Problem Set #1

MACS 30000, Dr. Evans
Fangfang Wan

Problem 1

(a).

In this paper, the authors built 2 versions of a linear model (one with fewer independent variables and one with more independent variables), to model the mean quarterly earnings for individual i of education level j in year t, while this value is log transformed. In the first version, the authors include race, exact education, exact age, state, etc. and a dummy variable indicating female as independent variables. In the second version, the authors include all exogenous variables in version 1, plus natural log of mean establishment earnings, industry and occupation as independent variables.

(b).

Goldin, C., Kerr, S. P., Olivetti, C., Barth, E. (2017). The expanding gender earnings gap: evidence from the LEHD-2000 Census. American Economic Review, 107(5), 110-14.

(c).

version(1)

$$ln(y_{ijt}) = \alpha_{jt} + \sum_{k} \beta_{kjt} X_{ijkt} + \phi_{jt} F_{ij} + \varepsilon_{ijt}$$

version (2)

$$ln(y_{ijt}) = \alpha_{jt} + \sum_{k} \beta_{kjt} X_{ijkt} + \gamma_{jt} ln(MEE)_{ijt} + \zeta_{jt} I_{ijt} + \omega_{jt} O_{ij} + \phi_{jt} F_{ij} + \varepsilon_{ijt}$$

in which y is mean quarterly earnings, X is a vector of k individual characteristics (time invariant: race, exact education; time varying: exact age, state, etc.), MEE is mean establishment earnings, I is industry, O is occupation, F is female, i is individual, j is education level, k is index of individual characteristics, and t is year.

(d).

In both versions of the model, the endogenous variable is the natural log of mean quarterly earnings for individual i of education level j in year t.

In version 1, the exogenous variables are race, exact education, exact age, state, etc. and a dummy variable indicating female. Exogenous variables in version 2 include all exogenous variables in version 1, plus natural log of mean establishment earnings, industry and occupation.

(e).

This model is dynamic, linear (although the endogenous variable has been log transformed) and deterministic.

(f).

Number of children that individual i with education level j has in year t

Problem 2
(a).

$$marry_i = \alpha_i + \beta_1 race_i + \beta_2 age_i + \beta_3 edu_i + \beta_4 parentmarry_i + \beta_5 state_i + \beta_6 gender_i + \varepsilon_i$$

in which marry is a dummy variable indicating whether individual i decides to marry or not, and 1 = get married and 0 = not get married, race is the race of individual i, age is the age of individual i, edu is education level of individual i, parentmarry is the marital status (married, divorced, etc.) of the parents of individual i, state is the state in which individual i resides in, and gender is the gender of individual i.
(b).
The equation satisfies this condition.
(c).
The equation satisfies this condition.
(d).
The key factors are race, age and parent marital status of individual i.
(e).
Regarding race, the culture of family and marriage in different racial groups tend to be discrepant, which can influence individual's decision of getting married. Age is also important since an individual's opinion in various kinds of things tend to fluctuate with age. The marital status of parents also plays a significant role, since the personalities, the way of dealing with issues, ideas and concepts, etc. of children tend to be similar to those of their parents. If parents have divorced, children usually tend to be lack of confidence in marriage and be more possible to decide not to get married. In contrast, if the marriage between parents is satisfying, children tend to think that marriage is a good thing, and are more likely to decide to get married.
The reason for omitting education, state and gender as important factors are that it is not clear what is the direction of influence of those factors on a person's decision to get married or not. For education, it is possible that people with higher education tend to earn more money, thus more financially dependent, and they are less likely to choose to get married in order to financially depend on the spouse. In contrast, it is also likely that people with higher education are more likely to earn more, and they have to get married and have children who can inherit their wealth. The direction of the influence of gender on the decision of getting married is also ambiguous, but gender is an indispensable demographic information of an individual, so I include it here, and it may affect the influence of age on individual's decision to get married (male may tend to get married later than female, since male tend to focus on career more than female, and some people tend to get married after they have a stable career). It is even more ambiguous with the influence of state on the decision to get married, but it is possible that different cultures in different state can affect residents' opinion regarding family, marriage, etc.
Regarding other possible factors that I did not include in the equation such as income, they are highly likely to be correlated with some independent variables. For example, income is associated with education level, so I did not include any indicators of income in the equation.

(f).
I can do a survey in the United States and collect the data about whether an individual decides to get married, and individuals' demographic information include race, age, education level, state, gender, and information about parents' marital status. Then I will run the Ordinary Least Squares linear regression on collected data, and test if the coefficients are significant with desired confidence level (e.g. 95%.)

Consulted Sources:

Goldin, C., Kerr, S. P., Olivetti, C., Barth, E. (2017). The expanding gender earnings gap: evidence from the LEHD-2000 Census. American Economic Review, 107(5), 110-14.

Is it possible to write the '%' symbol in text in LaTeX? (n.d.). Retrieved January 07, 2018, from https://tex.stackexchange.com/questions/339191/is-it-possible-to-write-the-symbol-in-text-in-latex