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);
```

```
Finished Age Group:7 of 7
Finished Age Group:6 of 7
Finished Age Group:5 of 7
Finished Age Group:4 of 7
Finished Age Group:3 of 7
Finished Age Group:2 of 7
Finished Age Group:1 of 7
Elapsed time is 67.846941 seconds.
```

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	-4.6423	-3.9293	-3.092	-2.0638	-0.90014
2	0.068587	-4.3299	-3.6876	-2.8958	-1.8965	-0.75175
3	0.5487	-3.0852	-2.6304	-1.9817	-1.1778	-0.13595
4	1.8519	-1.3933	-1.1296	-0.70319	-0.063849	0.74405
5	4.3896	0.28939	0.43135	0.68081	1.0949	1.7156
6	8.5734	1.7949	1.8726	2.0156	2.2696	2.6926
7	14.815	3.1049	3.1505	3.2364	3.3952	3.6772
8	23.525	4.2418	4.2711	4.3268	4.4319	4.6249
9	35.117	5.2351	5.2551	5.2935	5.3669	5.5041
10	50	6.1164	6.1306	6.1581	6.2111	6.3116

```
% 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	0.0042292	0.0089452	0.047396	0.13258	0.34511
2	0.068587	0.016583	0.025316	0.073652	0.15592	0.38331
3	0.5487	0.22027	0.25771	0.30952	0.37217	0.61517
4	1.8519	0.85076	0.88233	0.95457	1.1057	1.1837
5	4.3896	2.0912	2.1231	2.1862	2.308	2.6306
6	8.5734	4.0077	4.0213	4.0555	4.1795	4.4414
7	14.815	6.862	6.8802	6.9175	6.9903	7.2136
8	23.525	11.226	11.247	11.292	11.384	11.566
9	35.117	16.938	16.967	17.03	17.187	17.394
10	50	23.434	23.462	23.521	23.645	23.905

```
% 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	0.22088	0.29663	0.41556	0.64367	1.0617
2	0.068587	0.28149	0.35316	0.46216	0.69317	1.0963
3	0.5487	0.58839	0.63098	0.73627	0.98675	1.3742
4	1.8519	1.3429	1.3907	1.475	1.6367	2.1891
5	4.3896	2.7976	2.8444	2.9372	3.1278	3.4353
6	8.5734	5.3219	5.3864	5.5075	5.6954	6.0633
7	14.815	9.0898	9.1495	9.2671	9.5058	9.912

```
      8       23.525         13.966          14.023          14.133          14.352          14.799
      9       35.117         20.549          20.597          20.689          20.842          21.264
     10           50         29.839          29.888          29.984           30.17          30.539
```

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);
```

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	2.7883	2.8117	2.6288	2.1735	1.5677	1.4867	1.5251
2	2	0	2.579	1.8628	1.9631	1.7018	1.1819	1.1375	1.1785
3	3	0	1.8686	1.2776	1.405	1.2449	0.86018	0.92791	0.97581
4	1	1	1.735	1.9311	1.8944	1.5741	1.0392	1.1293	1.1785
5	2	1	1.6757	1.2066	1.3881	1.2346	0.80038	0.92423	0.97581
6	3	1	1.0364	0.81771	0.98893	0.90462	0.58072	0.77604	0.83197

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

xxx MEAN(AP(KM,J)) xxxxxxxxxxxxxxxxxxxxxxxxxx

group	kids	marry	mn_age_19	mn_age_28	mn_age_44	mn_age_60	mn_age_76	mn_age_92	mn_age_1
1	1	0	11.826	11	9.9029	8.7329	5.0157	0.33265	0
2	2	0	11.826	11	9.9029	8.7329	5.0157	0.33265	0
3	3	0	11.826	11	9.9029	8.7329	5.0157	0.33265	0
4	1	1	11.817	11.03	9.9815	8.888	5.0157	0.33265	0
5	2	1	11.791	11.025	9.9674	8.8641	5.0157	0.33265	0
6	3	1	11.789	11.013	9.9545	8.8443	5.0157	0.33265	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)) xxxxxxxxxxxxxxxxxxxxxxxxxx

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	3.6518	4.4776	5.8075	6.9469	9.9458	14.629	14.961
2	2	0	3.6518	4.4776	5.8075	6.9469	9.9458	14.629	14.961
3	3	0	3.6518	4.4776	5.8075	6.9469	9.9458	14.629	14.961
4	1	1	3.8191	4.6438	5.9699	7.0732	9.9458	14.629	14.961
5	2	1	3.8211	4.6178	5.9467	7.0536	9.9458	14.629	14.961
6	3	1	3.8018	4.6046	5.9281	7.0365	9.9458	14.629	14.961

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);
```