

In STATA, Generalized Lease Square(GLS) means Weighted Least Square(WLS)		
If I want to use a ... model	STATA command	Inference
Ordinary Least Squares (OLS)	<code>regress Y X</code>	OLS
Population average model Using GEE		GEE for coefficient estimates WLS for s.e. of coefficients estimates
equivalently	<code>xtreg Y X, pa i(id) corr()</code> <code>xtgee Y X, f(gaussian) link(id) corr()</code> Correlation option: <code>ind, exch, ar1, uns</code>	
equivalently	<code>xtreg Y X, pa i(id) corr() robust</code> <code>xtgee Y X, f(gaussian) link(id) corr() robust</code> Correlation option: <code>ind, exch, ar1, uns</code>	Sandwich Estimator for s.e. of coef est Robust to mis-specification of corr structure
Population average model Using GLS	<code>xtgls Y X, i(id) corr()</code> Correlation option: <code>ind, ar1</code>	feasible generalized least squares(FGLS)
Comparison with <code>xtreg, pa / xtgee</code>	<code>ind, equivalent</code> <code>ar1, small difference for different estimating approaches</code>	Estimate Cov first, then plug-in as weight matrix for WLS
Between-effects model	<code>xtreg Y X, be i(id)</code>	To control for unmeasured confounder that varies with time
equivalently	<code>xi: reg Y X i.time</code>	
Fixed-effects model	<code>xtreg Y X, fe i(id)</code>	To control for unmeasured confounder that varies between subjects
equivalently	<code>xi: reg Y X i.id</code>	
RandomEffects Models		
Random intercept model	<code>xtreg Y X, i(id) mle</code> Correlation structure: <code>exc</code>	Maximum likelihood estimate(MLE) estimated random-intercept SD is <code>/sigma_u</code> estimated residual SD is <code>/sigma_e</code> intra-class correlation is <code>rho</code>
equivalently	<code>xtmixed Y X id:, mle</code> Correlation structure: <code>exc</code>	estimated random-intercept SD is <code>sd(_cons)</code> estimated residual SD is <code>sd(Residual)</code>
	<code>xtregar Y X, i(id)</code> Correlation structure: <code>ar1</code>	estimated autocorrelation parameter: <code>rho_ar</code> estimated random-intercept SD is <code>/sigma_u</code> estimated residual SD is <code>/sigma_e</code> $\sigma_u^2 / (\sigma_u^2 + \sigma_e^2)$: <code>rho_fov</code>