# bfw_mlogit

This is the example vignette for function: bfw_mlogit from the **PrjLabEquiBFW Package**.

## Default

```
[mp_fl_labor_occprbty,mp_fl_labor_supplied] = bfw_mlogit();
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xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CONTAINER NAME: mp_wages Scalars
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
            i    idx    value
            _    ___    ______

    C011    1     1     2.1604
    C012    2     2     5.6589
    C013    3     3     5.8023
    C111    4     4     4.5245
    C112    5     5     5.4146
    C113    6     6     8.0437

BFW_SUPPLY_LEVELS_BF18;it_supplier_group=1;SNW_MP_CONTROL=;C011;time=;G01;fl_wage=2.1604
Supply data;potwrker=0.85421;shrmarid=0.87768;shrufive=0.54077;applianc=0.95588;jobscrys=0.613
BFW_SUPPLY_LEVELS_BF18;it_supplier_group=1;SNW_MP_CONTROL=;C012;time=;G01;fl_wage=5.6589
Supply data;potwrker=0.85421;shrmarid=0.87768;shrufive=0.54077;applianc=0.95588;jobscrys=0.613
BFW_SUPPLY_LEVELS_BF18;it_supplier_group=1;SNW_MP_CONTROL=;C013;time=;G01;fl_wage=5.8023
Supply data;potwrker=0.85421;shrmarid=0.87768;shrufive=0.54077;applianc=0.95588;jobscrys=0.613
BFW_SUPPLY_LEVELS_BF18;it_supplier_group=2;SNW_MP_CONTROL=;C111;time=;G11;fl_wage=4.5245
Supply data;potwrker=1.8792;shrmarid=0.9391;shrufive=0.54027;applianc=0.93209;jobscrys=0.613
BFW_SUPPLY_LEVELS_BF18;it_supplier_group=2;SNW_MP_CONTROL=;C112;time=;G11;fl_wage=5.4146
Supply data;potwrker=1.8792;shrmarid=0.9391;shrufive=0.54027;applianc=0.93209;jobscrys=0.613
BFW_SUPPLY_LEVELS_BF18;it_supplier_group=2;SNW_MP_CONTROL=;C113;time=;G11;fl_wage=8.0437
Supply data;potwrker=1.8792;shrmarid=0.9391;shrufive=0.54027;applianc=0.93209;jobscrys=0.613
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CONTAINER NAME: mp_fl_labor_occprbty Scalars
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
            i    idx     value
            _    ___    ________

    C011    1     1     0.015821
    C012    2     2      0.12787
    C013    3     3      0.36854
    C111    4     4     0.097357
    C112    5     5      0.17795
    C113    6     6      0.65443

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CONTAINER NAME: mp_fl_labor_supplied Scalars
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
            i    idx     value
            _    ___    ________

    C011    1     1     0.013514
    C012    2     2      0.10923
    C013    3     3      0.31481
    C111    4     4      0.18296
    C112    5     5      0.33441
    C113    6     6       1.2298
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CONTAINER NAME: mp_fl_labor_supplied_3v0f Scalars
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

| | i | idx | value |
|---|---|---|---|
| **C011** | 1 | 1 | 0.013514 |
| **C012** | 2 | 2 | 0.10923 |
| **C013** | 3 | 3 | 0.31481 |
| **C111** | 4 | 4 | 0.18296 |
| **C112** | 5 | 5 | 0.33441 |
| **C113** | 6 | 6 | 1.2298 |

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CONTAINER NAME: mp_fc_labor_occprbty_3v0f Functions
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| | i | idx | functionString |
|---|---|---|---|
| **C011** | "1" | "1" | "@(w1,w2,w3)fc_ar_prob_wrk(fl_psi0_manual,psi1,w1,fc_prob_denom_wage(w1,w2,w3))" |
| **C012** | "2" | "2" | "@(w1,w2,w3)fc_ar_prob_wrk(fl_psi0_routine,psi1,w2,fc_prob_denom_wage(w1,w2,w3))" |
| **C013** | "3" | "3" | "@(w1,w2,w3)fc_ar_prob_wrk(fl_psi0_analytical,psi1,w3,fc_prob_denom_wage(w1,w2,w3))" |
| **C111** | "4" | "4" | "@(w1,w2,w3)fc_ar_prob_wrk(fl_psi0_manual,psi1,w1,fc_prob_denom_wage(w1,w2,w3))" |
| **C112** | "5" | "5" | "@(w1,w2,w3)fc_ar_prob_wrk(fl_psi0_routine,psi1,w2,fc_prob_denom_wage(w1,w2,w3))" |
| **C113** | "6" | "6" | "@(w1,w2,w3)fc_ar_prob_wrk(fl_psi0_analytical,psi1,w3,fc_prob_denom_wage(w1,w2,w3))" |

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CONTAINER NAME: mp_fc_labor_supplied_3v0f Functions
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| | i | idx | functionString |
|---|---|---|---|
| **C011** | "1" | "1" | "@(w1,w2,w3)fc_supply(fl_potwrklei_potwrker,fc_labor_occprbty_3v0f(w1,w2,w3))" |
| **C012** | "2" | "2" | "@(w1,w2,w3)fc_supply(fl_potwrklei_potwrker,fc_labor_occprbty_3v0f(w1,w2,w3))" |
| **C013** | "3" | "3" | "@(w1,w2,w3)fc_supply(fl_potwrklei_potwrker,fc_labor_occprbty_3v0f(w1,w2,w3))" |
| **C111** | "4" | "4" | "@(w1,w2,w3)fc_supply(fl_potwrklei_potwrker,fc_labor_occprbty_3v0f(w1,w2,w3))" |
| **C112** | "5" | "5" | "@(w1,w2,w3)fc_supply(fl_potwrklei_potwrker,fc_labor_occprbty_3v0f(w1,w2,w3))" |
| **C113** | "6" | "6" | "@(w1,w2,w3)fc_supply(fl_potwrklei_potwrker,fc_labor_occprbty_3v0f(w1,w2,w3))" |

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CONTAINER NAME: mp_fc_labor_occprbty_1v2f Functions
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| | i | idx | functionString |
|---|---|---|---|
| **C011** | "1" | "1" | "@(wage)fc_ar_prob_wrk(fl_psi0_manual,psi1,wage,fc_prob_denom_wage(wage,fl_w2,fl_w3))" |
| **C012** | "2" | "2" | "@(wage)fc_ar_prob_wrk(fl_psi0_routine,psi1,wage,fc_prob_denom_wage(fl_w1,wage,fl_w3))" |
| **C013** | "3" | "3" | "@(wage)fc_ar_prob_wrk(fl_psi0_analytical,psi1,wage,fc_prob_denom_wage(fl_w1,fl_w2,wage))" |
| **C111** | "4" | "4" | "@(wage)fc_ar_prob_wrk(fl_psi0_manual,psi1,wage,fc_prob_denom_wage(wage,fl_w2,fl_w3))" |
| **C112** | "5" | "5" | "@(wage)fc_ar_prob_wrk(fl_psi0_routine,psi1,wage,fc_prob_denom_wage(fl_w1,wage,fl_w3))" |
| **C113** | "6" | "6" | "@(wage)fc_ar_prob_wrk(fl_psi0_analytical,psi1,wage,fc_prob_denom_wage(fl_w1,fl_w2,wage))" |

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CONTAINER NAME: mp_fc_labor_supplied_1v2f Functions
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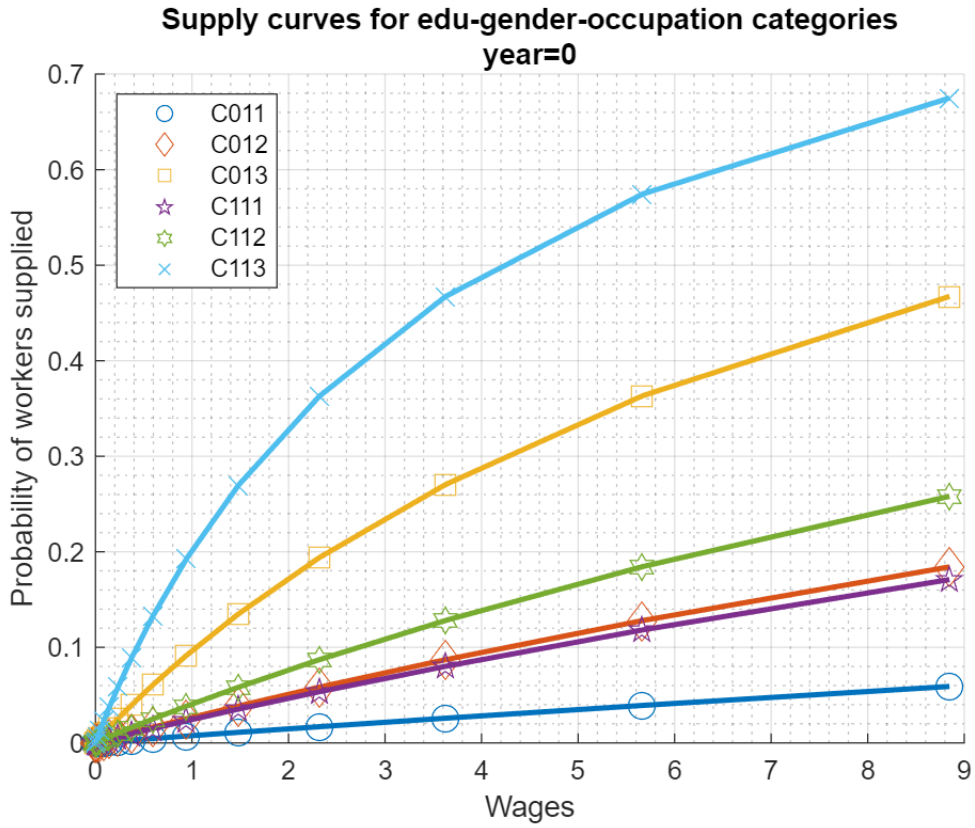
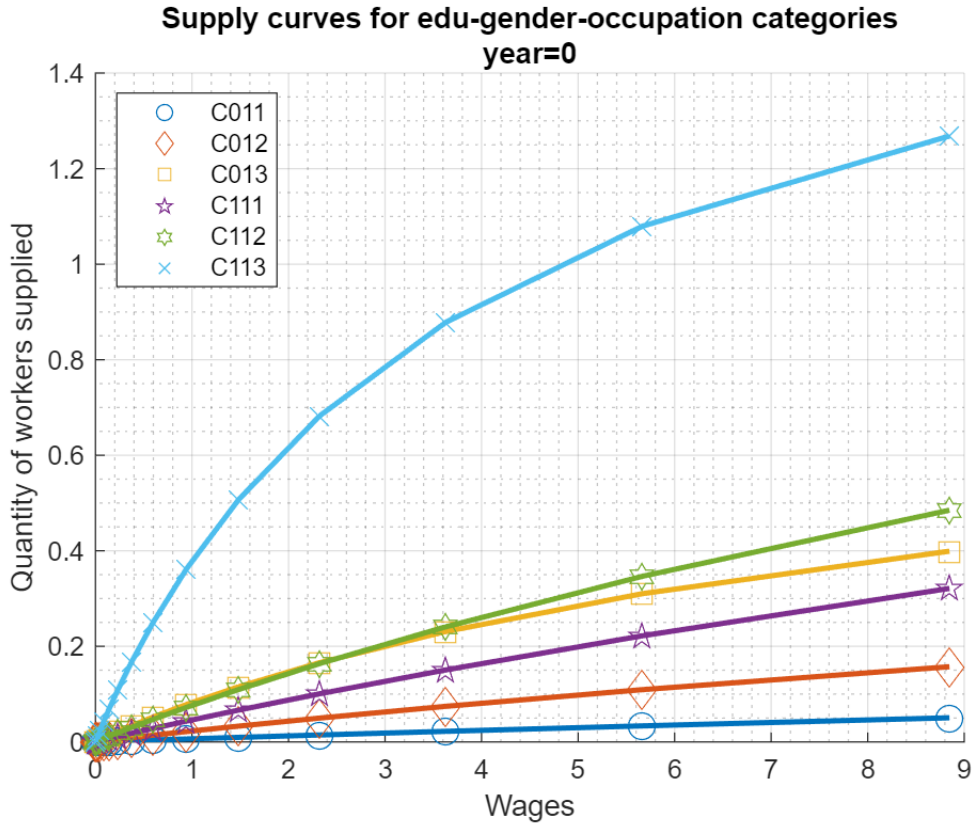
| | i | idx | functionString |
|---|---|---|---|
| **C011** | "1" | "1" | "@(wage)fc_supply(fl_potwrklei_potwrker,fc_labor_occprbty_1v2f(wage))" |

```
C012    "2"    "2"    "@(wage)fc_supply(fl_potwrklei_potwrker,fc_labor_occprbty_1v2f(wage))"
C013    "3"    "3"    "@(wage)fc_supply(fl_potwrklei_potwrker,fc_labor_occprbty_1v2f(wage))"
C111    "4"    "4"    "@(wage)fc_supply(fl_potwrklei_potwrker,fc_labor_occprbty_1v2f(wage))"
C112    "5"    "5"    "@(wage)fc_supply(fl_potwrklei_potwrker,fc_labor_occprbty_1v2f(wage))"
C113    "6"    "6"    "@(wage)fc_supply(fl_potwrklei_potwrker,fc_labor_occprbty_1v2f(wage))"
```



## Visualize Supply Curves Different Years

```
% 1. Print and Graph options
bl_verbose = false;
bl_graph = true;
ar_it_prob_or_quant = [1];

% 2. Get Parameters and data
bl_log_wage = true;
bl_verbose_nest = false;
% Get Parameters
mp_params = bfw_mp_param_esti(bl_log_wage);
mp_param_aux = bfw_mp_param_aux(bl_verbose_nest);
mp_params = [mp_params ; mp_param_aux];
% Get Data
mp_data = bfw_mp_data(bl_verbose_nest);
% Get Functions
mp_func = bfw_mp_func_supply(bl_log_wage, bl_verbose_nest);
% Get Controls
mp_controls = bfw_mp_control();

% 3. Data from which year, only integer year value allowed
% ar_it_data_year = [1989 1994 2000 2008 2014];
ar_it_data_year = [1989 2000 2014];
for it_data_year=ar_it_data_year

    % 4. Which categories to obtain data from, there are 12 possible
    % For non-college equilibrium, six wages, three female, three males
    % gen_occ = gender occupation
    for bl_skilled = [false true]
        if (bl_skilled)
            mt_st_gen_occ_categories = [...
                "C011", "C012", "C013"; ...
                "C111", "C112", "C113"];
        else
            mt_st_gen_occ_categories = [...
                "C001", "C002", "C003"; ...
                "C101", "C102", "C103"];
        end

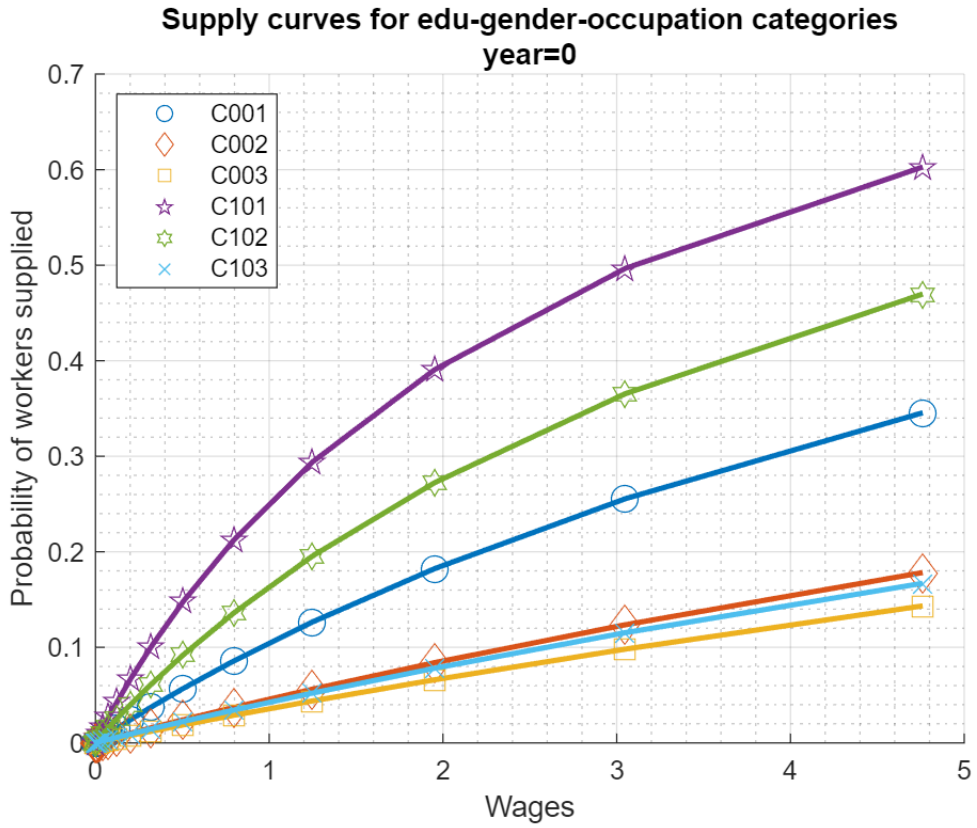
        % 5. Array of wages, at most, since there are six nests, there are 12
        % prices possible. And there are 12 quantity supplies possible, coming
        % from four tyeps of workers, each supply 3 + home categories.
        mp_wages = containers.Map('KeyType', 'char', 'ValueType', 'any');
        % Obtain some equilibrium wage data as testing inputs
        mp_path = bfw_mp_path();
        spt_codem_data = mp_path('spt_codem_data');
        tb_data_pq = mp_data('tb_data_pq');
        tb_data_pq = tb_data_pq(:, ["year", "category", "numberWorkers", "meanWage"]);
        ar_st_gen_occ_categories = mt_st_gen_occ_categories(:)';
        for st_gen_occ=ar_st_gen_occ_categories
            tb_gen_occ_over_years = tb_data_pq(strcmp(tb_data_pq.category, st_gen_occ),:);
            fl_wage_one_year = tb_gen_occ_over_years(tb_gen_occ_over_years.year == (it_data_yea
```

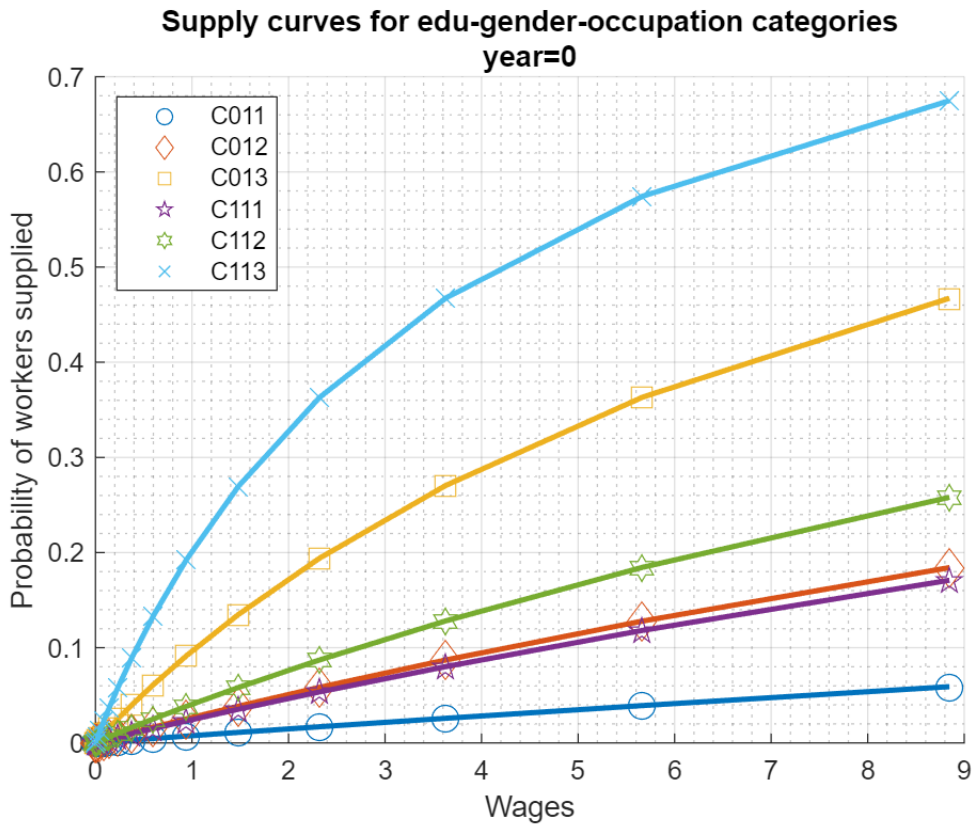
```
            mp_wages(st_gen_occ) = fl_wage_one_year{1, "meanWage"};
        end

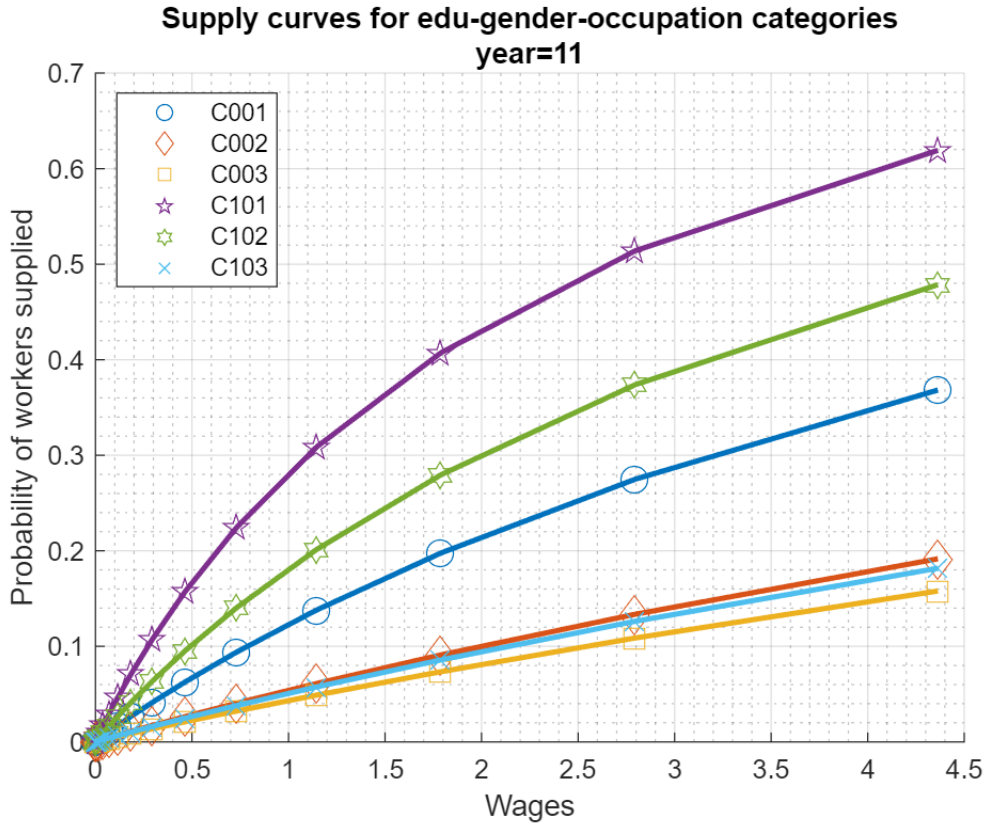
        % Print Wages
        % ff_container_map_display(mp_wages);

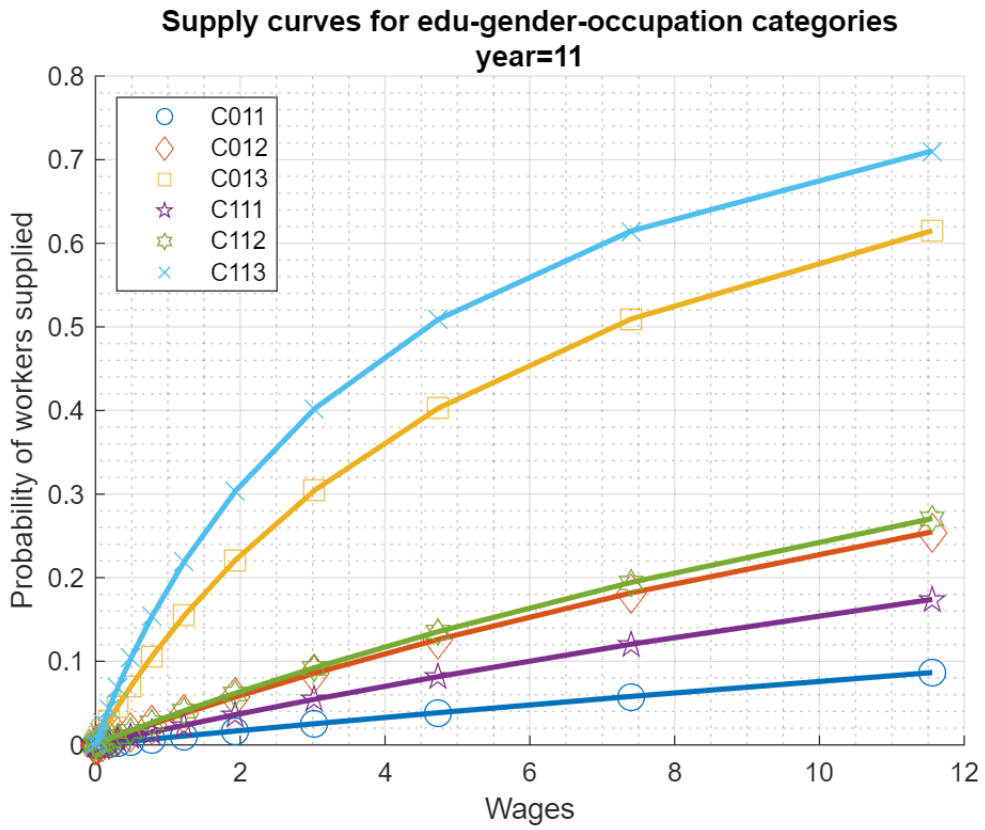
        % Get date offset
        params_group = values(mp_data, {'date_esti_offset'});
        [date_esti_offset] = params_group{:};

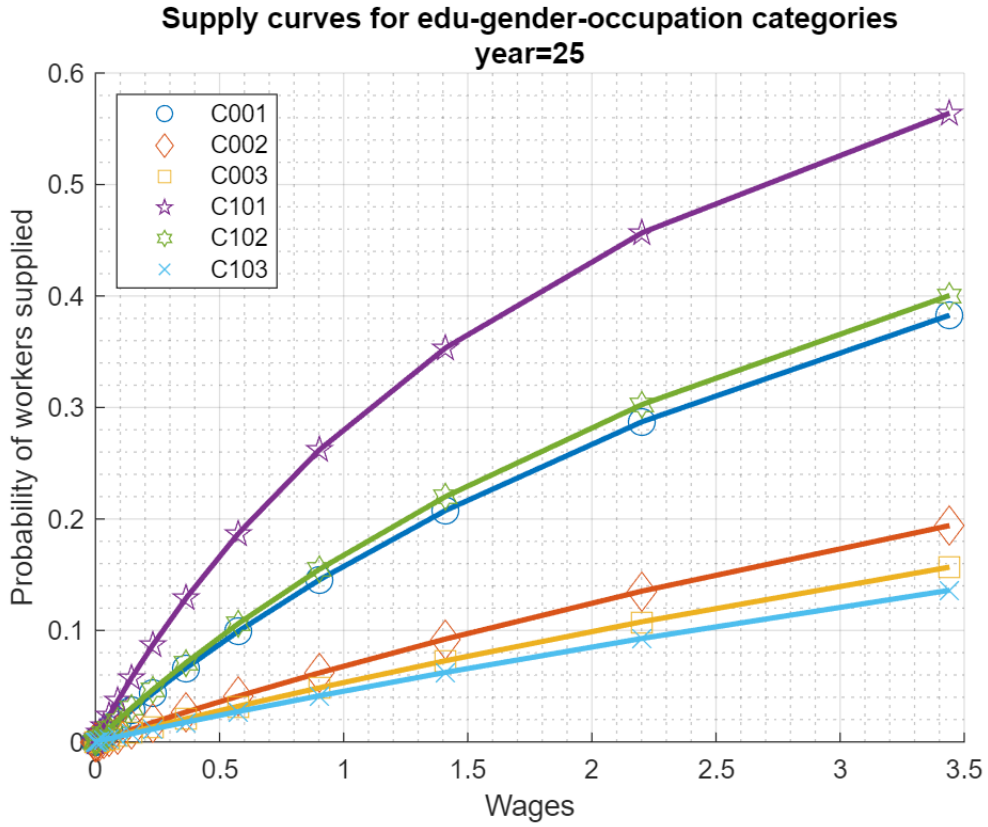
        % Run function
        [mp_fl_labor_occprbty,mp_fl_labor_supplied] = bfw_mlogit(...
            mp_params, mp_data, mp_func, mp_controls, ...
            mt_st_gen_occ_categories, it_data_year - date_esti_offset, mp_wages, ...
            bl_verbose, bl_graph, ...
            ar_it_prob_or_quant);
    end
end
```

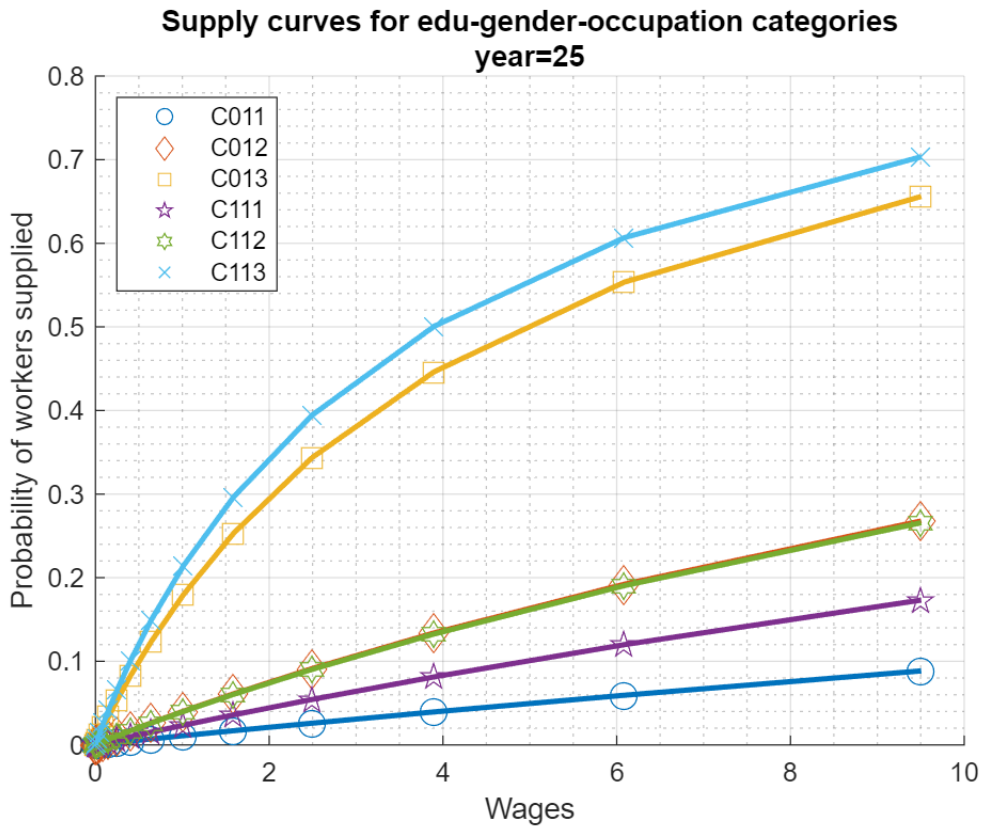



Supply curves for edu-gender-occupation categories
year=0
C011
C012
C013
C111
C112
C113
Probability of workers supplied
Wages
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0
1
2
3
4
5
6
7
8
9


Supply curves for edu-gender-occupation categories
year=11
C001
C002
C003
C101
C102
C103
Probability of workers supplied
Wages
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5


Supply curves for edu-gender-occupation categories
year=11
C011
C012
C013
C111
C112
C113
Probability of workers supplied
Wages
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0
2
4
6
8
10
12


Supply curves for edu-gender-occupation categories
year=25
C001
C002
C003
C101
C102
C103
Probability of workers supplied
Wages
0
0.1
0.2
0.3
0.4
0.5
0.6
0
0.5
1
1.5
2
2.5
3
3.5


Supply curves for edu-gender-occupation categories
year=25
C011
C012
C013
C111
C112
C113
Probability of workers supplied
Wages
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0
2
4
6
8
10