

Problem Set

MA17Q4-G

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Dynamics of Mankiw, Romer and Weil (1992)

Recall that the endogenous variables of MRW follows the two-dimensional system.

$$\begin{aligned}\dot{k} &= s_k k^\alpha h^\beta - (\delta + g + n)k \\ \dot{h} &= s_h k^\alpha h^\beta - (\delta + g + n)h\end{aligned}$$

1. Show that

$$\dot{k} = 0 \Leftrightarrow k = \left(\frac{s_k}{\delta + g + n} \right)^{\frac{1}{1-\alpha}} h^{\frac{\beta}{1-\alpha}}, \quad (1)$$

$$\dot{h} = 0 \Leftrightarrow h = \left(\frac{s_h}{\delta + g + n} \right)^{\frac{1}{1-\beta}} k^{\frac{\alpha}{1-\beta}}. \quad (2)$$

2. Equations (1) and (2) divide (k, h) space into four regions. See Figure 1 on the answer sheet. For each region, determine the sign of \dot{k} and \dot{h} by circling the right inequalities in Figure 1.
3. Now you can draw a sketch of dynamic behavior of the two-dimensional system. Draw trajectories starting from each of the eight dots in Figure 2. [Hint: all converge to the intersection of the two curves.]

Answer sheet. Please write your name and id number.
(1)

(2)

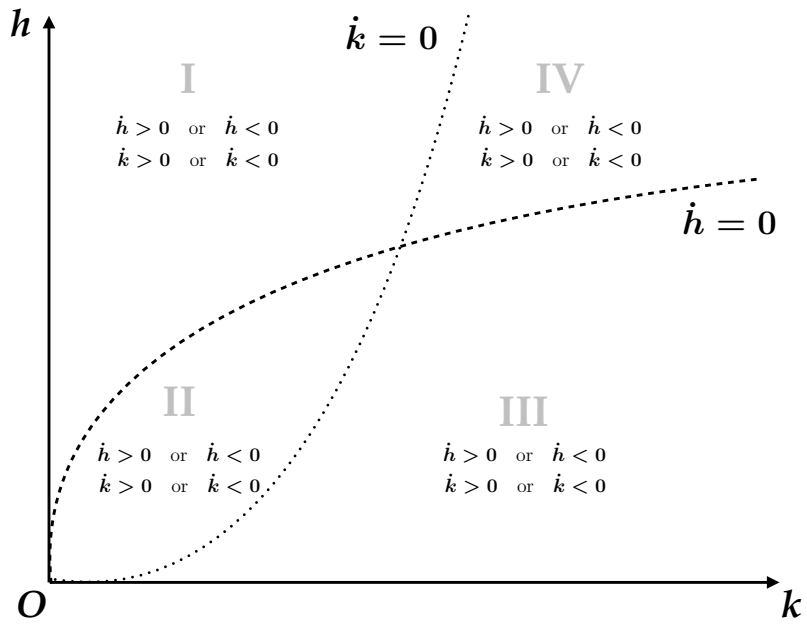


Figure 1: Determine the signs of \dot{k} and \dot{h}

(3)

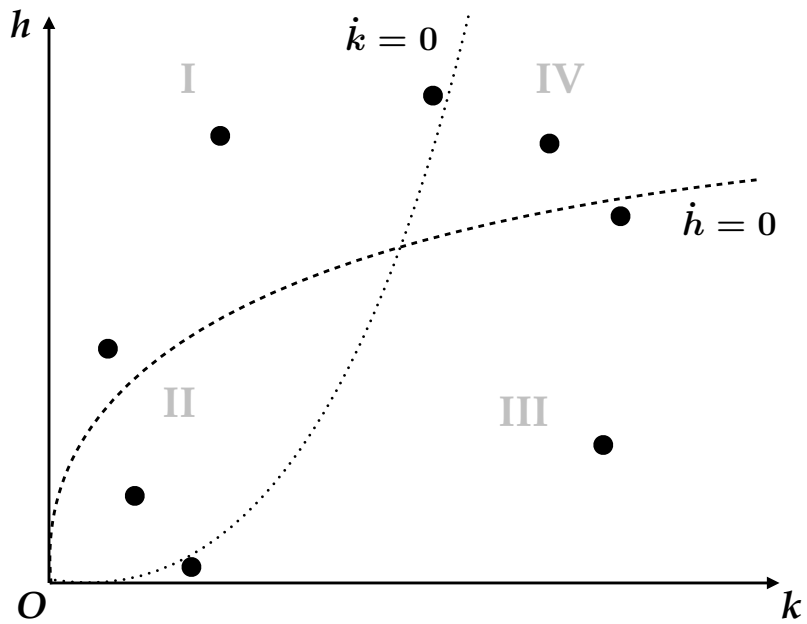


Figure 2: Draw trajectories from the dots