

Lab 12: Review for final quiz

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Data	Cross-section	Time Series	Panel Data
Models	OLS (lm) LPM (lm) Logit (glm) Probit (glm)	OLS (lm)	Pooled (plm) F.E. - within (plm) R.E. -between (plm)
Dependent	Y_i	Y_t	Y_{it}
Some possible controls	X_i	t Y_{t-1}, Y_{t-2}, \dots X_t, X_{t-1}, \dots	t X_{it} X_i X_t
What causes bias?	Endogeneity	Endogeneity	Endogeneity
What causes problems on the SEs?	Heteroskedasticity	Serial correlation	Both
	Problem: Cause SEs to be biased towards zero. Solution: Correct SEs.		

More on Endogeneity:

Type of endogeneity	Omitted Variables	Measurement Error	Reverse Causality
Definition	A variable X_2 is omitted and 1. $Corr(X_2, Y) \neq 0$ 2. $Corr(X_2, X_1) \neq 0$	You observe a noisy measure of X_1 , i.e., $X_1 = X_1^* + \eta$	X_1 explains Y , and Y explains X_1
Consequence	Bias β_1 $\hat{\beta}_1 = \beta_1 + \beta_2 \delta$ Where $\beta_2 \approx Corr(X_2, Y)$ $\delta \approx Corr(X_2, X_1)$	Bias β_1 $plim \hat{\beta}_1 = \frac{\sigma_{X_1^*}^2}{\sigma_{X_1^*}^2 + \sigma_\eta^2}$	Bias β_1
Solution	Include the omitted variable	Find a better measure	Instrumental Variables

Other things to remember: multicollinearity, unit root, stationarity, Dickey-Fuller, t-tests, F-tests.