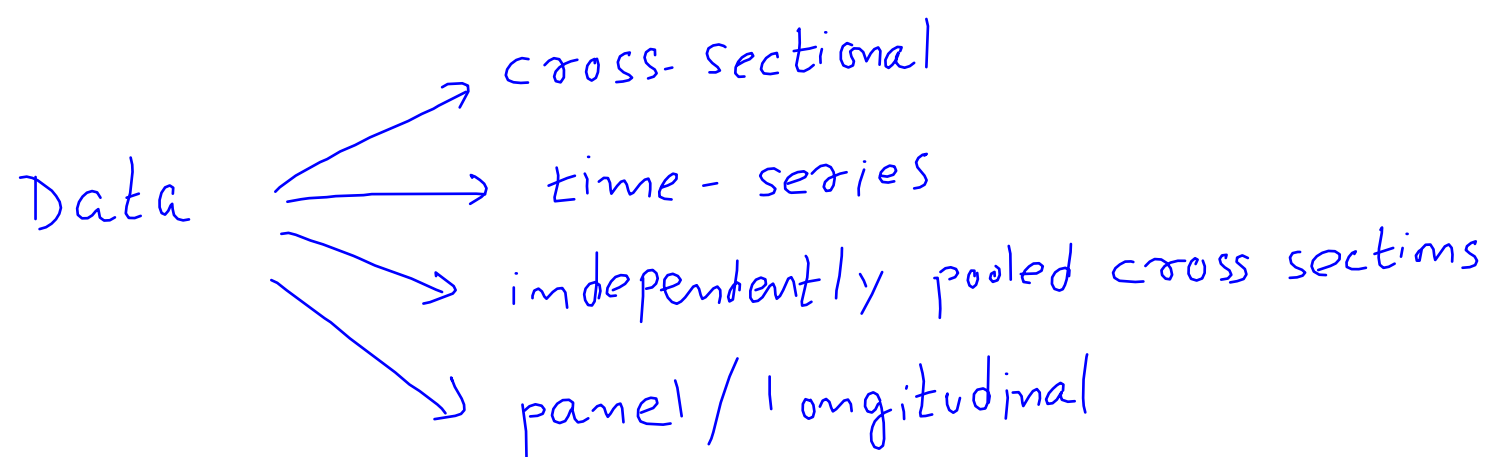
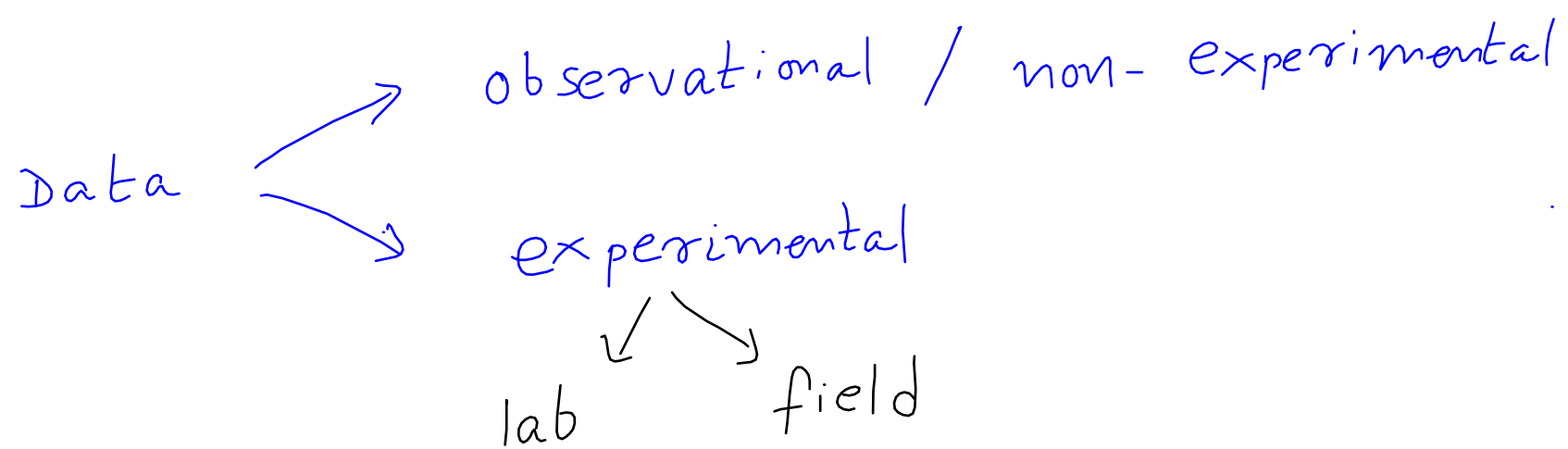




Ch. 2 : Simple Regression Model

Randomized Experiments/Trials :

Estimate the effect of

X on Y
grants $\rightarrow$ Yes
 $\rightarrow$ No
firm performance

sleep deprived $\rightarrow$ Yes
 $\rightarrow$ No
decision making
e.g. bids

u : unobserved factors affecting Y
e.g. firm size
IQ of indiv.

$\downarrow$
not correl. w/ X if X is randomly assigned

Randomiz? often infeasible.

Concerns over generalizability/ethics

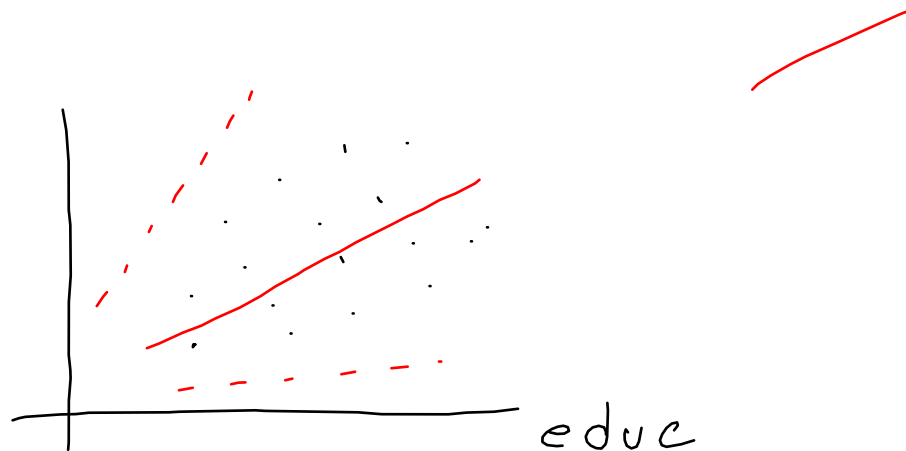
Objective: estimate the effect of

X	on	Y
indep. var. regressor		dep. var. regressand
e.g. educ. trade		wage poll.

The simple linear regression (SLR) model

one X

assumes X and Y to be linearly
related



one approach: estimate line of best fit

Diff. motivation: based on a causal framework

$$y = \beta_0 + \beta_1 x + u - 100$$

$E(u) = 100$

β_0 → intercept
 β_1 → slope
 $u - 100$ → unobserved or error term

$$\Delta y = \beta_1 \Delta x + \Delta u$$

β_1 : Δy for $\Delta x = 1$ (all else equal)
 " " const.

To estimate β_0 & $\beta_1 \rightarrow 2$ eqⁿs or ass^{ns}

e.g. u : ability
 x : yrs. of educ.

$$E(u) = 0 \quad (\text{harmless if intercept present})$$

$$E(u|x) = E(u) \quad (\text{crucial})$$

$$E(u|x=12)$$

$$= E(u|x=10) = E(u|x=8)$$

→ i.e. zero

$$E(x \cdot u) = 0$$

$$\text{corr}(x, u) = 0$$