ECONOMICS 6002 CLASSES 3-4
BASIC STATISTICAL INFERENCE UNDER ORDINARY LEAST SQUARES

1. Testing a hypothesis about a coefficient - the *t* test
    a. Testing statistical significance: $H_0 : \beta=0$
        i.   Role of the normality assumption
        ii. Distribution of the *t*-statistic
    b. Testing hypotheses on coefficients $H_0 : \beta=c$
    c. Testing linear combinations of coefficients . $H_0: r'\beta = q$
    d. Estimating the variances and covariances of OLS estimates
        i. $cov(\beta) = \sigma^2 (X'X)^{-1}$
        ii. Estimating σ^2

2. Testing joint hypotheses: e.g. $H_0:\{ \beta_1 = 0, \beta_2 = 0 \}$ - the *F* test
    a. Motivation: estimates of β_1 and β_2 can be correlated
    b. Distribution of the *F*-statistic
    c. General form: $H_0: R'\beta = q$, R JxK
    d. The F test is a test on $[SSE_R - SSE_U]$ - R=restricted, U=unrestricted

3. Testing non-linear hypotheses - the Wald test W
    a. *t* and *F* tests cannot test *non-linear* hypotheses - not normally distributed
    b. W can be used to test *non-linear* hypotheses
        i.   Relies on consistency and the Central Limit Theorem, so is only an
             asymptotic test
        ii. Estimation of the asymptotic variance of a non-linear function
    c. W can best both simple and joint hypotheses
    d. W is distributed (asymptotically) as chi-squared
    e. W is valid (asymptotically) even when disturbances are **not** normally distributed