

# Problem Set

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## Diagram for the Ramsey Model

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

$$\begin{aligned}\hat{k} &= f(\hat{k}) - \hat{c} - (\delta + g + n)\hat{k} \\ \frac{\hat{c}}{\hat{c}} &= \frac{f'(\hat{k}) - \delta - \rho - \theta g}{\theta}\end{aligned}$$

- (1) Suppose that the economy experiences a sudden increase in  $g$ . What happens to the loci for  $\hat{k} = 0$  and  $\hat{c} = 0$ ? Draw updated loci in **1** and explain why.
- (2) Suppose that the economy experiences a sudden decrease in  $n$ . What happens to the loci for  $\hat{k} = 0$  and  $\hat{c} = 0$ ? Draw updated loci in **2** and explain why.

## Balanced Growth

- (3) In the long run, the Ramsey economy will converge to the steady state  $(\hat{k}^*, \hat{c}^*)$  so that there is no growth in the variables per unit of effective labor. Compute the growth rates for per-capita variables  $y, k, c$  and aggregate variables  $Y, K, C$  in the steady state.

Answer sheet. Please write your name and id number.

(1)

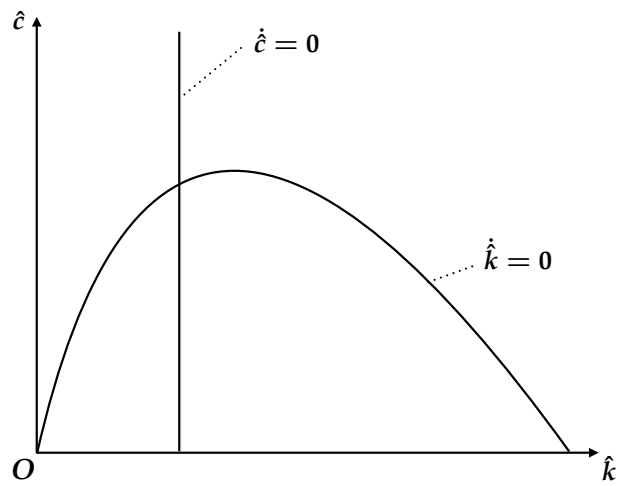


Figure 1: Increase in  $g$

(2)

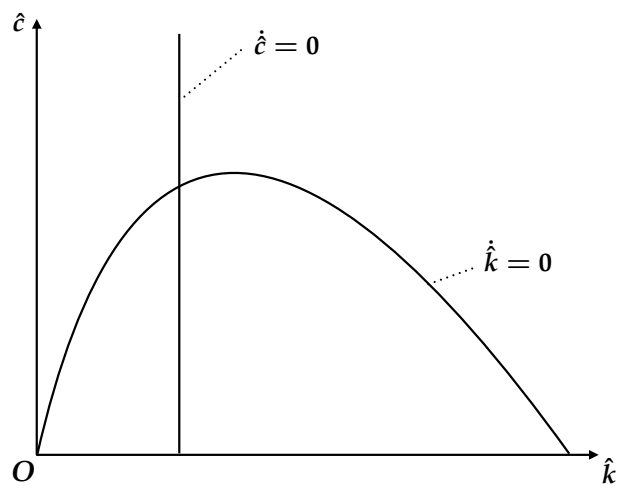


Figure 2: Decrease in  $n$

(3)