UI Benefit Unemployment Lost Wage Recovery Parameter b Calibration

Taking advantage of **snw_calibrate_2009_b** from the **PrjOptiSNW Package**.

The ratio of UI benefits to wages and salary is 2.1 percent in 2009. $\xi \in [0, 1]$ governs the duration of unemployment shock for those unemployed. This equals to 0.532 in 2009 (ξ = 0 no wages earned).

We solve for total wage earnings from unemployed and employed in 2009, for employed, same as under steady-state. For unemployed, they lose $(1 - \xi)$ share of the wage they would otherwise have earned. Our unemployment probability in 2009 is conditional on age and edu groups (SNW_UNEMP_2008.m) computed based on rectiilnear restriction.

We know total UI amount (multiply its share of total "Wages and salary" by total "wages and salary". We know how much wage was lost due to ξ. The ratio of these two levels is b, which is the parameter that is the share of lost-wage recovered. Note that this is based on exogenous wage earnings, so we do not have to worry about endogenous changes to savings. We will solve for the steady-state distribution, which generates mass of people by age, education, marital status, kids count, etc.

Calibrate b with 2.1% UI Benefits to Wages Ratio and $\xi = 0.532$

Using various default parameters, including the default unemployment in 2009 matrix, and the default $\xi = 0.532$ parameter, compute b.

```
% Solve parameters
mp_more_inputs = containers.Map('KeyType','char', 'ValueType','any');
mp_more_inputs('fl_ss_non_college') = 0.225;
mp_more_inputs('fl_ss_college') = 0.271;
mp_more_inputs('fl_scaleconvertor') = 54831;
% st_param_group = 'default_small';
st_param_group = 'default_docdense';
mp_params = snw_mp_param(st_param_group, false, 'tauchen', false, 8, 8, mp_more_inputs);
% Controls
mp_controls = snw_mp_control('default_test');

% no b, solving for b, b set to 0 when solving for wages
xi=0.532; % Proportional reduction in income due to unemployment (xi=0 refers to 0 labor income
mp_params('xi') = xi;

% Solve for Unemployment Values
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_calibrate_2009') = true;
mp_controls('bl_print_calibrate_2009_verbose') = false;

% 2.1% UI Benefits to Wages and Salary Ratio
fl_ratio_ui_benefits_to_wage = 0.021;
```

```
% Solve
[fl_b_calibrated_by_ui_share, ...
    mp_stats_wage_ui_spending, ...
    mn_earn_tot_wgted, mn_earn_unemp_wgted, ...
    mn_earn_unemp_tot_wgted, mn_earn_unemp_weighted_wgted] = ...
    snw_calibrate_2009_b(mp_params, mp_controls, ...
    fl_ratio_ui_benefits_to_wage);
```

```
Completed SNW_VFI_MAIN_BISEC_VEC;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=310.4866
Completed SNW_DS_MAIN_VEC;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=1294.5472
Completed SNW_calibrate_2009;SNW_MP_PARAM=default_docdense;SNW_MP_CONTROL=default_test;time=1668.355
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_stats_wage_ui_spending Scalars
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

	i	idx	value
fl_b_calibrated_by_ui_share	1	1	0.37451
fl_total_b_spending	2	2	1.1333
fl_total_wage	3	3	53.969
fl_total_wage_unemp_hhhead	4	4	3.4401
fl_total_wage_unemp_hhhead_and_spouse	5	5	6.0062
fl_total_wage_unemp_hhhead_lost	6	6	3.0262

Calibrate b with 5.68% UI Benefits to Wages Ratio and $\xi = 0.651$

Change the benefit share and ξ parameter to COVID values. The b we find below is not what should be used for COVID, the unemployment probability is based on 2009 crisis still. That is hard-coded into the **snw_calibrate_2009_b** function.

```
% Solve parameters
mp_more_inputs = containers.Map('KeyType','char', 'ValueType','any');
mp_more_inputs('fl_ss_non_college') = 0.225;
mp_more_inputs('fl_ss_college') = 0.271;
mp_more_inputs('fl_scaleconvertor') = 54831;
% st_param_group = 'default_small';
st_param_group = 'default_dense';
mp_params = snw_mp_param(st_param_group, false, 'tauchen', false, 8, 8, mp_more_inputs);
% Controls
mp_controls = snw_mp_control('default_test');

% no b, solving for b, b set to 0 when solving for wages
xi=0.651; % Proportional reduction in income due to unemployment (xi=0 refers to 0 labor income
mp_params('xi') = xi;

% Solve for Unemployment Values
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_calibrate_2009') = true;
mp_controls('bl_print_calibrate_2009_verbose') = false;
```

```
% 2.1% UI Benefits to Wages and Salary Ratio
fl_ratio_ui_benefits_to_wage = 0.0568;

% Solve
[fl_b_calibrated_by_ui_share, ...
    mp_stats_wage_ui_spending, ...
    mn_earn_tot_wgted, mn_earn_unemp_wgted, ...
    mn_earn_unemp_tot_wgted, mn_earn_unemp_weighted_wgted] = ...
    snw_calibrate_2009_b(mp_params, mp_controls, ...
    fl_ratio_ui_benefits_to_wage);
```

```
Completed SNW_VFI_MAIN_BISEC_VEC;SNW_MP_PARAM=default_dense;SNW_MP_CONTROL=default_test;time=14.9366
Completed SNW_DS_MAIN_VEC;SNW_MP_PARAM=default_dense;SNW_MP_CONTROL=default_test;time=37.6607
Completed SNW_calibrate_2009;SNW_MP_PARAM=default_dense;SNW_MP_CONTROL=default_test;time=55.5689
----------------------------------------
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_stats_wage_ui_spending Scalars
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

	i	idx	value
fl_b_calibrated_by_ui_share	1	1	1.3973
fl_total_b_spending	2	2	3.8087
fl_total_wage	3	3	67.055
fl_total_wage_unemp_hhhead	4	4	5.0843
fl_total_wage_unemp_hhhead_and_spouse	5	5	8.3311
fl_total_wage_unemp_hhhead_lost	6	6	2.7257