Econ7115: Structural Models and Numerical Methods in Economics
Assignment W2

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

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

①基于(a)的答案 (Gmm θ)，计算最终 moment condition $m_i(\theta)$.
②计算 Jacobian matrix
③最终 W₀ matrix，W_final
④计算方差协方差矩阵
J_WJ = Jacobian' × W_final × Jacob
var_covar = inv(J_WJ)

Ans: a) θ = 0.5521
2.1715
1.6903
0.0353
-5.2770
0.0587