

Problem Set #1

MACS 30100, Dr. Evans

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Problem 1. Classify a model from a journal.

Citation.

Blanchard, Olivier. 2016. "The Phillips Curve: Back to the '60s?" American Economic Review, 106(5): 31-34.

Model.

$$\pi_t = \theta_t (u_t - u_t^*) + \lambda_t \pi_t^e + (1 - \lambda_t) \pi_{t-1}^* + \mu_t \pi_{mt} + \varepsilon_t \quad (1)$$

$$\pi_t^e = \alpha_t + \beta_t \pi_{t-1}^* + \eta_t \quad (2)$$

Where π_t is headline CPI inflation (defined as quarterly inflation, annualized), u_t is the unemployment rate, u_t^* is the natural rate, π_t^e is long-term inflation expectations, π_{t-1}^* is the average of the last four quarterly inflation rates, π_{mt} is import price inflation relative to headline inflation, and λ_t , θ_t , μ_t , β_t , α_t , and u_t^* follow constrained random walks.

Exogenous/Endogenous variables.

In this model, π_t and π_t^e are endogenous. And u_t , u_t^* , π_{t-1}^* , π_{mt} are exogenous.

Model classification.

This model is dynamic. Because the inflation π of the year t is determined by the inflation of the year $(t-1)$.

This model is linear.

This model is stochastic since it includes the term ε_t .

Missing Variable.

To make the model better describe reality, one could consider adding an exogenous dummy variable that represents factors influence the whole market. This kind of factors includes natural disasters, wars, and the condition of world economy.

Problem 2. Make your own model.

Model.

The variables I chose to set up the model of how long popular musicians live include:

- a. dependent variable: predicted lifespan (in years) of musician (yr);
- b. independent variable: genres of the musician (g), wealth of the musician (w), family status of the musician (s), number of rehab visits (r), and life expectancy at musician's birth year by sex and race (le);
- c. error term (ε).

Therefore the model could be written as: (i denotes one certain musician)

$$yr_i = \beta_1 g_i + \beta_2 w_i + \beta_3 s_i + \beta_4 r_i + \beta_5 le_i + \varepsilon \quad (3)$$

Data generating process.

This model is a data generating process. Given parameters and relationships, we could gather data for those dependent variables and hence simulate data.

Variables.

Among these 5 factors I chose, I think the life expectancy at the musician's birth year (by sex and race), and the number of rehab visits are two key factors that would influence the outcome. The data of life expectancy could predict the lifespan of the musician on natural death, which could provide a baseline of the predicted lifespan. And the number of rehab visits denotes the lifestyle this musician chooses, since some musicians are known for drug addiction or alcoholism. Instead of using direct data on drug or alcohol use, which is difficult to gather, using number of rehab visits also implies that the severity of these two problems might cause death.

Apart from these 2 factors, I chose the genres, wealth, and family status of the musician. The relationship between predicted lifespan and genres (a dummy variable) might be the key fact one want to find out from this model. Whether different genres of musicians could affect their lifestyles and hence influence their lifespan is an interesting question. Wealth and family status are 2 factors that could indirectly influence musicians life. If they are richer, they might have more resource to live a health lifestyle. And the family status: whether they are married or having children to company/take care of them could also influence their life.

Preliminary test.

One could use existing data for dead musicians to conduct statistic test. For example, using data for David Bowie, George Michael, Prince, and so on (more than 30 samples would work better), one could test the R^2 of the model and conduct statistic tests of variables, thus determine whether the factors are significant in real life.