

Econ7115: Structural Models and Numerical Methods in Economics

Assignment W02

Due 6 February 2026

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1. Consider a one-step GMM estimator:

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

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

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

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 $m_i(\theta) = z_i \left(y_i - \frac{1}{1 + \exp[-x_i' \theta]} \right)$. Please use the one-step GMM estimator to recover θ .
- (b) Please estimate the variance-covariance matrix of the estimate of θ above.