

$$= (1-p)\mu + \int p E[X_1 | X_1, zc] + \int \frac{Pr(X_1, zc)}{Pr(X_1, zc)} \int_{-\infty}^c x f_{X_1}(x) dx$$

$$= \left(\frac{Pr(X_1, zc)}{Pr(X_1, zc)} \int_{-\infty}^c f_{X_1}(x) dx \right) ((1-p)\mu)$$

$$= \frac{1}{Pr(X_1, zc)} \int_{-\infty}^c [(1-p)\mu + \int p x] f_{X_1}(x) dx$$

: pdf

$$E[X_2 | X_1, zc] = \frac{1}{Pr(X_1, zc)} \int_{-\infty}^c E[X_2 | X_1 = x] f_{X_1}(x) dx$$

: pdf

$$E[X_2 | X_1 = x] = \mu + \int p(x - \mu) = (1-p)\mu + \int p x$$

if ρ , σ_1 , σ_2 are independent variables

$$\sigma^2 = \sigma_1^2 + \sigma_2^2$$

$$\rho = \frac{\sigma_1^2}{\sigma_1^2 + \sigma_2^2}$$

$$\begin{bmatrix} X_1 \\ X_2 \end{bmatrix} \sim N \left(\begin{bmatrix} \mu \\ \mu \end{bmatrix}, \begin{bmatrix} \sigma_1^2 & \rho \sigma_1 \sigma_2 \\ \rho \sigma_1 \sigma_2 & \sigma_2^2 \end{bmatrix} \right)$$

not p first

$$X_i = X + \epsilon, \quad i=1,2$$

$$X \sim N(\mu, \sigma^2)$$

$$\epsilon_i \sim N(0, \tau^2)$$

✓ "2" $X, \epsilon_1, \epsilon_2$

condition

Regression to the mean in the normal case

$$\left(\frac{\eta}{c-\mu}\right) \phi_{-1} \left(\left(\frac{\eta}{c-\mu}\right) \Phi - 1\right) \eta + \eta' =$$

$$\left[\left. \frac{c'}{\infty} \right|_{-\infty}^{\infty} e^{-\frac{\eta^2}{2(c-\mu)^2}} - \right]_{-1} \left(\left(\frac{\eta}{c-\mu}\right) \Phi - 1\right) \eta + \eta' =$$

$$\eta \int_{-\infty}^{\infty} e^{-\frac{\eta^2}{2(c-\mu)^2}} \left(\left(\frac{\eta}{c-\mu}\right) \Phi - 1\right) \eta + \eta' =$$

$$\eta \int_{-\infty}^{\infty} \phi(v) dv \left(\left(\frac{\eta}{c-\mu}\right) \Phi - 1\right) \eta + \eta' =$$

$$\left(c' = \frac{\eta}{c-\mu} \right) \text{ (ok)}$$

$$\int_{-\infty}^{\infty} \left(\left(\frac{\eta}{c-\mu}\right) \Phi - 1\right) \eta + \eta' \phi(v) dv =$$

$$\left[\begin{array}{l} v = \frac{\eta}{c-\mu} \\ x = \eta + \eta v \\ dx = \eta dv \end{array} \right]$$

$$= \int_{-\infty}^{\infty} \left(\left(\frac{\eta}{c-\mu}\right) \Phi - 1\right) \eta + \eta' \phi\left(\frac{\eta}{c-\mu}\right) dx$$

$$E[X_1 | X_1, zc] = \frac{E[X_1, zc]}{P(X_1, zc)} = \int_{-\infty}^{\infty} x f_{X_1}(x) dx$$

ok

$$= - (1-p) (E[X_1 | X_1, zc] - \mu)$$

$$= (1-p) \mu + p E[X_1 | X_1, zc] - E[X_1 | X_1, zc]$$

$$E[X_1 - X_1 | X_1, zc]$$

ok

$$E[X_2 - X_1 | X_1 = c] = - (1 - \beta) \eta \frac{\phi\left(\frac{c - \mu}{\sigma}\right) - 1}{\phi\left(\frac{c - \mu}{\sigma}\right)}$$

is 1031, 13 2011