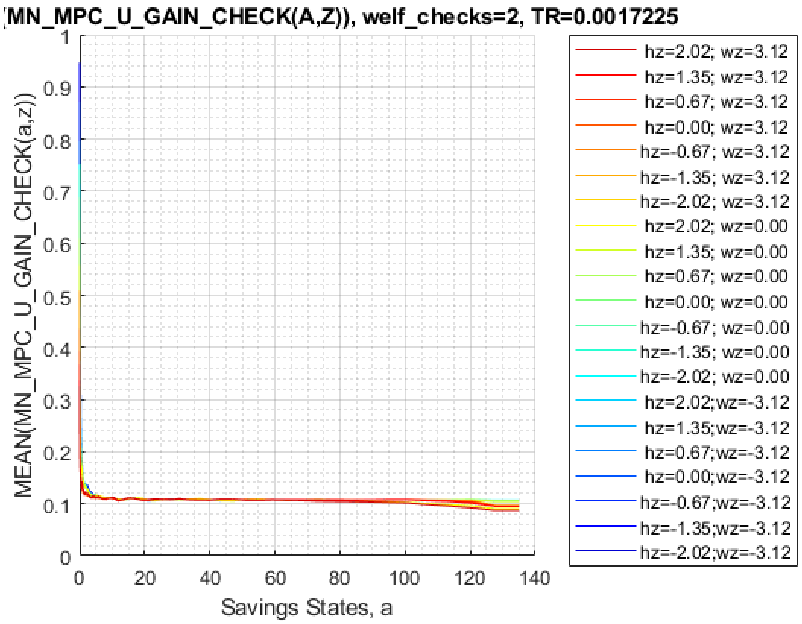
```
st_title = ['MEAN(MN\_V\_U\_GAIN\_CHECK(A,Z)), welf\_checks=' num2str(welf_checks) ', TR=' num2
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_V\_U\_GAIN\_CHECK(a,z))'};
ff_graph_grid((tb_az_v{1:end, 3:end})', ar_st_eta_HS_grid, agrid, mp_support_graph);
```

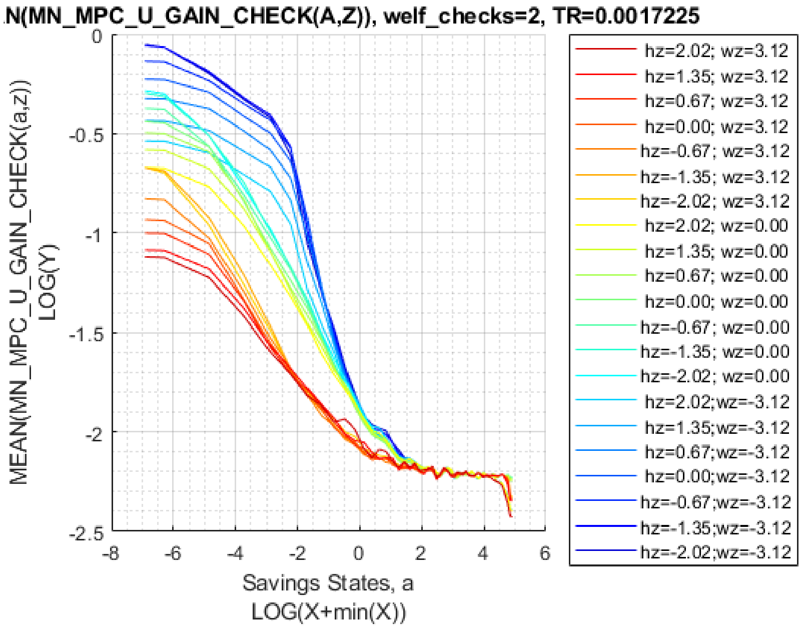




Graph Mean Consumption (MPC: Share of Check Consumed):

```
st_title = ['MEAN(MN\_MPC\_U\_GAIN\_CHECK(A,Z)), welf\_checks=' num2str(welf_checks) ', TR=' nu
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_MPC\_U\_GAIN\_CHECK(a,z))'};
ff_graph_grid((tb_az_c{1:end, 3:end})', ar_st_eta_HS_grid, agrid, mp_support_graph);
```





Analyze Marginal Value and MPC over Y(a,eta), Conditional On Kids, Marry, Age, Education

Income is generated by savings and shocks, what are the income levels generated by all the shock and savings points conditional on kids, marital status, age and educational levels. Plot on the Y axis MPC, and plot on the X axis income levels, use colors to first distinguish between different a levels, then use colors to distinguish between different eta levles.

Set Up date, Select Age 38, unmarried, no kids, lower education:

```
% NaN(n_jgrid,n_agrid,n_etagrid,n_educgrid,n_marriedgrid,n_kidsgrid);
% 38 year old, unmarried, no kids, lower educated
% Only Household Head Shock Matters so select up to 'n_eta_H_grid'
mn_total_inc_jemk = total_inc_VFI(20,:,1:mp_params('n_eta_H_grid'),1,1,1);
mn_V_W_gain_check_use = ev20_jaeemk_check2 - ev20_jaeemk_check0;
mn_C_W_gain_check_use = ec20_jaeemk_check2 - ec20_jaeemk_check0;
```

Select Age, Education, Marital, Kids Count:s

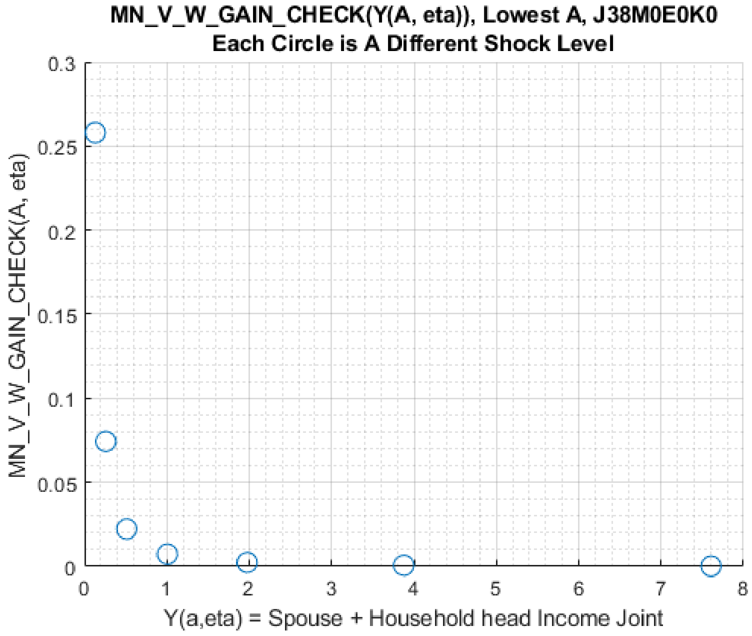
```
% Selections
it_age = 21; % +18
it_marital = 1; % 1 = unmarried
it_kids = 1; % 1 = kids is zero
it_educ = 1; % 1 = lower education
% Select: NaN(n_jgrid,n_agrid,n_etagrid,n_educgrid,n_marriedgrid,n_kidsgrid);
mn_C_W_gain_check_jemk = mn_C_W_gain_check_use(it_age, :, 1:mp_params('n_eta_H_grid'), it_educ,
mn_V_W_gain_check_jemk = mn_V_W_gain_check_use(it_age, :, 1:mp_params('n_eta_H_grid'), it_educ,
% Reshape, so shock is the first dim, a is the second
mt_total_inc_jemk = permute(mn_total_inc_jemk,[3,2,1]);
mt_C_W_gain_check_jemk = permute(mn_C_W_gain_check_jemk,[3,2,1]);
mt_C_W_gain_check_jemk(mt_C_W_gain_check_jemk<=1e-10) = 1e-10;
mt_V_W_gain_check_jemk = permute(mn_V_W_gain_check_jemk,[3,2,1]);
mt_V_W_gain_check_jemk(mt_V_W_gain_check_jemk<=1e-10) = 1e-10;
```

```
% Generate meshed a and shock grid
[mt_eta_H, mt_a] = ndgrid(eta_H_grid(1:mp_params('n_eta_H_grid')), agrid);
```

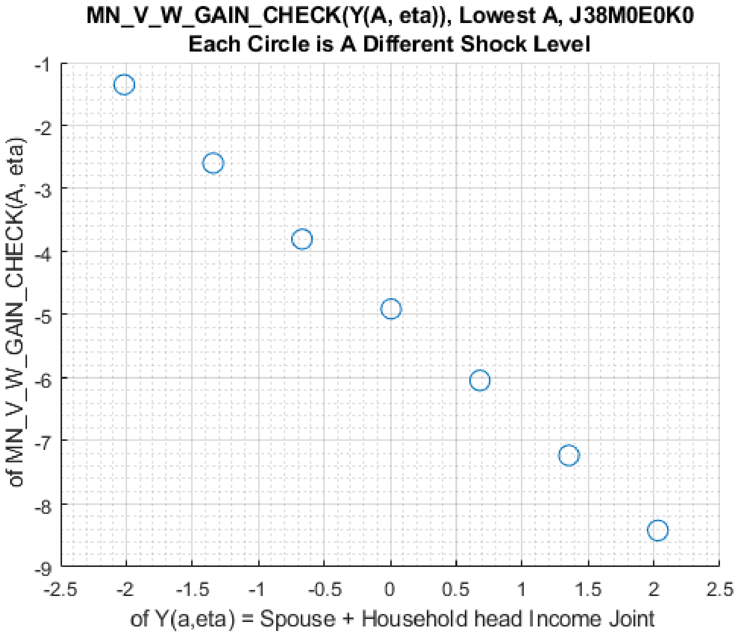
Marginal Value Gains, Color as Shock, Conditional on Age, Marital, Kids, and Education

How do shocks and a impact marginal value. First plot one asset level, variation comes only from increasingly higher shocks:

```
figure();
it_a = 1;
scatter((mt_total_inc_jemk(:,it_a)), (mt_V_W_gain_check_jemk(:,it_a)), 100);
title({'MN\_V\_W\_GAIN\_CHECK(Y(A, eta)), Lowest A, J38M0E0K0', ...
    'Each Circle is A Different Shock Level'});
xlabel('Y(a,eta) = Spouse + Household head Income Joint');
ylabel('MN\_V\_W\_GAIN\_CHECK(A, eta)');
grid on;
grid minor;
```

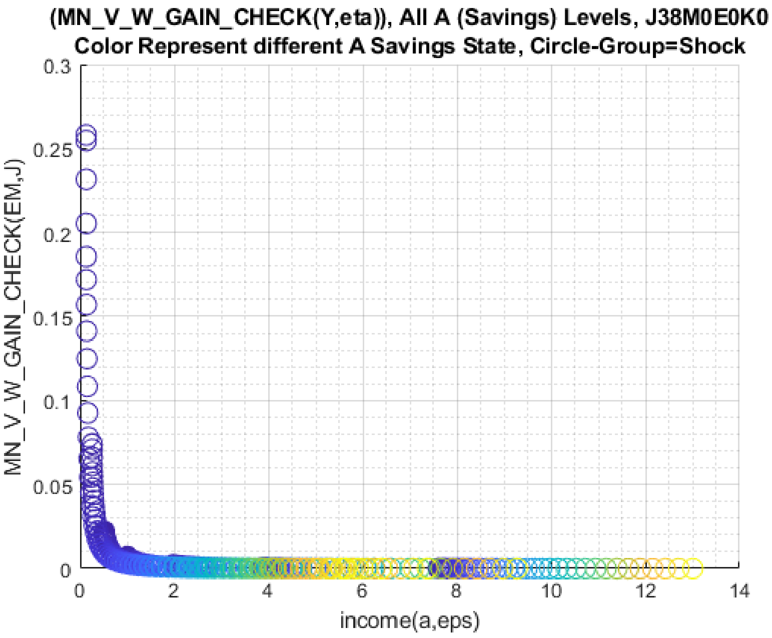


```
figure();
it_shock = 1;
scatter(log(mt_total_inc_jemk(:,it_a)), log(mt_V_W_gain_check_jemk(:,it_a)), 100);
title({'MN\_V\_W\_GAIN\_CHECK(Y(A, eta)), Lowest A, J38M0E0K0', ...
    'Each Circle is A Different Shock Level'});
xlabel(' of Y(a,eta) = Spouse + Household head Income Joint');
ylabel(' of MN\_V\_W\_GAIN\_CHECK(A, eta)');
grid on;
grid minor;
```

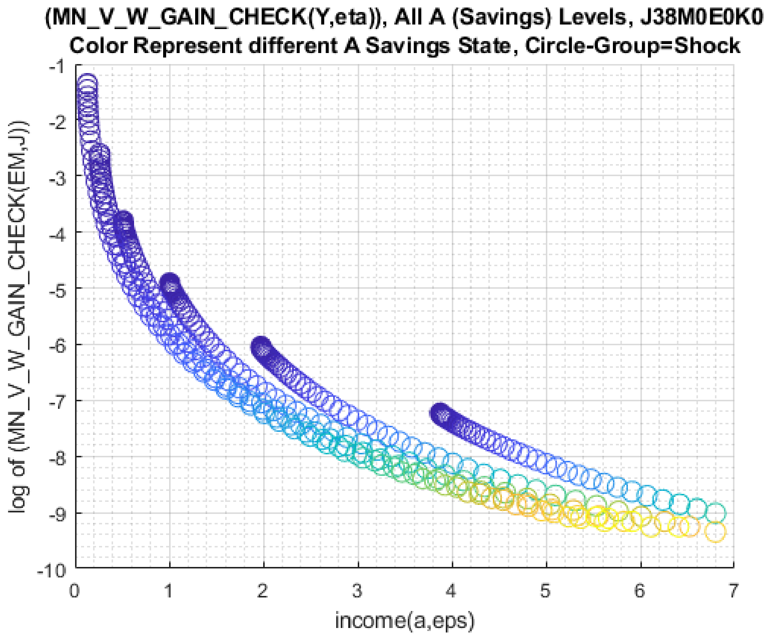


Plot all asset levels:

```
figure();
scatter((mt_total_inc_jemk(:)), (mt_V_W_gain_check_jemk(:)), 100, mt_a(:));
title({'(MN\_V\_W\_GAIN\_CHECK(Y,eta)), All A (Savings) Levels, J38M0E0K0', ...
    'Color Represent different A Savings State, Circle-Group=Shock'});
xlabel('income(a,eps)');
ylabel('MN\_V\_W\_GAIN\_CHECK(EM,J)');
grid on;
grid minor;
```



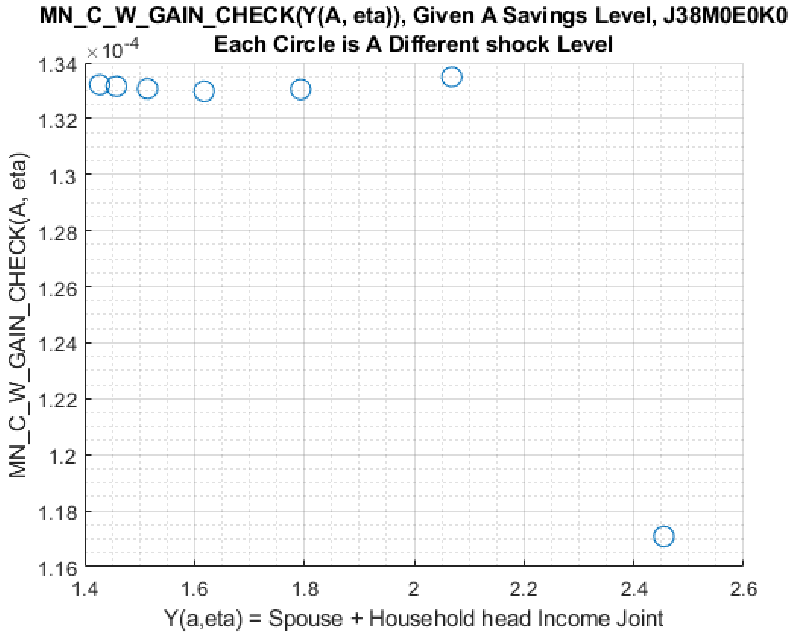
```
figure();
scatter((mt_total_inc_jemk(:)), log(mt_V_W_gain_check_jemk(:)), 100, mt_a(:));
title({'(MN\_V\_W\_GAIN\_CHECK(Y,eta)), All A (Savings) Levels, J38M0E0K0', ...
    'Color Represent different A Savings State, Circle-Group=Shock'});
xlabel('income(a,eps)');
ylabel('log of (MN\_V\_W\_GAIN\_CHECK(EM,J))');
xlim([0,7]);
grid on;
grid minor;
```



Marginal Consumption Gains, Color as Shock, Conditional on Age, Marital, Kids, and Education

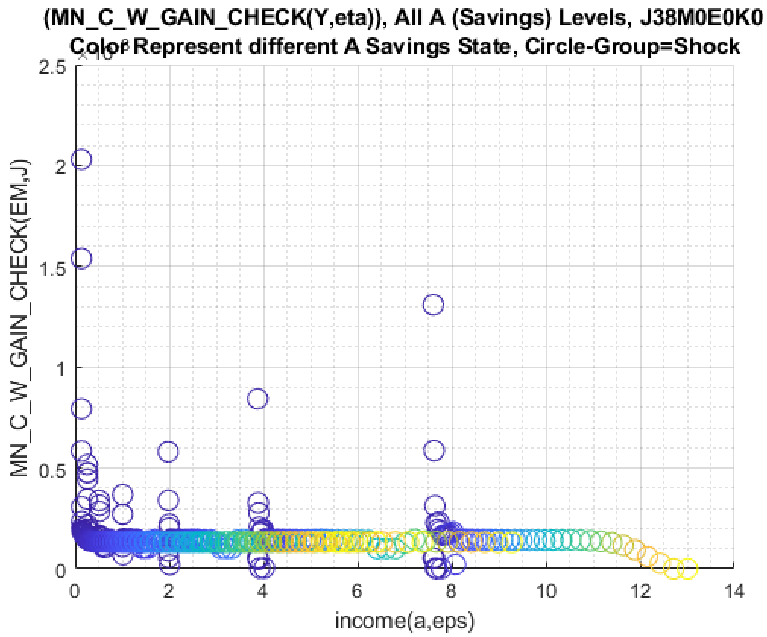
How do shocks and a impact marginal value. First plot one asset level, variation comes only from increasingly higher shocks:

```
figure();
it_a = 50;
scatter(log(mt_total_inc_jemk(:,it_a)), mt_C_W_gain_check_jemk(:,it_a), 100);
title({'MN\_C\_W\_GAIN\_CHECK(Y(A, eta)), Given A Savings Level, J38M0E0K0', ...
    'Each Circle is A Different shock Level'});
xlabel('Y(a,eta) = Spouse + Household head Income Joint');
ylabel('MN\_C\_W\_GAIN\_CHECK(A, eta)');
grid on;
grid minor;
```

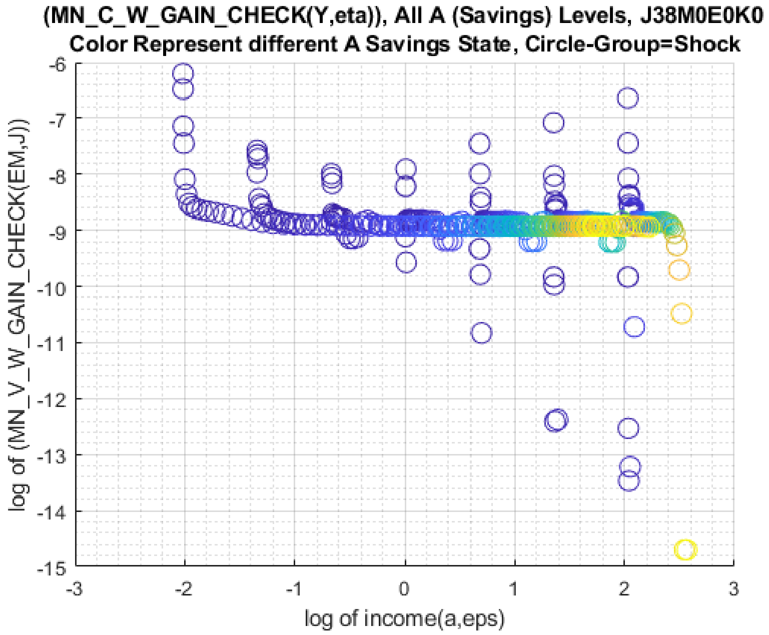


Plot all asset levels:

```
figure();
scatter((mt_total_inc_jemk(:)), (mt_C_W_gain_check_jemk(:)), 100, mt_a(:));
title({'(MN\_C\_W\_GAIN\_CHECK(Y,eta)), All A (Savings) Levels, J38M0E0K0', ...
    'Color Represent different A Savings State, Circle-Group=Shock'});
xlabel('income(a,eps)');
ylabel('MN\_C\_W\_GAIN\_CHECK(EM,J)');
grid on;
grid minor;
```



```
figure();
scatter(log(mt_total_inc_jemk(:)), log(mt_C_W_gain_check_jemk(:)), 100, mt_a(:));
title({'(MN\_C\_W\_GAIN\_CHECK(Y,eta)), All A (Savings) Levels, J38M0E0K0', ...
    'Color Represent different A Savings State, Circle-Group=Shock'});
xlabel('log of income(a,eps)');
ylabel('log of (MN\_V\_W\_GAIN\_CHECK(EM,J))');
grid on;
grid minor;
```



Analyze Kids and Marriage and Age

Aggregating over education, savings, and shocks, what are the differential effects of Marriage and Age.

```
% Generate some Data
mp_support_graph = containers.Map('KeyType', 'char', 'ValueType', 'any');
ar_row_grid = [...
    "k0M0", "K1M0", "K2M0", "K3M0", "K4M0", ...
    "k0M1", "K1M1", "K2M1", "K3M1", "K4M1"];
mp_support_graph('cl_st_xtitle') = {'Age'};
mp_support_graph('st_legend_loc') = 'best';
mp_support_graph('bl_graph_logy') = true; % do not log
mp_support_graph('st_rounding') = '6.2f'; % format shock legend
mp_support_graph('cl_scatter_shapes') = {...
    'o', 'd' ,'s', 'x', '*', ...
    'o', 'd', 's', 'x', '*'};
mp_support_graph('cl_colors') = {...
    'red', 'red', 'red', 'red', 'red'...
    'blue', 'blue', 'blue', 'blue', 'blue'};
```

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

Tabulate value and policies:

```
% Set
% NaN(n_jgrid,n_agrid,n_etagrid,n_educgrid,n_marriedgrid,n_kidsgrid);
ar_permute = [2,3,4,1,6,5];
% Value Function
```

```
st_title = ['MEAN(MN_V_U_GAIN_CHECK(KM,J)), welf_checks=' num2str(welf_checks) ', TR=' num2str(
tb_az_v = ff_summ_nd_array(st_title, mn_V_U_gain_check, true, ["mean"], 3, 1, cl_mp_datasetdesc
```

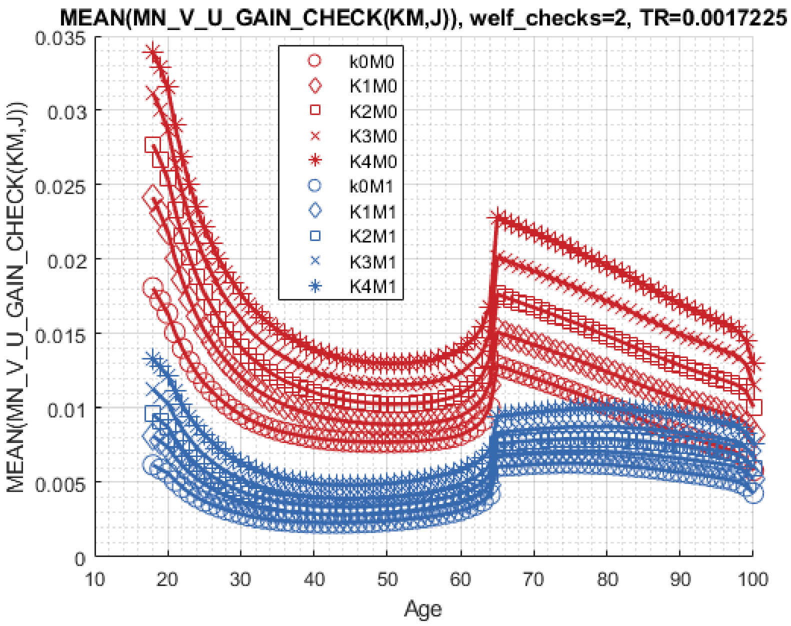
```
xxx  MEAN(MN_V_U_GAIN_CHECK(KM,J)), welf_checks=2, TR=0.0017225  xxxxxxxxxxxxxxxxxxxxxxxxxxx
    group    kids    marry    mean_age_18    mean_age_19    mean_age_20    mean_age_21    mean_age_22    mean_age_23
    _____    ____    _____    ___________    ___________    ___________    ___________    ___________    ___________

      1       1        0        0.018089       0.017252       0.016367       0.015089       0.014021        0.01312
      2       2        0        0.024167       0.023077       0.021867       0.020077       0.018573       0.017296
      3       3        0        0.027732       0.026669       0.025441       0.023362       0.021616       0.020134
      4       4        0        0.031193        0.03009       0.028767       0.026421       0.024452       0.022781
      5       5        0        0.033947       0.032875       0.031534        0.02899       0.026856       0.025048
      6       1        1       0.0061943      0.0059191      0.0056503      0.0051336      0.0047002      0.0043309
      7       2        1       0.0081386      0.0077695       0.007405      0.0067275      0.0061552      0.0056679
      8       3        1       0.0095966      0.0091734      0.0087634      0.0079591      0.0072803       0.006712
      9       4        1        0.011304       0.010815       0.010337      0.0093981      0.0086038      0.0079341
     10       5        1        0.013294       0.012771       0.012229       0.011142       0.010228       0.009448
```

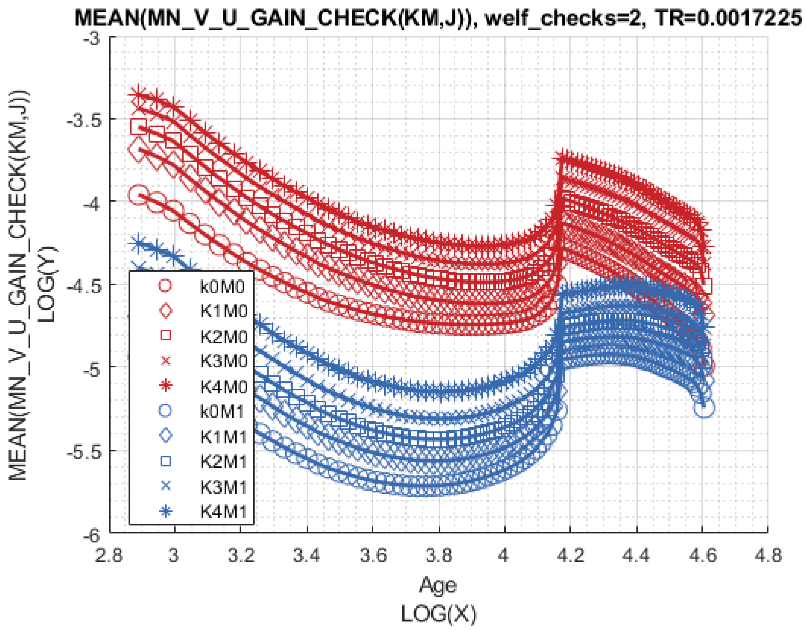
```
% Consumption Function
st_title = ['MEAN(MN_MPC_U_GAIN_CHECK(KM,J)), welf_checks=' num2str(welf_checks) ', TR=' num2st
tb_az_c = ff_summ_nd_array(st_title, mn_MPC_U_gain_share_check, true, ["mean"], 3, 1, cl_mp_dat
```

```
xxx  MEAN(MN_MPC_U_GAIN_CHECK(KM,J)), welf_checks=2, TR=0.0017225  xxxxxxxxxxxxxxxxxxxxxxxxxxx
    group    kids    marry    mean_age_18    mean_age_19    mean_age_20    mean_age_21    mean_age_22    mean_age_23
    _____    ____    _____    ___________    ___________    ___________    ___________    ___________    ___________

      1       1        0       0.064794       0.073581        0.10118       0.097925       0.093502        0.08852
      2       2        0       0.072702       0.085068        0.11591        0.11391        0.11124        0.10979
      3       3        0       0.087366        0.10442        0.13386        0.13266         0.1309        0.12783
      4       4        0       0.088926        0.10344        0.13895          0.138        0.13683        0.13527
      5       5        0        0.10276        0.11528        0.14404        0.14305        0.14187        0.14028
      6       1        1       0.098235        0.10626        0.11555        0.11505        0.11337        0.11228
      7       2        1        0.10346        0.10657        0.11743        0.11639        0.11571         0.1135
      8       3        1        0.10975        0.11642        0.12686        0.12437        0.12447        0.12303
      9       4        1        0.11043        0.11635        0.12843        0.12825        0.13154         0.1285
     10       5        1        0.12035        0.12608        0.13427          0.136        0.13418        0.13489
```

Graph Mean Values:

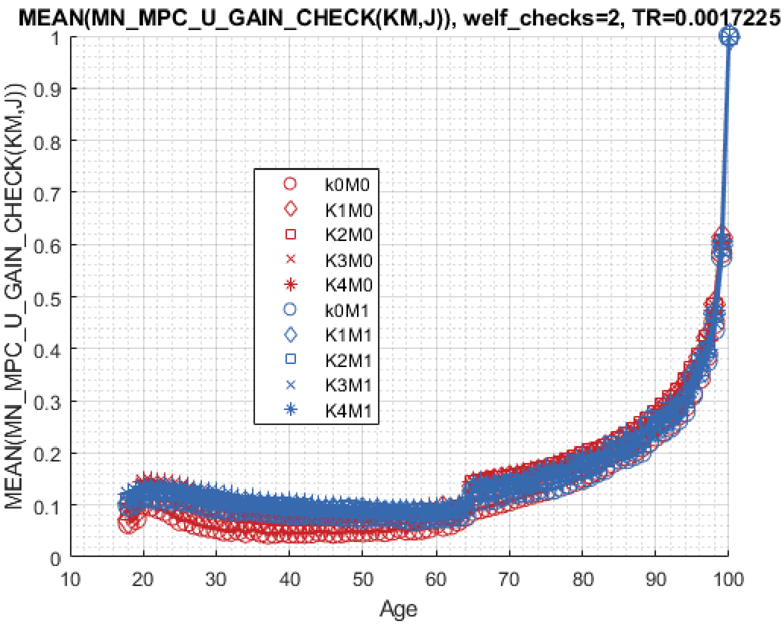
```
st_title = ['MEAN(MN\_V\_U\_GAIN\_CHECK(KM,J)), welf\_checks=' num2str(welf_checks) ', TR=' num
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_V\_U\_GAIN\_CHECK(KM,J))'};
ff_graph_grid((tb_az_v{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```

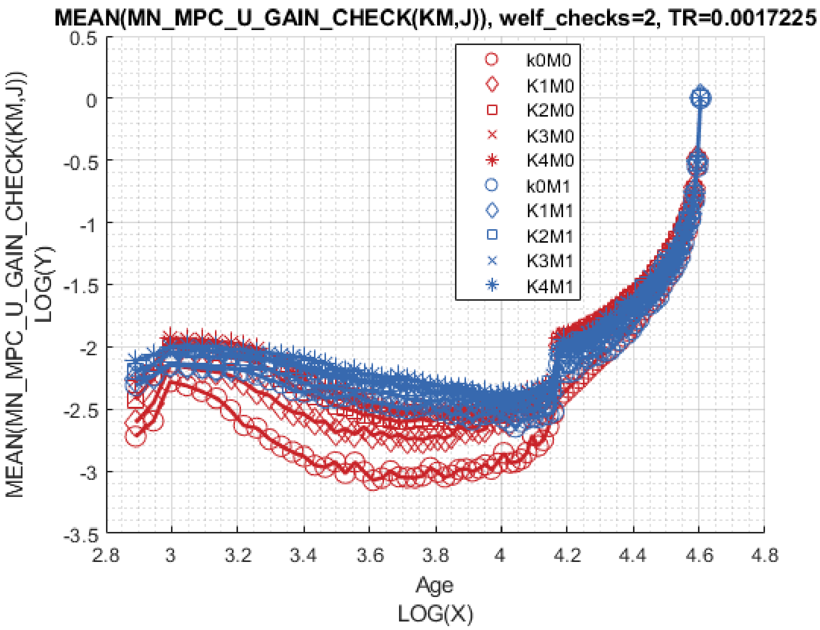




Graph Mean Consumption (***MPC: Share of Check Consumed***):

```
st_title = ['MEAN(MN\_MPC\_U\_GAIN\_CHECK(KM,J)), welf\_checks=' num2str(welf_checks) ', TR=' r
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_MPC\_U\_GAIN\_CHECK(KM,J))'};
ff_graph_grid((tb_az_c{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```





Analyze Education and Marriage

Aggregating over education, savings, and shocks, what are the differential effects of Marriage and Age.

```
% Generate some Data
mp_support_graph = containers.Map('KeyType', 'char', 'ValueType', 'any');
ar_row_grid = ["E0M0", "E1M0", "E0M1", "E1M1"];
mp_support_graph('cl_st_xtitle') = {'Age'};
mp_support_graph('st_legend_loc') = 'best';
mp_support_graph('bl_graph_logy') = true; % do not log
mp_support_graph('st_rounding') = '6.2f'; % format shock legend
mp_support_graph('cl_scatter_shapes') = {'*', 'p', '*','p' };
mp_support_graph('cl_colors') = {'red', 'red', 'blue', 'blue'};
```

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

Tabulate value and policies:

```
% Set
% NaN(n_jgrid,n_agrid,n_etagrid,n_educgrid,n_marriedgrid,n_kidsgrid);
ar_permute = [2,3,6,1,4,5];
% Value Function
st_title = ['MEAN(MN_V_U_GAIN_CHECK(EM,J)), welf_checks=' num2str(welf_checks) ', TR=' num2str(
tb_az_v = ff_summ_nd_array(st_title, mn_V_U_gain_check, true, ["mean"], 3, 1, cl_mp_datasetdesc
```

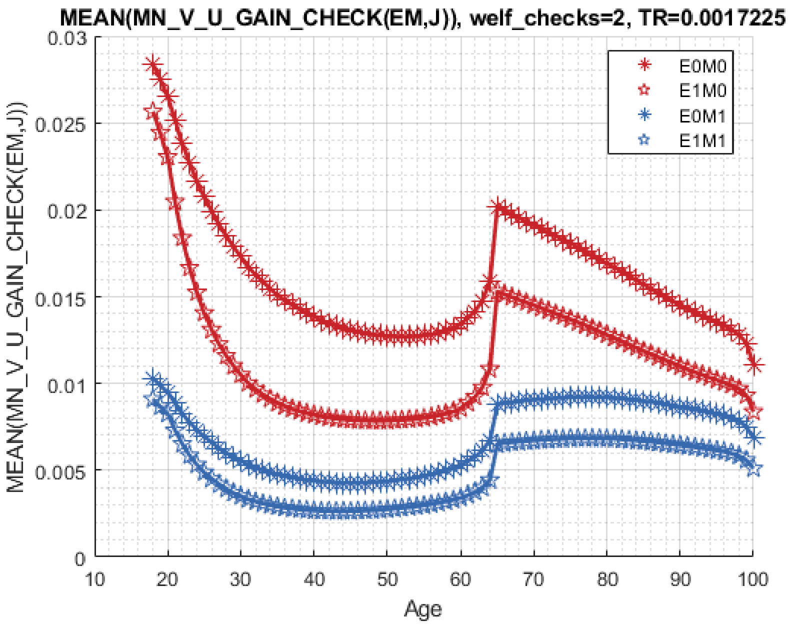
```
xxx  MEAN(MN_V_U_GAIN_CHECK(EM,J)), welf_checks=2, TR=0.0017225  xxxxxxxxxxxxxxxxxxxxxxxxxxx
    group    edu    marry    mean_age_18    mean_age_19    mean_age_20    mean_age_21    mean_age_22    mean_age_23
    _____    ___    _____    ___________    ___________    ___________    ___________    ___________    ___________

      1       0       0          0.0284       0.027529       0.026552       0.025115       0.023836       0.022692
      2       1       0        0.025651       0.024457       0.023039       0.020461       0.018371       0.016659
      3       0       1         0.01032      0.0099016      0.0094945      0.0088461      0.0082733      0.0077704
      4       1       1       0.0090905      0.0086775      0.0082596      0.0072981      0.0065136      0.0058668
```

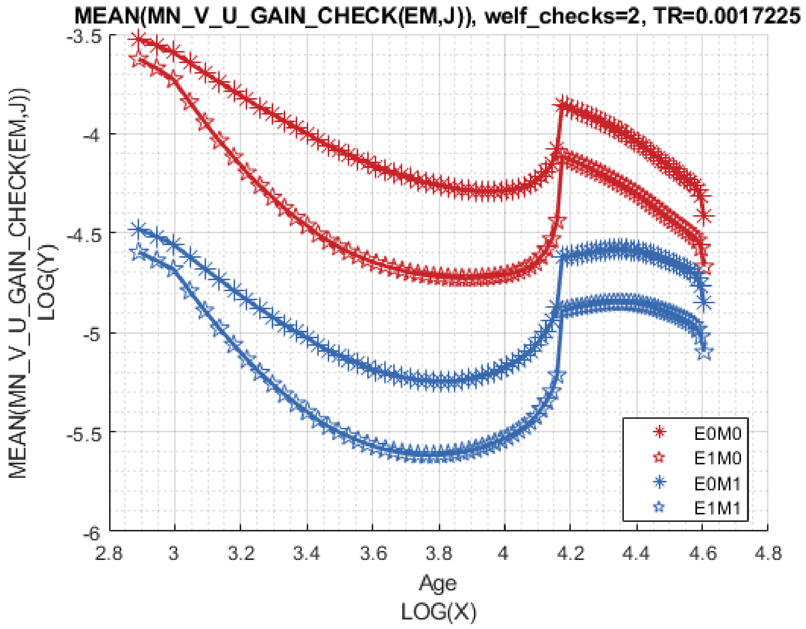
```
% Consumption
st_title = ['MEAN(MN_MPC_U_GAIN_CHECK(EM,J)), welf_checks=' num2str(welf_checks) ', TR=' num2st
tb_az_c = ff_summ_nd_array(st_title, mn_MPC_U_gain_share_check, true, ["mean"], 3, 1, cl_mp_dat
```

```
xxx  MEAN(MN_MPC_U_GAIN_CHECK(EM,J)), welf_checks=2, TR=0.0017225  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       0.073692       0.083211        0.1068        0.10496        0.10269        0.10155
      2       1       0       0.092928        0.10951       0.14677        0.14526        0.14305        0.13912
      3       0       1        0.10086         0.1066       0.11448        0.11496        0.11372         0.1132
      4       1       1        0.11603        0.12207       0.13453        0.13306        0.13399        0.13168
```

Graph Mean Values:

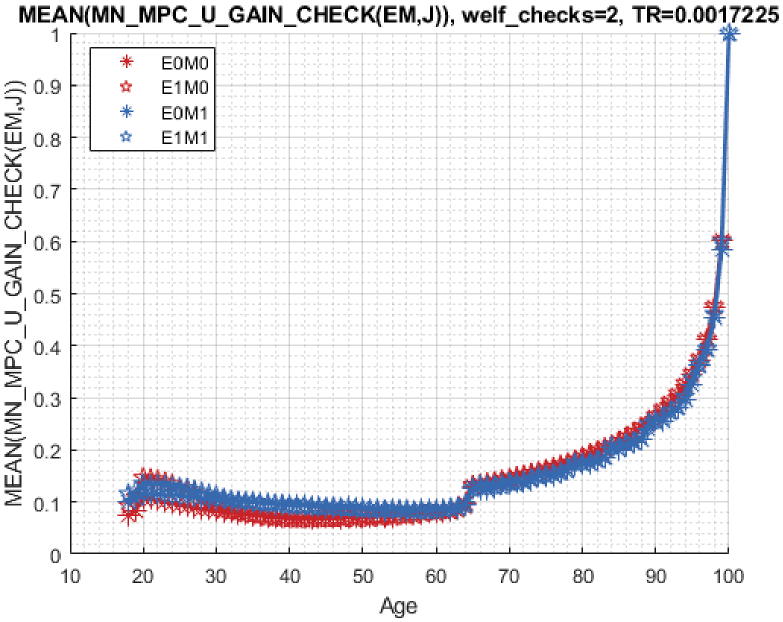
```
st_title = ['MEAN(MN\_V\_U\_GAIN\_CHECK(EM,J)), welf\_checks=' num2str(welf_checks) ', TR=' num
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_V\_U\_GAIN\_CHECK(EM,J))'};
ff_graph_grid((tb_az_v{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```

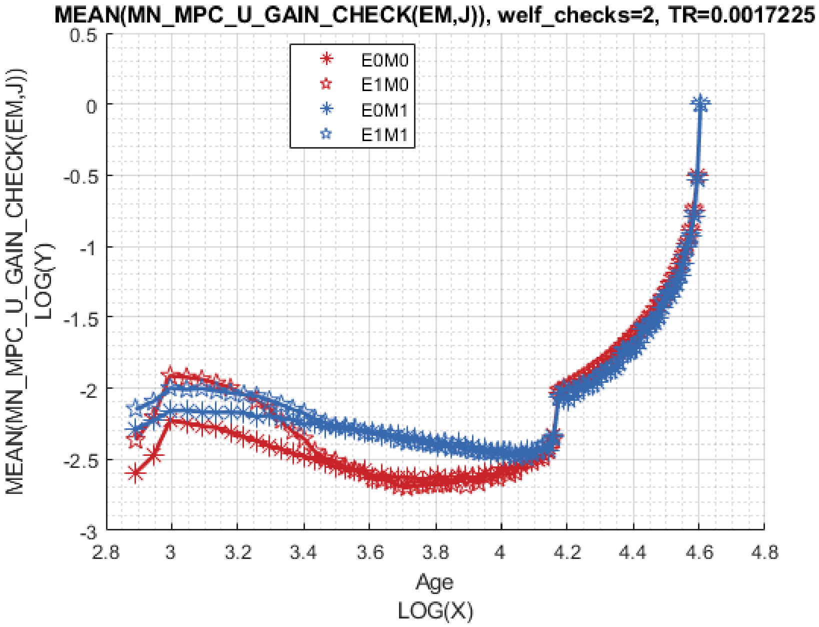




Graph Mean Consumption (***MPC: Share of Check Consumed***):

```
st_title = ['MEAN(MN\_MPC\_U\_GAIN\_CHECK(EM,J)), welf\_checks=' num2str(welf_checks) ', TR=' r
mp_support_graph('cl_st_graph_title') = {st_title};
mp_support_graph('cl_st_ytitle') = {'MEAN(MN\_MPC\_U\_GAIN\_CHECK(EM,J))'};
ff_graph_grid((tb_az_c{1:end, 4:end}), ar_row_grid, age_grid, mp_support_graph);
```


MEAN(MN_MPC_U_GAIN_CHECK(EM,J)), welf_checks=2, TR=0.0017225
MEAN(MN_MPC_U_GAIN_CHECK(EM,J))
Age
E0M0
E1M0
E0M1
E1M1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
10
20
30
40
50
60
70
80
90
100


MEAN(MN_MPC_U_GAIN_CHECK(EM,J)), welf_checks=2, TR=0.0017225
MEAN(MN_MPC_U_GAIN_CHECK(EM,J))
LOG(Y)
Age
LOG(X)
E0M0
E1M0
E0M1
E1M1
-3
-2.5
-2
-1.5
-1
-0.5
0
0.5
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8