

LECTURE I

Harvard Economics 1011B
Professor Gabriel Chodorow-Reich
Spring 2020

OUTLINE

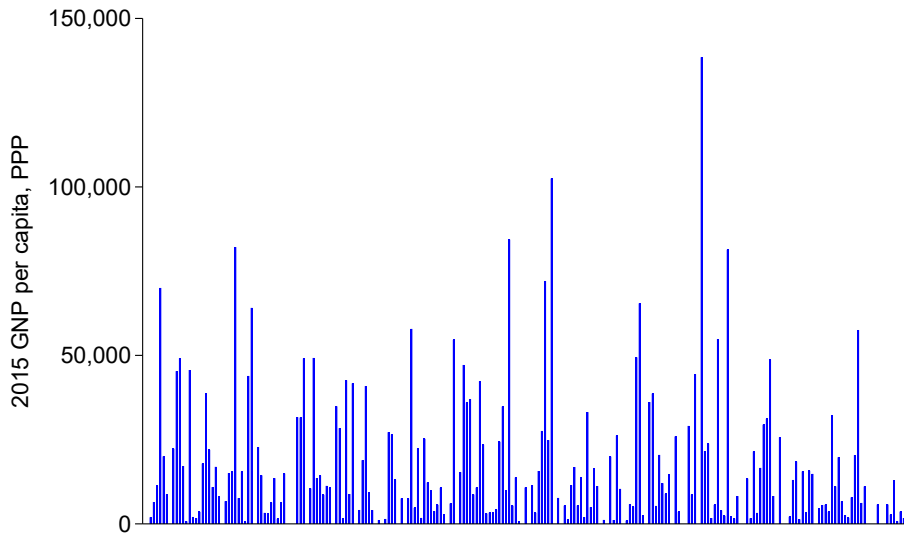
- 1 BIG QUESTIONS IN MACROECONOMICS
- 2 HOW MACROECONOMISTS APPROACH THESE QUESTIONS

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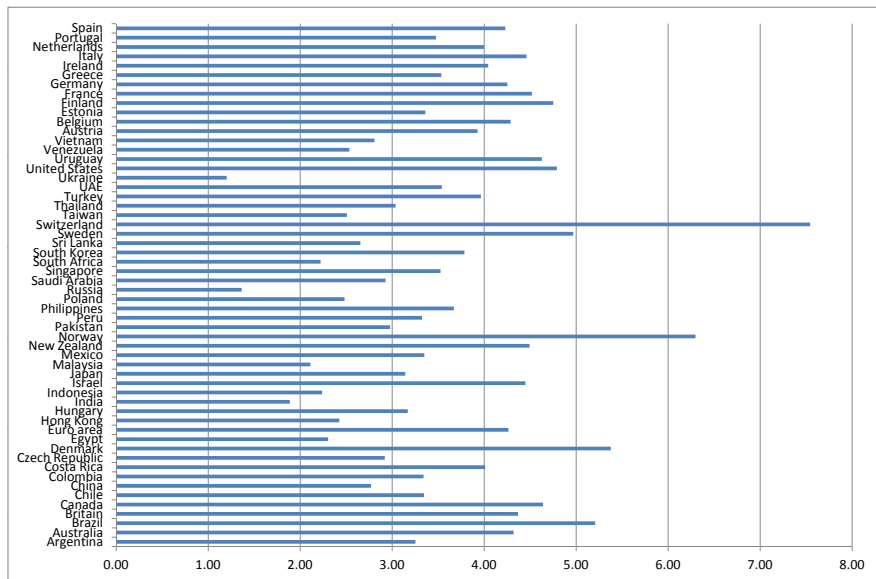
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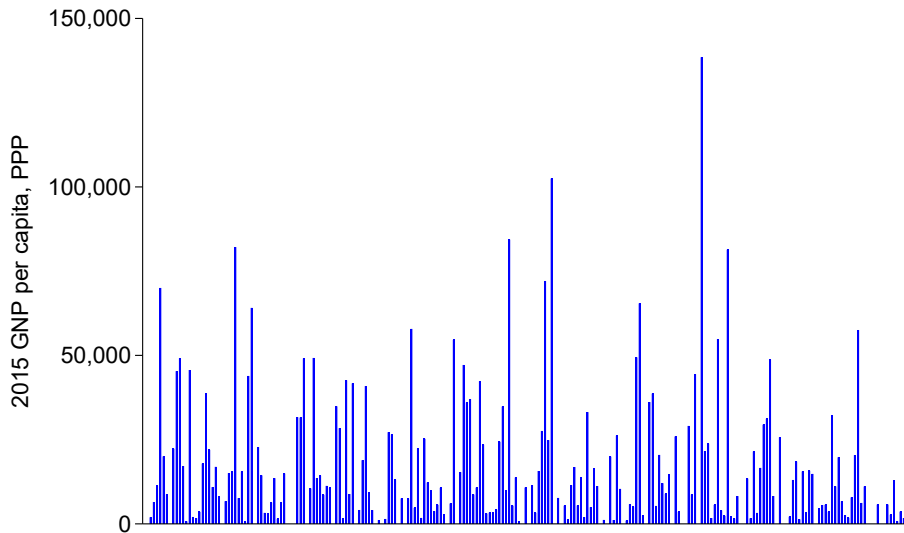
WHY ARE SOME COUNTRIES RICHER THAN OTHERS?



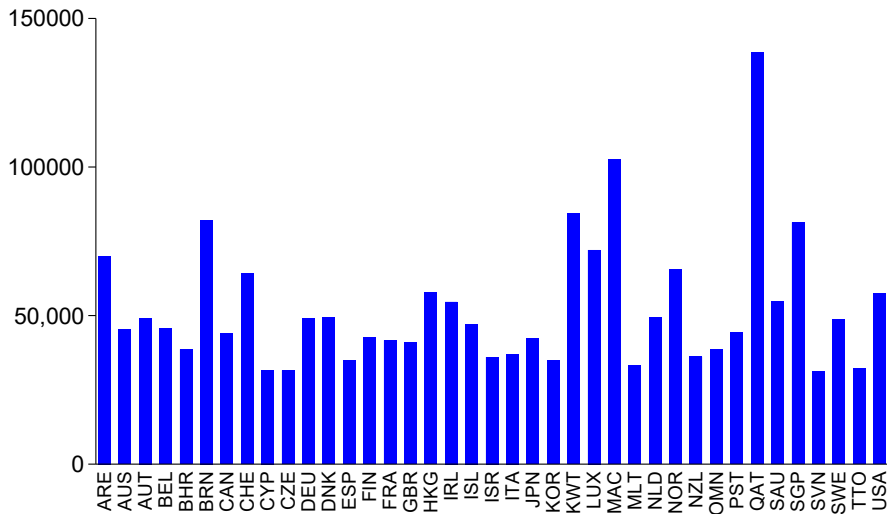
PPP AND BIG MAC INDEX



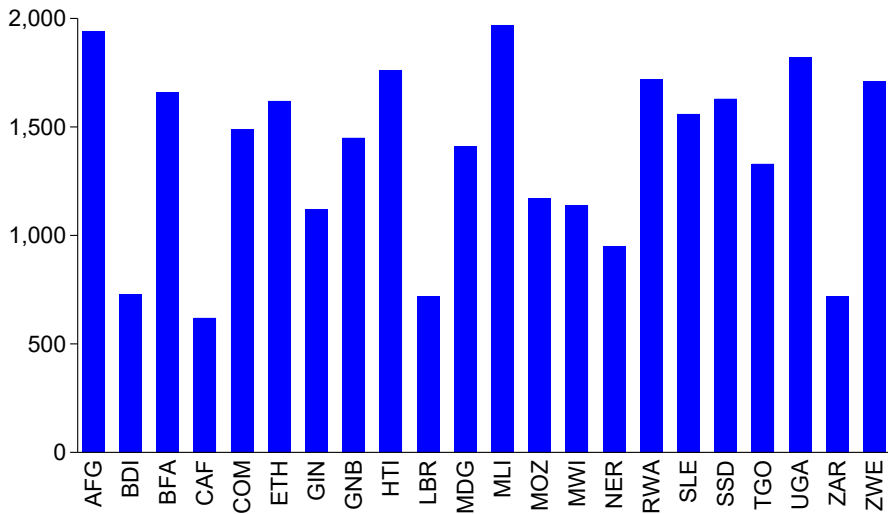
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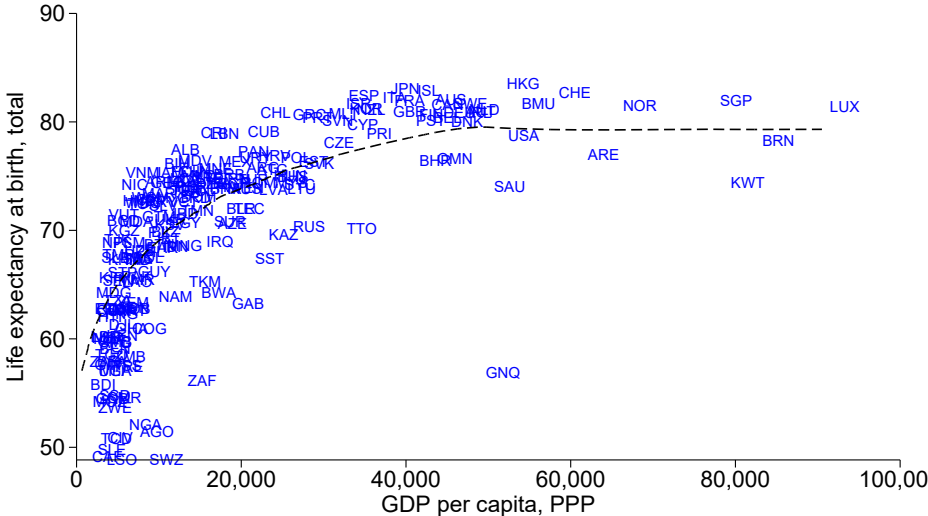
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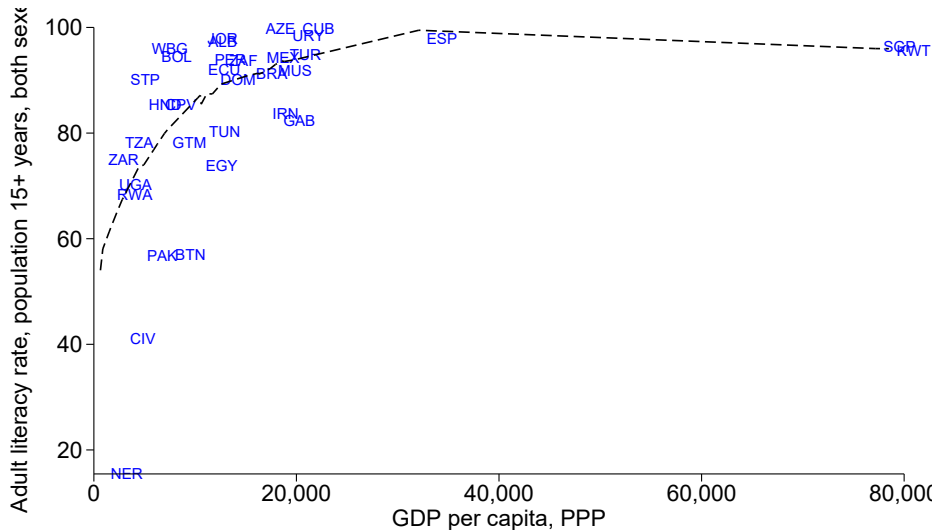
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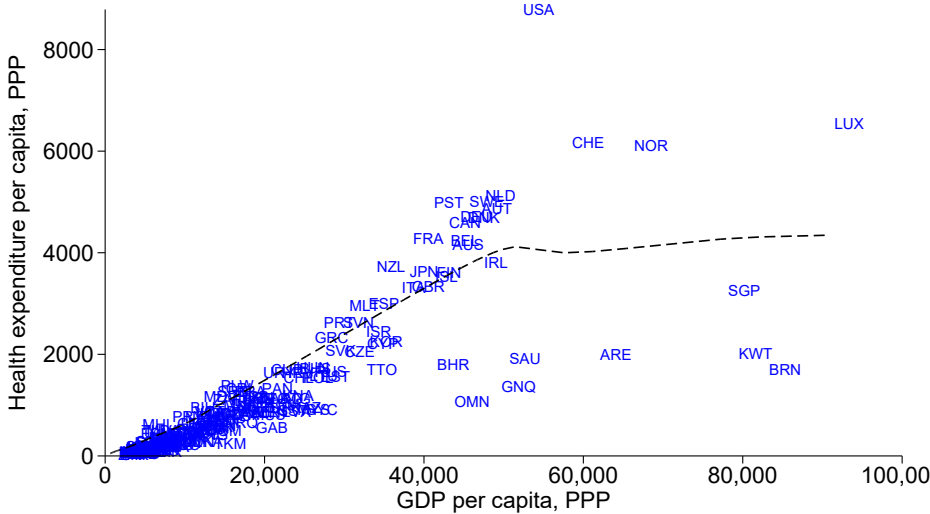
WHY WE CARE ABOUT GDP



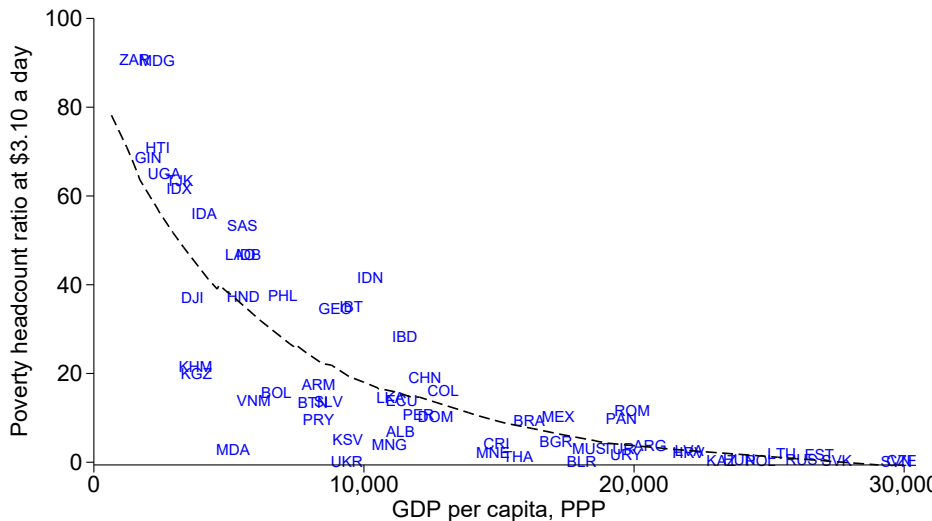
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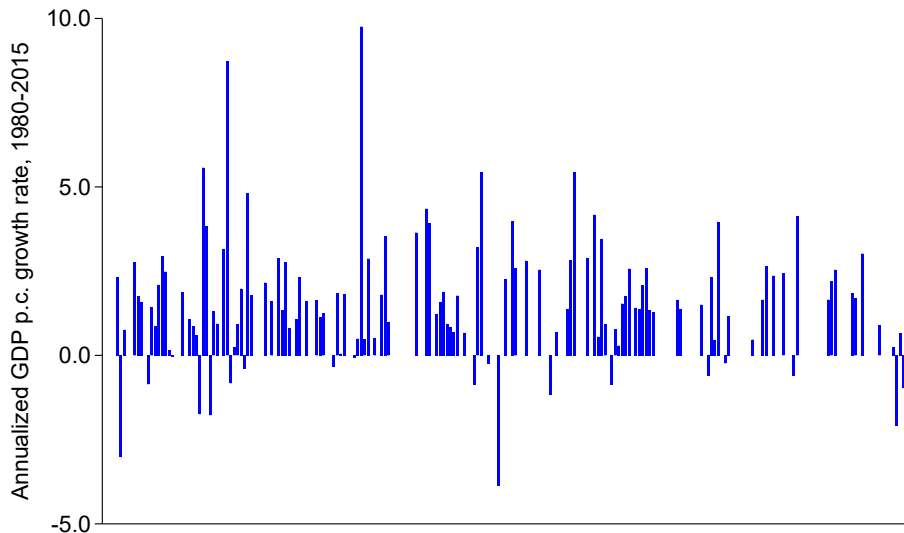
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WHY DO SOME COUNTRIES GROW MORE THAN OTHERS?



LOGS AND GROWTH RATES

- Often examining the log of a series is more useful than the level.
- Define the growth rate g_t :

$$g_t = \frac{x_t}{x_{t-1}} - 1.$$

- Then:

$$\ln x_t - \ln x_{t-1} = \ln(1 + g_t).$$

- First order Taylor expansion of $\ln(1 + g_t)$ around $g = 0$:

$$\ln(1 + g_t) \approx \ln(1 + g) + \frac{1}{1 + g}(g_t - g) = g_t.$$

- Combining two previous equations:

$$\ln x_t - \ln x_{t-1} \approx g_t.$$

- Small growth rates are well-approximated by the log change.
- If a series exhibits a constant growth rate, the log of the series will look linear when plotted against time.

RULE OF 70 (OR 69.3)

- “Doubling time” is useful metric for comparing growth rates.
- Suppose per capita GDP grows at rate g every year. How long does it take for per capita GDP to double?

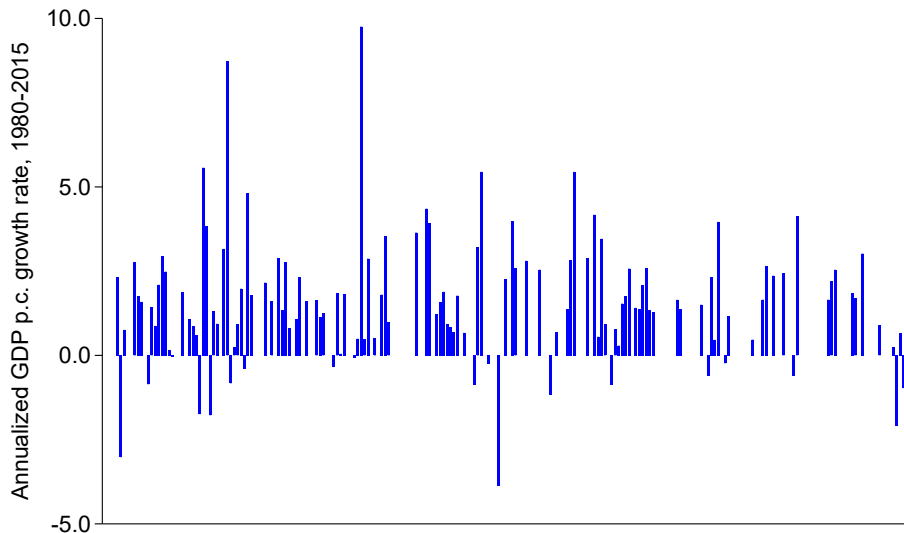
$$(1 + g)^T = 2 \Rightarrow T \ln(1 + g) = \ln(2) \Rightarrow T = \frac{\ln(2)}{\ln(1 + g)}.$$

- $\ln(2) = 0.693$.
- Using Taylor expansion from previous slide, $\ln(1 + g) \approx g \Rightarrow$

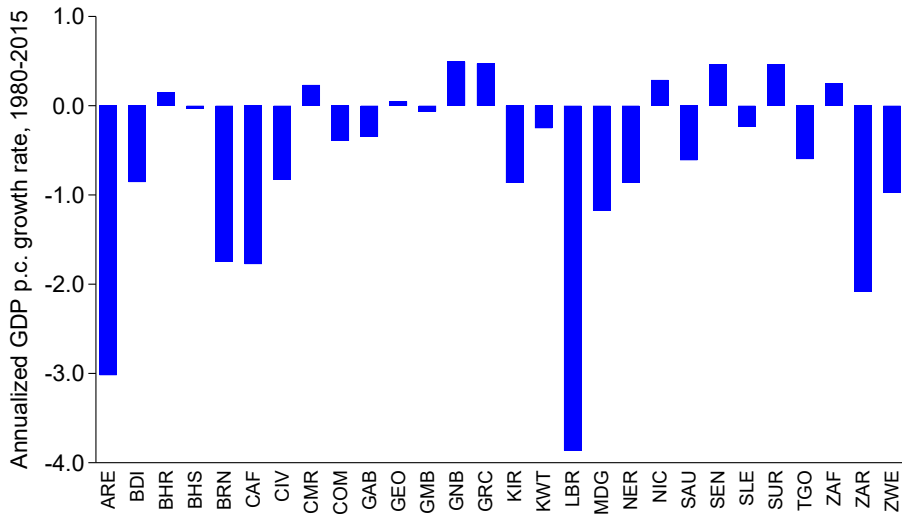
$$T = \frac{\ln(2)}{\ln(1 + g)} \approx \frac{0.693}{g}.$$

- When g is expressed as a percent, doubling time T is roughly $70/g$.

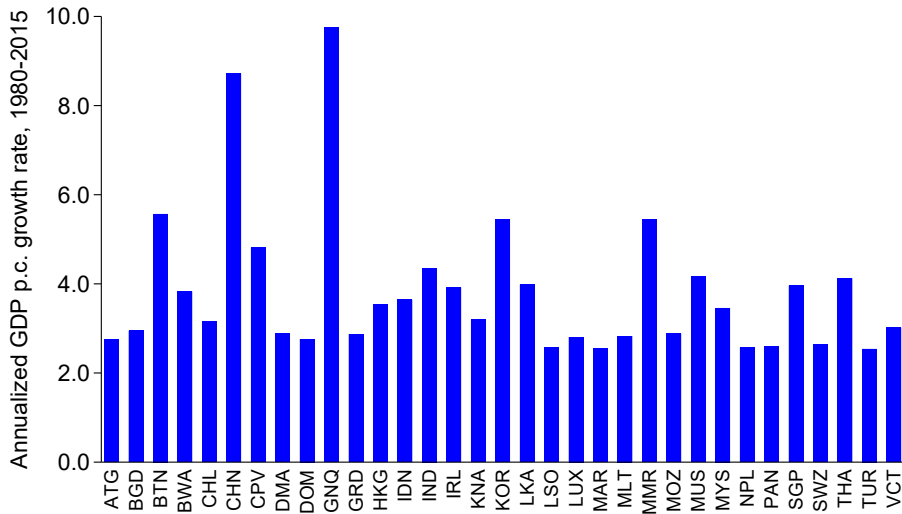
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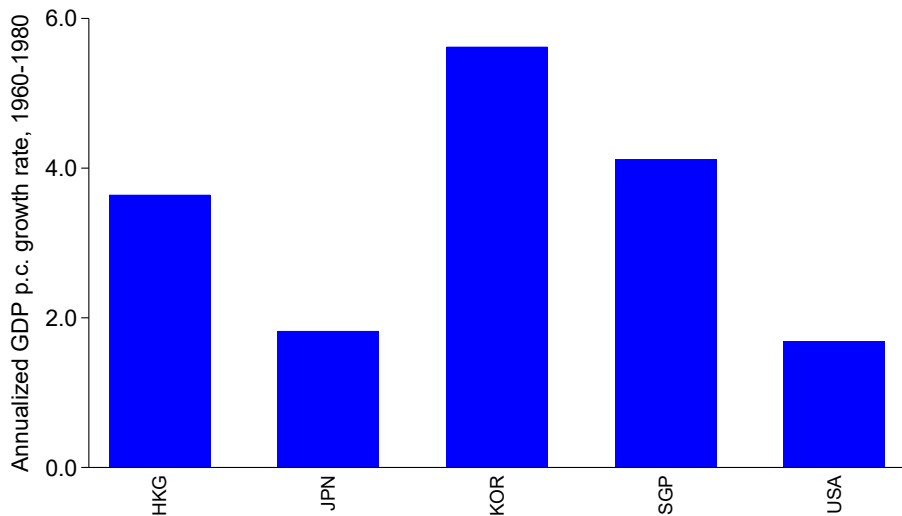
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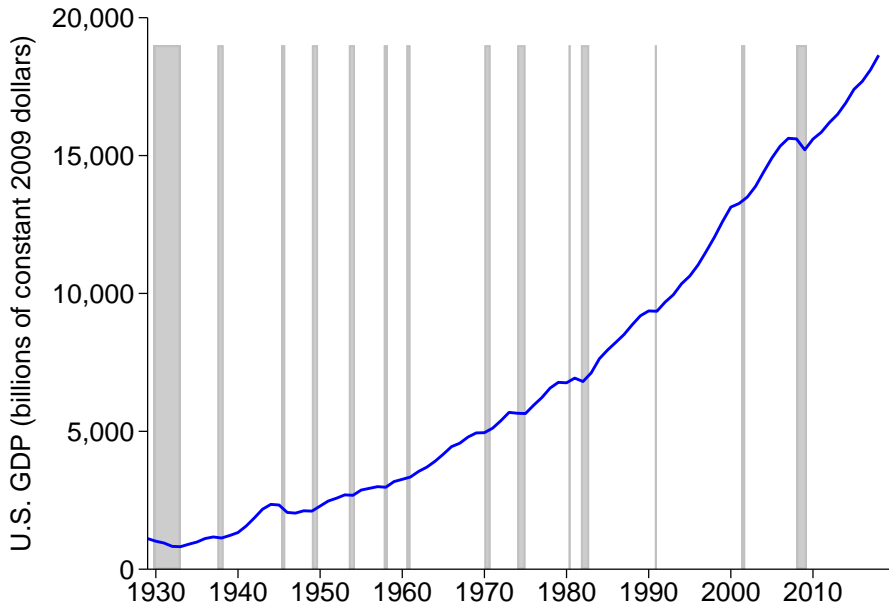
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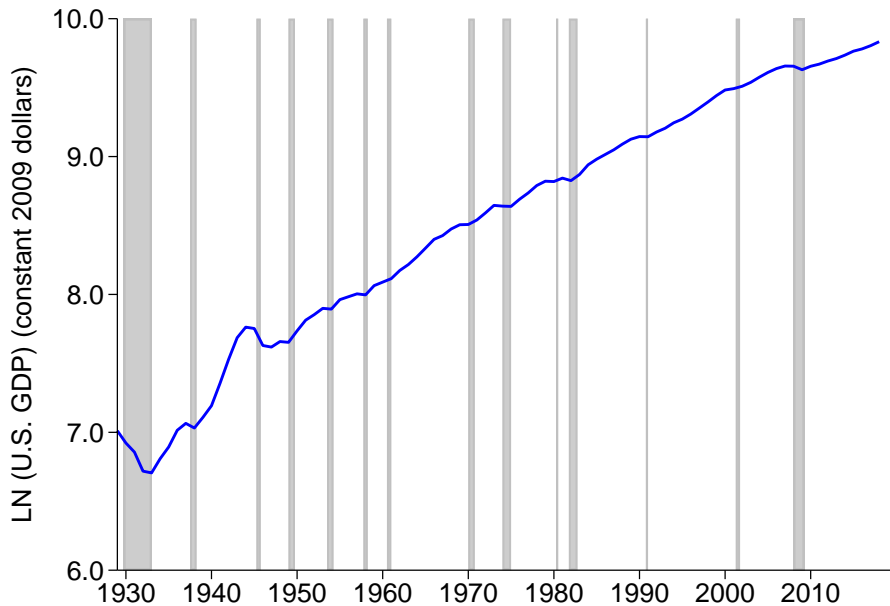
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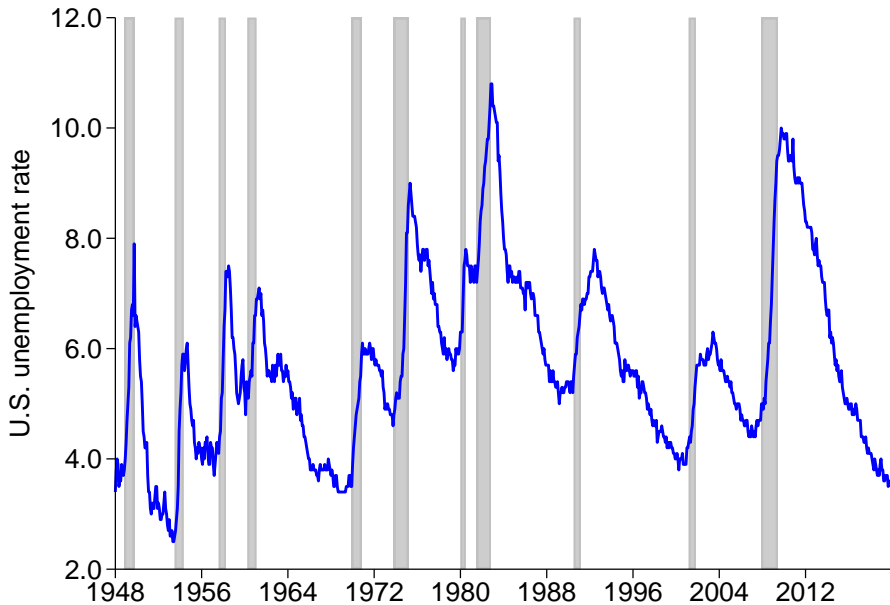
WHAT DETERMINES U.S. GROWTH?



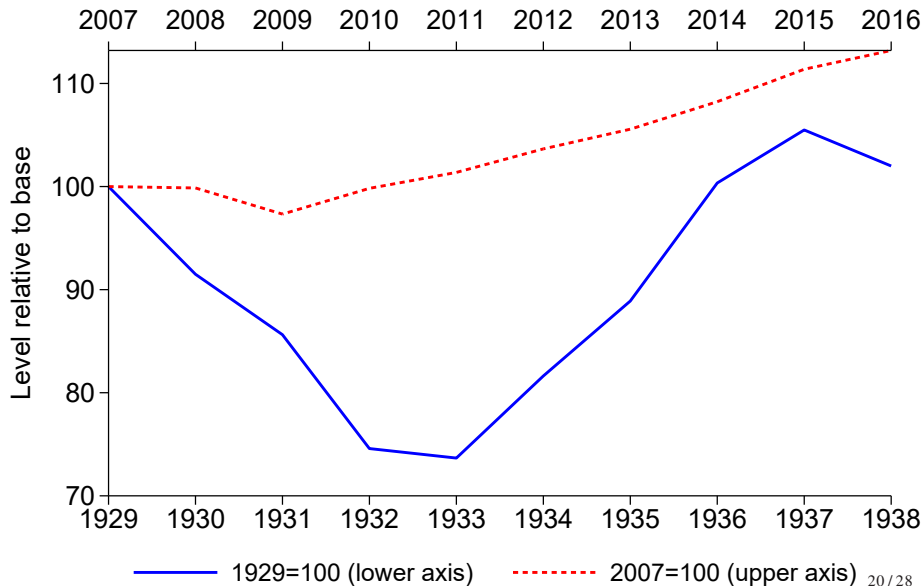
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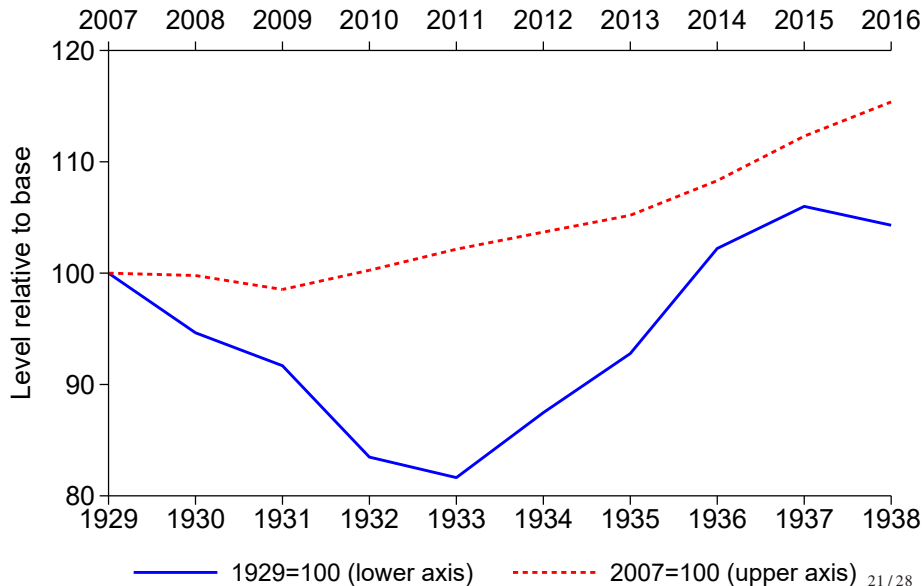
WHAT CAUSES BUSINESS CYCLES?



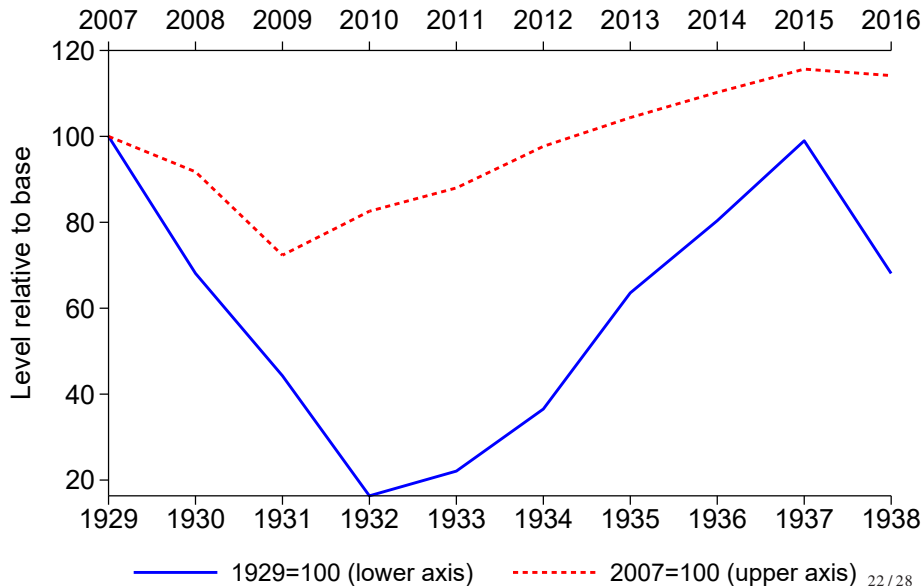
REAL GROSS DOMESTIC PRODUCT



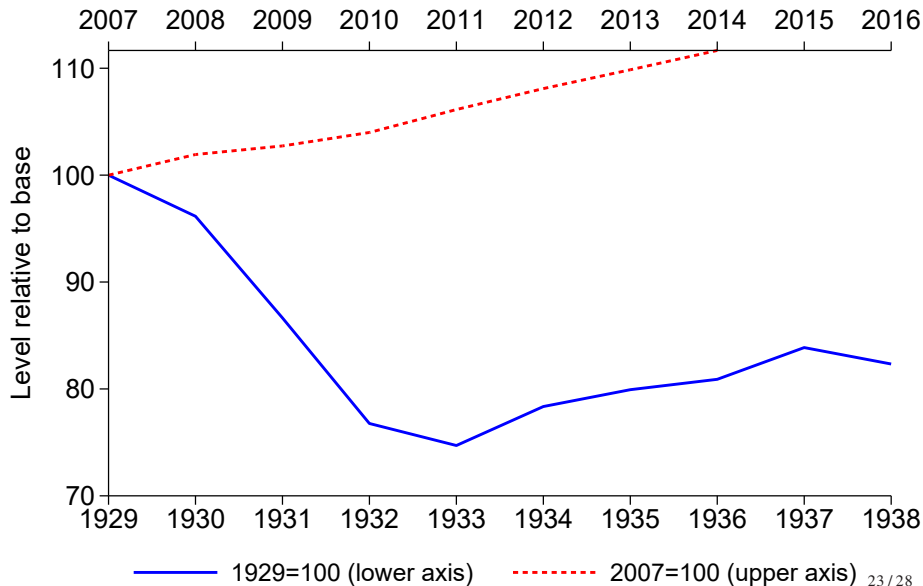
REAL PERSONAL CONSUMPTION EXPENDITURES



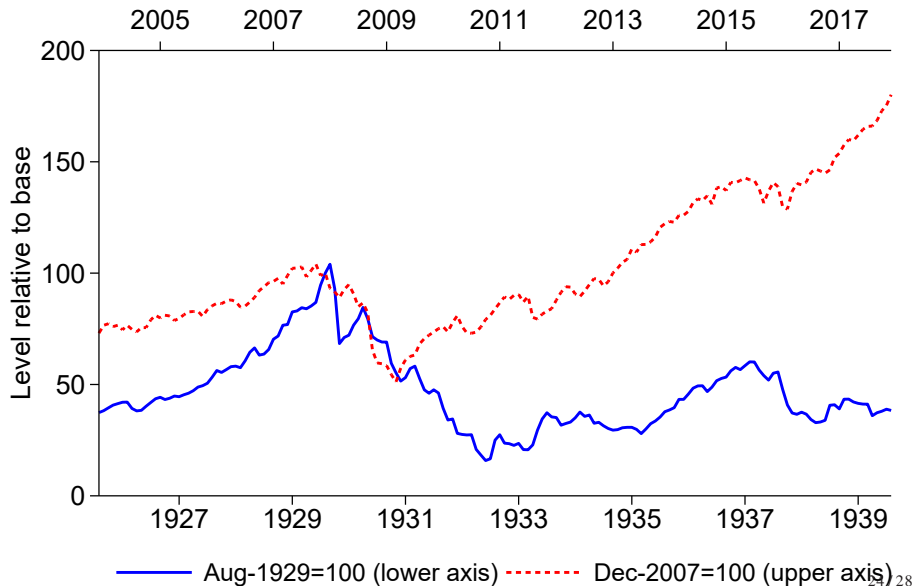
REAL GROSS PRIVATE DOMESTIC INVESTMENT



GROSS DOMESTIC PRODUCT PRICE INDEX



S&P 500



BIG QUESTIONS IN MACROECONOMICS

- ➊ Why are some countries richer than others?
- ➋ Why do some countries grow faster than others?
- ➌ What causes business cycles?
- ➍ What causes severe downturns?
- ➎ How can government policy affect these outcomes?

OUTLINE

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THEORY: WHY STUDY MODELS?

- 1 Real life is complicated.
- 2 Models simplify reality and highlight intuition.
- 3 Mathematical models serve as logical checks.

EMPIRICS

- Determining causality in empirical macroeconomics is difficult.
 - ▶ Our samples are small compared to microeconomists.
 - ▶ Countries differ for many reasons.
 - ▶ We can't do randomized control trials on countries.
- Macroeconomists look for natural experiments. We will study some of these.