Long Run Macroeconomics

Prof. Giacomo Rondina

University of California, San Diego

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Lecture 8

(note: this lecture will be recorded)

Looking ahead to the Midterm

- April 25, 27: The Solow Model
- May 2: How firms make investment decisions
- May 4: Review ahead of Midterm
- **Monday May 8:**

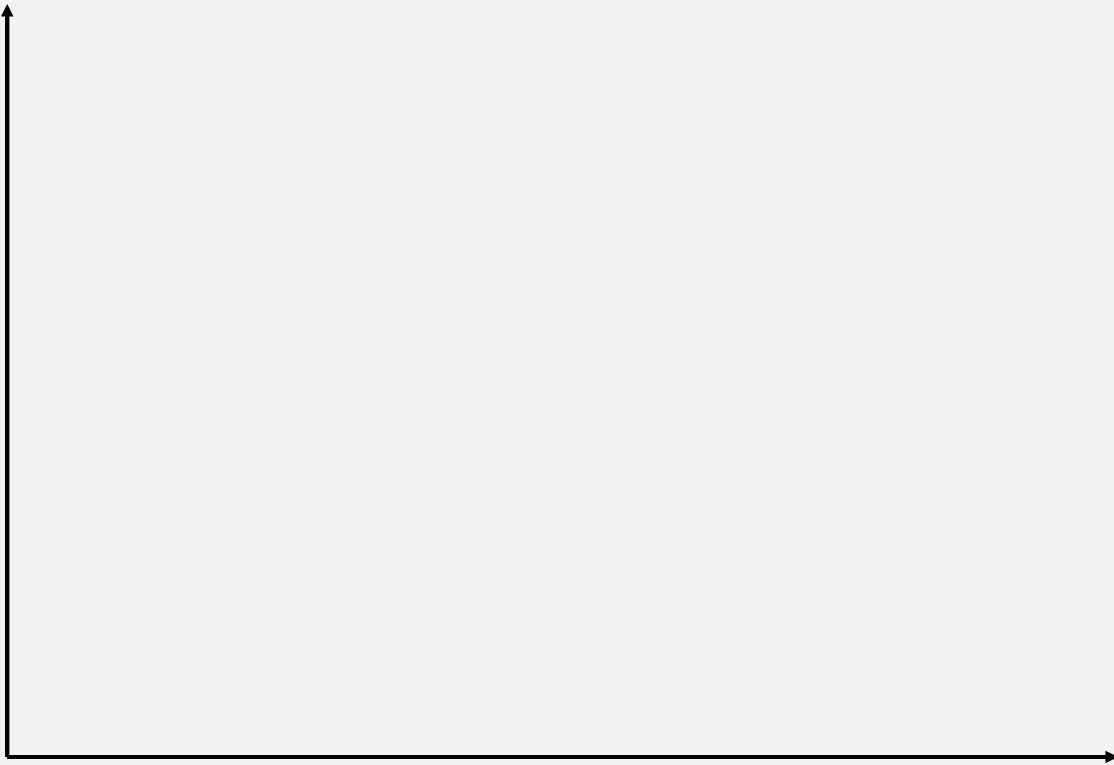 **Out-of-Class Midterm, 7 pm – 9 pm, Solis 107**

Econ 110A - Housekeeping

- Problem Set 3 is posted

- No live class today, please watch recordings of Lectures 8 and 9 from Spring 2022 (see Canvas announcement for details)
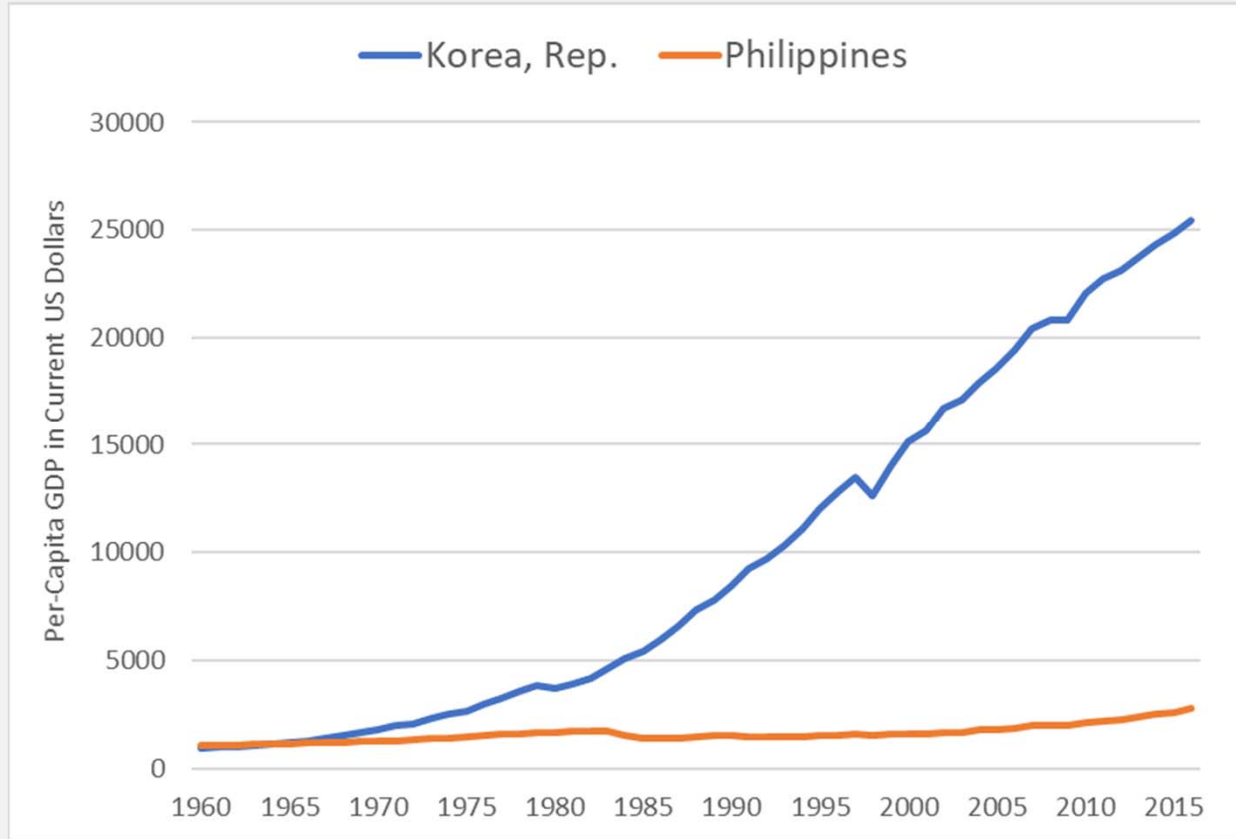
Plan for Lecture 8

- The Solow Model
  - The Solow Diagram (cont'd)
  - Recap
  - The Steady State
  - A first look at data
  - Experiment 1 and 2

Solow Diagram: Output, Consumption

Two Pictures from 1960

The Solow Model: quick recap

The Force in the Solow Model

Long Run: Steady State Capital

Long Run: Steady State Output
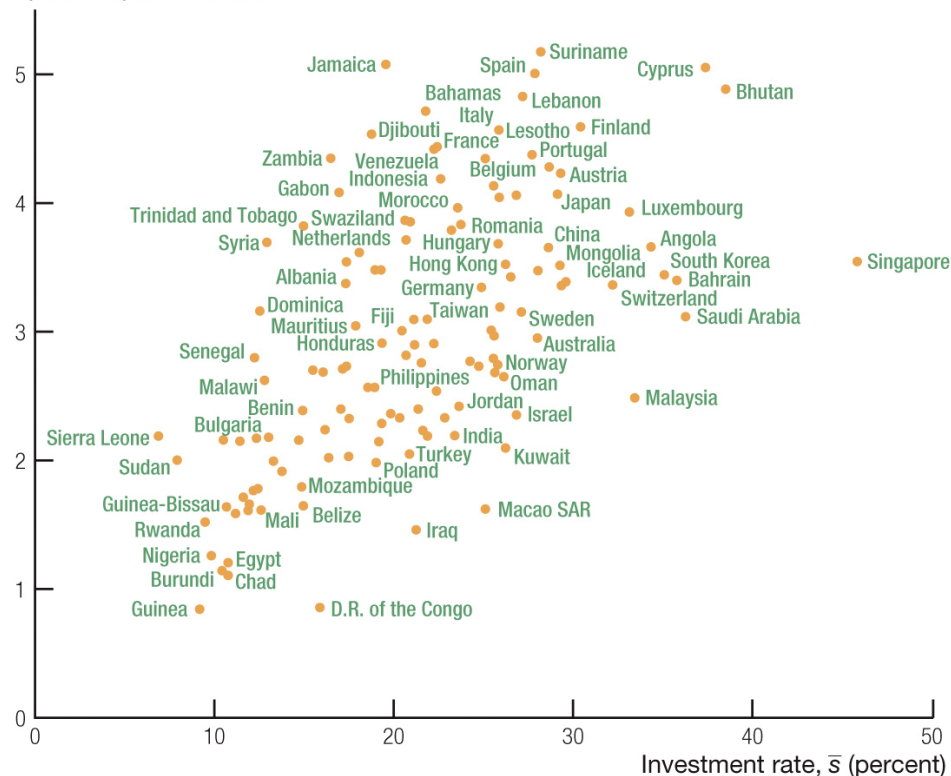
Aside: The Real Interest Rate

Amount of output a person can earn by saving one unit of output for a year, or amount of output a person must pay to borrow one unit of output for a year.

A first look at data using the Solow model

Capital/Output Ratio and the Investment Rate

Explaining Capital in the Solow Model

Is the Solow model successful in predicting the relationship between capital/output ratio (K/Y) and the investment (saving) rate $\bar{s}$ we see in the data?

TFP: Solow vs. Production Model

What is the role of TFP in Solow compared to the production model?

Production model:
$$\underbrace{\frac{y^*_{\text{rich}}}{y^*_{\text{poor}}}}_{70} = \underbrace{\frac{\overline{A}_{\text{rich}}}{\overline{A}_{\text{poor}}}}_{14} \cdot \underbrace{\left(\frac{\overline{k}_{\text{rich}}}{\overline{k}_{\text{poor}}}\right)^{1/3}}_{5}$$

$$70 \quad = \quad 14 \quad \times \quad 5$$

Solow model:

# The Solow Model: Taking Stock

1. Is there sustained growth in the Solow model?

2. What is the main force that brings the economy to a steady state?

3. Does population size matter for living standards in the Solow model?
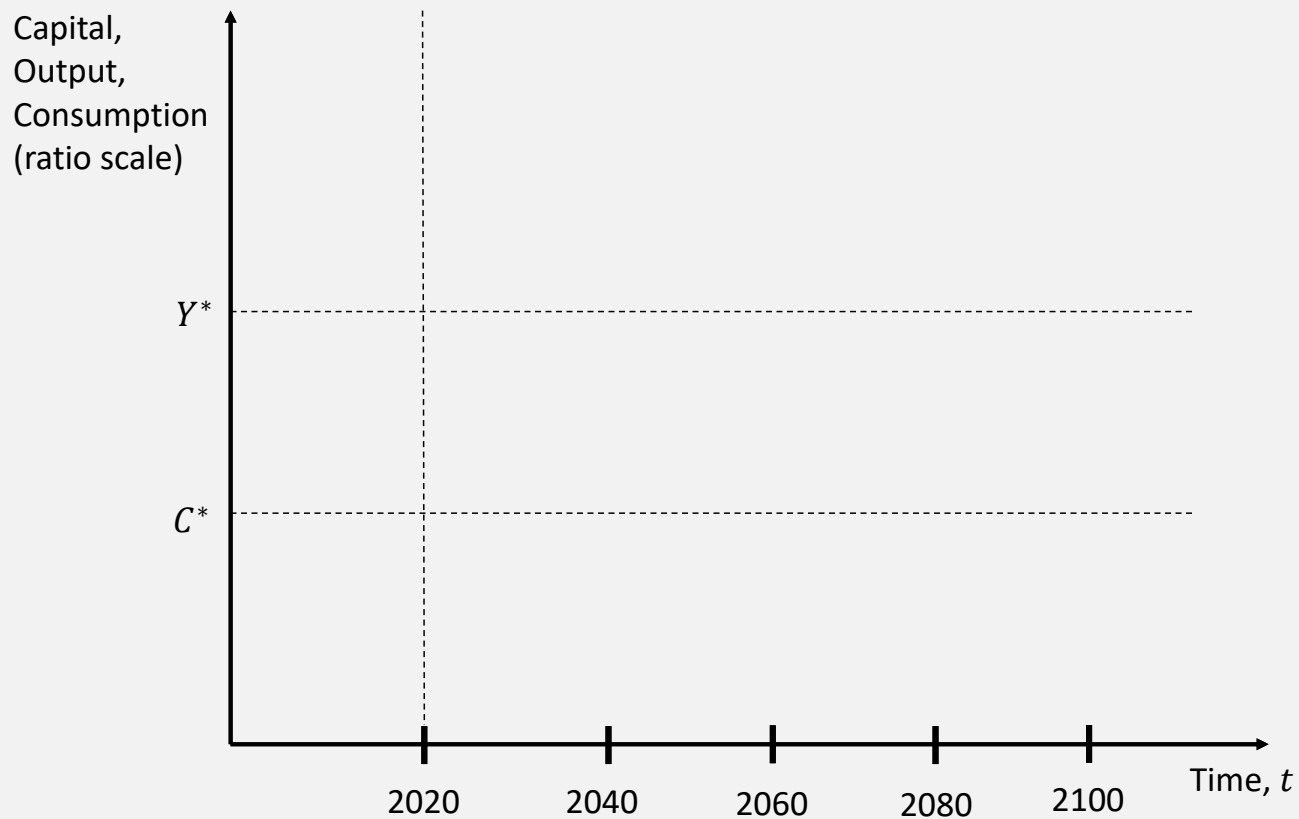
Experiments with the Solow Model

Experiment 1

Suppose the economy is in the steady state of the Solow model. Unexpectedly, there is a permanent increase in the **Investment rate $\bar{s}$.** What happens to capital, output and consumption according to the model?

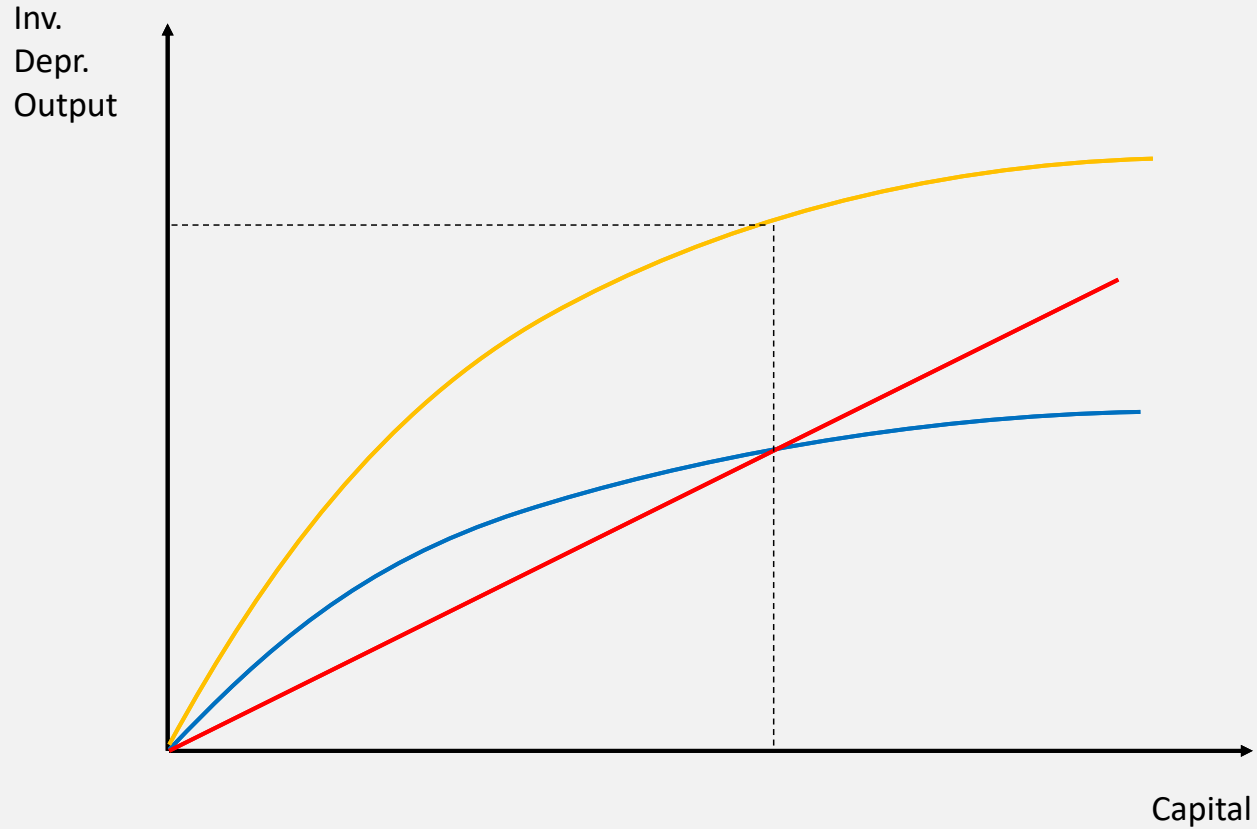Experiment 1: Increase in the **Investment rate** $\overline{s}$
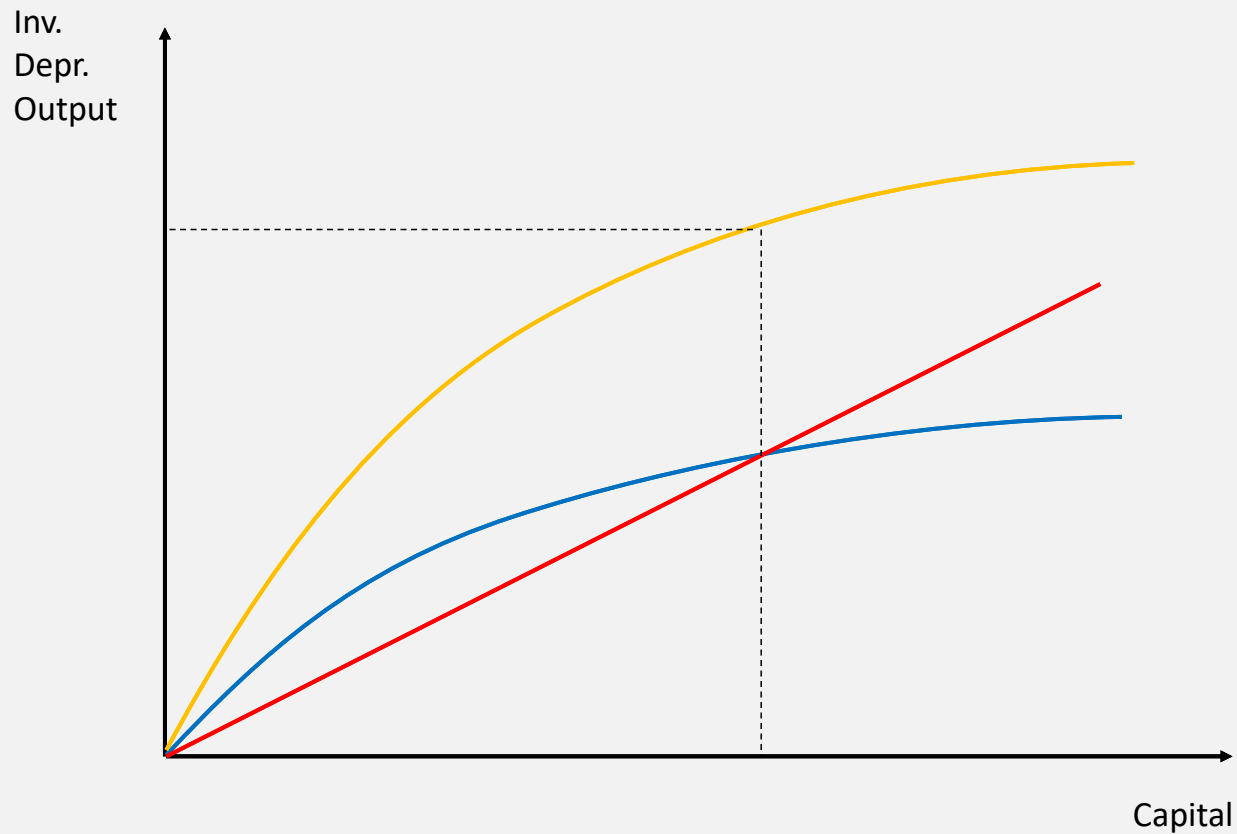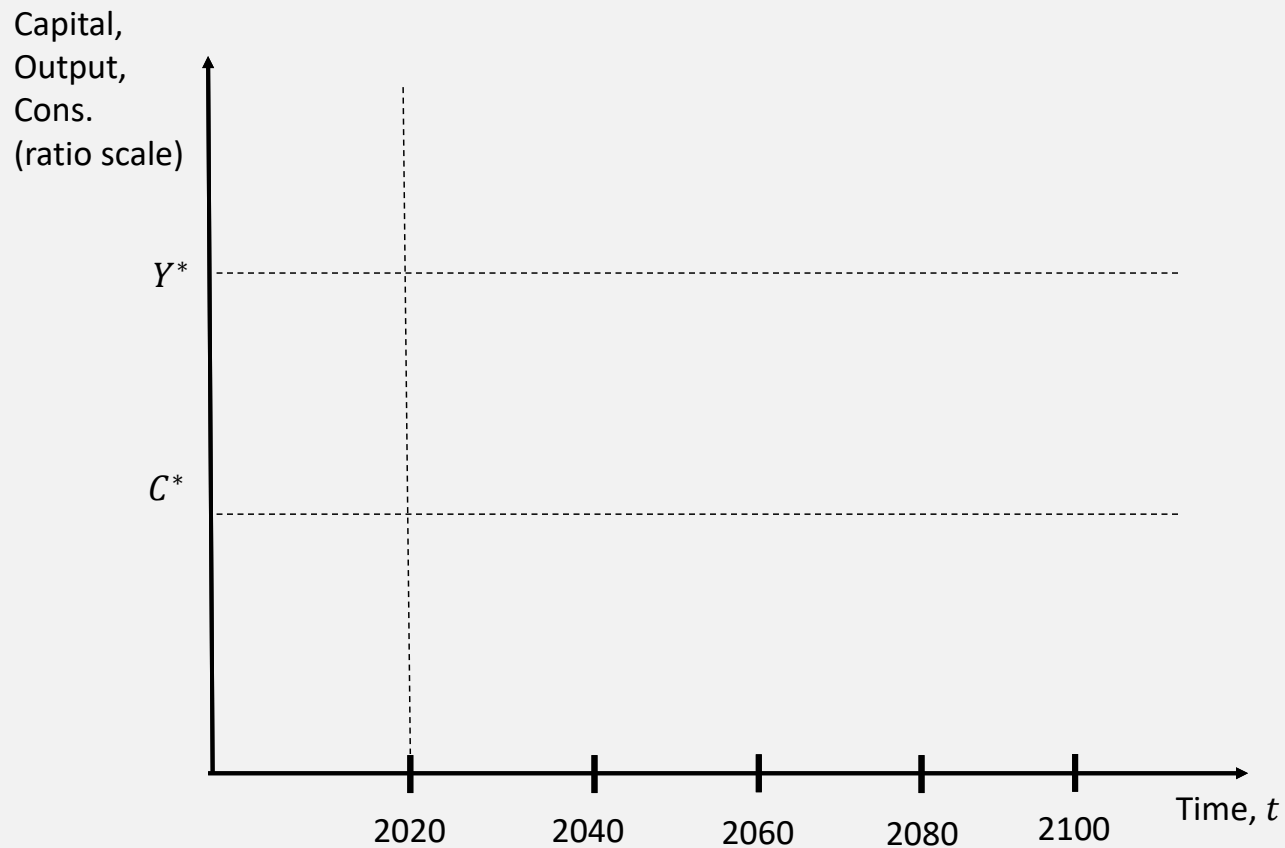
Experiment 1: Impulse Response

Experiment 2

Suppose the economy is in the steady state of the Solow model. Unexpectedly, there is a permanent increase in the **Depreciation Rate $\bar{d}$.** What happens to capital, output and consumption according to the model?

Experiment 2: Increase in the **Depreciation Rate** $\overline{d}$

Experiment 2: Impulse Response

Experiment 3

Experiment 3: Suppose the economy is in the steady state of the Solow model. Unexpectedly, there is a permanent increase in **Population, $\bar{L}$.** What happens to capital, output and consumption according to the model?

Experiment 3: Increase in **Population,** $\bar{L}$