Econ 301.01 **Bilkent University** **Berument**
Econometrics **Department of Economics**

A real estate economist analyzing the factors those contribute to the price changes in the real estate market. He collected data on two similar neighbourhoods, one bordering a large university and one that is a neighbourhood about 10 kilometres from the university. Data consists of 1000 observations and is reported in data set. The data file consists of the following variables:

$PRICE_i =$ House prices given in $'s
$SQFT =$ Number of square feet of living area,
$AGE_i =$ Age of the house,
$UTOWN_i = 1$ for houses near the university, 0 otherwise,
$POOL_i = 1$ for houses with a pool, 0 otherwise,
$FPLACE_i = 1$ for houses with a fireplace, 0 otherwise.

The economist specifies the regression equation as:
$PRICE_i = \beta_{1i} + \beta_{2i} SQFT_i + u_i$

I. Assess individually if the intercept term changes with
a. houses near to university ($\beta_{1i}=\beta_1+\delta_1 UTOWN_i$)
b. for houses with a pool ($\beta_{1i}=\beta_1+\delta_2 POOL_i$)
c. houses with a fireplace ($\beta_{1i}=\beta_1+\delta_3 FPLACE_i$)

where $\beta_{2i} = \beta_2$.

II. assess if the intercept term changes with above three conditions jointly
($\beta_{1i}=\beta_1+\delta_1 UTOWN_i+\delta_2 POOL_i+\delta_3 FPLACE_i$)

III. Assess if the slope term changes with houses near the university above model (II)
($\beta_{2i}=\beta_2+\lambda UTOWN_i$)

IV. Assess if the intercept term changes with ages(of houses) ($\beta_{1i}=\beta_1+\beta_3 AGE_i$)

V. Consider the following model
$$PRICE_i = \beta_1 + \beta_2 SQFT_i + \delta_1 UTOWN_i + \lambda(SQFT_i * UTOWN_i) + \beta_3 AGE_i + \delta_2 POOL_i + \delta_3 FPLACE_i + u_i$$

a) Test the null hypothesis that fireplace has no impact on prices.
b) Test the null hypothesis that location has no impact on house prices
c) Rewrite a new regression equation which captures the differential effect of depreciation for houses with a pool and without a pool.
d) Test the null that there is no difference on the houses prices hat has fireplace, in University town but no pool with pool, not near to university and no fire place in (c)?