Ch. 7 (cont.) Allowing for different slopes

$$y = \beta_0 + \beta_1 x_1 + \delta_0 M + \delta_1 M \cdot x_1 + u$$

- y: wage
- x_1: educ.
- M: 1 : married, 0 : not "

	Intercept	Slope
Marr.	$\beta_0 + \delta_0$	$\beta_1 + \delta_1$
Not marr.	β_0	β_1
Diff.	δ_0	δ_1

e.g. $\hat{\delta}_0 = 0.33$

$\hat{\delta}_1 = 0.1$

$\hat{\beta}_1 = 0.46$

Is the ret. to educ. same for $M=1$ & $M=0$?

$H_0 : \delta_1 = 0$

For same educ. do $M=1$ & $M=0$ have same wage?

$H_0 : \delta_0 = 0, \delta_1 = 0$

The Linear Probability Model

Dep. var. → dummy e.g. employed, graduated, sign treaty, etc.

$Y \rightarrow 0$ with $P(Y=0)$

$Y \rightarrow 1$ with $P(Y=1)$

$$E(Y) = [0 \times P(Y=0)] + [1 \times P(Y=1)]$$

$$= P(Y=1)$$

$$Y = \beta_0 + \beta_1 X_1 + \ldots + \beta_k X_k + u$$

$$P(Y=1 \mid X_1 \ldots X_k) = \beta_0 + \beta_1 X_1 + \ldots + \beta_k X_k$$

↙

instead of $E(Y \mid X_1 \ldots X_k)$

e.g. $P(\text{sign} = 1 \mid \text{GDPPC}, \text{democracy})$

$P(\text{employed} = 1 \mid \text{educ.}, \text{job training})$

Slope coeff. (cont. x_j): $\dfrac{\Delta P(Y=1 \mid x_1 \ldots x_k)}{\Delta x_j} = \beta_j$

MR02

$$inlf = \beta_0 + \beta_1 educ. + \beta_2 age + \beta_3 \left(\begin{matrix}\#\\ kids<6\end{matrix}\right) + u$$

↓

woman's lab. force participation

$$\hat{\beta}_3 = -0.303$$

One addl. child ↓ prob. of in LF by 0.303.

4 " " ↓ $4 \times 0.303 = 1.212$

Shortcomings of the LPM:

- Fitted / predicted values can be outside $[0, 1]$.
- Constant $\hat{\beta}$ may => unrealistic interpretation
- Heteroskedasticity : $var(y|x) = P(y=1|x)[1 - P(y=1|x)]$
- May perform well near avg. values in the data