Econ7115: Structural Models and Numerical Methods in Economics
Assignment W02

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1. Consider a one-step GMM estimator:

$$\hat{\theta} = \arg\min_{\theta \in \Theta} \hat{m}(\theta)'\hat{W}(\theta)\,\hat{m}(\theta), \tag{1}$$

where $\hat{W}(\theta)$ is the optimal weighting matrix

$$\hat{W}(\theta) \equiv \left\{ \frac{1}{n}\sum_{i=1}^{n} m_i(\theta)\, m_i(\theta)' - \left[\frac{1}{n}\sum_{i=1}^{n} m_i(\theta)\right]\left[\frac{1}{n}\sum_{i=1}^{n} m_i(\theta)\right]' \right\}^{-1}. \tag{2}$$

In the data file, "data.csv", the first column is the dependent variable y, the next six columns are the explanatory variables x, and the last twelve columns are the instrument variables z.

   (a) Consider the moment condition $m_i(\theta) = z_i\left(y_i - \frac{1}{1+\exp\left[-x_i'\theta\right]}\right)$. Please use the one-step GMM estimator to recover θ.

   (b) Please estimate the variance-covariance matrix of the estimate of θ above.