FF_VFI_AZ_VEC Savings Vectorized Grid Examples

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

This is the example vignette for function: **ff_vfi_az_vec** from the **MEconTools Package.** This function solves the dynamic programming problem for a (a,z) model. Households can save a, and face AR(1) shock z. The problem is solved over the infinite horizon.

This is the **vectorized** code, its speed is much faster than the looped code. The function is designed to have small memory footprint and requires low computing resources, yet is fast.

The code uses **common grid**, with the same state space and choice space grids. **ff_vfi_az_bisec_vec** from the **MEconTools Package** solves the same problem but using continuous exact percentage asset choices, which is more precise than the solution here, and perhaps a little bit slower and relies on First Order Conditions. The **ff_vfi_az_mzoom_vec** also solves the same class of problems with continuous exact percentage asset choices, and does not rely on First Order Conditions, but is slower than **ff_vfi_az_bisec_vec.**

Links to Other Code:

Core Savings/Borrowing Dynamic Programming Solution Functions that are functions in the **MEconTools Package.** :

- Common Choice and States Grid ***Loop***: **ff_vfi_az_loop**
- Common Choice and States Grid ***Vectorized***: **ff_vfi_az_vec**
- States Grid + Continuous Exact Savings as Share of Cash-on-Hand, rely on FOC, ***Loop***: **ff_vfi_az_bisec_loop**
- States Grid + Continuous Exact Savings as Share of Cash-on-Hand, rely on FOC ***Vectorized***: **ff_vfi_az_bisec_vec**
- States Grid + Continuous Exact Savings as Share of Cash-on-Hand, VALUE comparison, ***Loop***: **ff_vfi_az_mzoom_loop**
- States Grid + Continuous Exact Savings as Share of Cash-on-Hand, VALUE comparison, ***Vectorized***: **ff_vfi_az_mzoom_vec**

Test FF_VFI_AZ_VEC Defaults

Call the function with defaults. By default, shows the asset policy function summary. Model parameters can be changed by the mp_params.

```
%mp_params
mp_params = containers.Map('KeyType','char', 'ValueType','any');
mp_params('fl_crra') = 1.5;
mp_params('fl_beta') = 0.94;
ff_vfi_az_vec(mp_params);
```

```
Elapsed time is 0.136223 seconds.
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_ffcmd ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
          i    idx    ndim    numel    rowN    colN     sum       mean      std      coefvari    min    max
          _    ___    ____    _____    ____    ____    ______    ______    ______    ________    ___    ___
```

```
    ap    1     1      2       700     100      7      9855.1    14.079    14.408     1.0234      0     50

xxx TABLE:ap xxxxxxxxxxxxxxxxx
             c1        c2        c3         c4         c5         c6         c7
          ______    ______    ______    ________    _______    _______    ______

    r1         0         0         0    0.045213    0.25576    0.61095    1.0362
    r2         0         0         0    0.045213    0.25576    0.61095    1.0362
    r3         0         0         0    0.045213    0.25576    0.61095    1.0362
    r4         0         0         0     0.06647    0.25576    0.61095    1.0362
    r5         0         0         0     0.06647    0.25576    0.61095     1.164
    r96   43.924    43.924    43.924      43.924     43.924     45.102    45.102
    r97   45.102    45.102    45.102      45.102     45.102     46.298    46.298
    r98   46.298    46.298    46.298      46.298     46.298     47.513    47.513
    r99   47.513    47.513    47.513      47.513     47.513     48.747    48.747
    r100  48.747    48.747    48.747      48.747     48.747         50        50
```

Test FF_VFI_AZ_BISEC_VEC Speed Tests

Call the function with different a and z grid size, print out speed:

```
mp_support = containers.Map('KeyType','char', 'ValueType','any');
mp_support('bl_timer') = true;
mp_support('ls_ffcmd') = {};
% A grid 50, shock grid 5:
mp_params = containers.Map('KeyType','char', 'ValueType','any');
mp_params('it_a_n') = 50;
mp_params('it_z_n') = 5;
ff_vfi_az_vec(mp_params, mp_support);
```

```
Elapsed time is 0.025309 seconds.
```

```
% A grid 750, shock grid 15:
mp_params = containers.Map('KeyType','char', 'ValueType','any');
mp_params('it_a_n') = 750;
mp_params('it_z_n') = 15;
ff_vfi_az_vec(mp_params, mp_support);
```

```
Elapsed time is 4.855482 seconds.
```

```
% A grid 600, shock grid 45:
mp_params = containers.Map('KeyType','char', 'ValueType','any');
mp_params('it_a_n') = 600;
mp_params('it_z_n') = 45;
ff_vfi_az_vec(mp_params, mp_support);
```

```
Elapsed time is 12.201130 seconds.
```

Test FF_VFI_AZ_VEC Control Outputs

Run the function first without any outputs, but only the timer.

```
mp_params = containers.Map('KeyType','char', 'ValueType','any');
mp_params('it_a_n') = 50;
mp_params('it_z_n') = 5;
mp_support = containers.Map('KeyType','char', 'ValueType','any');
```

```
mp_support('bl_timer') = true;
mp_support('bl_print_params') = false;
mp_support('bl_print_iterinfo') = false;
mp_support('ls_ffcmd') = {};
ff_vfi_az_vec(mp_params, mp_support);
```

```
Elapsed time is 0.022504 seconds.
```

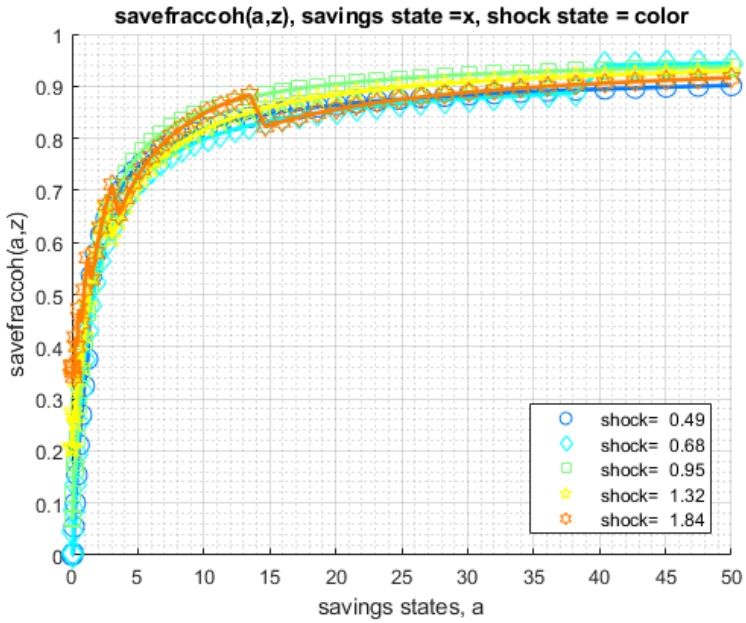
Run the function and show policy function for savings choice. For ls_ffcmd, ls_ffsna, ls_ffgrh, can include these: 'v', 'ap', 'c', 'y', 'coh', 'savefraccoh'. These are value, aprime savings choice, consumption, income, cash on hand, and savings fraction as cash-on-hand.

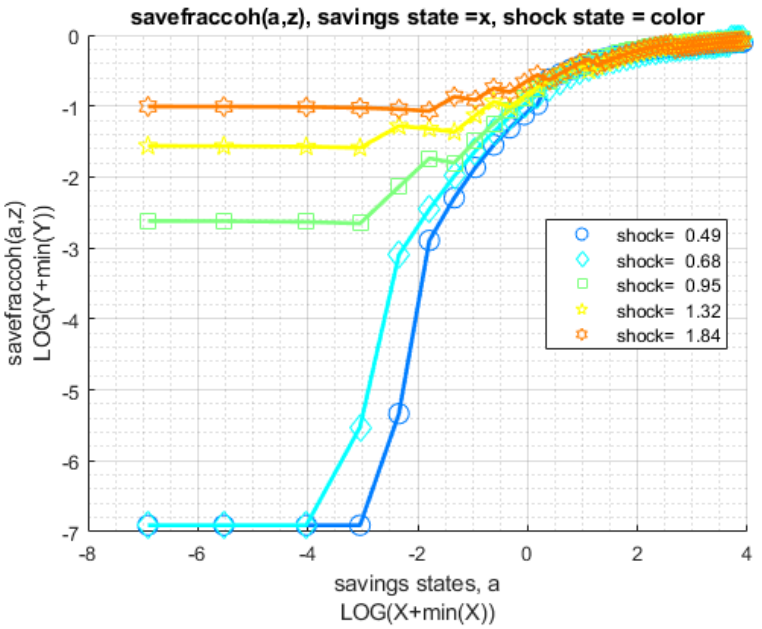
```
mp_support = containers.Map('KeyType','char', 'ValueType','any');
mp_support('bl_print_params') = false;
mp_support('bl_print_iterinfo') = false;
% ls_ffcmd: summary print which outcomes
mp_support('ls_ffcmd') = {};
% ls_ffsna: detail print which outcomes
mp_support('ls_ffsna') = {'savefraccoh'};
% ls_ffgrh: graphical print which outcomes
mp_support('ls_ffgrh') = {'savefraccoh'};
ff_vfi_az_vec(mp_params, mp_support);
```

```
Elapsed time is 0.041571 seconds.
xxx  ff_vfi_az_vec, outcome=savefraccoh  xxxxxxxxxxxxxxxxxxxxxxxxxx
```

group	a	mean_z_0_4858	mean_z_0_67798	mean_z_0_9462	mean_z_1_3205	mean_z_1_8429
1	0	0	0	0.071865	0.20862	0.36462
2	0.002975	0	0	0.071698	0.20827	0.36418
3	0.016829	0	0	0.070928	0.20666	0.36216
4	0.046375	0	0.0029827	0.069341	0.20331	0.35793
5	0.095198	0.0038183	0.044243	0.11681	0.27649	0.35114
6	0.1663	0.054362	0.084837	0.17517	0.26637	0.34171
7	0.26234	0.099899	0.13609	0.16422	0.25383	0.41847
8	0.38568	0.15381	0.19428	0.22348	0.32132	0.40047
9	0.53852	0.21153	0.25554	0.28573	0.39055	0.47258
10	0.72291	0.26934	0.31659	0.34814	0.36175	0.44538
11	0.94076	0.3247	0.37504	0.40848	0.42229	0.50941
12	1.1939	0.37617	0.42941	0.46521	0.4802	0.57087
13	1.484	0.53695	0.47898	0.51743	0.5344	0.5291
14	1.8128	0.57847	0.52356	0.56473	0.58429	0.58056
15	2.1817	0.61468	0.56329	0.6071	0.62958	0.62823
16	2.5924	0.6462	0.5985	0.64475	0.67028	0.67186
17	3.0463	0.67365	0.62963	0.67804	0.60721	0.71141
18	3.5449	0.69762	0.65713	0.70737	0.6404	0.65255
19	4.0894	0.71859	0.68142	0.73318	0.67021	0.68509
20	4.6813	0.73701	0.70293	0.75587	0.6969	0.71446
21	5.3218	0.75325	0.722	0.77584	0.72078	0.74089
22	6.0121	0.76763	0.73895	0.79344	0.74211	0.76461
23	6.7536	0.7804	0.75407	0.80897	0.76119	0.78587
24	7.5474	0.7918	0.76759	0.8227	0.77824	0.80491
25	8.3948	0.80201	0.77972	0.83486	0.79351	0.82194
26	9.2967	0.81119	0.79063	0.84567	0.80719	0.83719
27	10.254	0.81947	0.80049	0.8553	0.81948	0.85083
28	11.269	0.82697	0.80941	0.86389	0.83053	0.86306
29	12.342	0.83379	0.81752	0.87159	0.84048	0.87401
30	13.473	0.84001	0.8249	0.87849	0.84946	0.88384
31	14.665	0.84569	0.83165	0.8847	0.85759	0.82241
32	15.918	0.8509	0.83782	0.8903	0.86495	0.83188

33	17.233	0.8557	0.8435	0.89536	0.87163	0.84053
34	18.611	0.86012	0.84872	0.89995	0.8777	0.84844
35	20.053	0.86421	0.85354	0.90411	0.88324	0.85568
36	21.56	0.86799	0.858	0.9079	0.8883	0.86231
37	23.133	0.87151	0.86214	0.91136	0.89292	0.86841
38	24.773	0.87479	0.86598	0.91452	0.89716	0.87401
39	26.481	0.87784	0.86955	0.91741	0.90105	0.87917
40	28.258	0.8807	0.87289	0.92007	0.90463	0.88393
41	30.104	0.88337	0.87601	0.92251	0.90793	0.88833
42	32.021	0.88588	0.87893	0.92475	0.91097	0.8924
43	34.01	0.88824	0.88166	0.92683	0.91378	0.89617
44	36.07	0.89046	0.88423	0.92874	0.91638	0.89966
45	38.204	0.89256	0.88665	0.93052	0.91879	0.90291
46	40.412	0.89453	0.9403	0.93216	0.92102	0.90592
47	42.695	0.8964	0.94141	0.93368	0.9231	0.90873
48	45.053	0.89817	0.94245	0.9351	0.92504	0.91135
49	47.488	0.89985	0.94341	0.93642	0.92684	0.9138
50	50	0.90144	0.9443	0.93765	0.92853	0.91608





Run the function and show summaries for savings and fraction of coh saved:

```
mp_params('it_a_n') = 100;
mp_params('it_z_n') = 9;
mp_support('ls_ffcmd') = {'ap', 'savefraccoh'};
mp_support('ls_ffsna') = {};
mp_support('ls_ffgrh') = {};
mp_support('bl_vfi_store_all') = true; % store c(a,z), y(a,z)
ff_vfi_az_vec(mp_params, mp_support);
```

```
Elapsed time is 0.230510 seconds.
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_ffcmd ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

	i	idx	ndim	numel	rowN	colN	sum	mean	std	coefvari	min
ap	1	1	2	900	100	9	12904	14.338	14.524	1.013	0
savefraccoh	2	2	2	900	100	9	619.51	0.68834	0.26953	0.39157	0

xxx TABLE:ap xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c5	c6	c7	c8	c9
r1	0	0	0	0	0.092813	0.25576	0.61095	1.0362	1.6023
r2	0	0	0	0	0.092813	0.25576	0.61095	1.0362	1.6023
r3	0	0	0	0	0.092813	0.25576	0.61095	1.0362	1.6023
r4	0	0	0	0.00051272	0.092813	0.25576	0.61095	1.0362	1.6023
r5	0	0	0	0.0029004	0.092813	0.25576	0.61095	1.0362	1.6023
r96	43.924	43.924	43.924	43.924	43.924	45.102	45.102	45.102	46.298
r97	45.102	45.102	45.102	45.102	45.102	46.298	46.298	46.298	47.513
r98	46.298	46.298	46.298	46.298	46.298	47.513	47.513	47.513	48.747
r99	47.513	47.513	47.513	47.513	47.513	48.747	48.747	48.747	50
r100	48.747	48.747	48.747	48.747	48.747	50	50	50	50

xxx TABLE:savefraccoh xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c5	c6	c7	c8	c9
r1	0	0	0	0	0.070073	0.15255	0.28789	0.38573	0.47121
r2	0	0	0	0	0.070045	0.1525	0.28781	0.38565	0.47114
r3	0	0	0	0	0.069914	0.15228	0.28748	0.3853	0.4708
r4	0	0	0	0.00048613	0.069636	0.1518	0.28676	0.38454	0.47007
r5	0	0	0	0.0027273	0.069182	0.15101	0.28559	0.38329	0.46886
r96	0.92625	0.92358	0.92022	0.916	0.91072	0.92836	0.91992	0.90945	0.92033
r97	0.92676	0.92416	0.92088	0.91677	0.91162	0.92918	0.92095	0.91073	0.92169
r98	0.92727	0.92473	0.92153	0.91752	0.91249	0.92998	0.92194	0.91196	0.923
r99	0.92776	0.92528	0.92216	0.91824	0.91333	0.93076	0.92291	0.91315	0.92426
r100	0.92823	0.92581	0.92277	0.91895	0.91416	0.93151	0.92384	0.91431	0.90252

Test FF_VFI_AZ_VEC Change Interest Rate and Discount

Show only save fraction of cash on hand:

```
mp_support = containers.Map('KeyType','char', 'ValueType','any');
mp_support('bl_print_params') = false;
mp_support('bl_print_iterinfo') = false;
mp_support('ls_ffcmd') = {'savefraccoh'};
mp_support('ls_ffsna') = {};
```

```
mp_support('ls_ffgrh') = {};
mp_params = containers.Map('KeyType','char', 'ValueType','any');
mp_params('it_a_n') = 100;
mp_params('it_z_n') = 7;
mp_params('fl_a_max') = 50;
mp_params('st_grid_type') = 'grid_powerspace';
```

Solve the model with several different interest rates and discount factor:

```
% Lower Savings Incentives
mp_params('fl_beta') = 0.80;
mp_params('fl_r') = 0.01;
ff_vfi_az_vec(mp_params, mp_support);
```

```
Elapsed time is 0.058079 seconds.
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_ffcmd ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
                  i    idx    ndim    numel    rowN    colN     sum      mean      std      coefvari    min      m
                  _    ___    ____    _____    ____    ____    ______    ______    ______    ________    ___    ___

    savefraccoh   1     1      2       700     100      7      357.49    0.5107    0.2755    0.53945      0     0.8

xxx TABLE:savefraccoh xxxxxxxxxxxxxxxxx
              c1         c2         c3         c4         c5          c6          c7
            _______    _______    _______    _______    _______    _________    ________

    r1            0          0          0          0          0     0.0002246    0.041573
    r2            0          0          0          0          0    0.00022455    0.041566
    r3            0          0          0          0          0     0.0012689    0.041533
    r4            0          0          0          0          0      0.001266    0.041462
    r5            0          0          0          0          0     0.0034759    0.041345
    r96     0.78455    0.78145    0.79995    0.79456     0.7876       0.77865     0.76719
    r97     0.78669    0.78366    0.77972    0.79679    0.78998       0.78122     0.77001
    r98     0.78878    0.78582    0.78197    0.79897    0.79231       0.78374     0.77276
    r99     0.79084    0.78794    0.78417    0.77927    0.79459        0.7862     0.77545
    r100    0.79285    0.79001    0.78633    0.78154    0.79682        0.7886     0.77808
```

```
% Higher Savings Incentives
mp_params('fl_beta') = 0.95;
mp_params('fl_r') = 0.04;
ff_vfi_az_vec(mp_params, mp_support);
```

```
Elapsed time is 0.177867 seconds.
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_ffcmd ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
                  i    idx    ndim    numel    rowN    colN     sum      mean       std      coefvari    min
                  _    ___    ____    _____    ____    ____    ______    _______    _______    ________    ___

    savefraccoh   1     1      2       700     100      7      479.94    0.68563    0.27152    0.39602      0

xxx TABLE:savefraccoh xxxxxxxxxxxxxxxxx
              c1         c2          c3           c4          c5          c6          c7
            _______    _______    _________    ________    _______    _______    _______

    r1            0          0            0     0.07007    0.17967    0.30874    0.43404
    r2            0          0            0    0.070042    0.17961    0.30866    0.43396
    r3            0          0            0    0.069911    0.17935    0.30833     0.4336
```

r4	0	0	0	0.069633	0.17881	0.30762	0.43284
r5	0	0	0.00049972	0.069179	0.17792	0.30645	0.43158
r96	0.92489	0.92134	0.91672	0.91072	0.92717	0.91691	0.92776
r97	0.92544	0.92198	0.91747	0.91162	0.92802	0.91801	0.92895
r98	0.92598	0.9226	0.9182	0.91249	0.92885	0.91908	0.9301
r99	0.9265	0.9232	0.91891	0.91333	0.92965	0.92011	0.93121
r100	0.927	0.92379	0.9196	0.91416	0.93042	0.9211	0.90914

Test FF_VFI_AZ_VEC Changing Risk Aversion

Here, again, show fraction of coh saved in summary tabular form, but also show it graphically.

```
mp_support = containers.Map('KeyType','char', 'ValueType','any');
mp_support('bl_print_params') = false;
mp_support('bl_print_iterinfo') = false;
mp_support('ls_ffcmd') = {'savefraccoh'};
mp_support('ls_ffsna') = {};
mp_support('ls_ffgrh') = {'savefraccoh'};
mp_params = containers.Map('KeyType','char', 'ValueType','any');
mp_params('it_a_n') = 100;
mp_params('it_z_n') = 7;
mp_params('fl_a_max') = 50;
mp_params('st_grid_type') = 'grid_powerspace';
```

Solve the model with different risk aversion levels, higher preferences for risk:

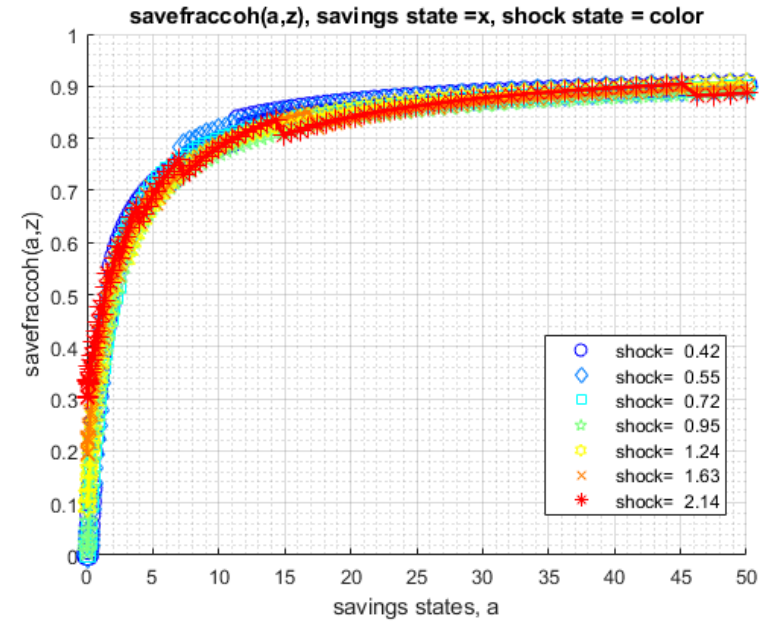
```
% Lower Risk Aversion
mp_params('fl_crra') = 0.5;
ff_vfi_az_vec(mp_params, mp_support);
```

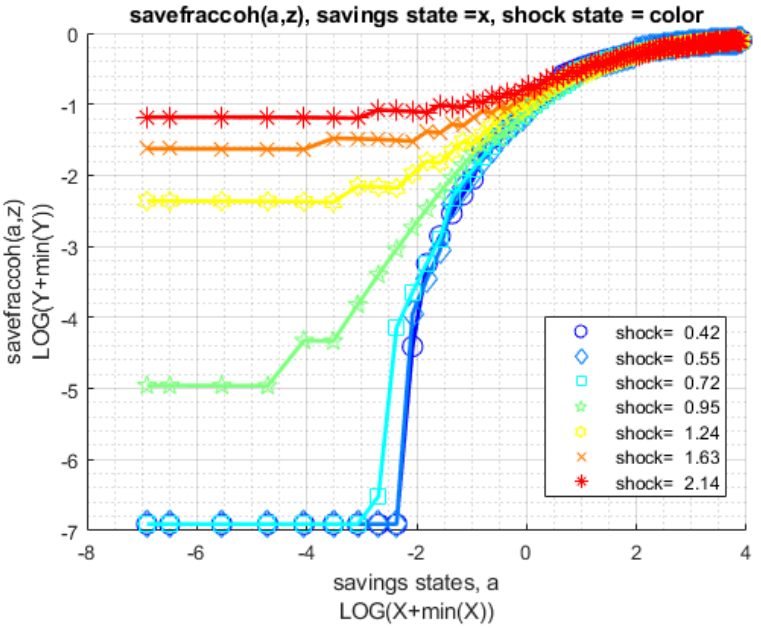
```
Elapsed time is 0.181638 seconds.
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_ffcmd ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

	i	idx	ndim	numel	rowN	colN	sum	mean	std	coefvari	min	
savefraccoh	1	1	2	700	100	7	450.35	0.64336	0.2803	0.43568	0	0.

```
xxx TABLE:savefraccoh xxxxxxxxxxxxxxxxxx
```

	c1	c2	c3	c4	c5	c6	c7
r1	0	0	0	0.0060341	0.093241	0.19572	0.30604
r2	0	0	0	0.0060316	0.093213	0.19567	0.30599
r3	0	0	0	0.0060204	0.09308	0.19546	0.30574
r4	0	0	0	0.0059964	0.092798	0.19501	0.3052
r5	0	0	0	0.012229	0.092335	0.19427	0.30431
r96	0.90049	0.89703	0.89253	0.88669	0.90296	0.89297	0.90379
r97	0.90128	0.89791	0.89351	0.88781	0.90404	0.89429	0.88181
r98	0.90205	0.89876	0.89447	0.88891	0.9051	0.89557	0.88337
r99	0.9028	0.89959	0.89541	0.88998	0.90612	0.89681	0.88489
r100	0.90354	0.9004	0.89632	0.89101	0.90711	0.89802	0.88636





When risk aversion increases, at every state-space point, the household wants to save more.

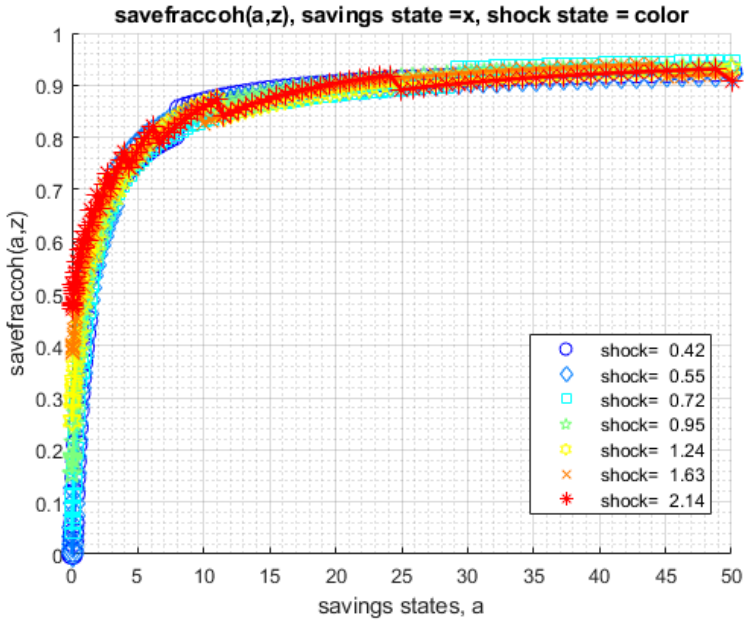
```
% Higher Risk Aversion
mp_params('fl_crra') = 5;
ff_vfi_az_vec(mp_params, mp_support);
```

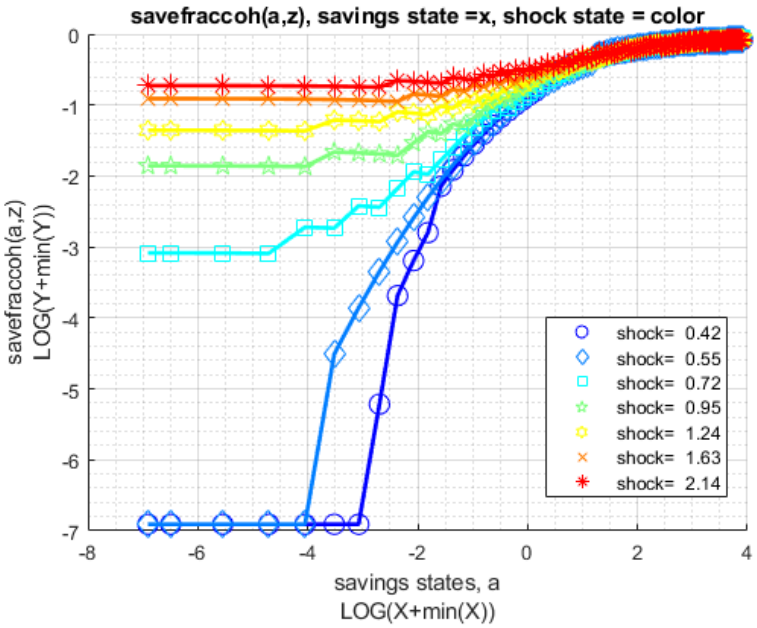
```
Elapsed time is 0.152901 seconds.
---------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_ffcmd ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
                  i    idx    ndim    numel    rowN    colN     sum       mean       std       coefvari     min
                  _    ___    ____    _____    ____    ____    ______    _______    _______    ________    ___

    savefraccoh   1      1       2      700      100       7     500.59    0.71513    0.25488    0.35641      0
```

xxx TABLE:savefraccoh xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c5	c6	c7
r1	0	0	0.044811	0.15534	0.25694	0.40177	0.48276
r2	0	0	0.044787	0.15528	0.25686	0.40168	0.48268
r3	0	0	0.044678	0.15499	0.2565	0.40124	0.48228
r4	0	0	0.044445	0.15437	0.25572	0.40032	0.48143
r5	0	0	0.064784	0.15337	0.25445	0.39879	0.48003
r96	0.92489	0.92134	0.94129	0.93513	0.92717	0.91691	0.92776
r97	0.92544	0.92198	0.9418	0.9358	0.92802	0.91801	0.92895
r98	0.92598	0.9226	0.9423	0.93644	0.92885	0.91908	0.9301
r99	0.9265	0.9232	0.94278	0.93706	0.92965	0.92011	0.93121
r100	0.927	0.92379	0.94324	0.93765	0.93042	0.9211	0.90914





Test FF_VFI_AZ_VEC with Higher Uncertainty

Increase the standard deviation of the Shock.

```
mp_support = containers.Map('KeyType','char', 'ValueType','any');
mp_support('bl_print_params') = false;
mp_support('bl_print_iterinfo') = false;
mp_support('ls_ffcmd') = {'savefraccoh'};
mp_support('ls_ffsna') = {};
mp_support('ls_ffgrh') = {};
mp_params = containers.Map('KeyType','char', 'ValueType','any');
mp_params('it_a_n') = 150;
mp_params('it_z_n') = 15;
mp_params('fl_a_max') = 50;
mp_params('st_grid_type') = 'grid_powerspace';
% graph color spectrum
mp_params('cl_colors') = 'copper';
```

Lower standard deviation of shock:

```
% Lower Risk Aversion
mp_params('fl_shk_std') = 0.10;
ff_vfi_az_vec(mp_params, mp_support);
```

```
Elapsed time is 0.544499 seconds.
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_ffcmd ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
                  i    idx    ndim    numel    rowN    colN     sum      mean       std      coefvari    min
                  _    ___    ____    _____    ____    ____    ______    _______    _______    ________    ___

    savefraccoh   1     1      2       2250     150      15     1506.3    0.66947    0.28673     0.4283      0
```

```
xxx TABLE:savefraccoh xxxxxxxxxxxxxxxxxx
              c1         c2         c3         c4         c5         c11        c12        c13        c14        c15
            _______    _______    _______    _______    _______    _______    _______    _______    _______    _____

    r1            0          0          0          0          0    0.14061     0.1891    0.24154     0.2699    0.324
    r2            0          0          0          0          0     0.1406    0.18908    0.24152    0.26988    0.324
    r3            0          0          0          0          0    0.14053      0.189    0.24142    0.26977    0.324
    r4            0          0          0          0          0    0.14038    0.18881     0.2412    0.26956    0.324
    r5            0          0          0          0          0    0.14013    0.18851    0.24085     0.2692    0.323
    r146    0.93087    0.92957    0.92815    0.92661    0.92492    0.92712    0.92403    0.92069    0.91706    0.913
    r147    0.93121    0.92994    0.92854    0.92702    0.92537    0.92768    0.92465    0.92135    0.91778    0.913
    r148    0.93156     0.9303    0.92893    0.92743    0.92581    0.92823    0.92525    0.92201    0.91849    0.914
    r149    0.93189    0.93065     0.9293    0.92783    0.92623    0.92878    0.92584    0.92264    0.91918    0.915
    r150    0.93222      0.931    0.92967    0.92823    0.92665     0.9293    0.92641    0.92327    0.91986    0.916
```

Higher shock standard deviation: low shock high asset save more, high shock more asset save less, high shock low asset save more:

```
% Higher Risk Aversion
mp_params('fl_shk_std') = 0.40;
ff_vfi_az_vec(mp_params, mp_support);
```

```
Elapsed time is 0.515060 seconds.
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_ffcmd ND Array (Matrix etc)
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

	i	idx	ndim	numel	rowN	colN	sum	mean	std	coefvari	min	
savefraccoh	1	1	2	2250	150	15	1678.8	0.74614	0.22779	0.30529	0	0

xxx TABLE:savefraccoh xxxxxxxxxxxxxxxxx

	c1	c2	c3	c4	c5	c11	c12	c13	c14	c15
r1	0	0	0	0	0	0.53612	0.59853	0.67884	0.73891	0.776
r2	0	0	0	0	0	0.53609	0.5985	0.67882	0.73889	0.776
r3	0	0	0	0	0	0.53594	0.59839	0.67873	0.73883	0.776
r4	0	0	0	0	0	0.53563	0.59814	0.67853	0.73868	0.776
r5	0	0	0	0	0	0.53511	0.59774	0.67821	0.73843	0.77
r146	0.92696	0.9262	0.92513	0.92359	0.92142	0.91653	0.9078	0.88992	0.86057	0.804
r147	0.92721	0.92647	0.92541	0.9239	0.92176	0.91741	0.90895	0.89144	0.84828	0.793
r148	0.92746	0.92673	0.92569	0.92421	0.9221	0.91827	0.91007	0.87813	0.83621	0.782
r149	0.9277	0.92698	0.92596	0.9245	0.92243	0.9191	0.89605	0.86507	0.82436	0.772
r150	0.92794	0.92724	0.92623	0.9248	0.92276	0.90467	0.88233	0.85227	0.81273	0.762