Macroeconomics 17q2
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Problem Set

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Dynamics of Mankiw, Romer and Weil (1992)

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

$$\dot{k} = k^{\alpha}h^{\beta} - (\delta + g + n)k$$
$$\dot{h} = k^{\alpha}h^{\beta} - (\delta + g + n)h$$

(1) Show that

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

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

(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 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)

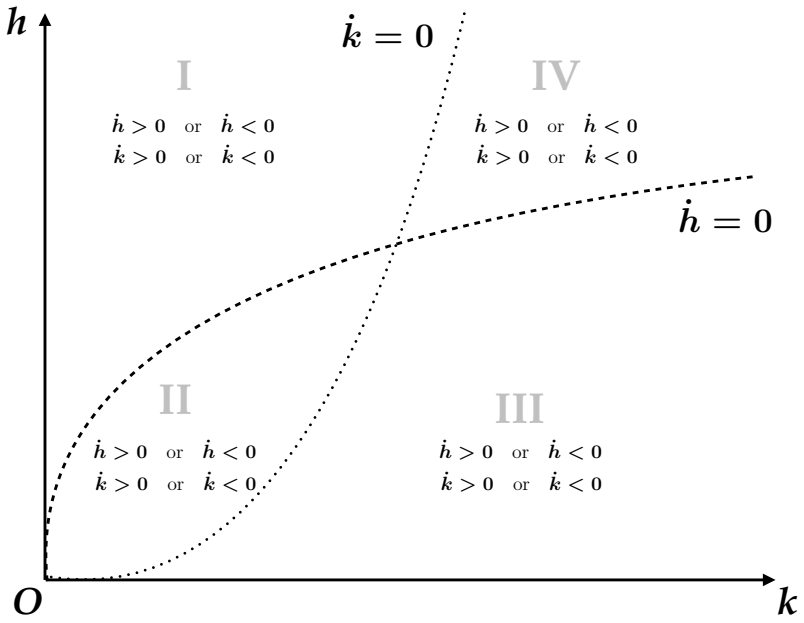

Figure 1: Determine the signs of $\dot{k}$ and $\dot{h}$

(3)

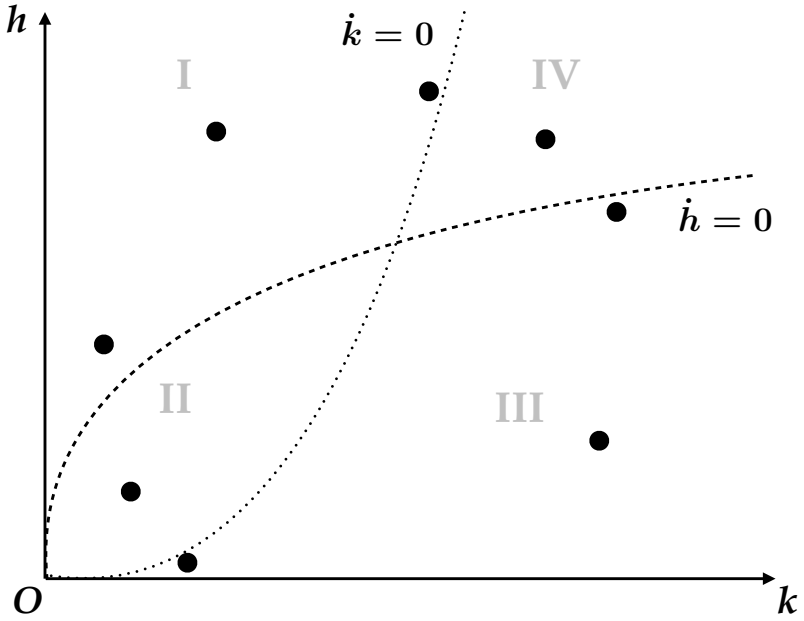

Figure 2: Draw trajectories from the dots