Problem Set

MA17Q4-K

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Govenment in the Ramsey Model

Consider the government puchases discussed in Section 2.7 of Romer 4e. The govenment purchases are devoted to provision of a public good that is perfectly substitutable with private goods. In effect, the existence of the govenment does not affect the level of utility or future investment.

The dynamics of the endogenous variables $(\hat{k}, \hat{c})$ of this version of the Ramsey model is governed by the following system of differential equations.

$$\dot{\hat{k}} = f\left(\hat{k}\right) - \hat{c} - \hat{G} - (\delta + g + n)\hat{k}, \qquad \frac{\dot{\hat{c}}}{\hat{c}} = \frac{f'\left(\hat{k}\right) - \delta - \rho - \theta g}{\theta},$$

where $\hat{G}$ is the government purchases per unit of effective labor.

1. Suppose that the economy is in its steady state with $\hat{G}(t) = 0$ for $t < 0$ and at $t = 0$ the government has raised the government purchases to $\hat{G}(t) = \hat{G}_H > 0$ for $t \geq 0$ without any prior announcement. What does the dynamics after $t = 0$ look like if the raise of $\hat{G}$ is anticipated to be permanent? Discuss using math and Figure 1.

2. Suppose that the economy is in its steady state with $\hat{G}(t) = 0$ for $t < 0$ and at $t = 0$ the government has raised the government expenditure to $\hat{G}(t) = \hat{G}_H > 0$ for $0 \leq t < T$ without any prior announcement. They announced that $\hat{G}(t)$ would go back to zero from $t = T$ on. What does the dynamics after $t = 0$ look like if the raise of $\hat{G}$ is anticipated to be temporary? Discuss using math and Figure 2.

3. In problems (1) and (2), we assumed that the tax $\hat{G}_H$ is constant (at least temporarily) in per AL terms, which means that the tax per capita $G = A\hat{G}_H$ grows at the rate of A. Give a supporting explanation of this assumption. [Hint: Recall the formula for the wage.][1]

[1] When you assume something non-standard, you will be almost always asked why you think it is no problem to assume it.

(1)

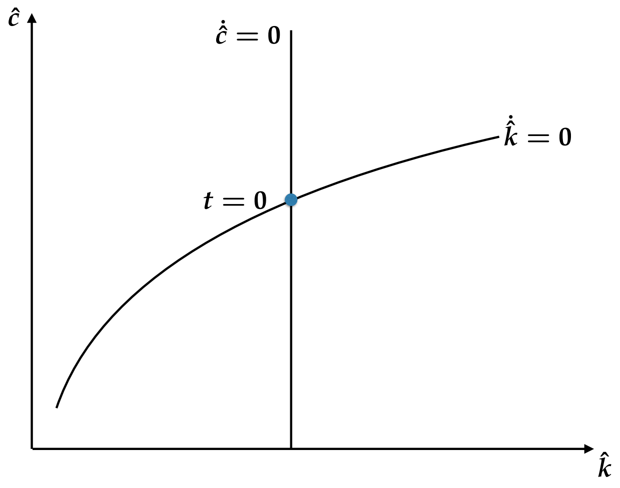

Figure 1: Increase in g

(2)

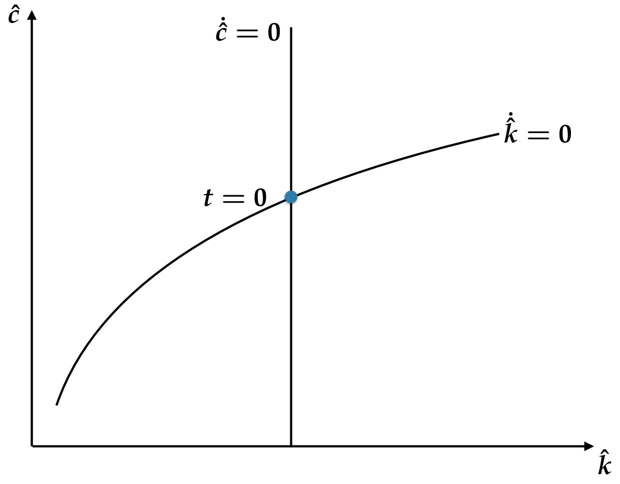

Figure 2: Decrease in n

(3)