Advanced Topics in Macroeconomics of the Labor Market II
Prof. Andreas I. Mueller, Spring 2022
Problem Set 3
Due on April 18, 2022

Notes (please read):

- You can hand in your solutions either hand-written or typed up, but figures need to be printed from a computer.
- Whenever you use Matlab or Stata to compute a number or a figure, please create an appendix to your problem set where you append the Matlab code.
- Problem sets will be graded on a check+, check and check- basis.

Question 1. Residual wage dispersion

a. Download the CPS Merged Outoing Rotation Group (MORG) file for 2018 from the NBER website (https://data.nber.org/morg/annual/), and clean the file as follows:

   – Define dummies for female, hispanic, black, white, married, married*female, presence of at least one child, state and occupation. Define potential experience as (age-schoolyrs-6), where years of schooling is defined as follows:

```
gen schoolyrs = 0
replace schoolyrs = 0 if ((grade92 ==31 — grade92==00))
replace schoolyrs = 3 if (grade92 ==32)
replace schoolyrs = 7 if ((grade92 ==33 — grade92==34))
replace schoolyrs = 9 if (grade92 == 35)
replace schoolyrs = 10 if (grade92 == 36)
replace schoolyrs = 11 if (grade92 ==37)
replace schoolyrs = 12 if (grade92 ==38)
replace schoolyrs = 12 if (grade92 ==39)
replace schoolyrs = 13.5 if (grade92 ==40)
replace schoolyrs = 14 if ((grade92 ==41 — grade92==42))
replace schoolyrs = 16 if (grade92 ==43)
replace schoolyrs = 17.5 if (grade92 ==44)
replace schoolyrs = 17.5 if (grade92 ==45)
replace schoolyrs = 18 if (grade92 ==46)
```

   – Compute hourly earnings: For workers paid hourly, use hourly earnings reported in the survey. For workers not paid hourly, use weekly earnings divided by hours worked last week.

Windsorize hourly earnings at (weekly earnings top code*1.4/35 hours). (Note: the weekly earnings top code is the maximum weekly earnings reported in the data for those not on an hourly basis.)

- Drop full-time students, those ages 17 and younger, those ages 66 and older, government employees, self-employed workers, and self-incorporated workers from the sample.

b. Carry out and show the results of a linear weighted regression of the log hourly wage on years of schooling, experience, experience squared, dummies for black, hispanic, white, female, married, married*female, presence of children and state dummies. Be sure to use the earnings weight as the survey weight in the regression. What is the R2 of the regression? How do you interpret the dummy on marital status for both men and women?

c. Carry out and show the results of a linear weighted regression with the same explanatory variables as in [b.] but adding dummies for each occupation. How does the R2 change relative to [b.]? How does the coefficient on years of schooling change relative to [b.]? Do you have an explanation for the latter?

d. Compute three different versions of the Mean-min ratio for the raw hourly wage, where you use percentiles 1, 5 and 10 for the min. Compute the standard deviation of the log hourly wage.

e. For both regressions in [b.] and [c.], compute the residuals of the regression and compute the standard deviation of the residuals. Then, add the sample mean of the log hourly wage to the residuals and take the exponent of it. Compute three different versions of the Mean-min ratio based on these residualized wagse, where you use percentiles 1, 5 and 10 for the min.

f. Repeat the steps [b.]-[e.] but exclude all observations where the hourly wages are below the federal hourly wage of $7.25/hour. How sensitive are the distributional statistics in [d.] and [e.] to excluding these observations?

Question 2. Predicted wages by (un-)employment status

Use the estimated regression coefficients from Question [1.b.] to compute the predicted wage for all privates-sector employees in the MORG 2018 sample (with the same sample restrictions as above: exclude full-time students and those ages<18 and ages>65). Based on their characteristics, compute the predicted wage for all *unemployed* workers in the MORG sample (with the same sample restrictions as above: exclude full-time students and those ages<18 and ages>65).

a. Plot the kernel densities of the predicted wage for both the employed and unemployed on the same graph. How do you interpret the differences in the densities?

b. Compute the average predicted wage for each type of unemployed (job losers, temporary job ended, job leavers, re-entrants and new entrants). Are there are any meaningful differences in predicted wages among these groups? If yes, how do you interpret these differences?

c. Compute the average predicted wage by duration of unemployment (0-13 weeks, 14-26 weeks and 27+ weeks). Are there are any meaningful differences in predicted wages among these groups? If yes, how do you interpret these differences or the lack thereof?

Question 3. Frictional wage dispersion and on-the-job search

a. Derive equation (14) in the paper of Hornstein, Krusell and Violante (AER, 2011).

b. Replicate the lower and upper bound estimates of the Mm-ratio in Figure 3 at $\rho = 0.4$.

c. Compute the lower and upper bound estimates of the Mm-ratio in Figure 3 at $\rho = 0.4$, but where you target $\lambda_u^* = 0.30$ (instead of 0.43). This is more consistent with U-to-E transition rates in worker transition data (e.g., see Table 2 in my 2017 paper in the AER). Does the puzzle still hold?

d. More recently, the U-to-E transition rate has dropped to 0.25 (or lower). Compute the lower and upper bound estimates of the Mm-ratio in Figure 3 at $\rho = 0.4$, but where you target $\lambda_u^* = 0.25$. Does the puzzle still hold?

e. Describe why a model with endogenous search effort further alleviates (and potentially resolves) the puzzle in HKV.

f. Read section VI.c of HKV's paper and describe the intuition why a model with sequential auctions potentially may resolve the wage dispersion puzzle.