

Applied Exercise #5

– Due Tuesday 05/06/08 –

This exercise examines the following research question: how do workers respond to a one time cash transfer? Specifically, we investigate the effect of a severance payment, that workers who were laid off receive from their former employer, on the time it takes them to find a new job.

For more background information read: David Card, Raj Chetty and Andrea Weber “Cash-on-hand and competing models of intertemporal behavior: new evidence from the labor market” (2007), *Quarterly Journal of Economics*, 122(4), 1511-1560.

Each student must hand in their own solution to the problem set using own words to explain and interpret the results. Please include a concise summary of your empirical results when appropriate. We will analyze the following data set:

Data:

sevpay.dta

The data set is an extract from the Austrian Social Security registers. It includes workers who enter unemployment after being laid off from a job with tenure between 1 and 5 years. The same data are used in the reference paper, but here we restrict to layoffs during the years 1993-2000. There are 240,432 observations and 18 variables.

Key variables for this exercise:

- tenure** – duration of the job just lost in days
- sevpay** – indicator variable equal to 1 if eligible for severance pay; tenure >3*365
- ten_cat** – monthly tenure category of the job just lost (takes on integer values from 13-58)
- nonedur** – nonemployment duration: measured by the number of days between job loss and start of a new job
- cens** – indicator variable equal one if nonemployment duration right censored, either by the end of the time period, or after a duration of 20 weeks.
- last_ten** – duration of the job held before the one just lost in days; last_ten is missing for individuals who did not hold a prior job
- last_cat** – monthly tenure category of the job held before the one just lost

other relevant variables

- female** –
- age, age2** – age in years and its square
- highed** – education above the compulsory schooling level
- austrian** – Austrian nationality
- married** –
- bluec** – blue collar worker
- lwage, lwage2** – log wage in the job just lost, and its square
- endmo** – month of job loss
- endy** – year of job loss

Research question: Does severance pay increase the time workers take to search for a new job? The outcome of interest is the time between layoff and start of a new job, which we call the nonemployment duration. We want to estimate the “causal” effect of a severance payment on nonemployment duration. In this exercise we will use the regression discontinuity design implicit in the administration of severance pay in Austria to estimate the effect. The basic rule is: every worker who gets laid off after at least 3 years of job tenure is eligible for severance pay, which is equivalent to two monthly wages paid by the former employer. Workers with less tenure are not eligible for severance pay. Read the referenced paper for background and details on the severance pay rules in Austria.

Note: the relevant outcome variable is a duration measure, therefore stset your data using the command: `stset nonedur, failure(cens==0)` and use Cox regression to estimate all models which have nonedur as a dependent variable. This model estimates the effects on the hazard rate into a new job during the first 20 weeks after job loss.

Questions:

- a) Write down a simple linear model to estimate the impact of severance pay on nonemployment durations. Explain why an estimate of the treatment effect from this model may be biased. Now estimate the model using Cox regression. What do the estimates imply about the size of the effect of severance pay? Interpret the parameter estimate from the Cox regression model.
- b) The eligibility for severance pay depends on previous job tenure in a non-continuous way. Describe how one could use this discontinuity in treatment assignment to derive an estimate of the severance pay effect while controlling for bias. Under what conditions will these estimates be valid?
- c) Explain the difference between the sharp and fuzzy regression discontinuity designs. Here, we do not observe actual receipt of severance pay in the data, but we assume that all employers comply to the severance pay law. Which design are we using? What are the consequences for the estimator of the treatment effect?
- d) Try to provide evidence for the validity of the assumptions implicit in the regression discontinuity design. First, investigate the density of job tenure, which is the variable determining treatment assignment, by plotting the number of layoffs in equally sized tenure bins; use monthly tenure categories given by the variable `ten_cat`. Interpret this

- frequency graph. Is there evidence for selection around the cutoff value? Second, investigate the behavior of several covariates around the discontinuity, by plotting mean values of X against monthly tenure categories. Give an interpretation of your findings.
- e) Now draw a graph of the relevant relationship between eligibility for severance pay and nonemployment durations, i.e. plot mean nonemployment duration by monthly tenure category. What does this graph imply about effect of severance pay on nonemployment duration. Compare your graph to Figure 5a in the reference paper, which uses exactly the same variables but is based on a larger set of observations. Explain the main differences between the two graphs.
- f) To determine the magnitude of the effect of severance pay on nonemployment duration, estimate a model using a flexible function of tenure and allow this function to differ for individuals eligible for severance pay and those not eligible. Try out different specifications: 1) a model that uses a linear function of tenure, 2) a model that uses nonlinear terms (quadratic, cubic, etc.) in tenure 3) a model that adds control variables to the linear specification in (1) and 4) a model that adds control variables to the specification in (2). Compare the magnitude of the severance pay effect across specifications.

Note: when generating polynomial terms and interacting them with severance pay eligibility make sure you use a re-centered tenure variable, which is equal to zero at the cutoff value:

```
gen tenure_recenter=tenure-3*365
gen tenure_recenter2=tenure_recenter^2
```

- g) A subset of individuals in our sample (44,581), had a job before the one they just lost, from which they were also laid off and became unemployed. We can use these observations for a “placebo test” of the regression discontinuity design; i.e. to find out whether there is a systematic difference between workers eligible for severance pay and those not eligible, which is unrelated to the tenure of the job they just lost. For the workers who had a prior job generate a new eligibility rule based on the tenure of the prior job, i.e. generate a variable
- ```
gen sevpay_last=last_ten>3*365
```
- Repeat the graph from d) and the model estimation from e) for this modified eligibility rule. Explain your findings.
- h) Provide a concise synthesis/ summary of your results similar in spirit to the one you wrote for Applied Exercise #4. Discuss the evidence you found on the “credibility” of the

regression discontinuity design and the importance of severance pay on the time it takes workers to return to employment after a layoff.