

Compute for Equilibrium Tax

Taking advantage of `snw_calibrate_beta_norm_gdp` from the [PrjOptiSNW Package](#), this function solves for equilibrium tax rate.

Parameter Controls

```
clear all;
mp_params = snw_mp_param('default_docdense');
xi=0; % Proportional reduction in income due to unemployment (xi=0 refers to 0 labor income; xi=1 refers to 100% reduction)
b=1; % Unemployment insurance replacement rate (b=0 refers to no UI benefits; b=1 refers to 100% replacement)
mp_params('xi') = xi;
mp_params('b') = b;
mp_controls = snw_mp_control('default_test');
```

Parameters for COVID related Costs:

```
% Average check per household, given COVID actual policy payment schedule
% And given distribution. The number is from averaging over the actual
% allocations given distribution.
Covid_checks_per_capita = 18.7255856*100/58056;
% Covid_checks_per_capita = 0;
% which tax parameter to change a2 is the default, a0 shifts max tax rate
bl_adjust_a0 = false;
bl_load_existing = false;
```

Graph Controls etc:

```
mp_controls('bl_timer') = true;
mp_controls('bl_print_vfi') = false;
mp_controls('bl_print_vfi_verbose') = false;
mp_controls('bl_print_ds') = false;
mp_controls('bl_print_ds_verbose') = false;
mp_controls('bl_print_find_tax_rate') = true;
mp_controls('bl_print_find_tax_rate_verbose') = true;
```

Solve for New Tax Rate

Solve for Equilibrium Tax rate that clears government costs and income. In the extreme bounding exercise, we assume the government will pay COVID costs all in one year. This is to test whether an extreme tax scenario will lead to changes in allocation results.

Given the checks that the government hands out and the taxes imposed, individual resources post-tax are different in 2020. Households' savings decisions in 2020 vary with taxes and checks. However, the policy function post 2020 shifts back to the previous non-COVID world's policy function because the COVID shock is an one period surprise shock.

```
a2 = snw_find_tax_rate(mp_params, mp_controls, Covid_checks_per_capita, bl_adjust_a0, bl_load_existing);
```

```
Completed SNW_VFI_MAIN_BISEC_VEC;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=319.664
Completed SNW_DS_MAIN_VEC;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=919.8561
Wage quintile cutoffs=0.4645    0.71528    1.0335    1.5632
```

Y_inc_agg=64.7962
A_agg=194.5563
Y_inc_agg_per_capita_1=1.415
A_per_capita=4.2486
Gov_cons_per_capita=0.24869
Covid_checks_share_of_GDP=0.022795
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SNW_FIND_TAX_RATE	tax	a2	or	a0	adjustments;a2=11.3699;a0=0.258;err=0.0034355
SNW_FIND_TAX_RATE	tax	a2	or	a0	adjustments;a2=11.3986;a0=0.258;err=0.0033555
SNW_FIND_TAX_RATE	tax	a2	or	a0	adjustments;a2=11.4267;a0=0.258;err=0.0032776
SNW_FIND_TAX_RATE	tax	a2	or	a0	adjustments;a2=11.4542;a0=0.258;err=0.0032017
SNW_FIND_TAX_RATE	tax	a2	or	a0	adjustments;a2=11.4812;a0=0.258;err=0.0031278
SNW_FIND_TAX_RATE	tax	a2	or	a0	adjustments;a2=11.5076;a0=0.258;err=0.0030558
SNW_FIND_TAX_RATE	tax	a2	or	a0	adjustments;a2=11.5334;a0=0.258;err=0.0029856
SNW_FIND_TAX_RATE	tax	a2	or	a0	adjustments;a2=11.5587;a0=0.258;err=0.0029172
SNW_FIND_TAX_RATE	tax	a2	or	a0	adjustments;a2=11.5835;a0=0.258;err=0.0028505
SNW_FIND_TAX_RATE	tax	a2	or	a0	adjustments;a2=11.6077;a0=0.258;err=0.0027855

SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.6315;a0=0.258;err=0.0027222
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.6548;a0=0.258;err=0.0026604
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.6775;a0=0.258;err=0.0026002
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.6998;a0=0.258;err=0.0025415
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.7217;a0=0.258;err=0.0024842
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.7431;a0=0.258;err=0.0024283
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.764;a0=0.258;err=0.0023738
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.7846;a0=0.258;err=0.0023207
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.8046;a0=0.258;err=0.0022688
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.8243;a0=0.258;err=0.0022182
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.8436;a0=0.258;err=0.0021688
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.8625;a0=0.258;err=0.0021206
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.8809;a0=0.258;err=0.0020735
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.899;a0=0.258;err=0.0020276
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.9168;a0=0.258;err=0.0019828
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.9341;a0=0.258;err=0.001939
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.9511;a0=0.258;err=0.0018963
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.9678;a0=0.258;err=0.0018546
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=11.9841;a0=0.258;err=0.0018138
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.0001;a0=0.258;err=0.0017741
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.0157;a0=0.258;err=0.0017352
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.031;a0=0.258;err=0.0016973
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.046;a0=0.258;err=0.0016602
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.0607;a0=0.258;err=0.001624
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.0751;a0=0.258;err=0.0015887
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.0892;a0=0.258;err=0.0015542
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.103;a0=0.258;err=0.0015204
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.1165;a0=0.258;err=0.0014875
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.1298;a0=0.258;err=0.0014552
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.1427;a0=0.258;err=0.0014238
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.1554;a0=0.258;err=0.001393
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.1679;a0=0.258;err=0.001363
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.1801;a0=0.258;err=0.0013336
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.192;a0=0.258;err=0.0013049
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.2037;a0=0.258;err=0.0012768
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.2151;a0=0.258;err=0.0012494
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.2263;a0=0.258;err=0.0012226
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.2373;a0=0.258;err=0.0011964
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.2481;a0=0.258;err=0.0011708
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.2586;a0=0.258;err=0.0011457
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.2689;a0=0.258;err=0.0011213
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.279;a0=0.258;err=0.0010973
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.2889;a0=0.258;err=0.0010739
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.2986;a0=0.258;err=0.001051
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.3081;a0=0.258;err=0.0010287
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.3174;a0=0.258;err=0.0010068
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.3265;a0=0.258;err=0.0009854
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.3355;a0=0.258;err=0.00096448
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.3442;a0=0.258;err=0.00094402
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.3528;a0=0.258;err=0.00092401
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.3612;a0=0.258;err=0.00090444
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.3694;a0=0.258;err=0.0008853
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.3774;a0=0.258;err=0.00086657
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.3853;a0=0.258;err=0.00084826
 SNW_FIND_TAX_RATE tax a2 or a0 adjustments;a2=12.393;a0=0.258;err=0.00083035