1 Review

E of #2.
Price offer curve is a set of bundles that are optimal for some set of prices.
$m = 1200$, $p_2 = 100$. What is the set of bundles that are optimal for $p_1 > 0$.
$u = min\left\{\frac{1}{2}x_1, x_2\right\}$
$\frac{1}{2}x_1 = x_2$ "no waste condition"
1. "Hack". $\frac{1}{2}x_1 = x_2$

$$\frac{1}{2}x_1 = x_2$$

$$p_1x_1 + 100x_2 = 1200$$

$$p_1x_1 + 100\left(\frac{1}{2}x_1\right) = 1200$$

$$x_1 = \frac{1200}{(p_1 + 50)}$$

$$x_2 = \frac{1}{2}\frac{1200}{(p_1 + 50)}$$

2. $x_1 = 2\frac{m}{2p_1+p_2}, x_2 = \frac{m}{2p_1+p_2}$

$$x_1 = 2\frac{1200}{2p_1 + 100}, x_2 = \frac{1200}{2p_1 + 100}$$

$$x_1 = \frac{1200}{p_1 + 50}, x_2 = \frac{1200}{2p_1 + 100}$$

Eliminate p_1 from this system:

$$x_1 = \frac{1200}{p_1 + 50}$$

$$p_1 = \frac{1200}{x_1} - 50$$

$$x_2 = \frac{1200}{2\left(\frac{1200}{x_1} - 50\right) + 100}$$

$$x_2 = \frac{1200}{\frac{2400}{x_1} - 100 + 100}$$

$$x_2 = \frac{1200}{\frac{2400}{x_1}} = x_1 \frac{1200}{2400} = \frac{1}{2} x_1$$

$$x_2 = \frac{1}{2} x_1$$

3. $x_1 = \frac{1200}{p_1+50}, x_2 = \frac{1200}{2p_1+100}$
$p_1 = 50$ $x_1 = 12, x_2 = 6$

$$p_1 = 100, x_1 = 8, x_2 = 4$$

$$p_1 = 0, x_1 = 24, x_2 = 12$$

2 Cobb Douglass Price offer Curve

$m = 1200, p_2 = 100$, $u = x_1^2 x_2^3$, Price offer curve for p_1.
Find the demands:

$$-\frac{\frac{\partial\left(x_1^2 x_2^3\right)}{\partial x_1}}{\frac{\partial\left(x_1^2 x_2^3\right)}{\partial x_2}} = -\frac{p_1}{100}$$

$$-\frac{\frac{\partial\left(x_1^2 x_2^3\right)}{\partial x_1}}{\frac{\partial\left(x_1^2 x_2^3\right)}{\partial x_2}} = -\frac{p_1}{100}$$

$$-\frac{2x_2}{3x_1} = -\frac{p_1}{100}$$

$$\frac{2x_2}{3x_1} = \frac{p_1}{100}$$

$$p_1 x_1 + 100 x_2 = 1200$$

$$x_1 = \frac{480}{p_1}, x_2 = \frac{36}{5}$$

3 Intertemporal Choice (Chapter)

3.1 Bundles (Consumption Today, Consumption Tomorrow)

Borrowing and Saving Behavior.

x_1, x_2 "amounts of a good"

c_1, c_2 "amounts of money spent in two time periods"

$$(1000, 1000)$$

Spend 1000 *in today and* 1000 *next year.*

(m_1, m_2) income today, income in the future. Get 500 today and 1500 in the future.

$$(500, 1500)$$

Get 1500 today and 500 in the future.

$$(1500, 500)$$

3.2 Budget Constraint

If there is borrowing and saving, but the "interest rate" is 0.

Suppose I save money, c_2 is the income I get tomorrow, plus the amount I saved today $(m_1 - c_1)$

$$c_2 = (m_1 - c_1) + m_2$$

Suppose I borrow money today, c_2 is my income tomorrow minus the amount I borrow today $(c_1 - m_1)$

$$c_2 = m_2 - (c_1 - m_1)$$

$$c_2 = m_2 + (m_1 - c_1)$$

Budget equation:

$$c_1 + c_2 = m_1 + m_2$$

In the real world, if I borrow a dollar, I pay more than a dollar. If I save a dollar, I get back get back *more than a dollar.*

Amount extra I get when I save a dollar is the interest rate r.
Amount extra I pay back when I borrow a dollar is the interest rate r.
Let's suppose I save money:

$$c_2 = m_2 + (1 + r)(m_1 - c_1)$$

$r = 0.05$ I get back 5% more than I saved. Every dollar I save gives me \$1.05 in period 2.

$$c_2 = m_2 - (1 + r)(c_1 - m_1)$$

$$c_2 = m_2 - (1 + r) c_1 + (1 + r) m_1$$

The budget equation for borrow and saving:

$$(1 + r) c_1 + c_2 = (1 + r) m_1 + m_2$$

A budget equation with slope of $-\frac{1+r}{1}$