

MACS 30150 – Problem set 1

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1. Classify a model from a journal

(a) This is a model measuring how market competition affected the political bias of government-owned newspapers in China from 1981 to 2011. It's from American Economic Review 2018.

(b) Qin, Bei, David Strömberg, and Yanhui Wu. "Media bias in China." American Economic Review 108.9 (2018): 2442-76.

(c) The model is as the following:

$$bias_{ijt} = \delta_i + \delta_t + \beta_1 Reform_2003_{ijt} + \beta_2 Reform_2003_{ijt} \times Commercial_i + X'_{jt}\gamma + \epsilon_{ijt} \quad (1)$$

The variable $bias_{ijt}$ is the measure of newspaper bias on politics for newspaper i in prefecture j at year t .

The variables δ_i and δ_t are newspaper and year fixed effects.

$Reform_2003_{ijt}$ measures the decline in the number of newspapers if all county papers existing in 2002 were closed due to the reform, which indicates the content of market competition.

The variable $Commercial_i$ is a dummy variable for the newspaper being a commercial newspaper or a party newspaper.

The time-varying controls X'_{jt} include a set of variables (all in logarithm) at the prefecture level: population, GDP, total employment, and real foreign direct investment (FDI).

(d) Exogenous variables include δ_i , δ_t , $Reform_2003_{ijt}$, $Commercial_i$ and X'_{jt} . Endogenous variable is $bias_{ijt}$.

(e) This model is static, linear and deterministic.

(f) One valuable but missing variable might be the market size of newspaper at prefecture level. Although the writer included population probably as a indicator of local market size of newspaper, it might not be proportion to the local market size in fact. Considering the phenomenon that prefectures with larger population in China usually are more developed areas and have more prosperous and diversified media industry, the market size of newspaper in these prefectures can be eroded by other more informative forms of media such as TV or Internet. In addition, the local market size of newspapers is also an important factor that influences the market competition in newspapers. Therefore I think the market size of newspaper is a valuable variable to include.

2. Make your own model

(a)

$$\textit{Whether_to_get_married} = \beta_1 \textit{education} + \beta_2 \textit{social_interaction} \quad (2)$$

$$+ \beta_3 \textit{age} + \beta_4 \ln(\textit{salary}) + \beta_5 \ln(\textit{property}) \quad (3)$$

$$+ \beta_6 \textit{friends'_marital_status} + \epsilon \quad (4)$$

(b) *Whether_to_get_married* is a dummy variable whose value equals 1 if one is married otherwise it equals 0.

(c) Variable description:

education: one's highest level of educational attainment.

$$\textit{education} = \begin{cases} 1, & \text{if no more than elementary school} \\ 2, & \text{high school graduate} \\ 3, & \text{Associate's and/or Bachelor's degree} \\ 4, & \text{Master's degree} \\ 5, & \text{Doctoral or Professional degree} \end{cases} \quad (5)$$

social_interaction: the number of people that one has interacted with in the past 6 months

age: one's age.

$\ln(\textit{salary})$: the logarithm of one's annual salary in dollar.

$\ln(\textit{property})$: the logarithm of one's property value in dollar.

friends'_marital_status: the percentage of married people among one's closest 10 friends.

ϵ : an random variable $\sim \text{i.i.d } \mathcal{N}(0, 0.1^2)$.

(d) I think the key factors will be *education* and *friends'_marital_status* because many empirical researches have illustrated that the education level of people, especially female group, is highly correlated with not to get married and one's behaviour is deeply influenced by people around him or her.

(e) Because I think these factors will be able to explain most part of the probability to get married. The benefit on explaining the outcome of adding other variables such as country or race is not large enough to offset the cost of increasing multicollinearity.

(f) We can use empirical data to do Pearson correlation test and make scatter plots to see whether there exhibits any pattern between my factors and the dummy variable of getting married or not.