Paper replication summary:

Buchinsky, Gotlibovski, and Lifshitz (2014) Residential location, work location, and labor market outcomes of immigrants in Israel

Nhi Cao

Contents

1 Descriptives

The following log file shows the Stata code to replicate Table I-V and XII-XVI.

```
. use "$path\data for sample description.dta", clear
(Brookdale Survey on Engineers)

.
.
. do "dofile_for_actual_data_tables_12a_to_16b.do"

. /*use stata file: data for sample description*/
.
.
. /*table 12a*/
.
.
. sum monthly_earnings, detail

                    monthly_earnings
-------------------------------------------------------------
      Percentiles      Smallest
 1%         1215            584
 5%         1826            832
10%         2029            882       Obs                 571
25%         2733            980       Sum of wgt.         571

50%         3340                      Mean           3739.965
                        Largest       Std. dev.      1738.539
75%         4411          12000
90%         5943          12000       Variance        3022518
95%         6862          15000       Skewness       2.182814
99%        10122          15183       Kurtosis        11.4104

. sum monthly_earnings if white_collar==1, detail

                    monthly_earnings
-------------------------------------------------------------
      Percentiles      Smallest
 1%         1924            1924
 5%         2632            1924
10%         2941            2117       Obs                 156
25%         3536            2227       Sum of wgt.         156

50%       4560.5                      Mean            4955.34
                        Largest       Std. dev.      2172.285
75%         5882          12000
90%         7085          12000       Variance        4718822
95%         9803          15000       Skewness       1.996712
99%        15000          15183       Kurtosis        8.83033

. sum monthly_earnings if blue_collar==1 , detail

                    monthly_earnings
-------------------------------------------------------------
      Percentiles      Smallest
 1%         1251            584
```

```
 5%         1752            980
10%         2000           1139       Obs                 411
25%         2500           1215       Sum of wgt.         411

50%         3037                      Mean           3298.813
                        Largest       Std. dev.      1269.666
75%         3849           7706
90%         4811           8098       Variance        1612052
95%         5943           8914       Skewness       1.653648
99%         7697          10895       Kurtosis       7.853981

.
.
.
. /*table 12b*/
.
. /* earnings for white collar - see dofile for table 5*/
.
.
. /*earnings for blue collar*/
.
.
. by  residential_location, sort: tab  residential_location if blue_col
> lar==1,sum( monthly_earnings)

------------------------------------------------------------------------------
-> residential_location = Tel Aviv

            |     Summary of monthly_earnings
            |        Mean   Std. dev.       Freq.
------------+------------------------------------
   Tel Aviv |   3026.7561    998.1076          41
------------+------------------------------------
      Total |   3026.7561    998.1076          41

------------------------------------------------------------------------------
-> residential_location = Sharon

            |     Summary of monthly_earnings
            |        Mean   Std. dev.       Freq.
------------+------------------------------------
     Sharon |   3281.1795   1191.7382          39
------------+------------------------------------
      Total |   3281.1795   1191.7382          39

------------------------------------------------------------------------------
-> residential_location = Shfela

            |     Summary of monthly_earnings
            |        Mean   Std. dev.       Freq.
------------+------------------------------------
     Shfela |   3330.1493   1257.7937         134
------------+------------------------------------
      Total |   3330.1493   1257.7937         134
```

```
-------------------------------------------------------------------------------
-> residential_location = Haifa

            |     Summary of monthly_earnings
            |        Mean   Std. dev.       Freq.
------------+------------------------------------
      Haifa |   3297.9783   1051.7372          46
------------+------------------------------------
      Total |   3297.9783   1051.7372          46

-------------------------------------------------------------------------------
-> residential_location = Galilee

            |     Summary of monthly_earnings
            |        Mean   Std. dev.       Freq.
------------+------------------------------------
    Galilee |   3411.9692   1296.9657          65
------------+------------------------------------
      Total |   3411.9692   1296.9657          65

-------------------------------------------------------------------------------
-> residential_location = Negev

            |     Summary of monthly_earnings
            |        Mean   Std. dev.       Freq.
------------+------------------------------------
      Negev |   3380.3148   1676.6574          54
------------+------------------------------------
      Total |   3380.3148   1676.6574          54

-------------------------------------------------------------------------------
-> residential_location = Jerusalem

            |     Summary of monthly_earnings
            |        Mean   Std. dev.       Freq.
------------+------------------------------------
  Jerusalem |   3171.4688   1210.1457          32
------------+------------------------------------
      Total |   3171.4688   1210.1457          32

-------------------------------------------------------------------------------
-> residential_location = .
no observations


.
. /*table 13*/
.
. by semester, sort: tab occ if semester<=11

-------------------------------------------------------------------------------
-> semester = 1
```

```
         occ |      Freq.     Percent        Cum.
-------------+-----------------------------------
White-Collar |         17        2.44        2.44
Blue-Collare |        147       21.09       23.53
Non-Employed |        533       76.47      100.00
-------------+-----------------------------------
       Total |        697      100.00

------------------------------------------------------------------------------
-> semester = 2

         occ |      Freq.     Percent        Cum.
-------------+-----------------------------------
White-Collar |         86       12.34       12.34
Blue-Collare |        417       59.83       72.17
Non-Employed |        194       27.83      100.00
-------------+-----------------------------------
       Total |        697      100.00

------------------------------------------------------------------------------
-> semester = 3

         occ |      Freq.     Percent        Cum.
-------------+-----------------------------------
White-Collar |        103       15.21       15.21
Blue-Collare |        452       66.77       81.98
Non-Employed |        122       18.02      100.00
-------------+-----------------------------------
       Total |        677      100.00

------------------------------------------------------------------------------
-> semester = 4

         occ |      Freq.     Percent        Cum.
-------------+-----------------------------------
White-Collar |        119       18.48       18.48
Blue-Collare |        420       65.22       83.70
Non-Employed |        105       16.30      100.00
-------------+-----------------------------------
       Total |        644      100.00

------------------------------------------------------------------------------
-> semester = 5

         occ |      Freq.     Percent        Cum.
-------------+-----------------------------------
White-Collar |        130       21.45       21.45
Blue-Collare |        395       65.18       86.63
Non-Employed |         81       13.37      100.00
-------------+-----------------------------------
       Total |        606      100.00

------------------------------------------------------------------------------
-> semester = 6
```

```
         occ |      Freq.     Percent        Cum.
-------------+-----------------------------------
White-Collar |        135       24.15       24.15
Blue-Collare |        356       63.69       87.84
Non-Employed |         68       12.16      100.00
-------------+-----------------------------------
       Total |        559      100.00

------------------------------------------------------------------------------
-> semester = 7

         occ |      Freq.     Percent        Cum.
-------------+-----------------------------------
White-Collar |        139       28.08       28.08
Blue-Collare |        307       62.02       90.10
Non-Employed |         49        9.90      100.00
-------------+-----------------------------------
       Total |        495      100.00

------------------------------------------------------------------------------
-> semester = 8

         occ |      Freq.     Percent        Cum.
-------------+-----------------------------------
White-Collar |        130       30.16       30.16
Blue-Collare |        253       58.70       88.86
Non-Employed |         48       11.14      100.00
-------------+-----------------------------------
       Total |        431      100.00

------------------------------------------------------------------------------
-> semester = 9

         occ |      Freq.     Percent        Cum.
-------------+-----------------------------------
White-Collar |        123       31.46       31.46
Blue-Collare |        227       58.06       89.51
Non-Employed |         41       10.49      100.00
-------------+-----------------------------------
       Total |        391      100.00

------------------------------------------------------------------------------
-> semester = 10

         occ |      Freq.     Percent        Cum.
-------------+-----------------------------------
White-Collar |        105       33.33       33.33
Blue-Collare |        177       56.19       89.52
Non-Employed |         33       10.48      100.00
-------------+-----------------------------------
       Total |        315      100.00

------------------------------------------------------------------------------
```

```
-> semester = 11

         occ |      Freq.     Percent        Cum.
-------------+-----------------------------------
White-Collar |         65       36.72       36.72
Blue-Collare |         96       54.24       90.96
Non-Employed |         16        9.04      100.00
-------------+-----------------------------------
       Total |        177      100.00

------------------------------------------------------------------------------
-> semester = 12
no observations

------------------------------------------------------------------------------
-> semester = 13
no observations


.
.
. /*table 14a*/
.
. by semester, sort: tab  employment_location if semester<=11 & white_c
> ollar==1

------------------------------------------------------------------------------
-> semester = 1

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |          3       21.43       21.43
     Shfela |          2       14.29       35.71
      Haifa |          1        7.14       42.86
    Galilee |          1        7.14       50.00
      Negev |          5       35.71       85.71
  Jerusalem |          2       14.29      100.00
------------+-----------------------------------
      Total |         14      100.00

------------------------------------------------------------------------------
-> semester = 2

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         17       22.37       22.37
     Sharon |          5        6.58       28.95
     Shfela |         12       15.79       44.74
      Haifa |         16       21.05       65.79
    Galilee |          8       10.53       76.32
      Negev |         11       14.47       90.79
  Jerusalem |          7        9.21      100.00
------------+-----------------------------------
      Total |         76      100.00
```

```
-------------------------------------------------------------------------------
-> semester = 3

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         20       21.05       21.05
     Sharon |          7        7.37       28.42
     Shfela |         20       21.05       49.47
      Haifa |         18       18.95       68.42
    Galilee |          9        9.47       77.89
      Negev |         13       13.68       91.58
  Jerusalem |          8        8.42      100.00
------------+-----------------------------------
      Total |         95      100.00

-------------------------------------------------------------------------------
-> semester = 4

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         23       20.91       20.91
     Sharon |          5        4.55       25.45
     Shfela |         28       25.45       50.91
      Haifa |         18       16.36       67.27
    Galilee |         12       10.91       78.18
      Negev |         15       13.64       91.82
  Jerusalem |          9        8.18      100.00
------------+-----------------------------------
      Total |        110      100.00

-------------------------------------------------------------------------------
-> semester = 5

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         23       19.17       19.17
     Sharon |          6        5.00       24.17
     Shfela |         32       26.67       50.83
      Haifa |         20       16.67       67.50
    Galilee |         13       10.83       78.33
      Negev |         17       14.17       92.50
  Jerusalem |          9        7.50      100.00
------------+-----------------------------------
      Total |        120      100.00

-------------------------------------------------------------------------------
-> semester = 6

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         24       18.90       18.90
     Sharon |          6        4.72       23.62
     Shfela |         34       26.77       50.39
```

```
      Haifa |         22       17.32       67.72
    Galilee |         15       11.81       79.53
      Negev |         18       14.17       93.70
  Jerusalem |          8        6.30      100.00
------------+-----------------------------------
      Total |        127      100.00

------------------------------------------------------------------------
-> semester = 7

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         22       16.79       16.79
     Sharon |          4        3.05       19.85
     Shfela |         39       29.77       49.62
      Haifa |         25       19.08       68.70
    Galilee |         14       10.69       79.39
      Negev |         19       14.50       93.89
  Jerusalem |          8        6.11      100.00
------------+-----------------------------------
      Total |        131      100.00

------------------------------------------------------------------------
-> semester = 8

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         20       16.95       16.95
     Sharon |          6        5.08       22.03
     Shfela |         33       27.97       50.00
      Haifa |         23       19.49       69.49
    Galilee |         14       11.86       81.36
      Negev |         17       14.41       95.76
  Jerusalem |          5        4.24      100.00
------------+-----------------------------------
      Total |        118      100.00

------------------------------------------------------------------------
-> semester = 9

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         19       17.12       17.12
     Sharon |          6        5.41       22.52
     Shfela |         31       27.93       50.45
      Haifa |         21       18.92       69.37
    Galilee |         14       12.61       81.98
      Negev |         15       13.51       95.50
  Jerusalem |          5        4.50      100.00
------------+-----------------------------------
      Total |        111      100.00

------------------------------------------------------------------------
-> semester = 10
```

```
            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         13       14.44       14.44
     Sharon |          5        5.56       20.00
     Shfela |         29       32.22       52.22
      Haifa |         17       18.89       71.11
    Galilee |         13       14.44       85.56
      Negev |         10       11.11       96.67
  Jerusalem |          3        3.33      100.00
------------+-----------------------------------
      Total |         90      100.00

-------------------------------------------------------------------------------
-> semester = 11

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |          4        7.02        7.02
     Sharon |          3        5.26       12.28
     Shfela |         20       35.09       47.37
      Haifa |         14       24.56       71.93
    Galilee |         10       17.54       89.47
      Negev |          4        7.02       96.49
  Jerusalem |          2        3.51      100.00
------------+-----------------------------------
      Total |         57      100.00

-------------------------------------------------------------------------------
-> semester = 12
no observations

-------------------------------------------------------------------------------
-> semester = 13
no observations


.
.
. /*table 14b*/
.
. by semester, sort: tab   residential_location if semester<=11 & blue_
> collar==1

-------------------------------------------------------------------------------
-> semester = 1

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         20       14.18       14.18
     Sharon |         10        7.09       21.28
     Shfela |         63       44.68       65.96
      Haifa |         12        8.51       74.47
    Galilee |         15       10.64       85.11
```

```
      Negev |         13        9.22       94.33
  Jerusalem |          8        5.67      100.00
------------+-----------------------------------
      Total |        141      100.00

------------------------------------------------------------------------------
-> semester = 2

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         48       11.76       11.76
     Sharon |         42       10.29       22.06
     Shfela |        130       31.86       53.92
      Haifa |         54       13.24       67.16
    Galilee |         59       14.46       81.62
      Negev |         45       11.03       92.65
  Jerusalem |         30        7.35      100.00
------------+-----------------------------------
      Total |        408      100.00

------------------------------------------------------------------------------
-> semester = 3

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         53       11.99       11.99
     Sharon |         49       11.09       23.08
     Shfela |        126       28.51       51.58
      Haifa |         62       14.03       65.61
    Galilee |         57       12.90       78.51
      Negev |         57       12.90       91.40
  Jerusalem |         38        8.60      100.00
------------+-----------------------------------
      Total |        442      100.00

------------------------------------------------------------------------------
-> semester = 4

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         51       12.32       12.32
     Sharon |         46       11.11       23.43
     Shfela |        118       28.50       51.93
      Haifa |         57       13.77       65.70
    Galilee |         57       13.77       79.47
      Negev |         48       11.59       91.06
  Jerusalem |         37        8.94      100.00
------------+-----------------------------------
      Total |        414      100.00

------------------------------------------------------------------------------
-> semester = 5

            |      Freq.     Percent        Cum.
```

```
------------+-----------------------------------
   Tel Aviv |         43       11.03       11.03
     Sharon |         45       11.54       22.56
     Shfela |        117       30.00       52.56
      Haifa |         49       12.56       65.13
    Galilee |         60       15.38       80.51
      Negev |         41       10.51       91.03
  Jerusalem |         35        8.97      100.00
------------+-----------------------------------
      Total |        390      100.00

------------------------------------------------------------------------------
-> semester = 6

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         38       10.73       10.73
     Sharon |         41       11.58       22.32
     Shfela |         98       27.68       50.00
      Haifa |         45       12.71       62.71
    Galilee |         55       15.54       78.25
      Negev |         45       12.71       90.96
  Jerusalem |         32        9.04      100.00
------------+-----------------------------------
      Total |        354      100.00

------------------------------------------------------------------------------
-> semester = 7

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         32       10.49       10.49
     Sharon |         31       10.16       20.66
     Shfela |         88       28.85       49.51
      Haifa |         38       12.46       61.97
    Galilee |         54       17.70       79.67
      Negev |         33       10.82       90.49
  Jerusalem |         29        9.51      100.00
------------+-----------------------------------
      Total |        305      100.00

------------------------------------------------------------------------------
-> semester = 8

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         27       10.71       10.71
     Sharon |         24        9.52       20.24
     Shfela |         70       27.78       48.02
      Haifa |         34       13.49       61.51
    Galilee |         44       17.46       78.97
      Negev |         29       11.51       90.48
  Jerusalem |         24        9.52      100.00
------------+-----------------------------------
```

```
      Total |        252      100.00

-------------------------------------------------------------------------------
-> semester = 9

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         19        8.41        8.41
     Sharon |         24       10.62       19.03
     Shfela |         68       30.09       49.12
      Haifa |         29       12.83       61.95
    Galilee |         42       18.58       80.53
      Negev |         25       11.06       91.59
  Jerusalem |         19        8.41      100.00
------------+-----------------------------------
      Total |        226      100.00

-------------------------------------------------------------------------------
-> semester = 10

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         14        7.91        7.91
     Sharon |         17        9.60       17.51
     Shfela |         53       29.94       47.46
      Haifa |         28       15.82       63.28
    Galilee |         29       16.38       79.66
      Negev |         20       11.30       90.96
  Jerusalem |         16        9.04      100.00
------------+-----------------------------------
      Total |        177      100.00

-------------------------------------------------------------------------------
-> semester = 11

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |          4        4.17        4.17
     Sharon |         10       10.42       14.58
     Shfela |         26       27.08       41.67
      Haifa |         19       19.79       61.46
    Galilee |         17       17.71       79.17
      Negev |          9        9.38       88.54
  Jerusalem |         11       11.46      100.00
------------+-----------------------------------
      Total |         96      100.00

-------------------------------------------------------------------------------
-> semester = 12
no observations

-------------------------------------------------------------------------------
-> semester = 13
no observations
```

```
.
.
. /*table 15*/
.
. by semester, sort: tab   residential_location if semester<=11

-------------------------------------------------------------------------------
-> semester = 1

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         71       10.64       10.64
     Sharon |         64        9.60       20.24
     Shfela |        199       29.84       50.07
      Haifa |        109       16.34       66.42
    Galilee |         92       13.79       80.21
      Negev |         76       11.39       91.60
  Jerusalem |         56        8.40      100.00
------------+-----------------------------------
      Total |        667      100.00

-------------------------------------------------------------------------------
-> semester = 2

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         74       10.85       10.85
     Sharon |         68        9.97       20.82
     Shfela |        202       29.62       50.44
      Haifa |        104       15.25       65.69
    Galilee |         94       13.78       79.47
      Negev |         85       12.46       91.94
  Jerusalem |         55        8.06      100.00
------------+-----------------------------------
      Total |        682      100.00

-------------------------------------------------------------------------------
-> semester = 3

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         70       10.54       10.54
     Sharon |         70       10.54       21.08
     Shfela |        187       28.16       49.25
      Haifa |         97       14.61       63.86
    Galilee |         96       14.46       78.31
      Negev |         90       13.55       91.87
  Jerusalem |         54        8.13      100.00
------------+-----------------------------------
      Total |        664      100.00

-------------------------------------------------------------------------------
```

-> semester = 4

	Freq.	Percent	Cum.
Tel Aviv	67	10.55	10.55
Sharon	64	10.08	20.63
Shfela	183	28.82	49.45
Haifa	92	14.49	63.94
Galilee	91	14.33	78.27
Negev	86	13.54	91.81
Jerusalem	52	8.19	100.00
Total	635	100.00	

-> semester = 5

	Freq.	Percent	Cum.
Tel Aviv	58	9.68	9.68
Sharon	64	10.68	20.37
Shfela	177	29.55	49.92
Haifa	86	14.36	64.27
Galilee	89	14.86	79.13
Negev	77	12.85	91.99
Jerusalem	48	8.01	100.00
Total	599	100.00	

-> semester = 6

	Freq.	Percent	Cum.
Tel Aviv	49	8.83	8.83
Sharon	56	10.09	18.92
Shfela	164	29.55	48.47
Haifa	80	14.41	62.88
Galilee	89	16.04	78.92
Negev	75	13.51	92.43
Jerusalem	42	7.57	100.00
Total	555	100.00	

-> semester = 7

	Freq.	Percent	Cum.
Tel Aviv	43	8.74	8.74
Sharon	48	9.76	18.50
Shfela	146	29.67	48.17
Haifa	71	14.43	62.60
Galilee	82	16.67	79.27

```
      Negev |         63       12.80       92.07
  Jerusalem |         39        7.93      100.00
------------+-----------------------------------
      Total |        492      100.00

------------------------------------------------------------------------------
-> semester = 8

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         36        8.39        8.39
     Sharon |         38        8.86       17.25
     Shfela |        130       30.30       47.55
      Haifa |         60       13.99       61.54
    Galilee |         74       17.25       78.79
      Negev |         60       13.99       92.77
  Jerusalem |         31        7.23      100.00
------------+-----------------------------------
      Total |        429      100.00

------------------------------------------------------------------------------
-> semester = 9

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         28        7.18        7.18
     Sharon |         35        8.97       16.15
     Shfela |        120       30.77       46.92
      Haifa |         57       14.62       61.54
    Galilee |         70       17.95       79.49
      Negev |         53       13.59       93.08
  Jerusalem |         27        6.92      100.00
------------+-----------------------------------
      Total |        390      100.00

------------------------------------------------------------------------------
-> semester = 10

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         21        6.67        6.67
     Sharon |         28        8.89       15.56
     Shfela |         99       31.43       46.98
      Haifa |         52       16.51       63.49
    Galilee |         52       16.51       80.00
      Negev |         39       12.38       92.38
  Jerusalem |         24        7.62      100.00
------------+-----------------------------------
      Total |        315      100.00

------------------------------------------------------------------------------
-> semester = 11

            |      Freq.     Percent        Cum.
```

```
------------+-----------------------------------
   Tel Aviv |          8        4.52        4.52
     Sharon |         14        7.91       12.43
     Shfela |         55       31.07       43.50
      Haifa |         33       18.64       62.15
    Galilee |         33       18.64       80.79
      Negev |         18       10.17       90.96
  Jerusalem |         16        9.04      100.00
------------+-----------------------------------
      Total |        177      100.00

------------------------------------------------------------------------------
-> semester = 12
no observations

------------------------------------------------------------------------------
-> semester = 13
no observations


.
.
. /*table 16a*/
.
. tab residential_location employment_location if white_collar==1, cell

+-----------------+
| Key             |
|-----------------|
|    frequency    |
| cell percentage |
+-----------------+

           |
           |  Tel Aviv     Sharon     Shfela      Haifa |     Total
-----------+--------------------------------------------+----------
  Tel Aviv |        34          2         23          0 |        59
           |      3.23       0.19       2.18       0.00 |      5.60
-----------+--------------------------------------------+----------
    Sharon |        47         30         14          8 |        99
           |      4.46       2.85       1.33       0.76 |      9.40
-----------+--------------------------------------------+----------
    Shfela |       101         20        226         16 |       389
           |      9.59       1.90      21.46       1.52 |     36.94
-----------+--------------------------------------------+----------
     Haifa |         0          0          0        125 |       138
           |      0.00       0.00       0.00      11.87 |     13.11
-----------+--------------------------------------------+----------
   Galilee |         0          2          5         49 |       153
           |      0.00       0.19       0.47       4.65 |     14.53
-----------+--------------------------------------------+----------
     Negev |         3          0         15          0 |       160
           |      0.28       0.00       1.42       0.00 |     15.19
-----------+--------------------------------------------+----------
```

```
 Jerusalem |         0          0          0          0 |        55
           |      0.00       0.00       0.00       0.00 |      5.22
-----------+----------------------------------------------+----------
     Total |       185         54        283        198 |     1,053
           |     17.57       5.13      26.88      18.80 |    100.00


           |
           |   Galilee      Negev  Jerusalem |     Total
-----------+---------------------------------+----------
  Tel Aviv |         0          0          0 |        59
           |      0.00       0.00       0.00 |      5.60
-----------+---------------------------------+----------
    Sharon |         0          0          0 |        99
           |      0.00       0.00       0.00 |      9.40
-----------+---------------------------------+----------
    Shfela |        13          2         11 |       389
           |      1.23       0.19       1.04 |     36.94
-----------+---------------------------------+----------
     Haifa |        13          0          0 |       138
           |      1.23       0.00       0.00 |     13.11
-----------+---------------------------------+----------
   Galilee |        97          0          0 |       153
           |      9.21       0.00       0.00 |     14.53
-----------+---------------------------------+----------
     Negev |         0        142          0 |       160
           |      0.00      13.49       0.00 |     15.19
-----------+---------------------------------+----------
 Jerusalem |         0          0         55 |        55
           |      0.00       0.00       5.22 |      5.22
-----------+---------------------------------+----------
     Total |       123        144         66 |     1,053
           |     11.68      13.68       6.27 |    100.00

.
.
. *table 16b*/
.
.  tab residential_location if blue_collar==1

           |      Freq.     Percent        Cum.
-----------+-----------------------------------
   Tel Aviv |        349       10.83       10.83
     Sharon |        341       10.58       21.42
     Shfela |        963       29.89       51.30
      Haifa |        432       13.41       64.71
    Galilee |        491       15.24       79.95
      Negev |        366       11.36       91.31
  Jerusalem |        280        8.69      100.00
-----------+-----------------------------------
      Total |      3,222      100.00

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end of do-file

.
. do "dofile_for_table_1.do"

. /*use stata file: data for sample description*/
.
. sum employed if semester==last_semester

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
    employed |        697    .8751793    .3307528          0          1

. sum months_in_israel if semester==last_semester

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
months_in_~l |        697    46.67719    16.45127          9         77

. sum years_of_education  if semester==last_semester
```

```
    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
years_of_e~n |        697    16.45624    1.599621         12         22

. sum previous_experience if semester==last_semester

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
previous_e~e |        697    18.55093    8.376421          1         34

. sum married if semester==last_semester

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
     married |        697    .8809182    .3241173          0          1

. sum children_under_21_living_at_home if semester==last_semester

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
children_u~e |        651    1.109063    .8568785          0          5

. sum years_of_education_spouse if semester==last_semester & married==1

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
years_of_e~e |        611    14.97872    2.073535         10         36

. sum from_ukraine if semester==last_semester

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
from_ukraine |        697    .3142037    .4645313          0          1

. sum from_belarus if semester==last_semester

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
from_belarus |        697    .1061693    .3082754          0          1

. sum from_russia if semester==last_semester

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
 from_russia |        697    .3199426     .466789          0          1

. tab year_of_arrival if semester==last_semester

year_of_arr |
       ival |      Freq.     Percent        Cum.
------------+-----------------------------------
         89 |          9        1.29        1.29
         90 |        280       40.17       41.46
```

```
         91 |        136       19.51       60.98
         92 |        102       14.63       75.61
         93 |        110       15.78       91.39
         94 |         60        8.61      100.00
------------+-----------------------------------
      Total |        697      100.00

.
. sum monthly_earnings if semester==2

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ea~s |         15      2599.4     579.713       1518       3340

. sum monthly_earnings if semester==5

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ea~s |         33    2908.697    835.3915       1725       5292

. sum monthly_earnings if semester==8

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ea~s |         34    3445.824    1478.356       1721       7895

. sum monthly_earnings if semester==11

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ea~s |        121    4190.413    2065.076        882      15000

.
. sum monthly_housing_costs if semester==2

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ho~s |         18    1397.778    1458.773        300       7060

. sum monthly_housing_costs if semester==5

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ho~s |         46    1057.565    421.2295        170       1950

. sum monthly_housing_costs if semester==8

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ho~s |         40      940.25    408.8915        100       2000

. sum monthly_housing_costs if semester==11

    Variable |        Obs        Mean    Std. dev.       Min        Max
```

```
-------------+---------------------------------------------------------
monthly_ho~s |        141    918.2837    433.2142         50       2100

.
.
end of do-file

.
. do "dofile_for_table_2a.do"

. /*use stata file: data for sample description*/
.
. tab  residential_location if semester==1

             |      Freq.     Percent        Cum.
-------------+-----------------------------------
   Tel Aviv |         71       10.64       10.64
     Sharon |         64        9.60       20.24
     Shfela |        199       29.84       50.07
      Haifa |        109       16.34       66.42
    Galilee |         92       13.79       80.21
      Negev |         76       11.39       91.60
  Jerusalem |         56        8.40      100.00
-------------+-----------------------------------
      Total |        667      100.00

. tab  residential_location if semester==4

             |      Freq.     Percent        Cum.
-------------+-----------------------------------
   Tel Aviv |         67       10.55       10.55
     Sharon |         64       10.08       20.63
     Shfela |        183       28.82       49.45
      Haifa |         92       14.49       63.94
    Galilee |         91       14.33       78.27
      Negev |         86       13.54       91.81
  Jerusalem |         52        8.19      100.00
-------------+-----------------------------------
      Total |        635      100.00

. tab  residential_location if semester==7

             |      Freq.     Percent        Cum.
-------------+-----------------------------------
   Tel Aviv |         43        8.74        8.74
     Sharon |         48        9.76       18.50
     Shfela |        146       29.67       48.17
      Haifa |         71       14.43       62.60
    Galilee |         82       16.67       79.27
      Negev |         63       12.80       92.07
  Jerusalem |         39        7.93      100.00
-------------+-----------------------------------
      Total |        492      100.00
```

```
. tab  residential_location if semester==10

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         21        6.67        6.67
     Sharon |         28        8.89       15.56
     Shfela |         99       31.43       46.98
      Haifa |         52       16.51       63.49
    Galilee |         52       16.51       80.00
      Negev |         39       12.38       92.38
  Jerusalem |         24        7.62      100.00
------------+-----------------------------------
      Total |        315      100.00

.
.
end of do-file

.
. do "dofile_for_table_2b.do"

. /*use stata file: data for sample description*/
.
. tab  occ if semester==1

         occ |      Freq.     Percent        Cum.
-------------+-----------------------------------
White-Collar |         17        2.44        2.44
Blue-Collare |        147       21.09       23.53
Non-Employed |        533       76.47      100.00
-------------+-----------------------------------
       Total |        697      100.00

. tab  occ if semester==2

         occ |      Freq.     Percent        Cum.
-------------+-----------------------------------
White-Collar |         86       12.34       12.34
Blue-Collare |        417       59.83       72.17
Non-Employed |        194       27.83      100.00
-------------+-----------------------------------
       Total |        697      100.00

. tab  occ if semester==3

         occ |      Freq.     Percent        Cum.
-------------+-----------------------------------
White-Collar |        103       15.21       15.21
Blue-Collare |        452       66.77       81.98
Non-Employed |        122       18.02      100.00
-------------+-----------------------------------
       Total |        677      100.00

. tab  occ if semester==6
```

```
         occ |      Freq.     Percent        Cum.
-------------+-----------------------------------
White-Collar |        135       24.15       24.15
Blue-Collare |        356       63.69       87.84
Non-Employed |         68       12.16      100.00
-------------+-----------------------------------
       Total |        559      100.00

. tab  occ if semester==10

         occ |      Freq.     Percent        Cum.
-------------+-----------------------------------
White-Collar |        105       33.33       33.33
Blue-Collare |        177       56.19       89.52
Non-Employed |         33       10.48      100.00
-------------+-----------------------------------
       Total |        315      100.00

.
.
.
end of do-file

.
. do "dofile_for_table_3.do"

. /*use stata file: data for sample description*/
.
. tab employment_location if  residential_location==1 & white_collar==1

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         34       57.63       57.63
     Sharon |          2        3.39       61.02
     Shfela |         23       38.98      100.00
------------+-----------------------------------
      Total |         59      100.00

. tab employment_location if  residential_location==1 & white_collar==1

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         34       57.63       57.63
     Sharon |          2        3.39       61.02
     Shfela |         23       38.98      100.00
------------+-----------------------------------
      Total |         59      100.00

. tab employment_location if  residential_location==2 & white_collar==1

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |         47       47.47       47.47
```

```
     Sharon |         30       30.30       77.78
     Shfela |         14       14.14       91.92
      Haifa |          8        8.08      100.00
------------+-----------------------------------
      Total |         99      100.00

. tab employment_location if  residential_location==3 & white_collar==1

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |        101       25.96       25.96
     Sharon |         20        5.14       31.11
     Shfela |        226       58.10       89.20
      Haifa |         16        4.11       93.32
    Galilee |         13        3.34       96.66
      Negev |          2        0.51       97.17
  Jerusalem |         11        2.83      100.00
------------+-----------------------------------
      Total |        389      100.00

. tab employment_location if  residential_location==4 & white_collar==1

            |      Freq.     Percent        Cum.
------------+-----------------------------------
      Haifa |        125       90.58       90.58
    Galilee |         13        9.42      100.00
------------+-----------------------------------
      Total |        138      100.00

. tab employment_location if  residential_location==5 & white_collar==1

            |      Freq.     Percent        Cum.
------------+-----------------------------------
     Sharon |          2        1.31        1.31
     Shfela |          5        3.27        4.58
      Haifa |         49       32.03       36.60
    Galilee |         97       63.40      100.00
------------+-----------------------------------
      Total |        153      100.00

. tab employment_location if  residential_location==6 & white_collar==1

            |      Freq.     Percent        Cum.
------------+-----------------------------------
   Tel Aviv |          3        1.88        1.88
     Shfela |         15        9.38       11.25
      Negev |        142       88.75      100.00
------------+-----------------------------------
      Total |        160      100.00

. tab employment_location if  residential_location==7 & white_collar==1

            |      Freq.     Percent        Cum.
------------+-----------------------------------
```

```
  Jerusalem |         55      100.00      100.00
------------+-----------------------------------
      Total |         55      100.00

.
.
.
end of do-file

.
. do "dofile_for_table_4a.do"

. /*use stata file: data for sample description*/
.
.
. /*OLS Log Monthly Housing Costs Regressions*/
.
.
. /*Regression (1) */
.
. #delimit;
delimiter now ;
. reg  ln_monthly_housing_costs married  one_child two_children more_th
> an_two_children renting, robust;

Linear regression                               Number of obs     =
>     635
                                                F(5, 629)         =
>    8.67
                                                Prob > F          =
>  0.0000
                                                R-squared         =
>  0.0576
                                                Root MSE          =
>  .57922

------------------------------------------------------------------------------
> -------
             |               Robust
ln_monthl~ts | Coefficient  std. err.      t    P>|t|     [95% conf. in
> terval]
-------------+----------------------------------------------------------------
> -------
     married |    .251097   .1060617     2.37   0.018     .0428191    .
> 4593749
   one_child |   .1331675   .0604864     2.20   0.028     .0143876    .
> 2519473
two_children |   .1675826   .0626029     2.68   0.008     .0446467    .
> 2905185
more_than_~n |   .0462513   .1645203     0.28   0.779    -.2768242    .
> 3693269
     renting |   .2560637   .0526484     4.86   0.000     .1526758    .
> 3594517
       _cons |   6.332501   .1072945    59.02   0.000     6.121802    6
```

```
> .543199
------------------------------------------------------------------------------
> -------

. /*Regression (2) */
>
> reg  ln_monthly_housing_costs married  one_child two_children more_th
> an_two_children renting  years_of_education previous_experience previ
> ous_experience_sq age_40 semester  from_ukraine
> from_belarus from_russia  years_of_education_spouse, robust;

Linear regression                               Number of obs     =
>     632
                                                F(14, 617)        =
>    5.03
                                                Prob > F          =
>  0.0000
                                                R-squared         =
>  0.0724
                                                Root MSE          =
>  .57791

------------------------------------------------------------------------------
> -------
             |               Robust
ln_monthl~ts | Coefficient  std. err.      t    P>|t|     [95% conf. in
> terval]
-------------+----------------------------------------------------------------
> -------
     married |   .5740755   .2370547     2.42   0.016     .1085435    1
> .039607
   one_child |   .0933754   .0582679     1.60   0.110    -.0210522    .
> 2078029
two_children |    .108608   .0665461     1.63   0.103    -.0220762    .
> 2392923
more_than_~n |  -.0322121   .1720974    -0.19   0.852    -.3701799    .
> 3057556
     renting |   .2731666   .0658239     4.15   0.000     .1439005    .
> 4024327
years_of_e~n |   .0021509   .0158678     0.14   0.892    -.0290104    .
> 0333123
previous_e~e |   .0242497   .0210278     1.15   0.249     -.017045    .
> 0655444
previous_e~q |   -.000695   .0004884    -1.42   0.155    -.0016541    .
> 0002641
      age_40 |  -.0750343   .0923328    -0.81   0.417    -.2563591    .
> 1062904
    semester |   .0076495    .011433     0.67   0.504    -.0148029    .
> 0301019
from_ukraine |  -.0376921   .0652525    -0.58   0.564     -.165836    .
> 0904518
from_belarus |   -.135575   .0766886    -1.77   0.078    -.2861773    .
> 0150274
 from_russia |   .0074282   .0619558     0.12   0.905    -.1142416    .
```

```
> 1290979
years_of_e~e |  -.0209688   .0145215    -1.44   0.149    -.0494863    .
> 0075487
       _cons |   6.171621   .4135078    14.93   0.000     5.359567    6
> .983674
------------------------------------------------------------------------------
> -------

. /*Regression (3) */
>
> reg  ln_monthly_housing_costs married  one_child two_children more_th
> an_two_children renting  years_of_education previous_experience previ
> ous_experience_sq age_40  live_in_sharon live_in_shfela live_in_haifa
>  live_in_galilee live_in_negev live_in_jerusalem semester  from_ukrai
> ne from_belarus from_russia  years_of_education_spouse, robust;

Linear regression                               Number of obs     =
>     632
                                                F(20, 611)        =
>    9.69
                                                Prob > F          =
>  0.0000
                                                R-squared         =
>  0.2260
                                                Root MSE          =
>  .53049

------------------------------------------------------------------------------
> -------
             |               Robust
ln_monthl~ts | Coefficient  std. err.      t    P>|t|     [95% conf. in
> terval]
-------------+----------------------------------------------------------------
> -------
     married |   .4706521   .2233223     2.11   0.035     .0320796    .
> 9092246
   one_child |   .0756328   .0562496     1.34   0.179    -.0348332    .
> 1860989
two_children |   .1033225   .0633689     1.63   0.104    -.0211247    .
> 2277698
more_than_~n |  -.0663971    .159781    -0.42   0.678    -.3801838    .
> 2473895
     renting |   .1278393   .0647435     1.97   0.049     .0006926
> .254986
years_of_e~n |  -.0028914   .0147506    -0.20   0.845    -.0318594    .
> 0260766
previous_e~e |   .0189233   .0185474     1.02   0.308     -.017501    .
> 0553476
previous_e~q |   -.000625   .0004338    -1.44   0.150    -.0014769    .
> 0002268
      age_40 |  -.0522496   .0875187    -0.60   0.551    -.2241235    .
> 1196243
live_in_sh~n |  -.0785973    .076176    -1.03   0.303    -.2281959    .
> 0710013
```

```
live_in_sh~a |  -.1018193   .0632092    -1.61   0.108     -.225953    .
> 0223144
live_in_ha~a |  -.3320172   .0752662    -4.41   0.000    -.4798291   -.
> 1842053
live_in_ga~e |  -.5564116    .088578    -6.28   0.000    -.7303658   -.
> 3824573
live_in_ne~v |  -.6795389    .110345    -6.16   0.000    -.8962404   -.
> 4628374
live_in_je~m |  -.0338887   .1022816    -0.33   0.741    -.2347547    .
> 1669774
    semester |   .0003224   .0106268     0.03   0.976    -.0205471
> .021192
from_ukraine |  -.0093043   .0603426    -0.15   0.878    -.1278084    .
> 1091998
from_belarus |  -.0695884   .0692184    -1.01   0.315    -.2055232    .
> 0663465
 from_russia |   .0249333   .0593485     0.42   0.675    -.0916185    .
> 1414851
years_of_e~e |  -.0175538    .013342    -1.32   0.189    -.0437556
> .008648
       _cons |   6.722653   .4048446    16.61   0.000     5.927597    7
> .517708
------------------------------------------------------------------------------
> -------

. #delimit cr
delimiter now cr
.
end of do-file

.
. do "dofile_for_table_4b.do"

. /*use stata file: data for sample description*/
.
. /*OLS employment regressions*/
.
.
. /*Regression (1) */
.
. #delimit;
delimiter now ;
. reg employed years_of_education previous_experience     previous_expe
> rience_sq age_40, robust;

Linear regression                               Number of obs     =
>     697
                                                F(4, 692)         =
>    5.86
                                                Prob > F          =
>  0.0001
                                                R-squared         =
>  0.0414
                                                Root MSE          =
```

```
>  .32477

------------------------------------------------------------------------------
> -------
             |               Robust
    employed | Coefficient  std. err.      t    P>|t|     [95% conf. in
> terval]
-------------+----------------------------------------------------------------
> -------
years_of_e~n |  -.0065828   .0081744    -0.81   0.421    -.0226324    .
> 0094668
previous_e~e |   .0185003    .010442     1.77   0.077    -.0020015
> .039002
previous_e~q |  -.0006959   .0002495    -2.79   0.005    -.0011856   -.
> 0002061
      age_40 |   .0236777   .0497272     0.48   0.634    -.0739565
> .121312
       _cons |   .9115148   .1519462     6.00   0.000     .6131839    1
> .209846
------------------------------------------------------------------------------
> -------

. /*Regression (2) */
>
> reg employed  years_of_education previous_experience previous_experie
> nce_sq age_40 semester from_ukraine from_belarus from_russia years_of
> _education_spouse, robust;

Linear regression                               Number of obs     =
>     694
                                                F(9, 684)         =
>    3.89
                                                Prob > F          =
>  0.0001
                                                R-squared         =
>  0.0606
                                                Root MSE          =
>  .32328

------------------------------------------------------------------------------
> -------
             |               Robust
    employed | Coefficient  std. err.      t    P>|t|     [95% conf. in
> terval]
-------------+----------------------------------------------------------------
> -------
years_of_e~n |  -.0058303   .0082896    -0.70   0.482    -.0221064    .
> 0104458
previous_e~e |   .0174823   .0102952     1.70   0.090    -.0027318    .
> 0376963
previous_e~q |  -.0006595   .0002459    -2.68   0.008    -.0011423   -.
> 0001766
      age_40 |    .019948    .050381     0.40   0.692     -.078972
> .118868
```

```
    semester |    .003345   .0048994     0.68   0.495    -.0062747    .
> 0129648
from_ukraine |  -.0878556   .0322248    -2.73   0.007    -.1511269   -.
> 0245842
from_belarus |  -.0414937   .0400705    -1.04   0.301    -.1201695    .
> 0371822
 from_russia |  -.0293193   .0293206    -1.00   0.318    -.0868884    .
> 0282498
years_of_e~e |   .0052496    .002789     1.88   0.060    -.0002265    .
> 0107257
       _cons |   .8500972   .1733289     4.90   0.000     .5097766    1
> .190418
------------------------------------------------------------------------------
> -------

. /*Regression (3) */
>
>  reg employed  years_of_education previous_experience previous_experi
> ence_sq age_40  live_in_sharon live_in_shfela live_in_haifa live_in_g
> alilee live_in_negev live_in_jerusalem semester  from_ukraine from_be
> larus from_russia years_of_education_spouse, robust;

Linear regression                               Number of obs     =
>     694
                                                F(15, 678)        =
>    3.39
                                                Prob > F          =
>  0.0000
                                                R-squared         =
>  0.0897
                                                Root MSE          =
>  .31963

------------------------------------------------------------------------------
> -------
             |               Robust
    employed | Coefficient  std. err.      t    P>|t|     [95% conf. in
> terval]
-------------+----------------------------------------------------------------
> -------
years_of_e~n |  -.0057117   .0081807    -0.70   0.485    -.0217742    .
> 0103508
previous_e~e |   .0158191   .0102381     1.55   0.123    -.0042832    .
> 0359214
previous_e~q |  -.0006117   .0002437    -2.51   0.012    -.0010903   -.
> 0001332
      age_40 |    .029026   .0513355     0.57   0.572    -.0717696    .
> 1298216
live_in_sh~n |   .0287369   .0434482     0.66   0.509    -.0565724    .
> 1140462
live_in_sh~a |   -.029865   .0381135    -0.78   0.434    -.1046997    .
> 0449696
live_in_ha~a |  -.1536891   .0555055    -2.77   0.006    -.2626724   -.
> 0447057
```

```
live_in_ga~e |  -.0581792   .0454026    -1.28   0.200    -.1473258    .
> 0309673
live_in_ne~v |  -.1356713    .050485    -2.69   0.007     -.234797   -.
> 0365457
live_in_je~m |  -.0637105   .0569587    -1.12   0.264    -.1755472    .
> 0481261
    semester |   .0042972   .0049146     0.87   0.382    -.0053525    .
> 0139469
from_ukraine |  -.0783275   .0324449    -2.41   0.016    -.1420321   -.
> 0146229
from_belarus |  -.0242851   .0389518    -0.62   0.533    -.1007658    .
> 0521956
 from_russia |   -.025023   .0300615    -0.83   0.405    -.0840478    .
> 0340018
years_of_e~e |   .0058487   .0027707     2.11   0.035     .0004086    .
> 0112888
       _cons |   .8911261   .1735708     5.13   0.000     .5503251    1
> .231927
------------------------------------------------------------------------------
> -------

. /*OLS monthly earning regression*/
>
>
> reg  ln_monthly_earnings years_of_education previous_experience previ
> ous_experience_sq age_40, robust;

Linear regression                               Number of obs     =
>     568
                                                F(4, 563)         =
>   21.17
                                                Prob > F          =
>  0.0000
                                                R-squared         =
>  0.1249
                                                Root MSE          =
>    .384

------------------------------------------------------------------------------
> -------
             |               Robust
ln_monthl~gs | Coefficient  std. err.      t    P>|t|     [95% conf. in
> terval]
-------------+----------------------------------------------------------------
> -------
years_of_e~n |  -.0352372   .0094582    -3.73   0.000     -.053815   -.
> 0166595
previous_e~e |  -.0093402   .0126139    -0.74   0.459    -.0341162    .
> 0154357
previous_e~q |  -.0002732   .0002937    -0.93   0.353      -.00085    .
> 0003036
      age_40 |   .0806422   .0733062     1.10   0.272    -.0633448    .
> 2246293
       _cons |   8.944466   .1754031    50.99   0.000     8.599942
```

```
> 9.28899
------------------------------------------------------------------------------
> -------

. /*Regression (2) */
>
> reg  ln_monthly_earnings  years_of_education previous_experience prev
> ious_experience_sq age_40 semester from_ukraine from_belarus from_rus
> sia years_of_education_spouse, robust;

Linear regression                               Number of obs     =
>     565
                                                F(9, 555)         =
>   23.22
                                                Prob > F          =
>  0.0000
                                                R-squared         =
>  0.2320
                                                Root MSE          =
>  .35609

------------------------------------------------------------------------------
> -------
             |               Robust
ln_monthl~gs | Coefficient  std. err.      t    P>|t|     [95% conf. in
> terval]
-------------+----------------------------------------------------------------
> -------
years_of_e~n |  -.0264953   .0091119    -2.91   0.004    -.0443932   -.
> 0085973
previous_e~e |  -.0002777   .0115715    -0.02   0.981    -.0230069    .
> 0224515
previous_e~q |  -.0003671   .0002687    -1.37   0.172    -.0008948    .
> 0001606
      age_40 |  -.0021096   .0702814    -0.03   0.976    -.1401597    .
> 1359405
    semester |   .0443399   .0052844     8.39   0.000     .0339601    .
> 0547197
from_ukraine |  -.0589266   .0389945    -1.51   0.131    -.1355216    .
> 0176683
from_belarus |  -.0148797   .0513068    -0.29   0.772     -.115659    .
> 0858995
 from_russia |  -.0404772   .0395238    -1.02   0.306    -.1181117    .
> 0371574
years_of_e~e |   .0059252   .0030439     1.95   0.052    -.0000539    .
> 0119042
       _cons |   8.321493   .1833342    45.39   0.000      7.96138    8
> .681607
------------------------------------------------------------------------------
> -------

. /*Regression (3) */
>
>  reg  ln_monthly_earnings years_of_education previous_experience prev
```

```
> ious_experience_sq age_40  live_in_sharon live_in_shfela live_in_haif
> a live_in_galilee live_in_negev live_in_jerusalem semester  from_ukra
> ine from_belarus from_russia years_of_education_spouse, robust;

Linear regression                               Number of obs     =
>     565
                                                F(15, 549)        =
>   14.27
                                                Prob > F          =
>  0.0000
                                                R-squared         =
>  0.2451
                                                Root MSE          =
>  .35498

------------------------------------------------------------------------------
> -------
             |               Robust
ln_monthl~gs | Coefficient  std. err.      t    P>|t|     [95% conf. in
> terval]
-------------+----------------------------------------------------------------
> -------
years_of_e~n |  -.0273726    .009238    -2.96   0.003    -.0455187   -.
> 0092264
previous_e~e |  -.0039913    .011468    -0.35   0.728    -.0265179    .
> 0185353
previous_e~q |  -.0002823    .000264    -1.07   0.285    -.0008009    .
> 0002363
      age_40 |   .0166294   .0711436     0.23   0.815    -.1231176    .
> 1563763
live_in_sh~n |    .038056   .0676043     0.56   0.574    -.0947387    .
> 1708507
live_in_sh~a |   .1012109   .0549878     1.84   0.066    -.0068014    .
> 2092232
live_in_ha~a |   .0968696   .0682327     1.42   0.156    -.0371595    .
> 2308987
live_in_ga~e |   .0718799   .0614626     1.17   0.243    -.0488507    .
> 1926105
live_in_ne~v |   .0389442   .0640788     0.61   0.544    -.0869253    .
> 1648137
live_in_je~m |  -.0579309   .0790698    -0.73   0.464    -.2132473    .
> 0973856
    semester |   .0435486   .0052196     8.34   0.000     .0332958    .
> 0538014
from_ukraine |   -.065274   .0389596    -1.68   0.094    -.1418022    .
> 0112541
from_belarus |  -.0233682   .0524061    -0.45   0.656    -.1263092    .
> 0795728
 from_russia |   -.028702   .0395615    -0.73   0.468    -.1064124    .
> 0490084
years_of_e~e |   .0058191   .0030601     1.90   0.058    -.0001919    .
> 0118301
       _cons |   8.302234   .1912006    43.42   0.000      7.92666    8
> .677808
```

```
------------------------------------------------------------------------------
> -------

. #delimit cr
delimiter now cr
.
end of do-file

.
. do "dofile_for_table_5.do"

. /*use stata file: data for sample description*/
.
.
.
. sum  monthly_housing_costs if  live_in_tel_aviv==1

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ho~s |         57     1276.93    394.7533        400       1950

. sum  monthly_housing_costs if  live_in_sharon==1

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ho~s |         60     1121.75    437.7086        350       2200

. sum  monthly_housing_costs if  live_in_shfela==1

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ho~s |        222    1121.649    585.8818        120       7000

. sum  monthly_housing_costs if  live_in_haifa==1

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ho~s |         89    858.0337    342.1819        200       2000

. sum  monthly_housing_costs if  live_in_galilee==1

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ho~s |        107    769.6449     675.464         50       7000

. sum  monthly_housing_costs if  live_in_negev==1

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ho~s |         95    755.6421    809.4792         50       7060

. sum  monthly_housing_costs if  live_in_jerusalem==1

    Variable |        Obs        Mean    Std. dev.       Min        Max
```

```
-------------+---------------------------------------------------------
monthly_ho~s |         50      1206.7    391.9322         40       2000

.
.
. sum  monthly_earnings if  work_in_tel_aviv==1  & white_collar==1

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ea~s |         23     5499.87    2714.006       2971      15183

. sum  monthly_earnings if  work_in_sharon==1    & white_collar==1

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ea~s |          9    4246.222     1690.87       2227       6862

. sum  monthly_earnings if  work_in_shfela==1    & white_collar==1

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ea~s |         39    5072.256    1728.384       2575      10122

. sum  monthly_earnings if  work_in_haifa==1     & white_collar==1

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ea~s |         23    5523.826    2289.513       2632      12000

. sum  monthly_earnings if  work_in_galilee==1   & white_collar==1

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ea~s |         16    5767.125     3437.02       2537      15000

. sum  monthly_earnings if  work_in_negev==1     & white_collar==1

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ea~s |         16    3959.563    1298.459       2117       7103

. sum  monthly_earnings if  work_in_jerusalem==1 & white_collar==1

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
monthly_ea~s |          9    4414.444    1946.719       1924       6933

.
.
.
.
.
.
.
```

```
.
.
.
.
end of do-file

.
.
.
.
.
.
.
. log close
      name:  <unnamed>
       log:  C:\Users\cahyonhy\Downloads\phd\courses\Structural Econome
> trics\assignment\buchinsky_log.log
  log type:  text
 closed on:  27 Nov 2023, 16:32:10
-------------------------------------------------------------------------------
```

2 Estimation results

The authors did not compile an executable that would print the output of the MLE. The binary `estimation` does not give the estimated parameters. I had to re-compile the source code with the following command:

```
g++ estimation.cpp -DTRACE_LOAD -DINFO -o estimation_new
```

where `estimation_new` is the executable that prints out the estimated parameters after the MLE procedure. The syntax `-D` followed by `FLAG_NAME` tells the compiler to compile the specific part (or 'flag' in `C++` jargon) of the source code that is under `FLAG_NAME`. For example, if the source code is something like:

```
192 int main ( )
193 {
194    f ( );
195    g ( );
196 }
197
198 #ifdef FLAG_NAME
199 f ( ) {
200    return 0;
201 }
202 #endif
203
204 #ifdef SOME_OTHER_FLAG
205    #ifdef STILL_SOME_OTHER_FLAG
206    g ( ) {
207       return 0;
208    }
209
210    #else
211    g ( ) {
212       #ifdef PRINT_SOMETHING_FLAG
213          print ("THIS")
214       #endif
215       return 0;
216    }
217    #endif
218
219 #else
220 h ( ) {
221    return 0;
222 }
223 #endif
```

then compiling

```
g++ source.cpp -DSOME_OTHER_FLAG -DFPRINT_SOMETHING_FLAG -o exe_file
```

will result in an executable that contains only the part of the source code under the specified flags.

```
228 int main ( )
229 {
230    f ( );
231    g ( );
232 }
233
234 g ( ) {
235          print ("THIS")
236       return 0;
237    }
238
```

Table VI - X

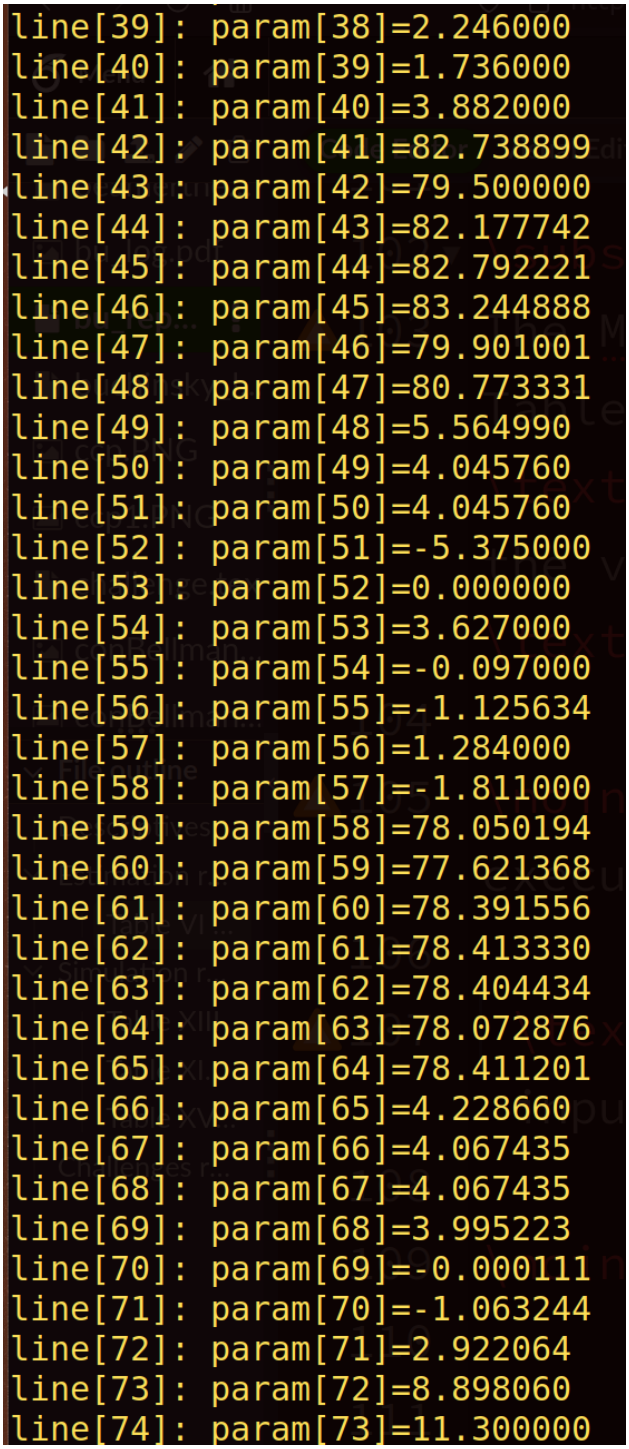
The MLE estimates/parameters in Table VI-X are printed under the #`ifdef TRACE_LOAD` and the value of log-likelihood under #`ifdef INFO`.

Running the new executable:

```
./estimation_new input.txt output.txt
```

we get the parameters:

```
line[1]: param[0]=7.311150
line[2]: param[1]=7.018123
line[3]: param[2]=8.307434
line[4]: param[3]=8.138864
line[5]: param[4]=8.111243
line[6]: param[5]=7.617544
line[7]: param[6]=8.758111
line[8]: param[7]=11.683330
line[9]: param[8]=11.554446
line[10]: param[9]=10.611110
line[11]: param[10]=8.237764
line[12]: param[11]=8.775477
line[13]: param[12]=-0.687770
line[14]: param[13]=3.599813
line[15]: param[14]=-5.970000
line[16]: param[15]=-3.447660
line[17]: param[16]=-5.127964
line[18]: param[17]=2.614565
line[19]: param[18]=-3.177777
line[20]: param[19]=4.981111
line[21]: param[20]=-3.301235
line[22]: param[21]=2.246333
line[23]: param[22]=7.431120
line[24]: param[23]=5.135112
line[25]: param[24]=12.136750
line[26]: param[25]=-5.361367
line[27]: param[26]=-4.811221
line[28]: param[27]=2.323300
line[29]: param[28]=-1.952000
line[30]: param[29]=8.187000
line[31]: param[30]=7.041000
line[32]: param[31]=6.850000
line[33]: param[32]=6.890000
line[34]: param[33]=6.686000
line[35]: param[34]=6.441000
line[36]: param[35]=6.192000
line[37]: param[36]=6.897000
line[38]: param[37]=38.389999
```


line[39]: param[38]=2.246000
line[40]: param[39]=1.736000
line[41]: param[40]=3.882000
line[42]: param[41]=82.738899
line[43]: param[42]=79.500000
line[44]: param[43]=82.177742
line[45]: param[44]=82.792221
line[46]: param[45]=83.244888
line[47]: param[46]=79.901001
line[48]: param[47]=80.773331
line[49]: param[48]=5.564990
line[50]: param[49]=4.045760
line[51]: param[50]=4.045760
line[52]: param[51]=-5.375000
line[53]: param[52]=0.000000
line[54]: param[53]=3.627000
line[55]: param[54]=-0.097000
line[56]: param[55]=-1.125634
line[57]: param[56]=1.284000
line[58]: param[57]=-1.811000
line[59]: param[58]=78.050194
line[60]: param[59]=77.621368
line[61]: param[60]=78.391556
line[62]: param[61]=78.413330
line[63]: param[62]=78.404434
line[64]: param[63]=78.072876
line[65]: param[64]=78.411201
line[66]: param[65]=4.228660
line[67]: param[66]=4.067435
line[68]: param[67]=4.067435
line[69]: param[68]=3.995223
line[70]: param[69]=-0.000111
line[71]: param[70]=-1.063244
line[72]: param[71]=2.922064
line[73]: param[72]=8.898060
line[74]: param[73]=11.300000

```
line[75]: param[74]=9.900000
line[76]: param[75]=-5.860000
line[77]: param[76]=-9.282000
line[78]: param[77]=-4.255000
line[79]: param[78]=-5.229000
line[80]: param[79]=-4.001569
line[81]: param[80]=-4.433580
line[82]: param[81]=-3.865541
line[83]: param[82]=-3.805954
line[84]: param[83]=-4.008665
line[85]: param[84]=-3.013219
line[86]: param[85]=-3.555379
line[87]: param[86]=0.500000
line[88]: param[87]=0.345000
line[89]: param[88]=0.345000
line[90]: param[89]=1.000000
line[91]: param[90]=-3.740000
line[92]: param[91]=0.228996
line[93]: param[92]=-0.012110
line[94]: param[93]=1.800290
line[95]: param[94]=1.070000
line[96]: param[95]=0.073124
line[97]: param[96]=0.062031
line[98]: param[97]=2.501930
line[99]: param[98]=1.422200
line[100]: param[99]=1.899200
line[101]: param[100]=2.170000
line[102]: param[101]=1.880000
line[103]: param[102]=2.066000
line[104]: param[103]=3.127550
line[105]: param[104]=0.099866
line[106]: param[105]=-0.000533
line[107]: param[106]=-1.379000
line[108]: param[107]=0.681120
line[109]: param[108]=1.966856
line[110]: param[109]=1.295991
```

```
line[111]: param[110]=3.632333
line[112]: param[111]=1.914666
line[113]: param[112]=1.163850
line[114]: param[113]=-1.047555
line[115]: param[114]=-1.206133
line[116]: param[115]=7.153332
line[117]: param[116]=0.001044
line[118]: param[117]=0.543250
line[119]: param[118]=0.561110
line[120]: param[119]=0.053569
line[121]: param[120]=0.048444
line[122]: param[121]=0.043333
line[123]: param[122]=0.064455
line[124]: param[123]=0.030750
line[125]: param[124]=0.024688
line[126]: param[125]=0.056867
line[127]: param[126]=157.111557
line[128]: param[127]=19.933201
line[129]: param[128]=-31.834000
line[130]: param[129]=91.255669
line[131]: param[130]=-41.346699
line[132]: param[131]=17.106550
line[133]: param[132]=17.124670
line[134]: param[133]=76.321999
line[135]: param[134]=0.974440
line[136]: param[135]=-13.811100
line[137]: param[136]=6.125679
line[138]: param[137]=6.237700
line[139]: param[138]=6.187770
line[140]: param[139]=4.178950
line[141]: param[140]=10.142232
line[142]: param[141]=5.824677
line[143]: param[142]=-18.653399
line[144]: param[143]=6.125568
line[145]: param[144]=8.916540
line[146]: param[145]=4.627000
```

```
line[147]: param[146]=15.765700
line[148]: param[147]=11.881110
line[149]: param[148]=4.344444
line[150]: param[149]=-3.122000
line[151]: param[150]=5.222000
line[152]: param[151]=7.612599
line[153]: param[152]=8.126000
line[154]: param[153]=7.145600
```

and the value of log-likelihood, as well as other info that is activated under `#ifdef TRACE_LOAD` such as estimation run time and the simulated traveling cost from r to r' following a transportation subsidy:

```
estimation initialization took: 2.461373 seconds
-------------------------------------------------------------------------------------------------------------------------------
| region |       1       |       2       |       3       |       4       |       5       |       6       |       7       |
-------------------------------------------------------------------------------------------------------------------------------
1      0.000000        7317.762207     7317.762207     80821.656250    80821.656250    80821.656250    80821.656250
2      7317.762207     0.000000        19930.363281    19930.363281    80821.656250    80821.656250    80821.656250
3      7317.762207     19930.363281    0.000000        80821.656250    80821.656250    80821.656250    80821.656250
4      80821.656250    19930.363281    80821.656250    0.000000        19930.363281    80821.656250    80821.656250
5      80821.656250    80821.656250    80821.656250    19930.363281    0.000000        80821.656250    80821.656250
6      80821.656250    80821.656250    80821.656250    80821.656250    80821.656250    0.000000        80821.656250
7      80821.656250    80821.656250    80821.656250    80821.656250    80821.656250    80821.656250    0.000000
counter true: 137710 counter false: 1522490 correct: 8.294784%
-inf value was calculated for I=53
**************************************************
-inf value was calculated for I=80
**************************************************
likelihood = -13964.923629
estimation = 1.396492e+04, took: 21.836155 seconds
```

The fundamental parameters (governing occupation decisions, residential location and work location) are summarized in table 1 and 2 below:

Table 1: Value of nonemp., white- and blue-collar job

Parameters	Elements in `param`	Table	Description
$\alpha_1, ..., \alpha_7$	`param[0..6]`	VI	value of leisure in t=1
$\gamma_1, \gamma_2, \gamma_3, \gamma_4$	`param[7..9]`	VI	moving costs by type
$\tau_{r,\ r=1..7}$	`param[10..14]`	VI	taste for residential location
R_1	`param[15..19]`	VI	republic 1 for every region (first & last region =0)
R_2	`param[20..24]`	VI	republic 2 for every region (first & last region =0)
R_3	`param[25..29]`	VI	republic 3 for every region (first & last region =0)
$hc_{r,\ r=1..7}$	`param[30..36]`	VI	housing cost for every region
$\beta_{02r,\ r=1..7}$	`param[41..47]`	VII	wage premium for white-collar
$\beta_{12}^{j=1,2,3}$	`param[48..50]`	VII	returns to schooling by type
β_{22}	`param[51]`	VII	experience in USSR
β_{32}	`param[52]`	VII	experience^2 in USSR
β_{42}	`param[53]`	VII	experience in Israel
β_{52}	`param[54]`	VII	experience^2 in Israel
β_{62}	`param[55]`	VII	age over 40
β_{72}	`param[56]`	VII	type 1
β_{82}	`param[57]`	VII	type 2
$\beta_{03r,\ r=1..7}$	`param[58..64]`	VIII	wage premium for blue-collar
$\beta_{13}^{j=1,2,3}$	`param[65..67]`	VIII	returns to schooling for each type
$\beta_{23} = \beta_{22}$		VIII	experience in USSR (as in white-collar)
$\beta_{33} = \beta_{32}$		VIII	experience^2 in USSR (as in white-collar)
β_{43}	`param[68]`	VIII	experience in Israel
β_{53}	`param[69]`	VIII	experience^2 in Israel
$\beta_{63} = \beta_{62}$		VIII	age over 40 (as in white-collar)
β_{73}	`param[70]`	VIII	type 1
β_{83}	`param[71]`	VIII	type 2
$tc(r, r')$	`param[72..74]`	VII	travelling costs

Table 2: Job arrival and termination

Parameters	Elements in `param`	Table	Description
$\eta_{2j,\ j=0,1,2}$	`param[75..77]`	IX	prob. of losing job in white-collar by type
$\eta_{3j,\ j=0,1,2}$	`param[78]`	IX	prob. of losing job in blue-collar (type 1, 2 are same in white)
White-collar			
$\lambda_{02r\ ,r=1..7}$	`param[79..85]`	X	job offer cons. for white-collar
$\lambda_{21j\ ,j=1,2,3}$	`param[86..88]`	X	returns to schooling by type
λ_{22}	`param[89]`	X	whether unemp. last period
λ_{23}	`param[90]`	X	age at arrival
λ_{24}	`param[91]`	X	time since arrival
λ_{24}	`param[92]`	X	(time since arrival)^2
λ_{25}	`param[93]`	X	type 1
λ_{26}	`param[94]`	X	type 2
ψ_w	`param[95]`	X	prob. of getting job at t=1 for white
Blue-collar			
ψ_b	`param[96]`	X	prob. of getting job at t=1 for blue
$\lambda_{03r\ ,r=1..7}$	`param[97..103]`	X	job offer cons. for blue-collar
$\lambda_{31j\ ,j=1,2,3}$		X	returns to schooling (same in white)
λ_{32}		X	whether unemp. t-1 (same in white)
λ_{33}		X	age at arrival (same)
λ_{34}	`param[104]`	X	time since arrival
λ_{34}	`param[105]`	X	(time since arrival)^2
λ_{35}	`param[106]`	X	type 1
λ_{36}	`param[107]`	X	type 2

Table 3: Other parameters

Parameters	Elements in `param`	Table	Description
φ_1	`param[108]`	XI	prob. of being type 1
φ_2	`param[109]`	XI	prob. of being type 2
	`param[110]`	XI	s.d. for measurement error for wages
	`param[111]`	XI	s.d. for measurement error for housing
υ	`param[112]`	XI	base classification error rate
$\sigma^2_{\varepsilon_1}$	`param[113]`	VI-VIII	variance of stochastic term ε_k for nonemp.
$\sigma^2_{\upsilon_2}$	`param[114]`	VII	variance of stochastic term ε_3 for blue-collar
$\sigma^2_{\omega_3}$	`param[115]`	VIII	variance of stochastic term ε_3 for white-collar
	`param[116]`	XI	wage punishment parameter
ρ_2	`param[117]`	VII	serial correlation for white
ρ_3	`param[118]`	VIII	serial correlation for blue
$rp_{r,\ r=1..7}$	`param[119..125]`	Eqn (8)	rate of house price increase by region
$\tau_{4r,\ r=1..7}$	`param[126..132]`	Eqn (7)	coef. on $Married$
$\tau_{5r,\ r=1..7}$	`param[133..139]`	Eqn (7)	coef. on $Married \times Schooling^{wife}$
$\tau_{6r,\ r=1..7}$	`param[140..146]`	Eqn (7)	coef. on $Married \times No.Kids$
$\tau_{7r,\ r=1..7}$	`param[147..153]`	Eqn (7)	coef. on $Married \times Age^{husband}$

* Some parameters are not explicitly given a Greek letter name, hence the missing entries under Parameters.

3 Simulation results

3.1 Table XIII

In terminal, set working directory to the folder containing the C++ code

```
cd ~/Buchinsky.../Estimation
```

Then run

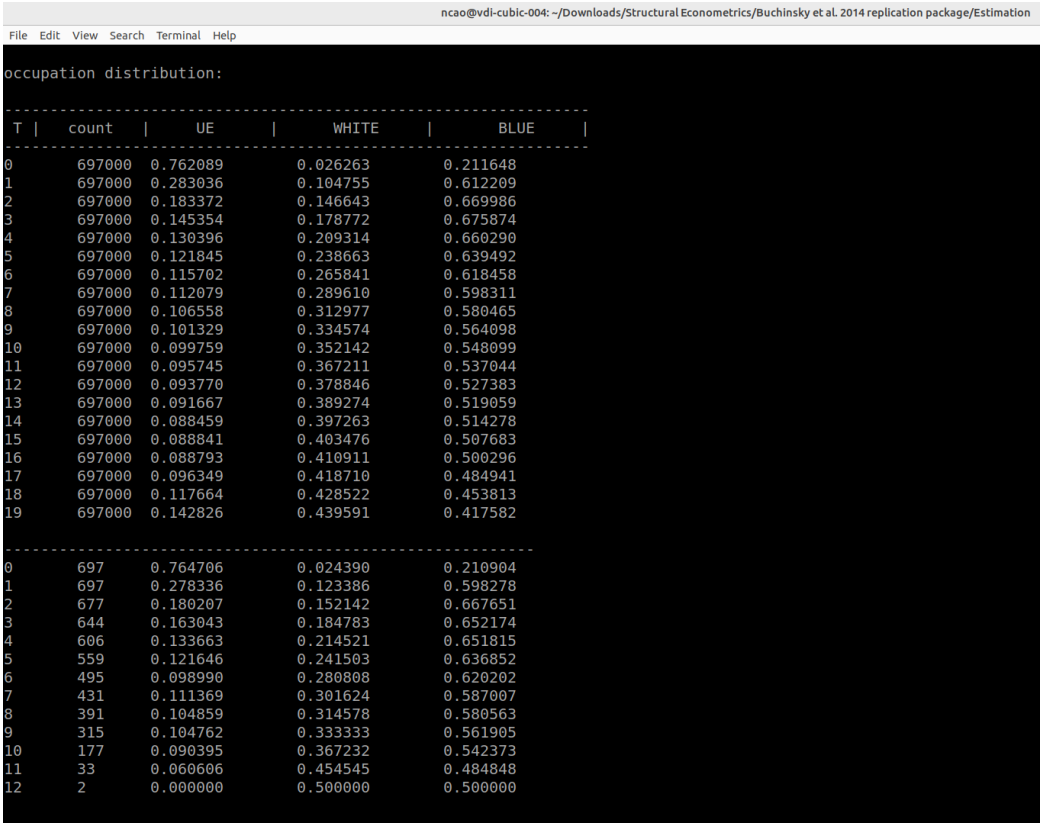
```
./estimation_sim_full <input file> <output file> <sim_type> <sim_percent>
```

where `sim_type = 0 (none), 1 (rent subsidy), 2 (wage subsidy), 3 (travel cost subsidy), 4 (residential location lumpsum), 5 (future interest), 6 (married only)`.

Specifically, the effect of a counterfactual policy of a 22.5% wage subsidy is implemented by running

```
./estimation_sim_full input.txt out.txt 2 22.5
```

The results under 'Occupation distribution' in the terminal output corresponds to Table XII - Distribution of Employment Status, by semester.



The table above the ----- line corresponds to panel c 'Wage Subsidy Simulation' and the table below ---- corresponds to panel a 'Actual Data'.

TABLE XIII

DISTRIBUTION OF EMPLOYMENT STATUS, BY SEMESTER

Employment Status	Semester 1	2	3	4	5	6	7	8	9	10	11
a. Actual Data											
Non-employed	.765	.278	.180	.163	.134	.122	.099	.111	.105	.105	.090
White-collar	.024	.123	.152	.185	.215	.242	.281	.302	.315	.333	.367
Blue-collar	.211	.598	.668	.652	.652	.637	.620	.587	.581	.562	.542
c. Wage Subsidy Simulation											
Non-employed	.762	.283	.181	.143	.128	.119	.113	.110	.104	.100	.099
White-collar	.026	.107	.151	.185	.216	.246	.273	.297	.320	.342	.359
Blue-collar	.212	.610	.668	.672	.656	.635	.614	.593	.576	.558	.542

Similarly, evaluate a transportation subsidy of 77.5% of travel costs by running:

```
./estimation_sim_full input.txt out.txt 3 77.5
```

The screenshot below shows the simulation results above the `----` line (results below `----`, representing actual data, is omitted from here on).

```
occupation distribution:

-------------------------------------------------------------------
 T |   count   |     UE      |      WHITE     |       BLUE     |
-------------------------------------------------------------------
0       697000  0.765682        0.026080        0.208238
1       697000  0.254760        0.154555        0.590684
2       697000  0.165621        0.200872        0.633506
3       697000  0.136357        0.231857        0.631786
4       697000  0.125092        0.261603        0.613306
5       697000  0.119475        0.291319        0.589207
6       697000  0.114449        0.319139        0.566412
7       697000  0.111620        0.343692        0.544689
8       697000  0.106433        0.366666        0.526901
9       697000  0.103288        0.386904        0.509808
10      697000  0.100841        0.402923        0.496237
11      697000  0.096704        0.415575        0.487720
12      697000  0.094839        0.424182        0.480978
13      697000  0.092406        0.432582        0.475011
14      697000  0.090265        0.437997        0.471737
15      697000  0.089192        0.442103        0.468704
16      697000  0.087960        0.446809        0.465231
17      697000  0.094881        0.451063        0.454056
18      697000  0.114845        0.455648        0.429506
19      697000  0.135729        0.464268        0.400003
```

These estimates are very similar (but not exactly) to estimates in panel d 'Transportation subsidy simulation' in table XIII:

TABLE XIII

DISTRIBUTION OF EMPLOYMENT STATUS, BY SEMESTER

Employment Status	Semester 1	2	3	4	5	6	7	8	9	10	11
d. Transportation Subsidy Simulation											
Non-employed	.765	.251	.162	.134	.123	.116	.113	.110	.105	.103	.098
White-collar	.027	.160	.208	.240	.271	.302	.330	.355	.378	.398	.414
Blue-collar	.208	.589	.630	.626	.606	.582	.557	.535	.517	.499	.488

A rent subsidy of 100% in Negev and Galilee region is evaluated by running:
`./estimation_sim_full input.txt out.txt 1 100`

which gives

```
occupation distribution:

-------------------------------------------------------------------
 T |   count   |     UE      |      WHITE     |       BLUE     |
-------------------------------------------------------------------
0       697000  0.770506        0.025877        0.203617
1       697000  0.300943        0.098209        0.600848
2       697000  0.193353        0.137324        0.669323
3       697000  0.153752        0.167171        0.679077
4       697000  0.136271        0.195413        0.668316
5       697000  0.127568        0.222944        0.649488
6       697000  0.119905        0.249363        0.630732
7       697000  0.117055        0.271842        0.611103
8       697000  0.111531        0.293796        0.594673
9       697000  0.107148        0.313931        0.578921
10      697000  0.104762        0.331191        0.564047
11      697000  0.099768        0.346293        0.553940
12      697000  0.097736        0.357112        0.545152
13      697000  0.095621        0.367278        0.537100
14      697000  0.092852        0.375515        0.531633
15      697000  0.092450        0.382517        0.525033
16      697000  0.091141        0.390888        0.517971
17      697000  0.099468        0.399531        0.501001
18      697000  0.124042        0.410062        0.465897
19      697000  0.152185        0.421821        0.425994

-------------------------------------------------------------------
```

The replicated results this time are exact to the estimates in panel e 'Rent subsidy simulation'.

TABLE XIII

DISTRIBUTION OF EMPLOYMENT STATUS, BY SEMESTER

Employment Status	Semester										
	1	2	3	4	5	6	7	8	9	10	11
e. Rent Subsidy Simulation											
Non-employed	.770	.300	.191	.152	.134	.125	.119	.115	.110	.106	.104
White-collar	.026	.101	.142	.173	.202	.231	.257	.280	.302	.322	.339
Blue-collar	.204	.599	.667	.675	.664	.644	.624	.605	.588	.572	.557

Finally, the lump-sum policy of giving 59,000 NIS conditional on moving to Negev or Galilee after arrival is implemented in a separately in another source file. We run

```
./estimation_sim4_full input.txt out.txt 4 100
```

The author did not provide instructions as to which percentage to input for this policy, so 100% is assumed here. This gives

```
occupation distribution:

-------------------------------------------------------------------
 T |   count   |     UE      |      WHITE     |       BLUE     |
-------------------------------------------------------------------
0       697000  0.895115        0.020554        0.084331
1       697000  0.341179        0.094297        0.564524
2       697000  0.210413        0.133362        0.656225
3       697000  0.164152        0.161907        0.673941
4       697000  0.144436        0.187166        0.668397
5       697000  0.133802        0.211950        0.654248
6       697000  0.125848        0.236020        0.638132
7       697000  0.120848        0.257386        0.621766
8       697000  0.117428        0.277416        0.605156
9       697000  0.114154        0.294892        0.590954
10      697000  0.109281        0.309648        0.581070
11      697000  0.105538        0.320953        0.573509
12      697000  0.103935        0.327593        0.568472
13      697000  0.100587        0.332882        0.566531
14      697000  0.098849        0.333407        0.567743
15      697000  0.098142        0.330395        0.571463
16      697000  0.096313        0.322382        0.581306
17      697000  0.107138        0.303640        0.589222
18      697000  0.163527        0.257765        0.578709
19      697000  0.460495        0.110760        0.428745

-------------------------------------------------------------
```

which happens to be the exact estimates provided in the paper, in panel f 'Living Location Subsidy Simulation' of table XIII.

TABLE XIII
DISTRIBUTION OF EMPLOYMENT STATUS, BY SEMESTER

Employment Status	Semester 1	2	3	4	5	6	7	8	9	10	11
f. Living Location Subsidy Simulation											
Non-employed	.895	.342	.210	.164	.144	.134	.126	.120	.118	.114	.109
White-collar	.021	.095	.136	.165	.191	.217	.241	.263	.282	.300	.315
Blue-collar	.084	.563	.654	.671	.665	.649	.633	.617	.600	.586	.576

3.2 Table XIVA - Work Location

Similar to the previous section, we run

```
./estimation_sim_full input.txt out.txt 2 22.5
./estimation_sim_full input.txt out.txt 3 77.5
./estimation_sim_full input.txt out.txt 1 100
```

and

```
./estimation_sim4_full input.txt out.txt 4 100
```

for the four counterfactuals Wage Subsidy, Transportation Subsidy, Rent Subsidy and Living Location Lumpsum Subsidy respectively.
The estimates of interest are now located under `work region distribution (all types)` headline of the resulting terminal output.
For Wage Subsidy, the replicated results are

```
work region distribution (all types):
```

T	count	1	2	3	4	5	6	7
0	18305	0.105326	0.071511	0.132423	0.132259	0.125266	0.279486	0.153728
1	73014	0.127893	0.055565	0.146712	0.140973	0.213671	0.253938	0.061249
2	102210	0.136797	0.045710	0.155210	0.127688	0.226563	0.253234	0.054799
3	124604	0.140292	0.038434	0.159915	0.118824	0.235281	0.252817	0.054436
4	145892	0.142749	0.033456	0.163642	0.112295	0.242755	0.250637	0.054465
5	166348	0.144029	0.030154	0.164240	0.107942	0.251244	0.247902	0.054488
6	185291	0.144195	0.027988	0.166214	0.105672	0.259133	0.242640	0.054158
7	201858	0.143680	0.025850	0.166503	0.104752	0.267753	0.238103	0.053359
8	218145	0.141919	0.024291	0.165784	0.104655	0.276839	0.233487	0.053024
9	233198	0.139517	0.022968	0.164122	0.103702	0.288519	0.229123	0.052050
10	245443	0.137331	0.021736	0.162808	0.102875	0.300359	0.224028	0.050863
11	255946	0.134337	0.020340	0.160100	0.102393	0.315488	0.218886	0.048456
12	264056	0.130272	0.018977	0.157039	0.101467	0.332316	0.213315	0.046615
13	271324	0.126318	0.017625	0.152740	0.100312	0.350780	0.208102	0.044124
14	276892	0.122347	0.016183	0.147700	0.098504	0.371900	0.201967	0.041399
15	281223	0.117369	0.014665	0.142819	0.097076	0.393040	0.196364	0.038667
16	286405	0.112229	0.013181	0.138552	0.096950	0.412685	0.191124	0.035279
17	291841	0.108158	0.011787	0.135958	0.097906	0.425653	0.188740	0.031798
18	298680	0.105775	0.010433	0.134130	0.100264	0.432309	0.188928	0.028161
19	306395	0.104160	0.009641	0.133563	0.104411	0.432184	0.191005	0.025036

which are similar but are not exact to those in the paper

TABLE XIVA—*Continued*

Region	Semester										
	1	2	3	4	5	6	7	8	9	10	11
	c. Wage Subsidy Simulation										
Tel Aviv	.108	.138	.149	.152	.155	.155	.155	.155	.152	.149	.146
Sharon	.073	.058	.049	.042	.037	.033	.031	.028	.027	.025	.024
Shfela	.134	.157	.165	.169	.172	.173	.175	.174	.173	.172	.170
Haifa	.135	.143	.131	.123	.117	.113	.111	.110	.110	.109	.109
Galilee	.123	.202	.213	.221	.228	.237	.244	.253	.263	.274	.286
Negev	.276	.243	.241	.241	.239	.237	.232	.229	.224	.221	.216
Jerusalem	.151	.059	.052	.052	.052	.052	.052	.051	.051	.050	.049

Results for the Transportation Subsidy are:

work region distribution (all types):

T	count	1	2	3	4	5	6	7
0	18178	0.107933	0.073936	0.134888	0.133293	0.123831	0.269282	0.156838
1	107725	0.121866	0.097916	0.201513	0.119712	0.176013	0.239796	0.043184
2	140008	0.137199	0.098066	0.220137	0.123336	0.184839	0.194389	0.042033
3	161604	0.146902	0.094991	0.233336	0.126482	0.191128	0.162836	0.044324
4	182337	0.152383	0.090508	0.243982	0.128493	0.195204	0.142802	0.046628
5	203049	0.155903	0.086536	0.251112	0.130737	0.197553	0.130353	0.047806
6	222440	0.158213	0.081604	0.256640	0.133393	0.199429	0.121808	0.048912
7	239553	0.159497	0.077110	0.261729	0.136012	0.200164	0.116237	0.049250
8	255566	0.160221	0.072224	0.266295	0.136939	0.201858	0.112355	0.050108
9	269672	0.159980	0.067627	0.269435	0.137830	0.205060	0.109552	0.050517
10	280837	0.160303	0.063645	0.273525	0.139006	0.206404	0.106272	0.050844
11	289656	0.161126	0.059850	0.275537	0.139752	0.208713	0.104372	0.050650
12	295655	0.162213	0.056157	0.277107	0.140958	0.211077	0.101723	0.050765
13	301510	0.163116	0.053129	0.278160	0.142854	0.213306	0.099350	0.050085
14	305284	0.164755	0.049996	0.277843	0.144112	0.217080	0.096687	0.049528
15	308146	0.164633	0.047461	0.277872	0.147164	0.221671	0.093063	0.048136
16	311426	0.164970	0.044193	0.276689	0.151712	0.228979	0.088114	0.045343
17	314391	0.165301	0.041719	0.273869	0.157749	0.236572	0.082340	0.042450
18	317587	0.165643	0.038692	0.270534	0.164292	0.244116	0.077125	0.039599
19	323595	0.165543	0.035878	0.266018	0.169969	0.248715	0.075700	0.038177

which are close but not exactly the same as estimates in the paper

TABLE XIVA—*Continued*

Region	Semester 1	2	3	4	5	6	7	8	9	10	11
d. Transportation Subsidy Simulation											
Tel Aviv	.110	.129	.145	.156	.162	.165	.168	.168	.169	.168	.169
Sharon	.076	.102	.103	.101	.097	.092	.087	.082	.077	.071	.067
Shfela	.137	.207	.227	.240	.251	.258	.264	.270	.275	.278	.281
Haifa	.137	.121	.125	.128	.130	.133	.135	.137	.139	.140	.142
Galilee	.121	.167	.174	.178	.181	.183	.184	.185	.186	.190	.191
Negev	.265	.233	.187	.156	.136	.125	.117	.112	.108	.106	.103
Jerusalem	.154	.041	.039	.041	.043	.044	.045	.046	.046	.047	.047

Replicated estimates for Rent Subsidy are:

work region distribution (all types):

T	count	1	2	3	4	5	6	7
0	18036	0.107064	0.071468	0.133178	0.132956	0.125527	0.276336	0.153471
1	68452	0.107097	0.046193	0.120917	0.167636	0.259583	0.247882	0.050692
2	95715	0.113890	0.037946	0.126574	0.147647	0.280677	0.250034	0.043233
3	116518	0.116857	0.032235	0.130289	0.132005	0.296074	0.250614	0.041925
4	136203	0.119226	0.028318	0.132743	0.120071	0.307688	0.250398	0.041556
5	155392	0.120618	0.026005	0.133411	0.111968	0.318453	0.248436	0.041109
6	173806	0.120951	0.024326	0.135473	0.107413	0.326945	0.244088	0.040804
7	189474	0.121188	0.022647	0.136188	0.105576	0.335249	0.238824	0.040327
8	204776	0.120952	0.021677	0.136808	0.105017	0.341563	0.234236	0.039746
9	218810	0.120109	0.020579	0.136301	0.104529	0.349966	0.229519	0.038997
10	230840	0.119598	0.019797	0.136168	0.104245	0.357494	0.224554	0.038143
11	241366	0.118894	0.019013	0.135864	0.104157	0.365329	0.220023	0.036720
12	248907	0.117502	0.018043	0.135653	0.103918	0.373730	0.215225	0.035929
13	255993	0.117062	0.016985	0.133629	0.104921	0.382698	0.210084	0.034622
14	261734	0.116133	0.015787	0.131232	0.105405	0.394171	0.204448	0.032823
15	266614	0.113944	0.014478	0.129536	0.107924	0.405691	0.197574	0.030854
16	272449	0.111786	0.013276	0.128931	0.112109	0.417403	0.188230	0.028266
17	278473	0.110258	0.012012	0.130659	0.117523	0.425618	0.178506	0.025424
18	285813	0.111202	0.010899	0.133262	0.123059	0.429158	0.169443	0.022977
19	294009	0.112670	0.010544	0.137645	0.128329	0.426028	0.162934	0.021850

which are also similar but not exactly the same as those in the paper.

TABLE XIVA—*Continued*

Region	Semester										
	1	2	3	4	5	6	7	8	9	10	11
e. Rent Subsidy Simulation											
Tel Aviv	.109	.116	.124	.128	.131	.133	.133	.132	.131	.130	.129
Sharon	.073	.049	.041	.035	.031	.028	.026	.024	.023	.022	.021
Shfela	.136	.128	.134	.138	.141	.141	.144	.144	.144	.144	.143
Haifa	.137	.172	.155	.140	.131	.124	.120	.117	.117	.116	.116
Galilee	.123	.247	.265	.278	.288	.298	.306	.315	.321	.330	.338
Negev	.271	.239	.240	.241	.239	.238	.233	.230	.226	.220	.217
Jerusalem	.151	.049	.041	.040	.039	.038	.038	.038	.038	.038	.036

For the Living Location Subsidy, results are

work region distribution (all types):

T	count	1	2	3	4	5	6	7
0	14326	0.091093	0.046629	0.124459	0.161315	0.158104	0.364512	0.053888
1	65725	0.022746	0.009814	0.027980	0.180342	0.337878	0.408764	0.012476
2	92953	0.018482	0.007337	0.021613	0.143406	0.372748	0.428249	0.008165
3	112849	0.016792	0.005866	0.018458	0.115535	0.397549	0.439632	0.006168
4	130455	0.016450	0.005220	0.017040	0.095228	0.418642	0.442252	0.005167
5	147729	0.016178	0.004738	0.016104	0.082401	0.434234	0.441924	0.004420
6	164506	0.016303	0.004359	0.015708	0.074429	0.447710	0.437571	0.003921
7	179398	0.016583	0.003785	0.014738	0.069995	0.459347	0.432129	0.003423
8	193359	0.016374	0.003444	0.014476	0.066384	0.469034	0.427236	0.003051
9	205540	0.016357	0.003153	0.013739	0.063890	0.477995	0.421962	0.002905
10	215825	0.016490	0.003053	0.013428	0.063056	0.486167	0.414989	0.002817
11	223704	0.016361	0.002816	0.012995	0.062520	0.493353	0.409210	0.002745
12	228332	0.016432	0.002693	0.012771	0.060421	0.501034	0.404017	0.002632
13	232019	0.016921	0.002534	0.012874	0.060508	0.505976	0.398804	0.002383
14	232385	0.017092	0.002414	0.012522	0.059698	0.511685	0.394371	0.002216
15	230285	0.017118	0.002202	0.012220	0.060073	0.516903	0.389483	0.002002
16	224700	0.017223	0.002439	0.011785	0.059346	0.524878	0.382568	0.001762
17	211637	0.016727	0.002339	0.011208	0.058643	0.537236	0.372321	0.001526
18	179662	0.014594	0.001859	0.009490	0.055621	0.561538	0.355373	0.001525
19	77200	0.000687	0.000117	0.000596	0.049016	0.632604	0.316412	0.000570

which are similar but not quite exact to the results in the paper:

TABLE XIVA—*Continued*

Region	Semester										
	1	2	3	4	5	6	7	8	9	10	11
	f. Living Location Subsidy Simulation										
Tel Aviv	.094	.022	.019	.016	.016	.016	.016	.016	.016	.015	.016
Sharon	.048	.010	.007	.006	.005	.004	.004	.004	.003	.003	.003
Shfela	.126	.029	.022	.019	.017	.016	.015	.015	.014	.014	.013
Haifa	.160	.180	.144	.116	.096	.083	.071	.071	.067	.065	.064
Galilee	.155	.336	.370	.395	.417	.432	.456	.456	.467	.476	.484
Negev	.359	.410	.429	.441	.443	.444	.433	.434	.429	.424	.417
Jerusalem	.058	.013	.009	.007	.006	.005	.005	.004	.004	.003	.003

3.3 Table XV-XVI and rest of the terminal output

Estimates for Table XV - Place of Residence correspond to those under headline `housing distribution (all types)` in the terminal output, while Table XVIA - Residential-Work Locations for White-Collar Workers correspond to output under `house-work region distribution (all types)`. These are all obtained by running the above commands respectively for four counterfactual policies.

```
./estimation_sim_full input.txt out.txt 2 22.5
```

```
**************************************************
-inf value was calculated for I=693
**************************************************
-inf value was calculated for I=694
**************************************************
-inf value was calculated for I=695
**************************************************
-inf value was calculated for I=696
**************************************************
likelihood = -76477.280623
============================
wage subsidy simulation
============================
total cost = 41898906.909438
----------------------------------------
 T |   Count   |   Average Max Utility   |
----------------------------------------
0       697000  633043405087
1       697000  622369321682
2       697000  607930841351
3       697000  604775526342
4       697000  607465372258
5       697000  638032679809
6       697000  675324985722
7       697000  624805622716
8       697000  525900912880
9       697000  529085752903
10      697000  550462808888
11      697000  489663458921
12      697000  496588648086
13      697000  489056137033
14      697000  460549010283
15      697000  451652338885
16      697000  423902961718
17      697000  427628188152
18      697000  430537846691
19      697000  425765266596

type 0 probability = 0.084726   type 1 probability = 0.605634   type 2 probability = 0.309640
```

occupation distribution:

T	count	UE	WHITE	BLUE
0	697000	0.762089	0.026263	0.211648
1	697000	0.283036	0.104755	0.612209
2	697000	0.183372	0.146643	0.669986
3	697000	0.145354	0.178772	0.675874
4	697000	0.130396	0.209314	0.660290
5	697000	0.121845	0.238663	0.639492
6	697000	0.115702	0.265841	0.618458
7	697000	0.112079	0.289610	0.598311
8	697000	0.106558	0.312977	0.580465
9	697000	0.101329	0.334574	0.564098
10	697000	0.099759	0.352142	0.548099
11	697000	0.095745	0.367211	0.537044
12	697000	0.093770	0.378846	0.527383
13	697000	0.091667	0.389274	0.519059
14	697000	0.088459	0.397263	0.514278
15	697000	0.088841	0.403476	0.507683
16	697000	0.088793	0.410911	0.500296
17	697000	0.096349	0.418710	0.484941
18	697000	0.117664	0.428522	0.453813
19	697000	0.142826	0.439591	0.417582

0	697	0.764706	0.024390	0.210904
1	697	0.278336	0.123386	0.598278
2	677	0.180207	0.152142	0.667651
3	644	0.163043	0.184783	0.652174
4	606	0.133663	0.214521	0.651815
5	559	0.121646	0.241503	0.636852
6	495	0.098990	0.280808	0.620202
7	431	0.111369	0.301624	0.587007
8	391	0.104859	0.314578	0.580563
9	315	0.104762	0.333333	0.561905
10	177	0.090395	0.367232	0.542373
11	33	0.060606	0.454545	0.484848
12	2	0.000000	0.500000	0.500000

average white wage in last period:

ty	1	2	3	4	5	6	7	average
0	6690.039	4954.474	6317.785	6927.059	8745.979	6273.532	5980.448	7245.971
1	7293.238	5412.346	6959.274	7438.706	9574.170	6757.144	6293.540	8080.355
2	6513.782	5352.019	6699.743	7690.272	7929.823	6306.948	8513.947	7607.263
avg	7262.520	5382.435	6933.058	7424.801	9453.159	6730.684	6285.950	8038.627
real	5499.870	4246.222	5072.256	5523.826	5767.125	3959.562	4414.444	5073.600

average blue wage in last period:

ty	1	2	3	4	5	6	7	average
0	3989.773	4045.229	4419.741	4419.101	5580.742	5342.520	4616.290	4859.985
1	3775.030	3690.974	3909.112	4054.399	5062.846	4918.279	4248.068	4630.357
2	5168.483	6919.766	6975.443	7866.696	7820.533	7780.525	9154.442	7731.272
avg	4221.015	4855.587	5154.947	5099.995	7137.230	7191.575	5166.198	6694.650
real	3026.756	3281.179	3330.149	3297.978	3411.969	3377.577	3171.469	3298.066

average rent in last period:

ty	1	2	3	4	5	6	7	average
0	2292.250	1798.218	1738.215	1830.264	956.163 690.452	2043.204	1392.917	
1	2704.858	2127.946	2073.245	2210.919	1130.033	824.176	2477.675	1520.552
2	3516.111	2586.069	2562.886	2566.345	1403.000	1015.308	2893.379	1428.603
avg	2769.004	2114.233	2088.093	2188.179	1228.126	898.297	2428.311	1481.412
real	1435.0000	1165.0000	1225.3623	990.0000	772.1053	471.2778	1210.5555	1128.9108

housing region distribution (all types):

T	count	1	2	3	4	5	6	7
0	697000	0.106307	0.070234	0.193308	0.100053	0.271924	0.192706	0.065468
1	697000	0.095578	0.071504	0.191273	0.100852	0.279148	0.196750	0.064895
2	697000	0.087264	0.070564	0.190095	0.099989	0.287096	0.199851	0.065142
3	697000	0.082772	0.068816	0.188967	0.099386	0.294164	0.202461	0.063435
4	697000	0.078083	0.068438	0.188152	0.099986	0.300220	0.204858	0.060264
5	697000	0.075670	0.066288	0.186693	0.098822	0.309039	0.206245	0.057242
6	697000	0.072558	0.066286	0.184603	0.097253	0.315976	0.207970	0.055356
7	697000	0.070601	0.063364	0.182539	0.096013	0.323872	0.209923	0.053687
8	697000	0.067588	0.061531	0.180029	0.094293	0.332452	0.211765	0.052343
9	697000	0.064917	0.059564	0.176614	0.092601	0.342438	0.213339	0.050528
10	697000	0.063050	0.056053	0.172984	0.091683	0.353086	0.215832	0.047311
11	697000	0.060607	0.053796	0.169197	0.090139	0.365750	0.215459	0.045052
12	697000	0.058786	0.051370	0.163821	0.087871	0.378924	0.215366	0.043862
13	697000	0.056006	0.049207	0.158921	0.083855	0.394659	0.215706	0.041647
14	697000	0.054026	0.046872	0.153601	0.080185	0.410278	0.216407	0.038630
15	697000	0.052362	0.044726	0.148775	0.075908	0.425973	0.215907	0.036350
16	697000	0.050001	0.042567	0.144208	0.073142	0.440496	0.215904	0.033681
17	697000	0.049188	0.039938	0.140912	0.072109	0.449714	0.217156	0.030981
18	697000	0.047548	0.037868	0.139211	0.073709	0.453778	0.219653	0.028234
19	697000	0.046024	0.037679	0.135854	0.078435	0.452247	0.224324	0.025438
0	667	0.106447	0.095952	0.298351	0.163418	0.137931	0.113943	0.083958
1	682	0.108504	0.099707	0.296188	0.152493	0.137830	0.124633	0.080645
2	664	0.105422	0.105422	0.281626	0.146084	0.144578	0.135542	0.081325
3	635	0.105512	0.100787	0.288189	0.144882	0.143307	0.135433	0.081890
4	599	0.096828	0.106845	0.295493	0.143573	0.148581	0.128548	0.080134
5	555	0.088288	0.100901	0.295496	0.144144	0.160360	0.135135	0.075676
6	492	0.087398	0.097561	0.296748	0.144309	0.166667	0.128049	0.079268
7	429	0.083916	0.088578	0.303030	0.139860	0.172494	0.139860	0.072261
8	390	0.071795	0.089744	0.307692	0.146154	0.179487	0.135897	0.069231
9	315	0.066667	0.088889	0.314286	0.165079	0.165079	0.123810	0.076190
10	177	0.045198	0.079096	0.310734	0.186441	0.186441	0.101695	0.090395
11	33	0.030303	0.090909	0.454545	0.272727	0.090909	0.030303	0.030303
12	2	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000

work region distribution (all types):

T	count	1	2	3	4	5	6	7
0	18305	0.105326	0.071511	0.132423	0.132259	0.125266	0.279486	0.153728
1	73014	0.127893	0.055565	0.146712	0.140973	0.213671	0.253938	0.061249
2	102210	0.136797	0.045710	0.155210	0.127688	0.226563	0.253234	0.054799
3	124604	0.140292	0.038434	0.159915	0.118824	0.235281	0.252817	0.054436
4	145892	0.142749	0.033456	0.163642	0.112295	0.242755	0.250637	0.054465
5	166348	0.144029	0.030154	0.164240	0.107942	0.251244	0.247902	0.054488
6	185291	0.144195	0.027988	0.166214	0.105672	0.259133	0.242640	0.054158
7	201858	0.143680	0.025850	0.166503	0.104752	0.267753	0.238103	0.053359
8	218145	0.141919	0.024291	0.165784	0.104655	0.276839	0.233487	0.053024
9	233198	0.139517	0.022968	0.164122	0.103702	0.288519	0.229123	0.052050
10	245443	0.137331	0.021736	0.162808	0.102875	0.300359	0.224028	0.050863
11	255946	0.134337	0.020340	0.160100	0.102393	0.315488	0.218886	0.048456
12	264056	0.130272	0.018977	0.157039	0.101467	0.332316	0.213315	0.046615
13	271324	0.126318	0.017625	0.152740	0.100312	0.350780	0.208102	0.044124
14	276892	0.122347	0.016183	0.147700	0.098504	0.371900	0.201967	0.041399
15	281223	0.117369	0.014665	0.142819	0.097076	0.393040	0.196364	0.038667
16	286405	0.112229	0.013181	0.138552	0.096950	0.412685	0.191124	0.035279
17	291841	0.108158	0.011787	0.135958	0.097906	0.425653	0.188740	0.031798
18	298680	0.105775	0.010433	0.134130	0.100264	0.432309	0.188928	0.028161
19	306395	0.104160	0.009641	0.133563	0.104411	0.432184	0.191005	0.025036
0	14	0.214286	0.000000	0.142857	0.071429	0.071429	0.357143	0.142857
1	76	0.223684	0.065789	0.157895	0.210526	0.105263	0.144737	0.092105
2	95	0.210526	0.073684	0.210526	0.189474	0.094737	0.136842	0.084211
3	110	0.209091	0.045455	0.254545	0.163636	0.109091	0.136364	0.081818
4	120	0.191667	0.050000	0.266667	0.166667	0.108333	0.141667	0.075000
5	127	0.188976	0.047244	0.267717	0.173228	0.118110	0.141732	0.062992
6	131	0.167939	0.030534	0.297710	0.190840	0.106870	0.145038	0.061069
7	118	0.169492	0.050847	0.279661	0.194915	0.118644	0.144068	0.042373
8	111	0.171171	0.054054	0.279279	0.189189	0.126126	0.135135	0.045045
9	90	0.144444	0.055556	0.322222	0.188889	0.144444	0.111111	0.033333
10	57	0.070175	0.052632	0.350877	0.245614	0.175439	0.070175	0.035088
11	12	0.166667	0.083333	0.416667	0.250000	0.083333	0.000000	0.000000

house-work region distribution (all types):

rg	count	1	2	3	4	5	6	7
1	203439	0.685198	0.046235	0.268154	0.000059	0.000020	0.000113	0.000221
2	217896	0.547293	0.300992	0.060143	0.090741	0.000060	0.000344	0.000427
3	864682	0.322362	0.010566	0.666645	0.000059	0.000023	0.000104	0.000241
4	428836	0.000030	0.008943	0.000030	0.843425	0.147278	0.000058	0.000236
5	1429121	0.000072	0.000021	0.000040	0.041555	0.957899	0.000131	0.000283
6	915940	0.000085	0.000011	0.000058	0.000055	0.000026	0.999556	0.000210
7	187156	0.000032	0.000027	0.000011	0.000027	0.000016	0.000091	0.999797
1	-----	57.63000	3.390000	38.98000	0.000000	0.000000	0.000000	0.000000
2	-----	47.47000	30.30000	14.14000	8.080000	0.000000	0.000000	0.000000
3	-----	25.96000	5.140000	58.10000	4.110000	3.340000	0.510000	2.830000
4	-----	0.000000	0.000000	0.000000	90.58000	9.420000	0.000000	0.000000
5	-----	0.000000	1.310000	3.270000	32.03000	63.40000	0.000000	0.000000
6	-----	1.880000	0.000000	9.380000	0.000000	0.000000	88.75000	0.000000

```
./estimation_sim_full input.txt out.txt 3 77.5
```

```
-inf value was calculated for I=692
**************************************************
-inf value was calculated for I=693
**************************************************
-inf value was calculated for I=694
**************************************************
-inf value was calculated for I=695
**************************************************
-inf value was calculated for I=696
**************************************************
likelihood = -76477.280623
==============================
travel cost subsidy simulation
==============================
total cost = 40578222.592377
----------------------------------------
 T |   Count   |   Average Max Utility   |
----------------------------------------
0       697000  633043348058
1       697000  614162474212
2       697000  601730073263
3       697000  605070693211
4       697000  612057050517
5       697000  630865182086
6       697000  676195060354
7       697000  625114338987
8       697000  522982351568
9       697000  528516731607
10      697000  550288059186
11      697000  494204263061
12      697000  496894242960
13      697000  488394381770
14      697000  460367052424
15      697000  451620718344
16      697000  425013104156
17      697000  427505764507
18      697000  432378243229
19      697000  426773591064

type 0 probability = 0.084726   type 1 probability = 0.605634   type 2 probability = 0.309640
```

occupation distribution:

T	count	UE	WHITE	BLUE
0	697000	0.765682	0.026080	0.208238
1	697000	0.254760	0.154555	0.590684
2	697000	0.165621	0.200872	0.633506
3	697000	0.136357	0.231857	0.631786
4	697000	0.125092	0.261603	0.613306
5	697000	0.119475	0.291319	0.589207
6	697000	0.114449	0.319139	0.566412
7	697000	0.111620	0.343692	0.544689
8	697000	0.106433	0.366666	0.526901
9	697000	0.103288	0.386904	0.509808
10	697000	0.100841	0.402923	0.496237
11	697000	0.096704	0.415575	0.487720
12	697000	0.094839	0.424182	0.480978
13	697000	0.092406	0.432582	0.475011
14	697000	0.090265	0.437997	0.471737
15	697000	0.089192	0.442103	0.468704
16	697000	0.087960	0.446809	0.465231
17	697000	0.094881	0.451063	0.454056
18	697000	0.114845	0.455648	0.429506
19	697000	0.135729	0.464268	0.400003

0	697	0.764706	0.024390	0.210904
1	697	0.278336	0.123386	0.598278
2	677	0.180207	0.152142	0.667651
3	644	0.163043	0.184783	0.652174
4	606	0.133663	0.214521	0.651815
5	559	0.121646	0.241503	0.636852
6	495	0.098990	0.280808	0.620202
7	431	0.111369	0.301624	0.587007
8	391	0.104859	0.314578	0.580563
9	315	0.104762	0.333333	0.561905
10	177	0.090395	0.367232	0.542373
11	33	0.060606	0.454545	0.484848
12	2	0.000000	0.500000	0.500000

average white wage in last period:

ty	1	2	3	4	5	6	7	average
0	6643.784	4924.045	6293.779	6868.495	7032.208	5381.805	6033.358	6446.489
1	7351.482	5212.506	7010.189	7441.819	7872.782	5672.586	6245.771	7159.713
2	6496.840	5392.185	6348.607	6826.640	6624.611	5478.195	6646.015	6432.435
avg	7307.245	5204.388	6966.845	7410.194	7790.233	5653.312	6240.819	7113.764
real	5499.870	4246.222	5072.256	5523.826	5767.125	3959.562	4414.444	5073.600

average blue wage in last period:

ty	1	2	3	4	5	6	7	average
0	4054.688	3970.327	4507.195	4457.713	4472.405	4352.911	4558.084	4374.249
1	3790.323	3682.883	4076.263	4120.863	4176.854	4047.938	4251.763	4045.772
2	5893.287	6213.592	6516.590	6731.924	6579.999	6343.519	7606.238	6509.988
avg	4734.691	5346.380	5773.393	5756.037	6078.249	5952.424	5757.329	5778.927
real	3026.756	3281.179	3330.149	3297.978	3411.969	3377.577	3171.469	3298.066

average rent in last period:

ty	1	2	3	4	5	6	7	average
0	2314.598	1779.637	1735.833	1856.013	965.407	691.911	2029.892	1614.465
1	2728.182	2157.881	2072.524	2189.158	1132.962	825.783	2487.081	1923.394
2	3436.125	2593.927	2559.334	2669.044	1412.723	1024.842	2932.370	2031.482
avg	2799.676	2234.807	2190.315	2266.739	1234.689	917.658	2506.220	1930.224
real	1435.0000	1165.0000	1225.3623	990.0000	772.1053	471.2778	1210.5555	1128.9108

housing region distribution (all types):

T	count	1	2	3	4	5	6	7
0	697000	0.116517	0.126539	0.274722	0.190353	0.118372	0.100859	0.072638
1	697000	0.108725	0.130349	0.273296	0.191762	0.121369	0.101037	0.073463
2	697000	0.102567	0.130663	0.274357	0.193103	0.122471	0.101897	0.074943
3	697000	0.099211	0.130475	0.275461	0.193980	0.123400	0.102901	0.074572
4	697000	0.095690	0.130571	0.276947	0.195333	0.123752	0.104095	0.073613
5	697000	0.092745	0.130499	0.278452	0.195235	0.126663	0.104214	0.072192
6	697000	0.090568	0.130822	0.278637	0.194722	0.129050	0.104783	0.071418
7	697000	0.089535	0.129482	0.279148	0.194346	0.130561	0.106197	0.070732
8	697000	0.087324	0.129176	0.279859	0.194217	0.132476	0.106772	0.070175
9	697000	0.085270	0.128663	0.279706	0.195321	0.134445	0.107131	0.069465
10	697000	0.084128	0.126485	0.279317	0.195851	0.136941	0.109449	0.067829
11	697000	0.082796	0.125327	0.279495	0.197062	0.139673	0.109158	0.066489
12	697000	0.081419	0.125116	0.278750	0.195976	0.142930	0.110052	0.065758
13	697000	0.079825	0.124178	0.278986	0.195238	0.146723	0.111141	0.063910
14	697000	0.078214	0.123588	0.277555	0.194496	0.152372	0.112824	0.060951
15	697000	0.076801	0.121568	0.276254	0.194383	0.159855	0.113154	0.057986
16	697000	0.074786	0.119192	0.274340	0.195003	0.169963	0.112621	0.054095
17	697000	0.073844	0.114717	0.272798	0.194780	0.181616	0.111735	0.050511
18	697000	0.073178	0.109175	0.273187	0.190950	0.195851	0.110702	0.046958
19	697000	0.075983	0.111879	0.263181	0.188136	0.203162	0.113862	0.043796
0	667	0.106447	0.095952	0.298351	0.163418	0.137931	0.113943	0.083958
1	682	0.108504	0.099707	0.296188	0.152493	0.137830	0.124633	0.080645
2	664	0.105422	0.105422	0.281626	0.146084	0.144578	0.135542	0.081325
3	635	0.105512	0.100787	0.288189	0.144882	0.143307	0.135433	0.081890
4	599	0.096828	0.106845	0.295493	0.143573	0.148581	0.128548	0.080134
5	555	0.088288	0.100901	0.295496	0.144144	0.160360	0.135135	0.075676
6	492	0.087398	0.097561	0.296748	0.144309	0.166667	0.128049	0.079268
7	429	0.083916	0.088578	0.303030	0.139860	0.172494	0.139860	0.072261
8	390	0.071795	0.089744	0.307692	0.146154	0.179487	0.135897	0.069231
9	315	0.066667	0.088889	0.314286	0.165079	0.165079	0.123810	0.076190
10	177	0.045198	0.079096	0.310734	0.186441	0.186441	0.101695	0.090395
11	33	0.030303	0.090909	0.454545	0.272727	0.090909	0.030303	0.030303
12	2	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000

work region distribution (all types):

T	count	1	2	3	4	5	6	7
0	18178	0.107933	0.073936	0.134888	0.133293	0.123831	0.269282	0.156838
1	107725	0.121866	0.097916	0.201513	0.119712	0.176013	0.239796	0.043184
2	140008	0.137199	0.098066	0.220137	0.123336	0.184839	0.194389	0.042033
3	161604	0.146902	0.094991	0.233336	0.126482	0.191128	0.162836	0.044324
4	182337	0.152383	0.090508	0.243982	0.128493	0.195204	0.142802	0.046628
5	203049	0.155903	0.086536	0.251112	0.130737	0.197553	0.130353	0.047806
6	222440	0.158213	0.081604	0.256640	0.133393	0.199429	0.121808	0.048912
7	239553	0.159497	0.077110	0.261729	0.136012	0.200164	0.116237	0.049250
8	255566	0.160221	0.072224	0.266295	0.136939	0.201858	0.112355	0.050108
9	269672	0.159980	0.067627	0.269435	0.137830	0.205060	0.109552	0.050517
10	280837	0.160303	0.063645	0.273525	0.139006	0.206404	0.106272	0.050844
11	289656	0.161126	0.059850	0.275537	0.139752	0.208713	0.104372	0.050650
12	295655	0.162213	0.056157	0.277107	0.140958	0.211077	0.101723	0.050765
13	301510	0.163116	0.053129	0.278160	0.142854	0.213306	0.099350	0.050085
14	305284	0.164755	0.049996	0.277843	0.144112	0.217080	0.096687	0.049528
15	308146	0.164633	0.047461	0.277872	0.147164	0.221671	0.093063	0.048136
16	311426	0.164970	0.044193	0.276689	0.151712	0.228979	0.088114	0.045343
17	314391	0.165301	0.041719	0.273869	0.157749	0.236572	0.082340	0.042450
18	317587	0.165643	0.038692	0.270534	0.164292	0.244116	0.077125	0.039599
19	323595	0.165543	0.035878	0.266018	0.169969	0.248715	0.075700	0.038177
0	14	0.214286	0.000000	0.142857	0.071429	0.071429	0.357143	0.142857
1	76	0.223684	0.065789	0.157895	0.210526	0.105263	0.144737	0.092105
2	95	0.210526	0.073684	0.210526	0.189474	0.094737	0.136842	0.084211
3	110	0.209091	0.045455	0.254545	0.163636	0.109091	0.136364	0.081818
4	120	0.191667	0.050000	0.266667	0.166667	0.108333	0.141667	0.075000
5	127	0.188976	0.047244	0.267717	0.173228	0.118110	0.141732	0.062992
6	131	0.167939	0.030534	0.297710	0.190840	0.106870	0.145038	0.061069
7	118	0.169492	0.050847	0.279661	0.194915	0.118644	0.144068	0.042373
8	111	0.171171	0.054054	0.279279	0.189189	0.126126	0.135135	0.045045
9	90	0.144444	0.055556	0.322222	0.188889	0.144444	0.111111	0.033333
10	57	0.070175	0.052632	0.350877	0.245614	0.175439	0.070175	0.035088
11	12	0.166667	0.083333	0.416667	0.250000	0.083333	0.000000	0.000000
12	1	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000

house-work region distribution (all types):

rg	count	1	2	3	4	5	6	7
1	347221	0.510153	0.084381	0.339167	0.000009	0.043099	0.022974	0.000216
2	701758	0.309451	0.148261	0.387180	0.047697	0.066693	0.040487	0.000231
3	1408710	0.269744	0.065694	0.571834	0.000020	0.057826	0.034659	0.000223
4	1121258	0.000025	0.054454	0.029475	0.562359	0.328090	0.025368	0.000229
5	560231	0.000037	0.008347	0.047593	0.055311	0.848077	0.040196	0.000439
6	440395	0.000027	0.007580	0.043951	0.000020	0.072249	0.875725	0.000447
7	268646	0.000000	0.007095	0.043604	0.000007	0.067970	0.032526	0.848797
1	-----	57.63000	3.390000	38.98000	0.000000	0.000000	0.000000	0.000000
2	-----	47.47000	30.30000	14.14000	8.080000	0.000000	0.000000	0.000000
3	-----	25.96000	5.140000	58.10000	4.110000	3.340000	0.510000	2.830000
4	-----	0.000000	0.000000	0.000000	90.58000	9.420000	0.000000	0.000000
5	-----	0.000000	1.310000	3.270000	32.03000	63.40000	0.000000	0.000000
6	-----	1.880000	0.000000	9.380000	0.000000	0.000000	88.75000	0.000000

```
./estimation_sim_full input.txt out.txt 1 100
```

```
**************************************************
-inf value was calculated for I=693
**************************************************
-inf value was calculated for I=694
**************************************************
-inf value was calculated for I=695
**************************************************
-inf value was calculated for I=696
**************************************************
likelihood = -76477.280623
============================
rent subsidy simulation
============================
total cost = 41733915.580938
----------------------------------------
 T |   Count   |   Average Max Utility   |
----------------------------------------
0       697000  633043393712
1       697000  622286573326
2       697000  608387460658
3       697000  604694849852
4       697000  607036175829
5       697000  635737215448
6       697000  675407645321
7       697000  624661060680
8       697000  525968381325
9       697000  528925146506
10      697000  550896947551
11      697000  489549874461
12      697000  499042459756
13      697000  489204691806
14      697000  464472846412
15      697000  451714139938
16      697000  423833125824
17      697000  427838922091
18      697000  433270742012
19      697000  562568533319

type 0 probability = 0.084726   type 1 probability = 0.605634   type 2 probability = 0.309640
```

occupation distribution:

T	count	UE	WHITE	BLUE
0	697000	0.770506	0.025877	0.203617
1	697000	0.300943	0.098209	0.600848
2	697000	0.193353	0.137324	0.669323
3	697000	0.153752	0.167171	0.679077
4	697000	0.136271	0.195413	0.668316
5	697000	0.127568	0.222944	0.649488
6	697000	0.119905	0.249363	0.630732
7	697000	0.117055	0.271842	0.611103
8	697000	0.111531	0.293796	0.594673
9	697000	0.107148	0.313931	0.578921
10	697000	0.104762	0.331191	0.564047
11	697000	0.099768	0.346293	0.553940
12	697000	0.097736	0.357112	0.545152
13	697000	0.095621	0.367278	0.537100
14	697000	0.092852	0.375515	0.531633
15	697000	0.092450	0.382517	0.525033
16	697000	0.091141	0.390888	0.517971
17	697000	0.099468	0.399531	0.501001
18	697000	0.124042	0.410062	0.465897
19	697000	0.152185	0.421821	0.425994

0	697	0.764706	0.024390	0.210904
1	697	0.278336	0.123386	0.598278
2	677	0.180207	0.152142	0.667651
3	644	0.163043	0.184783	0.652174
4	606	0.133663	0.214521	0.651815
5	559	0.121646	0.241503	0.636852
6	495	0.098990	0.280808	0.620202
7	431	0.111369	0.301624	0.587007
8	391	0.104859	0.314578	0.580563
9	315	0.104762	0.333333	0.561905
10	177	0.090395	0.367232	0.542373
11	33	0.060606	0.454545	0.484848
12	2	0.000000	0.500000	0.500000

average white wage in last period:

ty	1	2	3	4	5	6	7	average
0	6708.405	4930.426	6342.689	6933.225	7064.944	5100.012	6248.013	6487.271
1	7378.006	5407.667	7026.143	7472.468	7740.352	5527.187	6457.607	7144.710
2	6890.857	4998.125	6763.979	7232.048	6461.961	5066.102	8266.303	6381.754
avg	7346.653	5376.031	6997.812	7453.216	7640.738	5504.175	6454.641	7097.710
real	5499.870	4246.222	5072.256	5523.826	5767.125	3959.562	4414.444	5073.600

average blue wage in last period:

ty	1	2	3	4	5	6	7	average
0	3971.394	4025.725	4427.197	4462.250	4535.469	4417.383	4582.416	4403.785
1	3725.387	3703.323	4050.435	4136.396	4074.728	3983.660	4436.862	4040.877
2	5786.984	6682.919	7091.970	7737.459	6201.615	6218.493	8391.077	6303.723
avg	4305.052	5001.840	5324.890	5408.652	5624.024	5648.692	5555.528	5537.522
real	3026.756	3281.179	3330.149	3297.978	3411.969	3377.577	3171.469	3298.066

average rent in last period:

ty	1	2	3	4	5	6	7	average
0	2280.973	1809.846	1726.818	1796.050	0.000	0.000	2026.815	903.434
1	2719.952	2111.407	2041.584	2173.197	0.000	0.000	2474.213	852.293
2	3497.130	2586.162	2530.792	2594.080	0.000	0.000	2889.546	326.886
avg	2765.433	2131.803	2061.771	2173.595	0.000	0.000	2433.924	693.800
real	1435.0000	1165.0000	1225.3623	990.0000	772.1053	471.2778	1210.5555	1128.9108

housing region distribution (all types):

T	count	1	2	3	4	5	6	7
0	697000	0.099092	0.065250	0.134720	0.069841	0.410300	0.173321	0.047476
1	697000	0.089694	0.066834	0.136251	0.070941	0.411403	0.177495	0.047382
2	697000	0.082205	0.065637	0.136760	0.071171	0.415974	0.180092	0.048161
3	697000	0.078736	0.063674	0.137189	0.071836	0.420023	0.181395	0.047146
4	697000	0.074334	0.063013	0.137834	0.072508	0.423601	0.183535	0.045175
5	697000	0.071089	0.061349	0.137907	0.071637	0.430082	0.184204	0.043733
6	697000	0.068132	0.061613	0.137189	0.070182	0.435052	0.185600	0.042232
7	697000	0.066943	0.059088	0.136499	0.069575	0.439723	0.187290	0.040882
8	697000	0.064762	0.057461	0.135927	0.068595	0.444920	0.188529	0.039806
9	697000	0.062687	0.055842	0.134743	0.068159	0.450548	0.189290	0.038730
10	697000	0.061040	0.052539	0.133240	0.067904	0.457004	0.191720	0.036552
11	697000	0.059113	0.050941	0.132090	0.067544	0.463660	0.191291	0.035360
12	697000	0.057867	0.049494	0.130017	0.067040	0.469881	0.190829	0.034872
13	697000	0.056049	0.048273	0.128452	0.065337	0.478166	0.190555	0.033168
14	697000	0.054581	0.046485	0.126317	0.063824	0.487001	0.190934	0.030858
15	697000	0.053121	0.044696	0.125181	0.061920	0.496637	0.189372	0.029075
16	697000	0.050956	0.043026	0.124244	0.061729	0.505693	0.187278	0.027075
17	697000	0.050198	0.040669	0.124465	0.063871	0.511067	0.184521	0.025209
18	697000	0.049831	0.038826	0.126257	0.069541	0.510565	0.181829	0.023151
19	697000	0.047618	0.039722	0.126763	0.075656	0.507452	0.181574	0.021215
0	667	0.106447	0.095952	0.298351	0.163418	0.137931	0.113943	0.083958
1	682	0.108504	0.099707	0.296188	0.152493	0.137830	0.124633	0.080645
2	664	0.105422	0.105422	0.281626	0.146084	0.144578	0.135542	0.081325
3	635	0.105512	0.100787	0.288189	0.144882	0.143307	0.135433	0.081890
4	599	0.096828	0.106845	0.295493	0.143573	0.148581	0.128548	0.080134
5	555	0.088288	0.100901	0.295496	0.144144	0.160360	0.135135	0.075676
6	492	0.087398	0.097561	0.296748	0.144309	0.166667	0.128049	0.079268
7	429	0.083916	0.088578	0.303030	0.139860	0.172494	0.139860	0.072261
8	390	0.071795	0.089744	0.307692	0.146154	0.179487	0.135897	0.069231
9	315	0.066667	0.088889	0.314286	0.165079	0.165079	0.123810	0.076190
10	177	0.045198	0.079096	0.310734	0.186441	0.186441	0.101695	0.090395
11	33	0.030303	0.090909	0.454545	0.272727	0.090909	0.030303	0.030303
12	2	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000

work region distribution (all types):

T	count	1	2	3	4	5	6	7
0	18036	0.107064	0.071468	0.133178	0.132956	0.125527	0.276336	0.153471
1	68452	0.107097	0.046193	0.120917	0.167636	0.259583	0.247882	0.050692
2	95715	0.113890	0.037946	0.126574	0.147647	0.280677	0.250034	0.043233
3	116518	0.116857	0.032235	0.130289	0.132005	0.296074	0.250614	0.041925
4	136203	0.119226	0.028318	0.132743	0.120071	0.307688	0.250398	0.041556
5	155392	0.120618	0.026005	0.133411	0.111968	0.318453	0.248436	0.041109
6	173806	0.120951	0.024326	0.135473	0.107413	0.326945	0.244088	0.040804
7	189474	0.121188	0.022647	0.136188	0.105576	0.335249	0.238824	0.040327
8	204776	0.120952	0.021677	0.136808	0.105017	0.341563	0.234236	0.039746
9	218810	0.120109	0.020579	0.136301	0.104529	0.349966	0.229519	0.038997
10	230840	0.119598	0.019797	0.136168	0.104245	0.357494	0.224554	0.038143
11	241366	0.118894	0.019013	0.135864	0.104157	0.365329	0.220023	0.036720
12	248907	0.117502	0.018043	0.135653	0.103918	0.373730	0.215225	0.035929
13	255993	0.117062	0.016985	0.133629	0.104921	0.382698	0.210084	0.034622
14	261734	0.116133	0.015787	0.131232	0.105405	0.394171	0.204448	0.032823
15	266614	0.113944	0.014478	0.129536	0.107924	0.405691	0.197574	0.030854
16	272449	0.111786	0.013276	0.128931	0.112109	0.417403	0.188230	0.028266
17	278473	0.110258	0.012012	0.130659	0.117523	0.425618	0.178506	0.025424
18	285813	0.111202	0.010899	0.133262	0.123059	0.429158	0.169443	0.022977
19	294009	0.112670	0.010544	0.137645	0.128329	0.426028	0.162934	0.021850
0	14	0.214286	0.000000	0.142857	0.071429	0.071429	0.357143	0.142857
1	76	0.223684	0.065789	0.157895	0.210526	0.105263	0.144737	0.092105
2	95	0.210526	0.073684	0.210526	0.189474	0.094737	0.136842	0.084211
3	110	0.209091	0.045455	0.254545	0.163636	0.109091	0.136364	0.081818
4	120	0.191667	0.050000	0.266667	0.166667	0.108333	0.141667	0.075000
5	127	0.188976	0.047244	0.267717	0.173228	0.118110	0.141732	0.062992
6	131	0.167939	0.030534	0.297710	0.190840	0.106870	0.145038	0.061069
7	118	0.169492	0.050847	0.279661	0.194915	0.118644	0.144068	0.042373
8	111	0.171171	0.054054	0.279279	0.189189	0.126126	0.135135	0.045045
9	90	0.144444	0.055556	0.322222	0.188889	0.144444	0.111111	0.033333
10	57	0.070175	0.052632	0.350877	0.245614	0.175439	0.070175	0.035088
11	12	0.166667	0.083333	0.416667	0.250000	0.083333	0.000000	0.000000

house-work region distribution (all types):

rg	count	1	2	3	4	5	6	7
1	193987	0.686964	0.046096	0.266621	0.000015	0.000015	0.000052	0.000237
2	196738	0.557193	0.296557	0.056949	0.088758	0.000046	0.000066	0.000432
3	701888	0.317876	0.009130	0.672593	0.000040	0.000009	0.000041	0.000312
4	307776	0.000013	0.008545	0.000010	0.938767	0.052324	0.000016	0.000325
5	1625798	0.000058	0.000017	0.000044	0.091140	0.908290	0.000073	0.000379
6	849707	0.000071	0.000015	0.000049	0.000064	0.000022	0.999503	0.000275
7	137486	0.000015	0.000007	0.000007	0.000007	0.000015	0.000015	0.999935
1	-----	57.63000	3.390000	38.98000	0.000000	0.000000	0.000000	0.000000
2	-----	47.47000	30.30000	14.14000	8.080000	0.000000	0.000000	0.000000
3	-----	25.96000	5.140000	58.10000	4.110000	3.340000	0.510000	2.830000
4	-----	0.000000	0.000000	0.000000	90.58000	9.420000	0.000000	0.000000
5	-----	0.000000	1.310000	3.270000	32.03000	63.40000	0.000000	0.000000
6	-----	1.880000	0.000000	9.380000	0.000000	0.000000	88.75000	0.000000

```
./estimation_sim4_full input.txt out.txt 4 100
```

```
**************************************************
-inf value was calculated for I=692
**************************************************
-inf value was calculated for I=693
**************************************************
-inf value was calculated for I=694
**************************************************
-inf value was calculated for I=695
**************************************************
-inf value was calculated for I=696
**************************************************
likelihood = -76670.000000
==============================
==============================
total cost = 40897703.000000
----------------------------------------
 T |   Count   |   Average Max Utility   |
----------------------------------------
0       697000  633045169282
1       697000  622527244741
2       697000  608166474556
3       697000  604656286001
4       697000  616281517194
5       697000  620247233933
6       697000  675469427097
7       697000  624650580082
8       697000  524396344166
9       697000  528410985055
10      697000  551100943450
11      697000  490547750607
12      697000  498892430476
13      697000  488712382613
14      697000  464138902936
15      697000  451908931119
16      697000  423857134374
17      697000  428580539871
18      697000  431118389888
19      697000  427035275226

type 0 probability = 0.084726   type 1 probability = 0.605634   type 2 probability = 0.309640
```

occupation distribution:

T	count	UE	WHITE	BLUE
0	697000	0.895115	0.020554	0.084331
1	697000	0.341179	0.094297	0.564524
2	697000	0.210413	0.133362	0.656225
3	697000	0.164152	0.161907	0.673941
4	697000	0.144436	0.187166	0.668397
5	697000	0.133802	0.211950	0.654248
6	697000	0.125848	0.236020	0.638132
7	697000	0.120848	0.257386	0.621766
8	697000	0.117428	0.277416	0.605156
9	697000	0.114154	0.294892	0.590954
10	697000	0.109281	0.309648	0.581070
11	697000	0.105538	0.320953	0.573509
12	697000	0.103935	0.327593	0.568472
13	697000	0.100587	0.332882	0.566531
14	697000	0.098849	0.333407	0.567743
15	697000	0.098142	0.330395	0.571463
16	697000	0.096313	0.322382	0.581306
17	697000	0.107138	0.303640	0.589222
18	697000	0.163527	0.257765	0.578709
19	697000	0.460495	0.110760	0.428745

0	697	0.764706	0.024390	0.210904
1	697	0.278336	0.123386	0.598278
2	677	0.180207	0.152142	0.667651
3	644	0.163043	0.184783	0.652174
4	606	0.133663	0.214521	0.651815
5	559	0.121646	0.241503	0.636852
6	495	0.098990	0.280808	0.620202
7	431	0.111369	0.301624	0.587007
8	391	0.104859	0.314578	0.580563
9	315	0.104762	0.333333	0.561905
10	177	0.090395	0.367232	0.542373
11	33	0.060606	0.454545	0.484848
12	2	0.000000	0.500000	0.500000

average white wage in last period:

ty	1	2	3	4	5	6	7	average
0	20224.344	--------	15877.388	9170.606	7695.222	6025.640	5809.111	7384.282
1	12538.415	8387.399	11476.535	10127.875	8823.881	6394.964	8596.281	8106.021
2	--------	--------	--------	9417.238	7509.585	5892.191	--------	7322.572
avg	12683.432	8387.399	11572.205	10052.393	8705.198	6370.466	8532.937	8042.598
real	5499.870	4246.222	5072.256	5523.826	5767.125	3959.562	4414.444	5073.600

average blue wage in last period:

ty	1	2	3	4	5	6	7	average
0	--------	--------	--------	--------	4410.142	4314.237	--------	4381.410
1	--------	--------	--------	--------	4102.533	4092.399	--------	4098.683
2	--------	--------	--------	--------	6018.929	5941.670	--------	5997.837
avg	-nan	-nan	-nan	-nan	5420.856	5204.176	-nan	5355.922
real	3026.756	3281.179	3330.149	3297.978	3411.969	3377.577	3171.469	3298.066

average rent in last period:

ty	1	2	3	4	5	6	7	average
0	2083.006	---------	---------	---------	949.653	690.899	---------	878.421
1	2765.671	---------	---------	---------	1126.472	822.844	---------	1024.676
2	4747.427	---------	---------	---------	1398.500	1020.524	---------	1301.749
avg	2909.862	-nan	-nan	-nan	1203.432	862.488	-nan	1098.094
real	1435.0000	1165.0000	1225.3623	990.0000	772.1053	471.2778	1210.5555	1128.9108

housing region distribution (all types):

T	count	1	2	3	4	5	6	7
0	697000	0.039891	0.006479	0.009119	0.006615	0.654750	0.279303	0.003842
1	697000	0.037735	0.004881	0.007446	0.004641	0.650976	0.291410	0.002911
2	697000	0.036385	0.004858	0.007359	0.004740	0.649168	0.294616	0.002875
3	697000	0.035323	0.005060	0.007284	0.004648	0.648174	0.296565	0.002945
4	697000	0.034131	0.005053	0.007154	0.004531	0.647902	0.298230	0.003000
5	697000	0.032871	0.004638	0.007036	0.004803	0.647166	0.300611	0.002874
6	697000	0.030379	0.006250	0.006966	0.004011	0.647752	0.301888	0.002755
7	697000	0.029778	0.006194	0.007184	0.004234	0.646941	0.302869	0.002801
8	697000	0.028089	0.007492	0.007007	0.003912	0.646709	0.304079	0.002712
9	697000	0.027446	0.008003	0.006937	0.003772	0.645650	0.305240	0.002953
10	697000	0.027651	0.007280	0.006651	0.004077	0.645308	0.306178	0.002854
11	697000	0.026284	0.006888	0.006669	0.003740	0.645660	0.308003	0.002756
12	697000	0.025661	0.006855	0.006815	0.003491	0.645293	0.309110	0.002775
13	697000	0.026010	0.006426	0.007049	0.003415	0.644253	0.310264	0.002584
14	697000	0.025227	0.006245	0.006696	0.003182	0.644274	0.311806	0.002570
15	697000	0.025528	0.005311	0.006364	0.002956	0.644298	0.313641	0.001901
16	697000	0.023287	0.005092	0.006367	0.002766	0.644472	0.315648	0.002367
17	697000	0.021844	0.004562	0.006258	0.002547	0.644729	0.317828	0.002232
18	697000	0.018756	0.003636	0.005118	0.002033	0.647158	0.321519	0.001780
19	697000	0.005037	0.000000	0.000000	0.000000	0.660871	0.334092	0.000000
0	667	0.106447	0.095952	0.298351	0.163418	0.137931	0.113943	0.083958
1	682	0.108504	0.099707	0.296188	0.152493	0.137830	0.124633	0.080645
2	664	0.105422	0.105422	0.281626	0.146084	0.144578	0.135542	0.081325
3	635	0.105512	0.100787	0.288189	0.144882	0.143307	0.135433	0.081890
4	599	0.096828	0.106845	0.295493	0.143573	0.148581	0.128548	0.080134
5	555	0.088288	0.100901	0.295496	0.144144	0.160360	0.135135	0.075676
6	492	0.087398	0.097561	0.296748	0.144309	0.166667	0.128049	0.079268
7	429	0.083916	0.088578	0.303030	0.139860	0.172494	0.139860	0.072261
8	390	0.071795	0.089744	0.307692	0.146154	0.179487	0.135897	0.069231
9	315	0.066667	0.088889	0.314286	0.165079	0.165079	0.123810	0.076190
10	177	0.045198	0.079096	0.310734	0.186441	0.186441	0.101695	0.090395
11	33	0.030303	0.090909	0.454545	0.272727	0.090909	0.030303	0.030303
12	2	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000

work region distribution (all types):

T	count	1	2	3	4	5	6	7
0	14326	0.091093	0.046629	0.124459	0.161315	0.158104	0.364512	0.053888
1	65725	0.022746	0.009814	0.027980	0.180342	0.337878	0.408764	0.012476
2	92953	0.018482	0.007337	0.021613	0.143406	0.372748	0.428249	0.008165
3	112849	0.016792	0.005866	0.018458	0.115535	0.397549	0.439632	0.006168
4	130455	0.016450	0.005220	0.017040	0.095228	0.418642	0.442252	0.005167
5	147729	0.016178	0.004738	0.016104	0.082401	0.434234	0.441924	0.004420
6	164506	0.016303	0.004359	0.015708	0.074429	0.447710	0.437571	0.003921
7	179398	0.016583	0.003785	0.014738	0.069995	0.459347	0.432129	0.003423
8	193359	0.016374	0.003444	0.014476	0.066384	0.469034	0.427236	0.003051
9	205540	0.016357	0.003153	0.013739	0.063890	0.477995	0.421962	0.002905
10	215825	0.016490	0.003053	0.013428	0.063056	0.486167	0.414989	0.002817
11	223704	0.016361	0.002816	0.012995	0.062520	0.493353	0.409210	0.002745
12	228332	0.016432	0.002693	0.012771	0.060421	0.501034	0.404017	0.002632
13	232019	0.016921	0.002534	0.012874	0.060508	0.505976	0.398804	0.002383
14	232385	0.017092	0.002414	0.012522	0.059698	0.511685	0.394371	0.002216
15	230285	0.017118	0.002202	0.012220	0.060073	0.516903	0.389483	0.002002
16	224700	0.017223	0.002439	0.011785	0.059346	0.524878	0.382568	0.001762
17	211637	0.016727	0.002339	0.011208	0.058643	0.537236	0.372321	0.001526
18	179662	0.014594	0.001859	0.009490	0.055621	0.561538	0.355373	0.001525
19	77200	0.000687	0.000117	0.000596	0.049016	0.632604	0.316412	0.000570
0	14	0.214286	0.000000	0.142857	0.071429	0.071429	0.357143	0.142857
1	76	0.223684	0.065789	0.157895	0.210526	0.105263	0.144737	0.092105
2	95	0.210526	0.073684	0.210526	0.189474	0.094737	0.136842	0.084211
3	110	0.209091	0.045455	0.254545	0.163636	0.109091	0.136364	0.081818
4	120	0.191667	0.050000	0.266667	0.166667	0.108333	0.141667	0.075000
5	127	0.188976	0.047244	0.267717	0.173228	0.118110	0.141732	0.062992
6	131	0.167939	0.030534	0.297710	0.190840	0.106870	0.145038	0.061069
7	118	0.169492	0.050847	0.279661	0.194915	0.118644	0.144068	0.042373
8	111	0.171171	0.054054	0.279279	0.189189	0.126126	0.135135	0.045045
9	90	0.144444	0.055556	0.322222	0.188889	0.144444	0.111111	0.033333
10	57	0.070175	0.052632	0.350877	0.245614	0.175439	0.070175	0.035088
11	12	0.166667	0.083333	0.416667	0.250000	0.083333	0.000000	0.000000

house-work region distribution (all types):

rg	count	1	2	3	4	5	6	7
1	46027	0.695222	0.048037	0.254981	0.000652	0.000348	0.000435	0.000326
2	23620	0.485097	0.378747	0.054615	0.080525	0.000296	0.000466	0.000254
3	45962	0.258540	0.005700	0.735542	0.000065	0.000000	0.000131	0.000022
4	18664	0.000107	0.007662	0.000161	0.969246	0.022718	0.000054	0.000054
5	1853589	0.000250	0.000054	0.000194	0.117770	0.881305	0.000154	0.000274
6	1364158	0.000163	0.000023	0.000127	0.000172	0.000084	0.999347	0.000084
7	10569	0.000189	0.000000	0.000189	0.000095	0.000000	0.000095	0.999432
1	-----	57.63000	3.390000	38.98000	0.000000	0.000000	0.000000	0.000000
2	-----	47.47000	30.30000	14.14000	8.080000	0.000000	0.000000	0.000000
3	-----	25.96000	5.140000	58.10000	4.110000	3.340000	0.510000	2.830000
4	-----	0.000000	0.000000	0.000000	90.58000	9.420000	0.000000	0.000000
5	-----	0.000000	1.310000	3.270000	32.03000	63.40000	0.000000	0.000000
6	-----	1.880000	0.000000	9.380000	0.000000	0.000000	88.75000	0.000000

4 Modification

I would introduce some weights into the taste function (of living in specific region). This is originally specified in equation (7) in the paper as:

$$\begin{aligned}\tau_r(x_{it}, \mu_{it}) &= \tau_r^1(\mu_{it}) + \tau_r^2(x_{it}) \\ \tau_r^1(\mu_{it}) &= \tau_0 + \tau_{1r} R_{1i} + \tau_{2r} R_{2i} + \tau_{2r} R_{3i} \\ \tau_r^2(x_{it}) &= \tau_{4r} M_{it} + \tau_{5r} M_{it} S_i^w + \tau_{6r} M_{it} NK_{it} + \tau_{7r} M_{it} \text{age}_i\end{aligned}$$

The new taste function would be:

$$\tau_r(x_{it}, \mu_{it}) = (1 - \xi)\tau_r^1(\mu_{it}) + \xi\tau_r^2(x_{it})$$

a weighted sum of

- factors that drive personal taste for a particular region have something to do with one's nationality (Ukraine, Belarus, Russia resp.)
- and family- and spouse-related characteristics
- Weight ξ, $0 < \xi < 1$ indicates how important the needs and preferences of spouse and offsprings are to the decision-maker's preference for living in certain areas, *relative* to his own.

One can specify ξ ex-ante and see how the fundamental parameters change. In the source code `estimation.cpp`, the taste function is located at line 1094:

```
1094        float const_taste[RG_SIZE];
1095        float rent[RG_SIZE];
1096        float wife[RG_SIZE];
1097        float original_rent[RG_SIZE];
1098        for (unsigned short rg = 0; rg < RG_SIZE; ++rg)
1099        {
1100            const_taste[rg] = teta0[rg]+teta1[rg]*REP1+teta2[rg]*REP2+teta3[rg]*REP3; //taste
1101            // define const taste, move the final calculation into draws
1102            rent[rg] = 6.0f*expf(gama0[rg]+rent_for_all_regions)*RENT_REF_PARAM; // full cost
1103            wife[rg] = psi1[rg]*M + psi2[rg]*M*WIFE_EDU + psi3[rg]*M*KIDS + psi4[rg]*M*AGE;
```

Simply add constants, say $\xi = 0.9$ to `wife[rg]` and $1-\xi = 0.1$ to `const_taste[rg]`:

```
   const_taste[rg] = 0.1f*(teta0[rg] + teta1[rg]*REP1 + teta2[rg]*REP2
+ teta3[rg]*REP3);

   wife[rg] = 0.9f*(psi1[rg]*M + psi2[rg]*M*WIFE_EDU + psi3[rg]*M*KIDS
+ psi4[rg]*M*AGE);
```

Recompile and run the executable with using commands given in Estimation section. Terminal output shows that fundamental parameters are the same, although introducing weights to the taste function seems to reduce classification error rate (from 8.29 to 6.98) and worsen log-likelihood (from -13964.92 to -14284.60).

```
line[149]: param[148]=4.344444
line[150]: param[149]=-3.122000
line[151]: param[150]=5.222000
line[152]: param[151]=7.612599
line[153]: param[152]=8.126000
line[154]: param[153]=7.145600
estimation initialization took: 2.528756 seconds
-------------------------------------------------------------------------
| region |       1       |       2       |       3       |       4
-------------------------------------------------------------------------
1       0.000000        7317.762207     7317.762207     80821.656250
2       7317.762207     0.000000        19930.363281    19930.363281
3       7317.762207     19930.363281    0.000000        80821.656250
4       80821.656250    19930.363281    80821.656250    0.000000
5       80821.656250    80821.656250    80821.656250    19930.363281
6       80821.656250    80821.656250    80821.656250    80821.656250
7       80821.656250    80821.656250    80821.656250    80821.656250
counter true: 115855 counter false: 1544345 correct: 6.978376%
-inf value was calculated for I=53
*****************************************************
-inf value was calculated for I=80
*****************************************************
likelihood = -14284.597245
estimation = 1.428460e+04, took: 21.828743 seconds
```

One can also go a step further by making ξ a parameter to be estimated.

5 Challenges regarding replication

1. Missing input files

   There was no `final151.dta` file provided in the package, which is used as input to the do file `std.do` to calculate standard errors for SML estimates.

2. No instructions for compiling (which flags to use, ...etc.)

   There is no documentation as to which flags were used to compile the executables or which flags to use if one wants to print certain output or to use a specific functionality in the code.

   There was no documentation as to how the parameters/estimates of moments provided in `std_final.xls` are obtained from the `C++` source code. None of the executables produce these parameters as outputs.

3. Limited experience with `C++`

   The modification I implemented by introducing weights was undoubtedly too simple.

4. Some replicated panels are not exact, reasons not known

   Despite running the executables with the arguments (e.g. `sim_type` and `sim_percent`) according to the authors, I couldn't get the exact same estimates for some of the panels.

5. Results are not output to file but printed on terminal.

   This has made the replication process laborious, inconvenient and time-consuming.

References

Buchinsky, M., Gotlibovski, C., & Lifshitz, O. (2014). Residential location, work location, and labor market outcomes of immigrants in israel. *Econometrica*, *82*(3), 995–1054.