

## Recitation #3 - September 6th, 2019

1. Consider the following utility function with constant elasticity of substitution (CES):  
 $u(x_1, x_2) = [\alpha_1 x_1^\rho + \alpha_2 x_2^\rho]^{\frac{1}{\rho}}$  where  $\rho \neq 0$  and  $\rho \leq 1$ . Show that:
  - (a) When  $\rho = 1$ , indifference curves are linear (goods 1 and 2 are perfect substitutes).
  - (b) When  $\rho \rightarrow 0$ , the utility function represents a Cobb-Douglas utility function,  $u(x_1, x_2) = x_1^{\alpha_1} x_2^{\alpha_2}$ , where the exponents satisfy  $\alpha_1 + \alpha_2 = 1$ .
2. Consider a setting with three goods ( $L = 3$ ) and a consumer with Walrasian demand function  $x(p, w)$  given by

$$x_1(p, w) = \frac{p_2}{p_3}; \quad x_2(p, w) = -\frac{p_1}{p_3}; \quad \text{and} \quad x_3(p, w) = \frac{w}{p_3}$$

- (a) Show that the Walrasian demand is homogeneous of degree zero in prices and wealth,  $(p, w)$ .
- (b) Show that  $x(p, w)$  satisfies Walras' law.
- (c) Show that  $x(p, w)$  violates the weak axiom of revealed preference (WARP).
- (d) Find the Slutsky matrix  $S(p, w)$ .