APEC 8001: Problem Set 1

Professor: Paul Glewwe TA: Monique Davis

Due Date: September 17, 2020

1. Proposition 1.B.1 in MWG states the following:

   If $\succsim$ is rational then:

   i. $\succ$ is both irreflexive ($x \succ x$ cannot hold) and transitive (if $x \succ y$ and $y \succ z$, then $x \succ z$)
   ii. $\sim$ is reflexive ($x \sim x$ for all x), transitive (if $x \sim y$ and $y \sim z$, then $x \sim z$) and symmetric (if $x \sim y$ then $y \sim x$),
   iii. If $x \succ y$ and $y \succsim z$, then $x \succ z$

   Provide a proof of the three results in this proposition. Hint: Showing that ~ is transitive is the easiest, so start there.

2. Given the choice set $X = \{x, y, z\}$ and the choice structure $(\mathscr{B}, C(\,))$, where $\mathscr{B} = \{\{x, y\}, \{y, z\}, \{x, z\}, \{x, y, z\}\}$, $C(\{x, y\}) = \{x\}$, $C(\{y, z\}) = \{z\}$, $C(\{x, z\}) = \{x, z\}$, and $C(\{x, y, z\}) = \{x, z\}$:

   a. Demonstrate this choice structure satisfies the weak axiom of revealed preferences (WARP)

   b. Suppose instead $C(\{x, y, z\}) = \{x\}$. Does this choice structure satisfy WARP? Provide an explanation for your answer.

3. Consider a consumer's choice of spending wealth on only two goods, x_1 and x_2. Show, for each of the following Walrasian demands, that they satisfy: i) homogeneity of degree zero, and ii) Walras' law:

   a. $x_1(p_1, p_2, w) = \frac{w}{3p_1}$ and $x_2(p_1, p_2, w) = \frac{2w}{3p_2}$

   b. $x_1(p_1, p_2, w) = \frac{p_2^2}{4p_1^2}$ and $x_2(p_1, p_2, w) = \frac{w}{p_2} - \frac{p_2}{4p_1}$

   c. $x_1(p_1, p_2, w) = \frac{w}{p_1+p_2}$ and $x_2(p_1, p_2, w) = \frac{w}{p_1+p_2}$