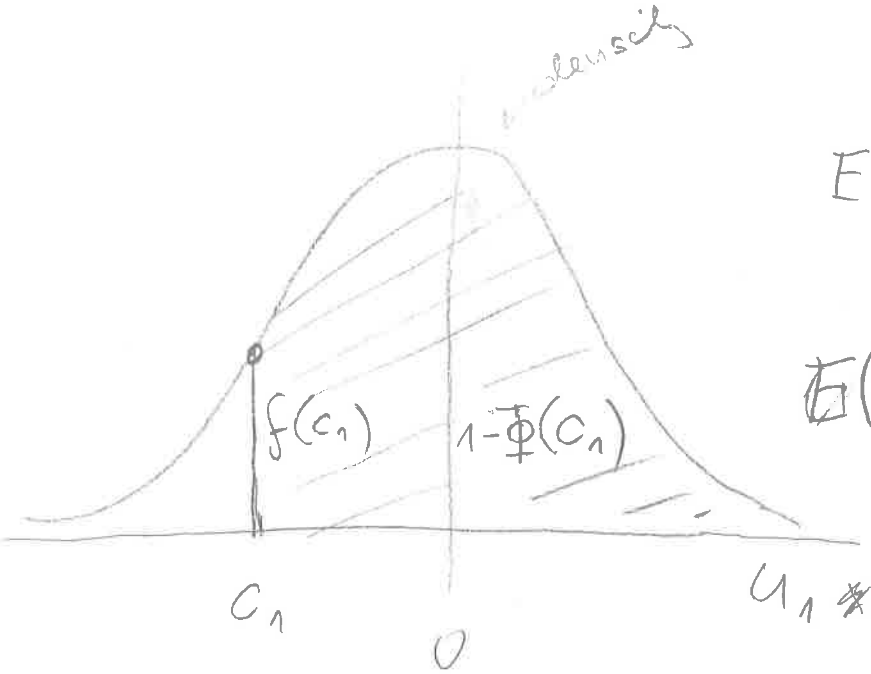
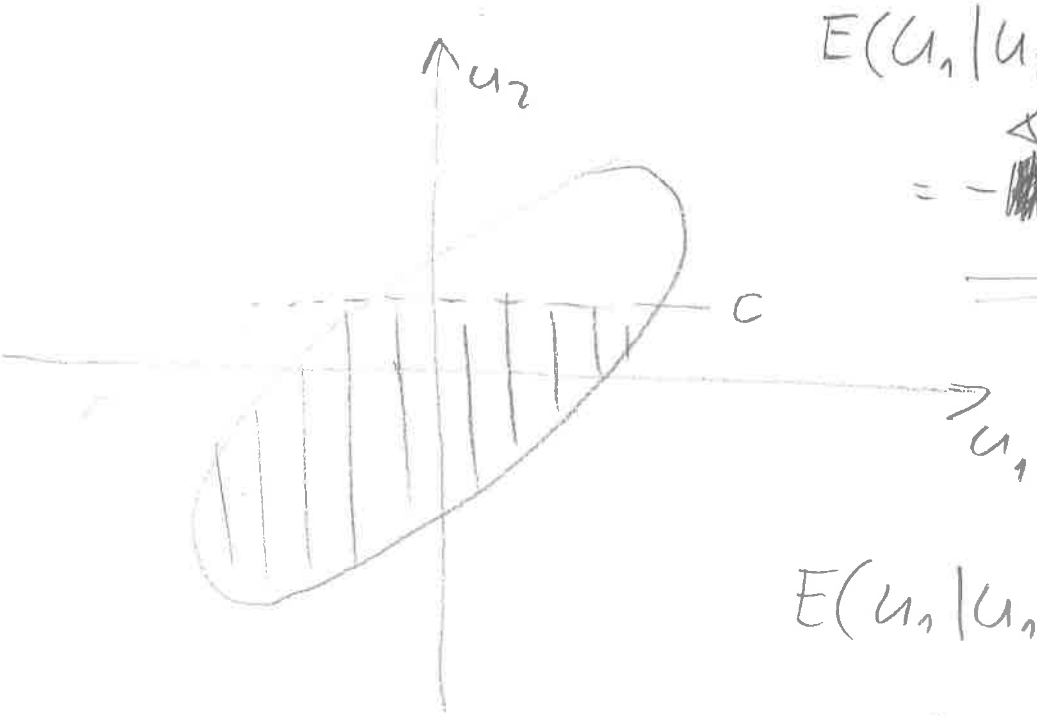


$$E(u_1 \mid u_1 > c_1) = \frac{\phi(c_1)}{1-\Phi(c_1)}$$

$$E(u_1 \mid u_1 < c_1) = \frac{-\phi(c_1)}{\Phi(c_1)}$$



$$E(u_1 \mid u_2 < c) = \sigma_{12} E(u_2 \mid u_2 < c)$$

$$= -\sigma_{12} \frac{\phi(c)}{\Phi(c)}$$

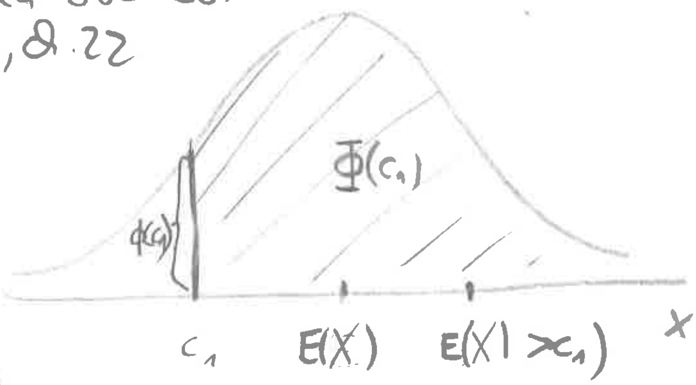
$$E(u_1 \mid u_1 > c) = \sigma_{12} E(u_2 \mid u_2 > c)$$

$$\sigma_{12} \frac{\phi(c)}{1-\Phi(c)}$$

Mean & Variance of truncated normal dist

- Maddala 365-367 on www
- Green, 8.22

$X \sim N(0,1)$



A If X truncated from bellow:

$$E(X \mid X > c_1) = \frac{\phi(c_1)}{1-\Phi(c_1)}$$

A' If X truncated from above:

$$E(\varepsilon \mid \varepsilon < c_1) = \frac{-\phi(c_1)}{\Phi(c_1)}$$

if $\varepsilon \sim N(\mu, \sigma^2) \underset{\text{substitute}}{\Rightarrow} \underbrace{\frac{\varepsilon-\mu}{\sigma}}_{X}, \underbrace{\frac{c_1-\mu}{\sigma}}_{c_1}, \underbrace{\frac{c_2-\mu}{\sigma}}_{c_2}$

$N\left(\begin{bmatrix}0\\0\end{bmatrix}, \begin{bmatrix}1 & \sigma_{12}\\ \sigma_{12} & 1\end{bmatrix}\right)$

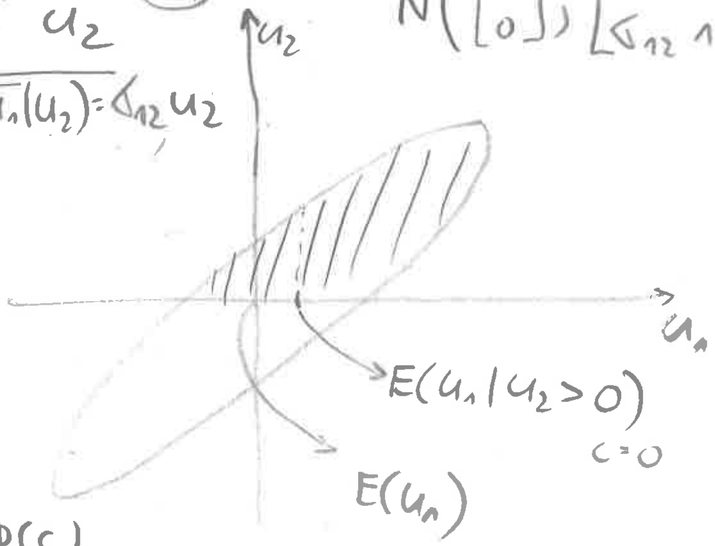
B Truncation by values of u_2

$E(u_1|u_2) = \sigma_{12} u_2$

- $E(u_1 \mid u_2 > c) =$

$= \sigma_{12} E(u_2 \mid u_2 > c) =$

$$= \sigma_{12} \frac{\phi(c)}{1-\Phi(c)}$$



- $E(u_1 \mid u_2 < c) = \ldots = -\sigma_{12} \dfrac{\phi(c)}{\Phi(c)}$

From Maddala, sections 8.5-8.6

Estimating Labor supply

x, z exog

H .. hours worked

$S_r = \gamma_0 + \gamma_1 H + \gamma_2 Z + u_1$ S.. shadow wage

$W = \beta_0 + \beta_1 X + u_2$ wage

---

when working $H > 0$

$W \overset{!}{=} S = \gamma_0 + \gamma_1 H + \gamma_2 Z + u_1$ if $H > 0$

Problems with OLS:

1. H is endogenous since

$$H^* = \frac{\beta_0 + \beta_1 + \dots}{\gamma_1} + \frac{u_2 - u_1}{\gamma_1}$$

2. $E(u_1 | H > 0) \neq 0$ → truncated u_1 → inconsistent OLS

$E\left(u_1 \middle| \frac{u_2 - u_1}{\gamma} > \Delta\right)$

⇒ 1. Instrument H by $\hat{H}$ →

2. Correct for self-selection →
truncation