

14.462

Problem set 3

We take the Matsuyama model and want to compute the effect of inequality. We assume labor endowment  $y$  is distributed uniformly over  $[\bar{y} - \sigma, \bar{y} + \sigma]$ . Unit labor requirement in the food sector is  $a_0$ . Unit labor requirement in the industrial sector (good 1) is  $A(Q_1)$ ,  $A' < 0$ , where  $Q_1$  is total output of good 1.

1. Show that the equilibrium steady state level of  $Q_1$  must satisfy

$$Q_1 = 1/2 - \frac{a_0 - \bar{y} + A(Q_1)}{2\sigma}.$$

2. Show that an equilibrium is stable if and only if  $A'(Q_1) < 0$  locally.
3. What is the effect of  $a_0$  and  $\bar{y}$  on  $Q_1$ ? Explain.
4. Show that an increase in income dispersion  $\sigma$  may increase or reduce output depending on whether or not the average agent can afford the industrial good.
5. What is the typical path followed by output as  $\sigma$  increases?
6. Assume now that there is a second industrial good, good 2, with the same hierarchical preferences as in the Matsuyama paper. How is its output determined in steady state? How does inequality affect it? Does inequality always affect the output of each industrial good in the same way?