Multiple Hypotheses

$$H_0 : \beta_j = 0 , \beta_\ell = 0$$

$$H_1 : \text{at least } \beta_j \text{ or } \beta_\ell \neq 0$$

unrestricted model : H_0 not imposed

restricted " : H_0 imposed

by omitting x_j and x_ℓ

Test statistic based on comparing fit across the 2 models

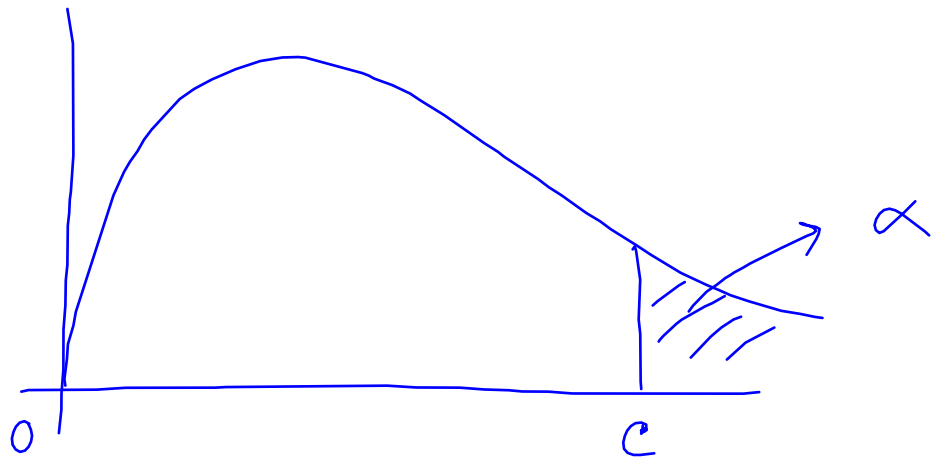
Follows F distribution

$$F_{test} = \frac{(SSR_r - SSR_{ur})/q}{SSR_{ur}/(n-k-1)}$$

q : numerator df (# β's tested)

$n-k-1$: denominator df

$$F_{test} \sim F_{q,(n-k-1)}$$



Reject H_0 if $F_{test} > c$

critical values : Tables G. 3a, G. 3b, and G. 3c

$$F_{test} = \frac{\left(R^2_{ur} - R^2_r\right)/q}{\left(1 - R^2_{ur}\right)/(n-k-1)}$$

nbasal :

$$wage = \beta_0 + \beta_1 points + \beta_2 rebounds + \beta_3 assists + u$$

$H_0 : \beta_1 = 0, \beta_2 = 0$

$H_1 :$ not H_0

$q = 2$

$R^2_{ur} = 0.475$

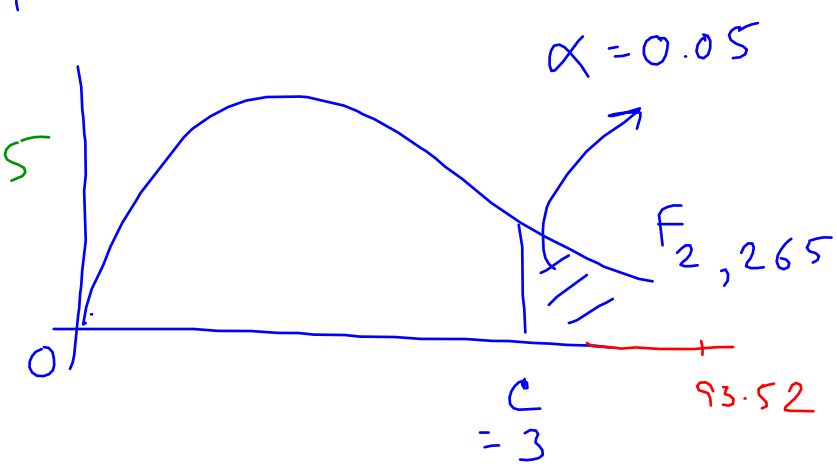
$n - k - 1 = 269 - 3 - 1$

$F_{test} = 93.52 = 265$

c for $F_{2,265} = 3$ (from Table G.3b)

$\alpha = 0.05$ $R^2_r = 0.105$

Reject H_0.



$SSR_{ur} =$ 140512078

$SSR_r =$ 239682605

Special case : overall significance of regression

$H_0 : \beta_1 = 0, \ldots, \beta_k = 0$

H_1 : at least one of $\beta_1, \ldots, \beta_k \neq 0$

$R^2_r = 0$

R^2_{ur} = usual R^2

$q = k$

$$F_{test} = \frac{R^2 / k}{(1 - R^2) / (n-k-1)}$$

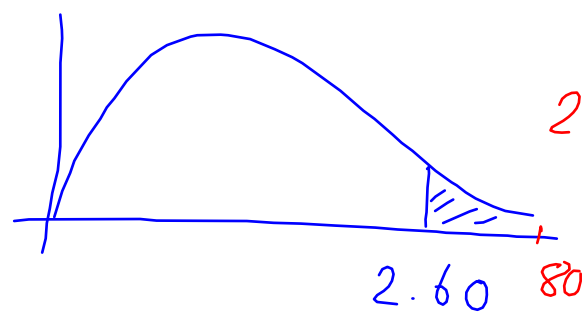
nbasal : $H_0 : \beta_1, \beta_2, \beta_3 = 0$

H_1 : not H_0

$F_{test} = 80.07$

c for $F_{3,265} (\alpha = 0.05)$ = 2.60 (from table)

Reject H_0.



2.64 (from R)