chapter 7

Dummy / binary indep. var.

y	x	u
trade/env. performance	trade/env. agreement	political pref.
wage	marital status	work ethic, reliability

Single Dummy Variable

$$y = \beta_0 + \delta_0 x + u$$

$$\downarrow$$

$$0/1$$

$$E(y|x) = \beta_0 + \delta_0 x$$

$$\Rightarrow \quad \delta_0 = E(y|x=1) - E(y|x=0) \quad \begin{array}{l} \text{effect} \\ \text{of } x=1 \\ \text{rel. to} \\ x = 0 \\ \text{(base/reference} \\ \text{group)} \end{array}$$

$$\hat{\delta}_0 = \bar{y}_{x=1} - \bar{y}_{x=0}$$

$$= \overline{wage}_{marr.} - \overline{wage}_{not\ marr.} \quad \begin{array}{l} \text{if } y \rightarrow wage \\ x \rightarrow 1 \text{ for marr.} \\ \rightarrow 0 \text{ for} \\ \quad \text{not} \\ \quad \text{marr.} \end{array}$$

$$y = \beta_0 + \beta_1 x_1 + \delta_0 x_2 + u$$
$$\hookrightarrow 0/1$$

$$E(y \mid x_1, x_2) = \beta_0 + \beta_1 x_1 + \delta_0 x_2$$

$$\delta_0 = E(y \mid x_1, x_2 = 1) - E(y \mid x_1, x_2 = 0)$$

if $y \rightarrow$ wage

$x_1 \rightarrow$ educ

$x_2 \rightarrow$ 1 : marr.

0 : not "

$\hookrightarrow$ base/ref. group

effect of $x_2 = 1$ rel. to $x_2 = 0$
after controlling for x_1

Note : 2 groups denoted by a
single dummy

x_3 :   1 for not marr.

       0 for marr.

x_2	x_3
1	0
0	1

Not reqd. $\because$ x_2 & x_3 perfectly
            collinear
(as long as
we have β_0)
       $\longrightarrow$ dummy variable trap

If $y = \log(\text{wage})$

Approximate effect of $x_2 = 1$: $100\,\hat{\delta}_0\,\%$

Exact   "   : $100\left[\exp(\hat{\delta}_0) - 1\right]\,\%$

e.g. $\hat{\delta}_0 = 0.26$

$\Rightarrow$ 26% or 29.7%

Multiple Categories

$$M \longrightarrow \quad 1 \quad (\text{married})$$
$$0 \quad (\text{not} \quad '' \quad)$$

$$W \longrightarrow \quad 1 \quad (\text{Western region})$$
$$0 \quad (\text{not} \quad '' \quad)$$

4 groups $\Rightarrow$ choose $\underline{1}$ as
base/reference &
include dummies
for rest