ECON 210C PROBLEM SET # 4

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1. Labor supply problem

(a) individuals with time-separable utility solve the following maximization problem:

$$\mathcal{L} = \sum_{t=0}^{\infty} \beta^t \Big(\log C_t + \log(1 - L_t) \Big) + \lambda \sum_{t=0}^{\infty} \beta^t \left(C_t - w_t L_t \right)$$

Since the future wage schedule is known in advance, the problem is translated into the following form:

(b)

2. Demand shock

(a)

(b)

(c)

(d)

(e)

3. Business cycle and external returns to scale

(a)

(b)

(c)

(d)

(e)

4. Problems from Romer

4.1. Problem 6.10.

(a) Using the given three equations, it is easy to get the closed form solution for p, p^*, and y.

$$p = \frac{f\phi m'}{1-f+f\phi}$$
$$p^* = \frac{\phi m'}{1-f+f\phi}$$
$$y = \frac{m'(1-f)}{1-f+f\phi}$$

(b) The following figure summarizes the results

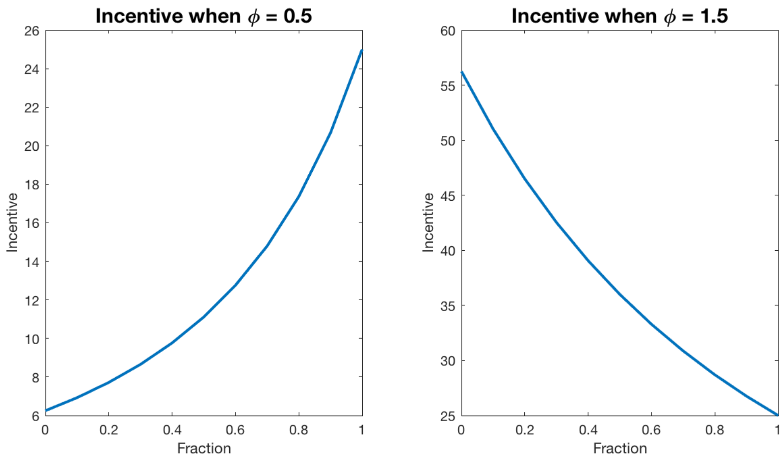

Figure 1. A firm's incentive to adjust its price

(c) Whether a firm adjusts its price or not depends on the size of the menu cost, Z. Suppose $\phi < 1$. To be written...

4.2. Problem 6.11.

(a) If the firm does not adjust its price and stays at $r^*(y_0)$ level, its profit is $\pi\left(y_1, r^*(y_0)\right)$. On the other hand, if the firm choose to adjust its price to the optimal level for y_1, its profit is $\pi\left(y_1, r^*(y_1)\right)$ The difference between these two is a potential gain from adjusting the price, so can be interpreted as the incentive to adjust its price.

(b) Second-order Taylor approximation of $G = \pi\left(y_1, r^*(y_1)\right) - \pi\left(y_1, r^*(y_0)\right)$ is:

$$
\begin{aligned}
G &= \pi\left(y_1, r^*(y_1)\right) - \pi\left(y_1, r^*(y_0)\right) \\
&\simeq
\end{aligned}
$$

(c)

4.3. **Problem 6.12.**