Session 10: Booms, Busts, and the IS curve

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Short Run Macro

In the second half of the course we are going to focus on short run macro:

- Booms and Recessions
- Inflation and expectations
- Monetary and fiscal policy
- Financial crises
- Exchange rates and international finance

Outline for today's class: Booms, Busts, and the IS Curve

- The Short Run and the Long Run
- Short-Run Output
- Okun's Law
- How costly are recessions?
- Deriving the IS curve, the first building block of the SR Model
- Using the IS curve — many examples
- How effective is a fiscal stimulus?

The Long Run and the Short Run

- Long-Run model: Potential Output, Long-Run Inflation
- Short-Run model: Current Output, Inflation

The Short-Run is the length of time over which these deviations occur – e.g. two to four years

Trends and Fluctuations

$$\underbrace{\text{Current Output}}_{Y_t} = \underbrace{\text{Long Run Trend}}_{\bar{Y}_t} + \underbrace{\text{Short Run Fluctuations}}_{\tilde{Y}_t \text{ (as percent of } \bar{Y}_t)}$$

Define short run output $\tilde{Y}_t$:

$$\tilde{Y}_t = \frac{Y_t - \bar{Y}_t}{\bar{Y}_t}$$

What is the interpretation of $\tilde{Y}_t$?

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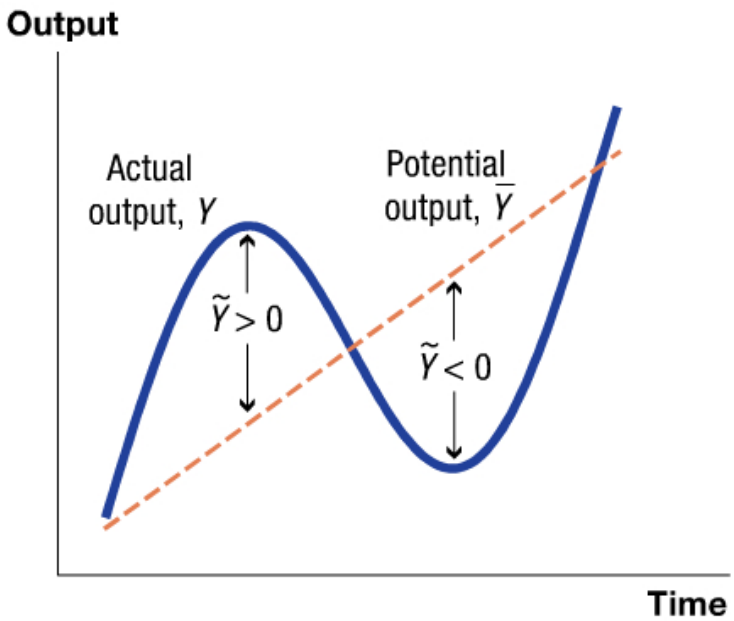
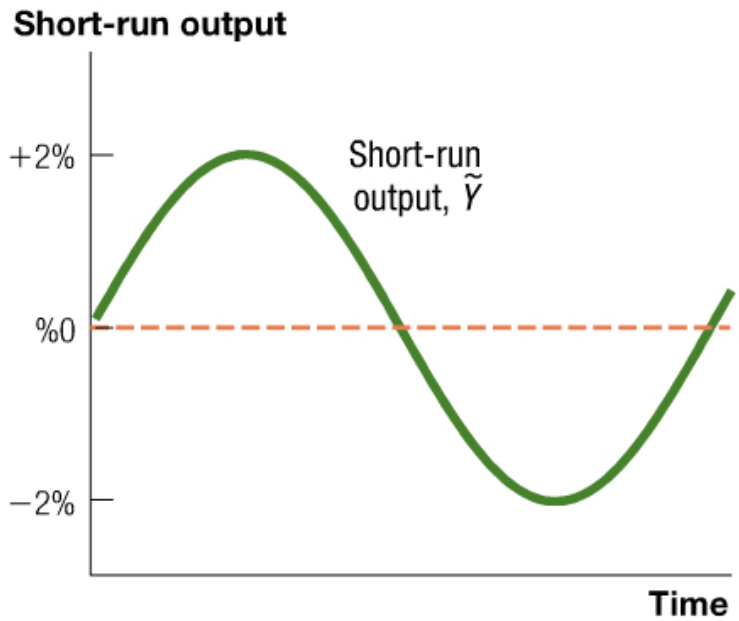
What is the interpretation of $\tilde{Y}_t$?

$\tilde{Y}_t$ is the percentage deviation from long run trend...

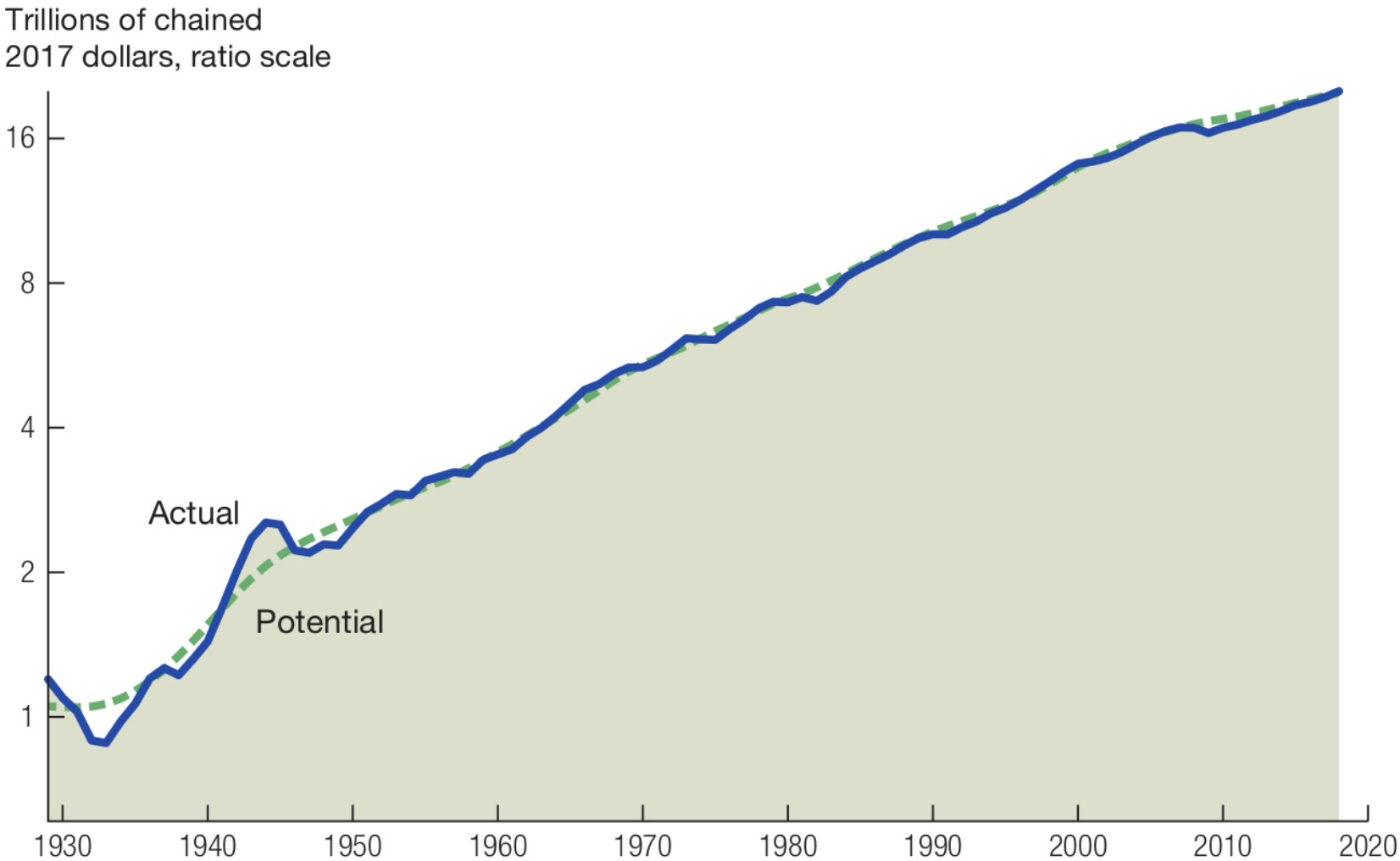
Economic Fluctuations and Short-Run Output



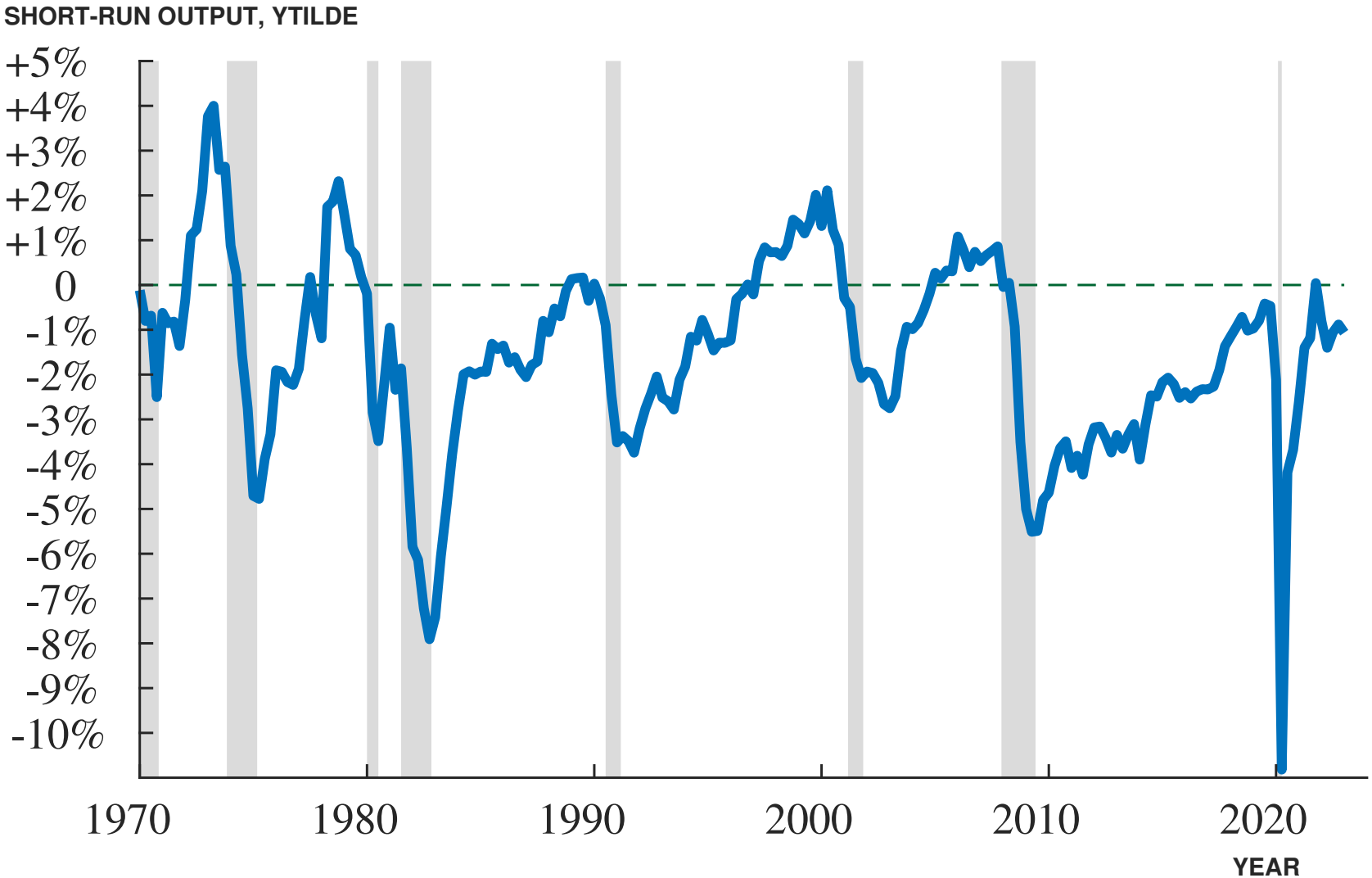


- What is a recession?
- How can output be above potential?

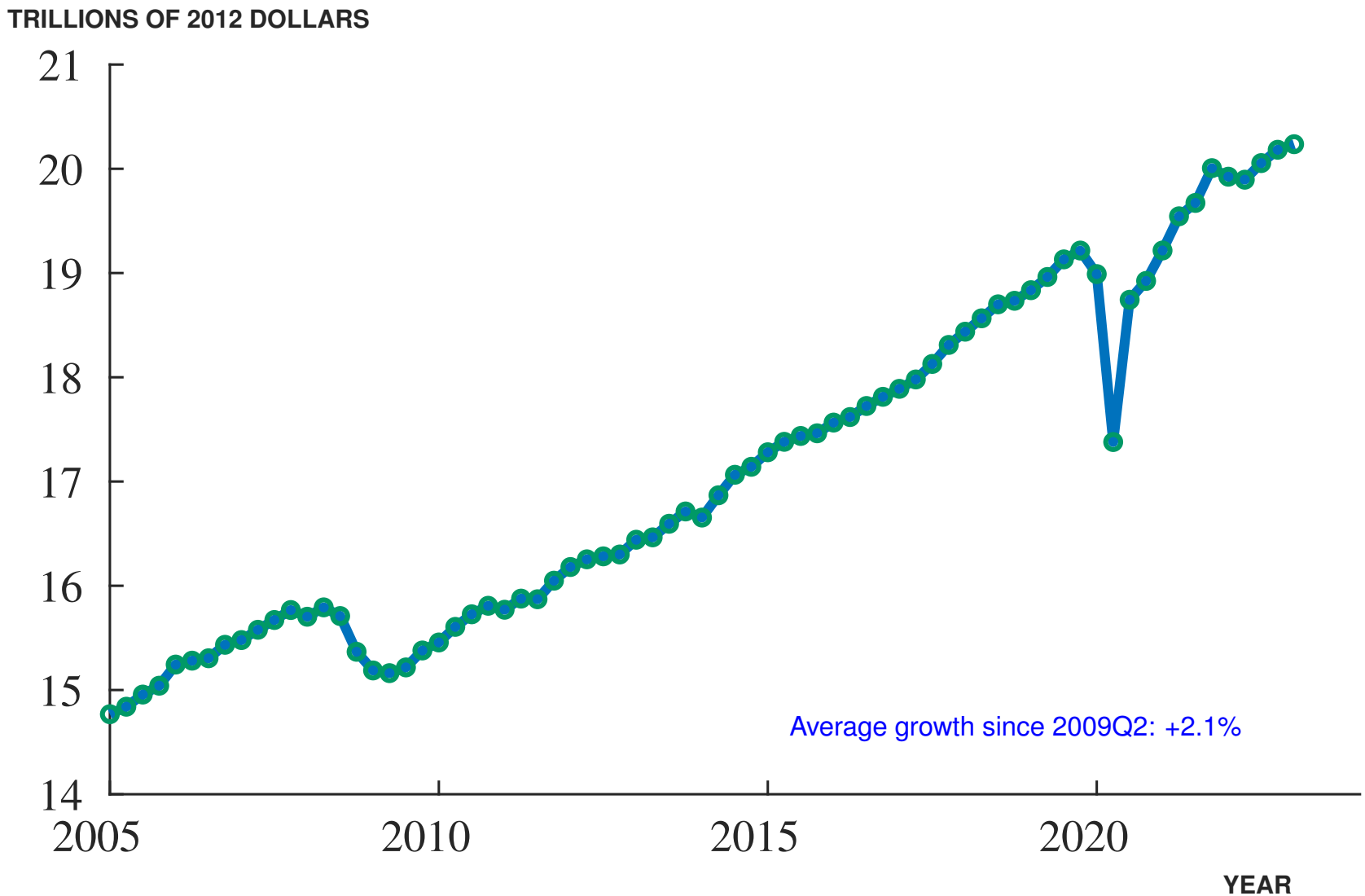
Actual and Potential Real GDP in the U.S.



U.S. Economic Fluctuations



U.S. Real GDP in Recent Years



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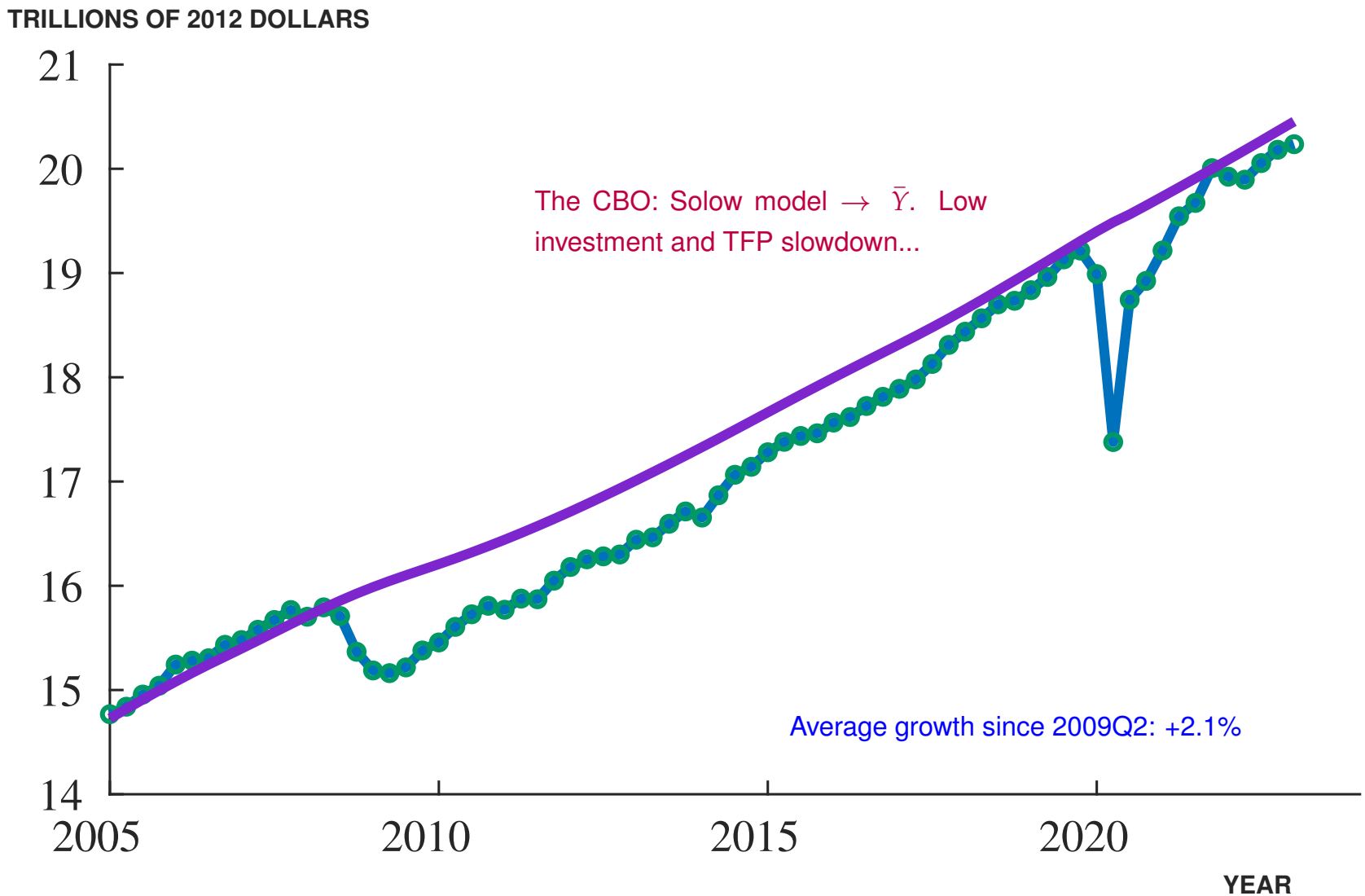
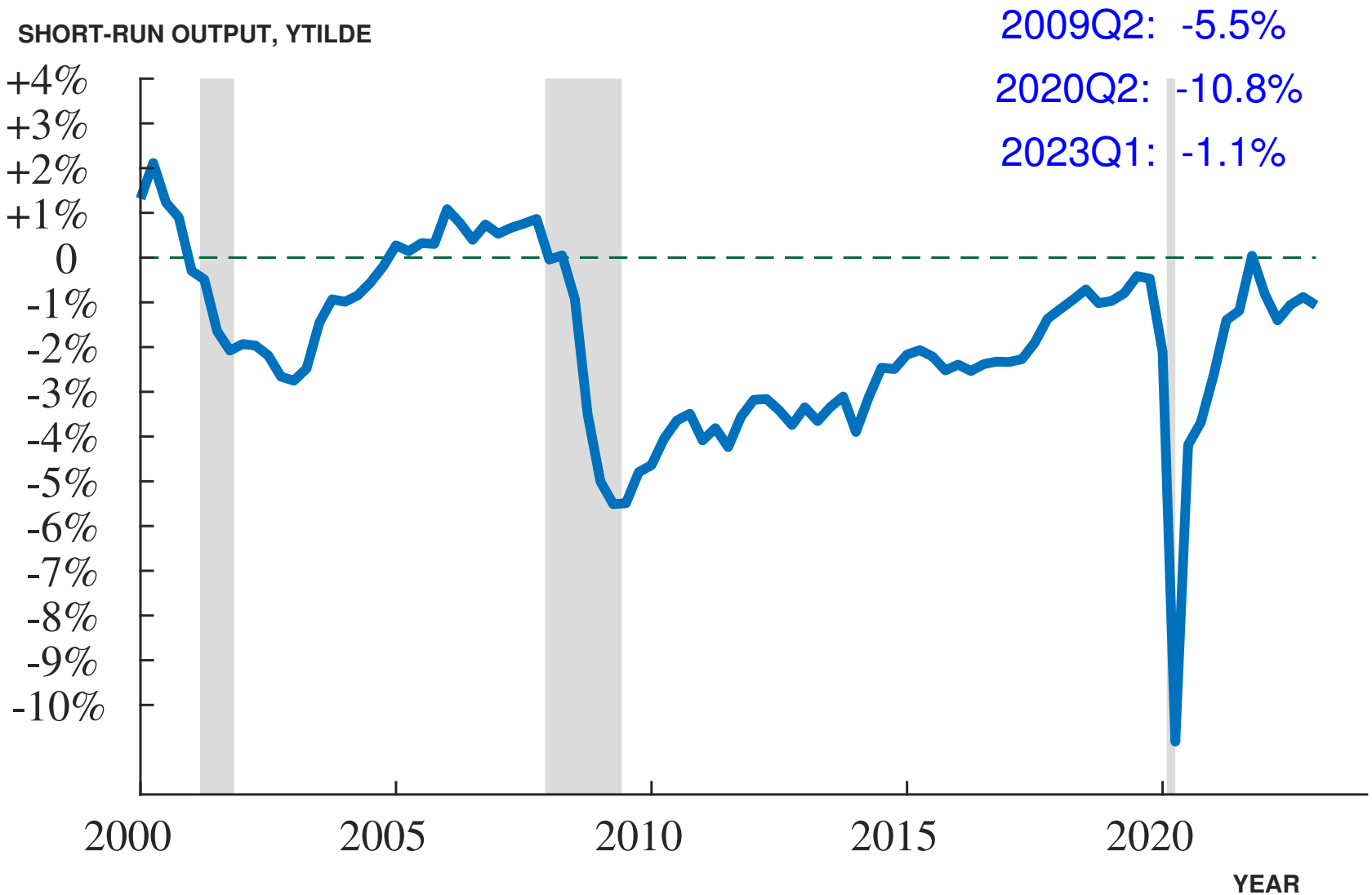
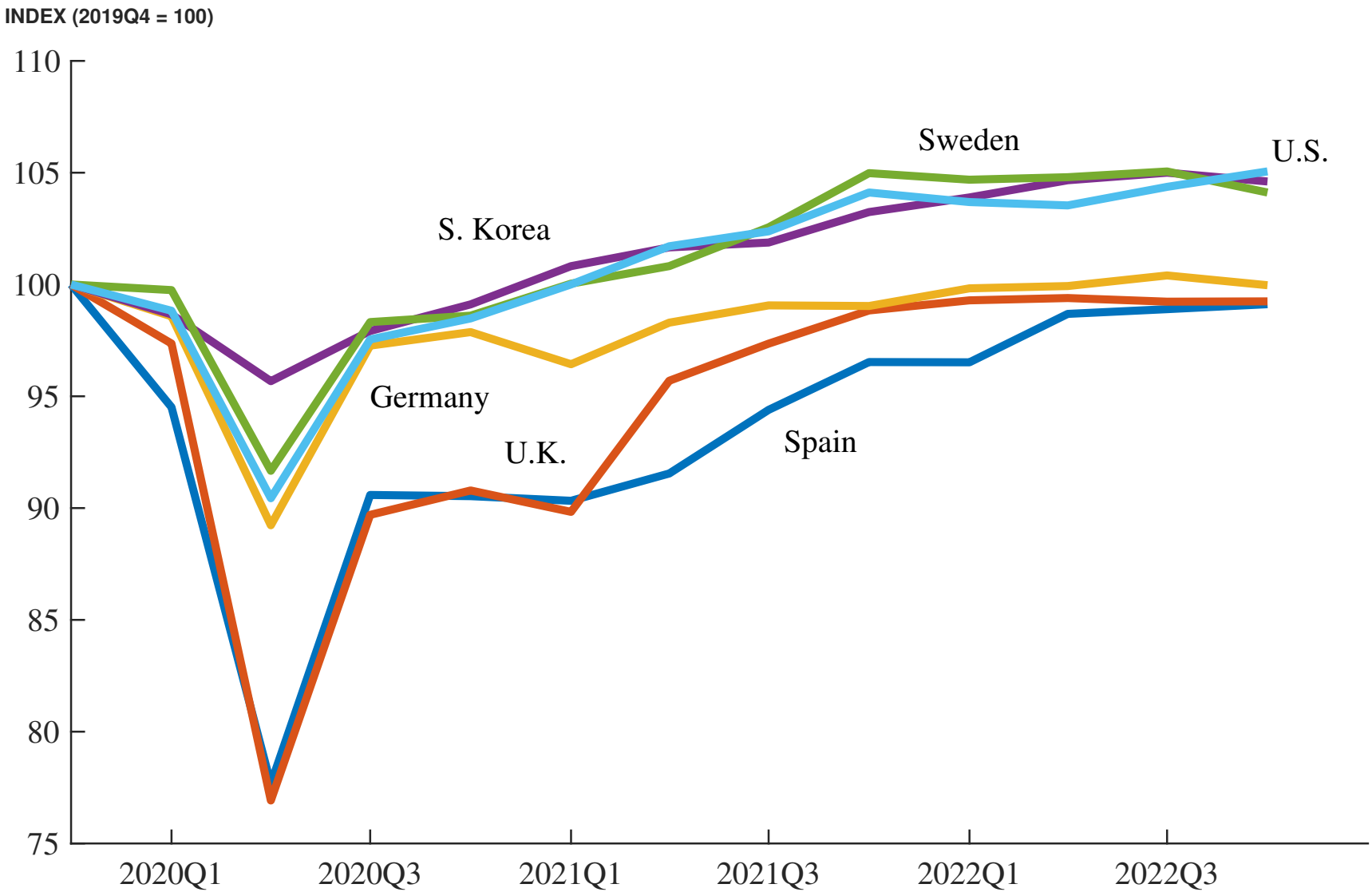


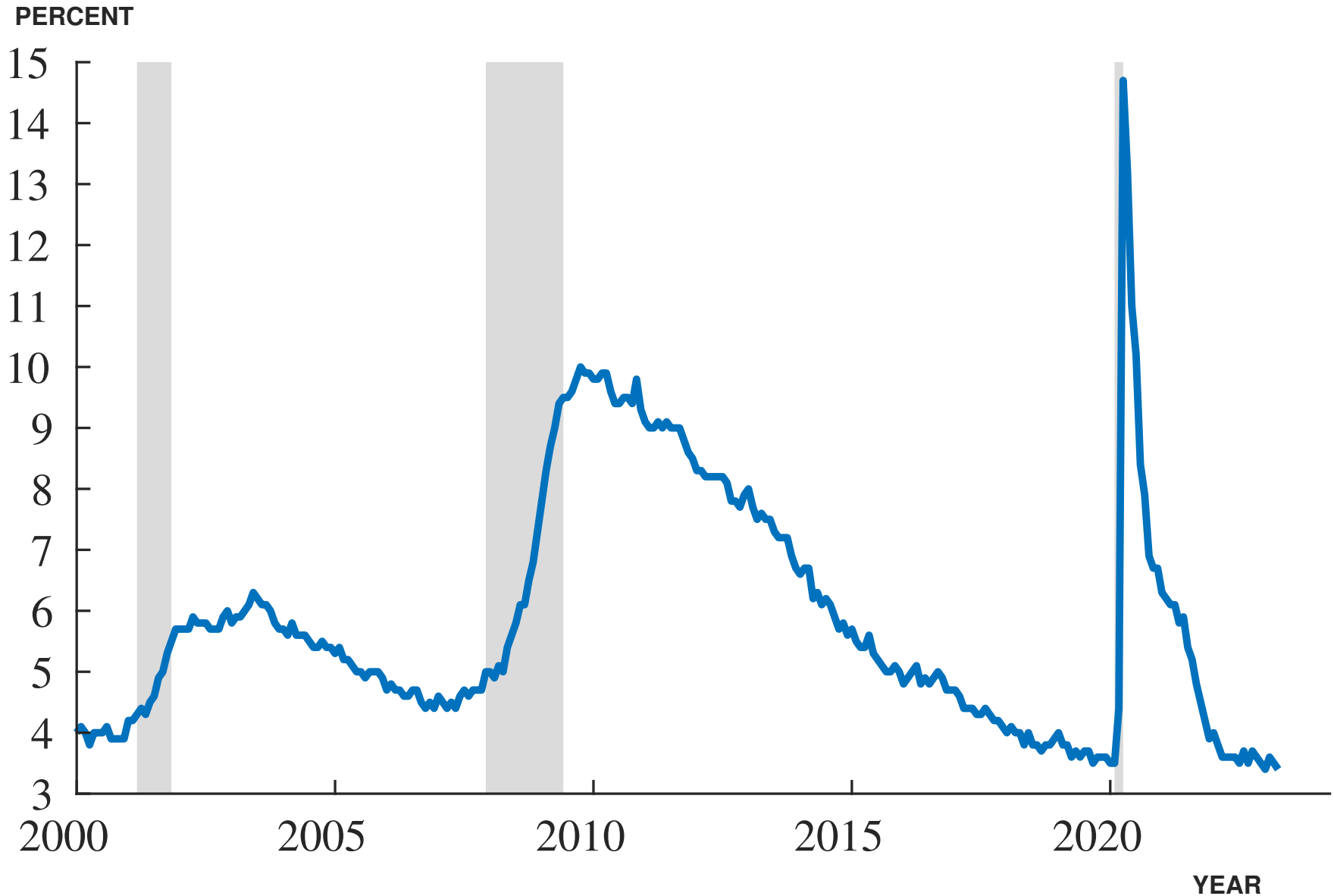
Short-Run Output, $\tilde{Y}$ Recently



GDP in Select Countries



U.S. Unemployment



Okun's Law

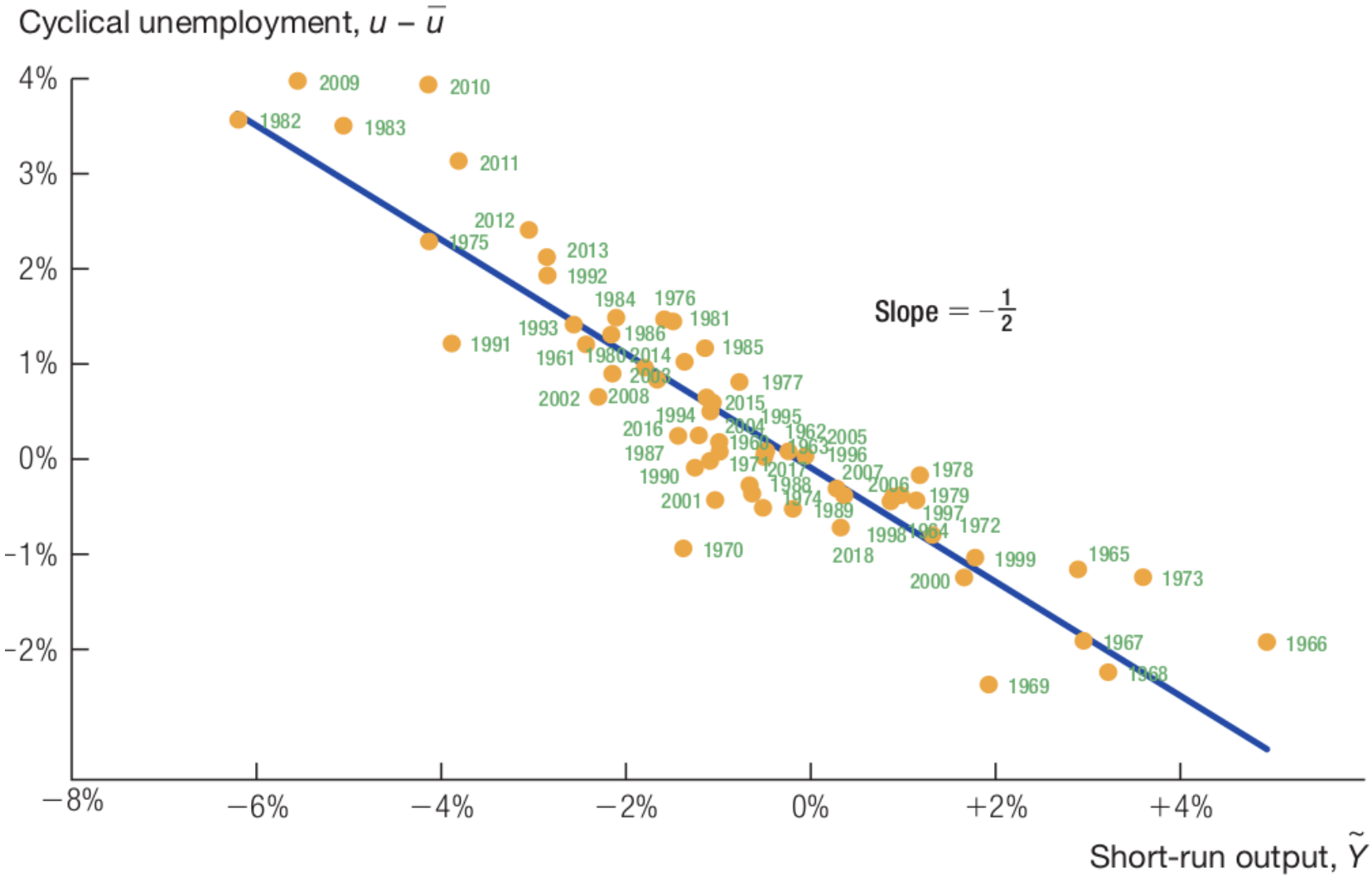
- In modeling booms and recessions, we could focus on either short-run output or unemployment.
  - Recession: Low short-run output and high unemployment
  - Boom: high short-run output and low unemployment

- Okun's Law is an empirical relationship that lets us go back and forth between these two

$$u - \bar{u} = -\frac{1}{2} \times \tilde{Y}$$

Each percentage point of unemployment
= 2 percentage point lower SR output

Okun's Law for the U.S. Economy



Comparing Recessions

TABLE 10.1

Changes in Key Macroeconomic Variables: Previous Recessions and the Great Recession

	Average of previous recessions since 1950	The Great Recession	Covid Recession
GDP	−1.7%	−4.7%	-9.6%
Nonfarm employment	−2.5%	−6.3%	-11.9%
Unemployment rate	2.5	4.5	+9.4pp
Components of GDP			
Consumption	0.4%	−3.4%	-10.6%
Investment	−14.4%	−34.0%	-16.5%
Government purchases	1.2%	5.5%	2.6%
Exports	−1.5%	−10.3%	-24.1%
Imports	−4.2%	−18.7%	-20.2%

Overview of the Short-Run Model

Questions our Short-Run Model Addresses

- Why does actual GDP differ from potential?
- Why do recessions follow peaks in the inflation rate?
- What is the role for monetary and fiscal policy in smoothing economic fluctuations?
- How do economic fluctuations in one country spill over to affect other countries?
- How do we understand current events in the macroeconomy?

Three Premises of the Short-Run Model

1. The economy is constantly being hit by shocks

2. Monetary policy affects the real economy in the short run
   - The Classical Dichotomy fails in the short run

3. There is a dynamic tradeoff between output and inflation in the short run
   - If monetary policy can affect output, why wouldn't the government keep output as high as possible?

Two sentence summary of the Short-Run Model?

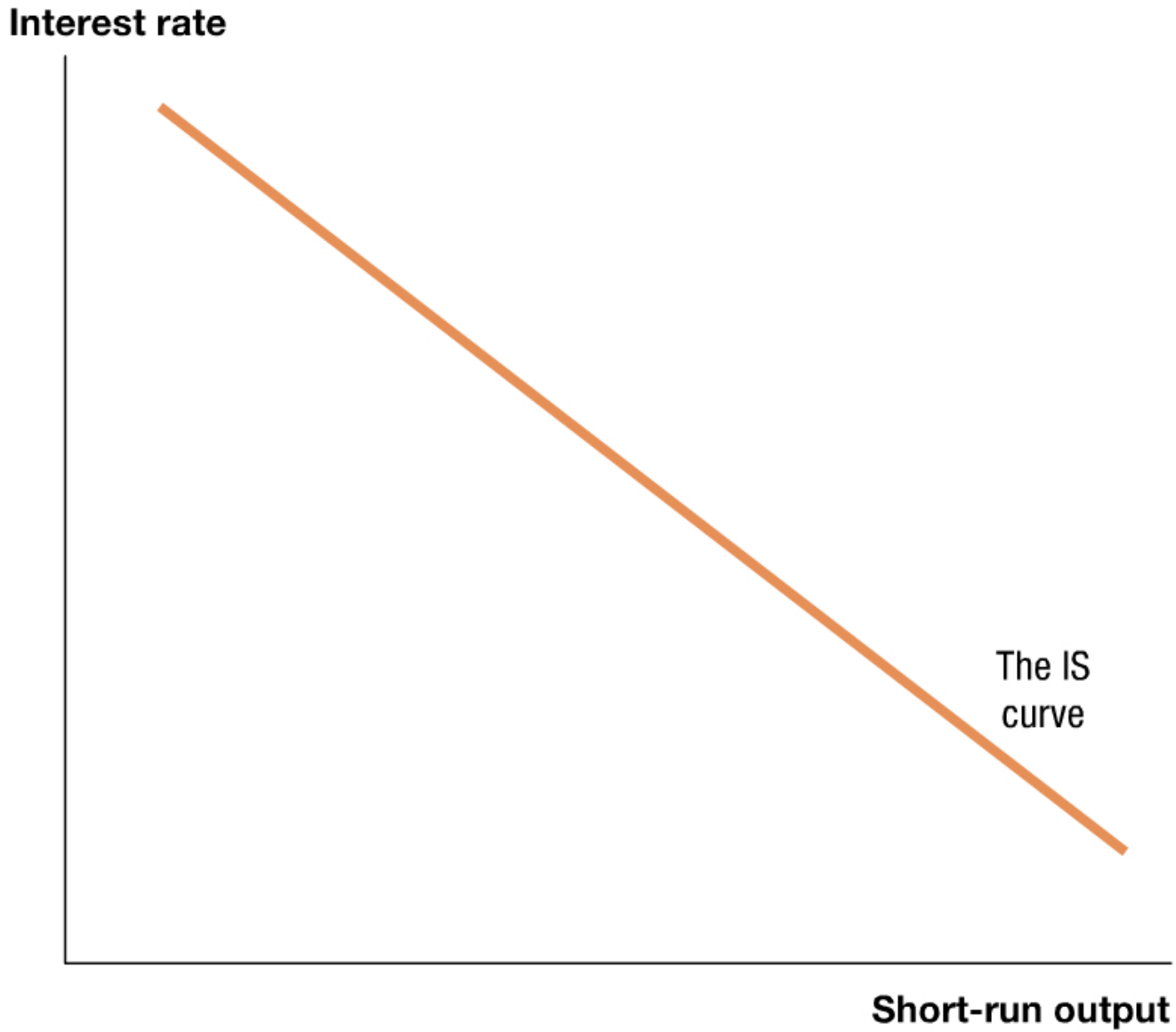
- A booming economy leads the inflation rate to increase, and a slumping economy leads inflation to decline.
- The government (via the central bank and its fiscal authority) can influence output in the short run.

Three Building Blocks of the Short-Run Model

1. **The IS Curve**: Short-run output depends on the real interest rate.
2. **The MP Curve**: The central bank sets the real interest rate.
3. **The Phillips Curve**: Inflation rises if the economy is booming, and falls if the economy is slumping.

The IS Curve

The IS Curve



Basic questions

- What is the IS curve?

- Why does it slope downward?

What two equations are fundamental to the IS curve?

$$Y_t = C_t + I_t + G_t + NX_t$$

$$\frac{I_t}{\bar{Y}_t} = \bar{a}_i - \bar{b}(R_t - \bar{r})$$

For the other components of GDP:

$$\frac{C_t}{\bar{Y}_t} = \bar{a}_c \qquad \frac{G_t}{\bar{Y}_t} = \bar{a}_g \qquad \frac{NX_t}{\bar{Y}_t} = \bar{a}_{nx}$$

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Firms have a menu of investment projects with different returns.
As R rises, fewer of these projects are worth undertaking.

For the other components of GDP:

$$\frac{C_t}{\bar{Y}_t} = \bar{a}_c \qquad \frac{G_t}{\bar{Y}_t} = \bar{a}_g \qquad \frac{NX_t}{\bar{Y}_t} = \bar{a}_{nx}$$

The IS Curve in Equation Form

$$\tilde{Y}_t = \bar{a} - \bar{b}(R_t - \bar{r})$$

$\tilde{Y}$	Short-run output
$\bar{a}$	Aggregate demand shock (zero normally)
R_t	The real interest rate (financial markets)
$\bar{r}$	The marginal product of capital
$\bar{b}$	The sensitivity of investment to interest rates

$$\bar{a} = \bar{a}_c + \bar{a}_i + \bar{a}_g + \bar{a}_{nx} - 1$$

Why is it called the "IS curve"?

- Investment equals Saving
- Return to the National Income Identity:

$$Y = C + I + G + EX - IM$$

- Rearrange the terms to get

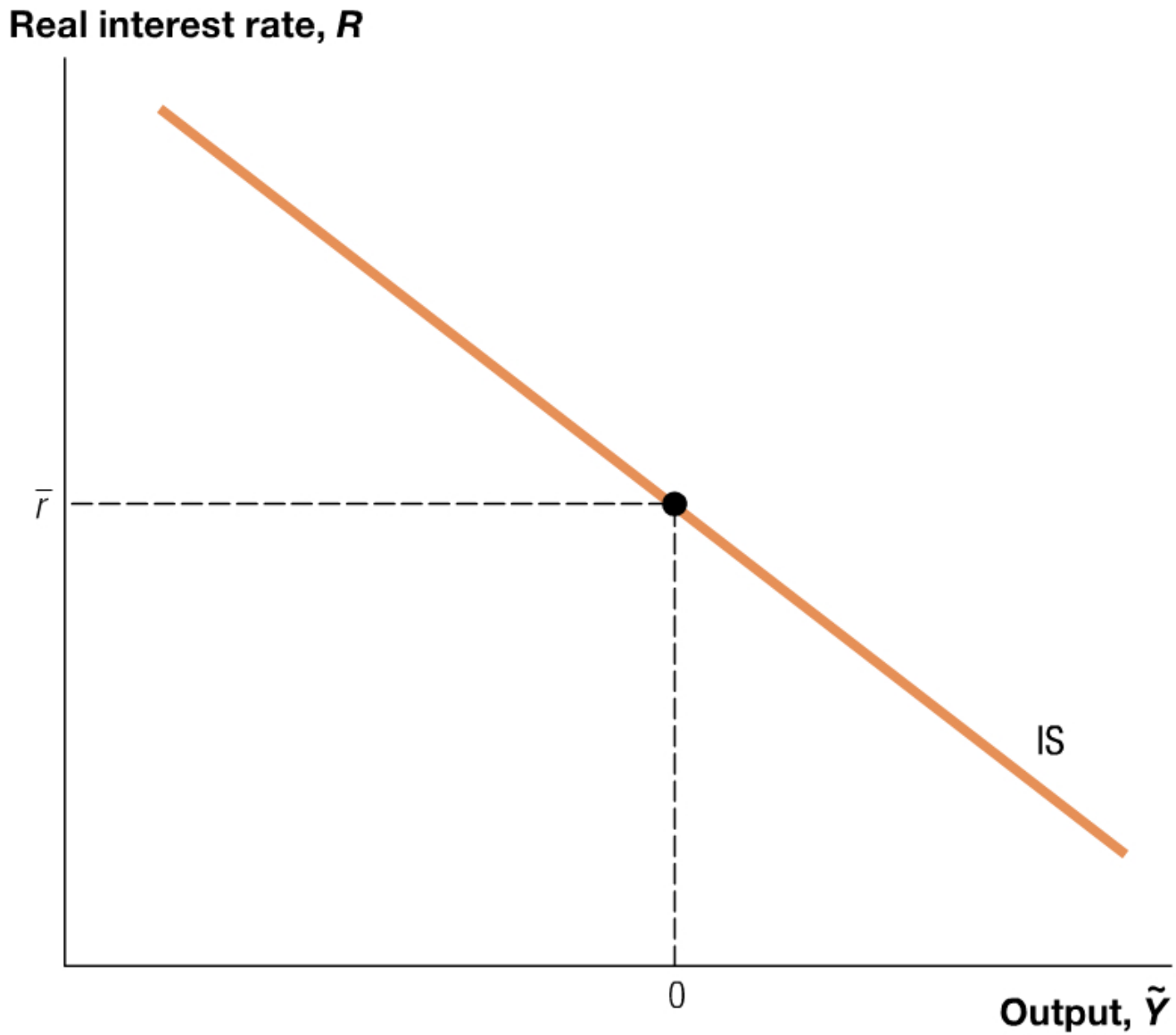
$$Y - C - G + (IM - EX) = I$$

- Add and subtract taxes

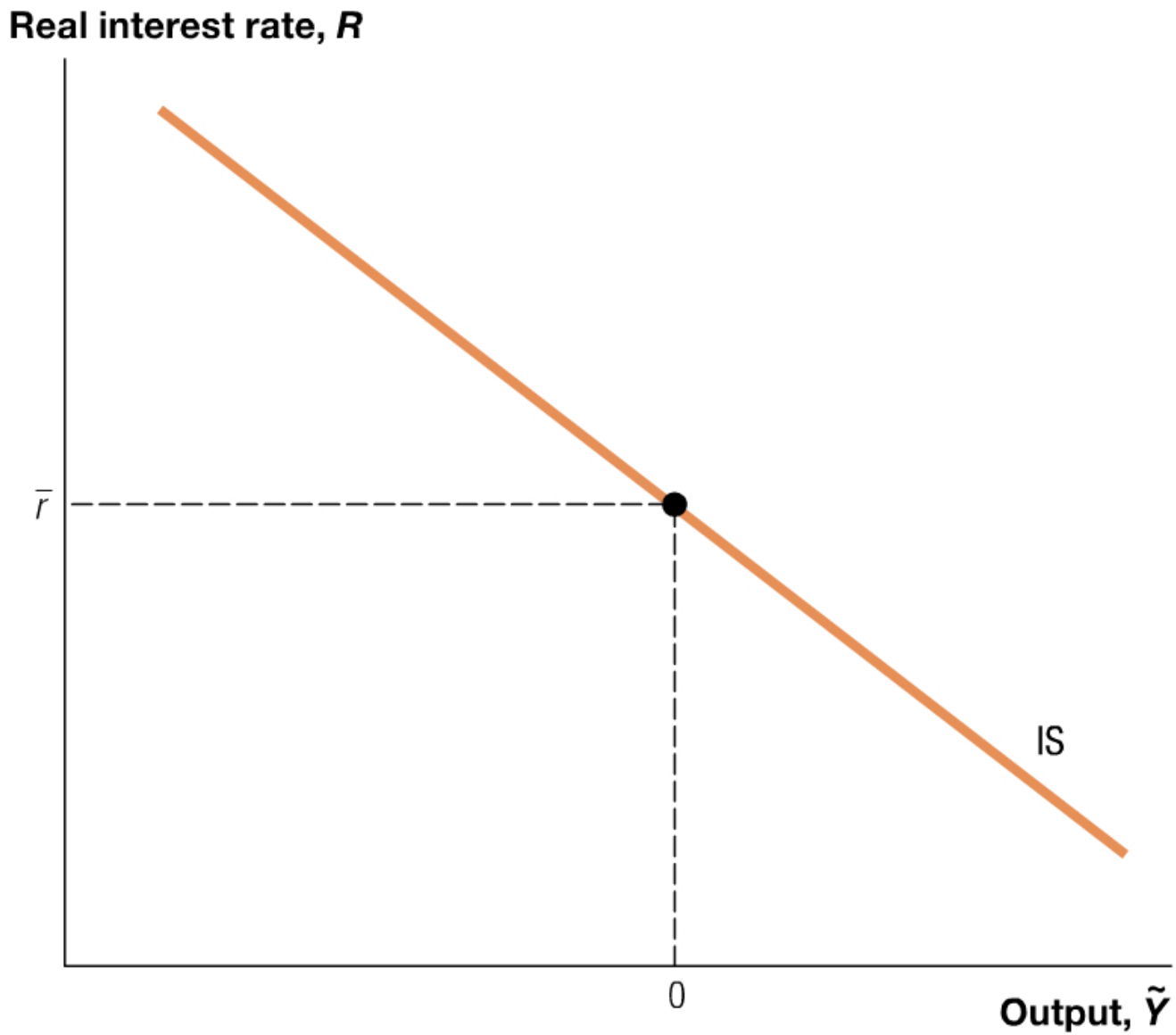
$$\underbrace{(Y - T - C)}_{\text{Private Saving}} + \underbrace{(T - G)}_{\text{Gov't Saving}} + \underbrace{(IM - EX)}_{\text{Foreign saving}} = I$$

Using the IS Curve

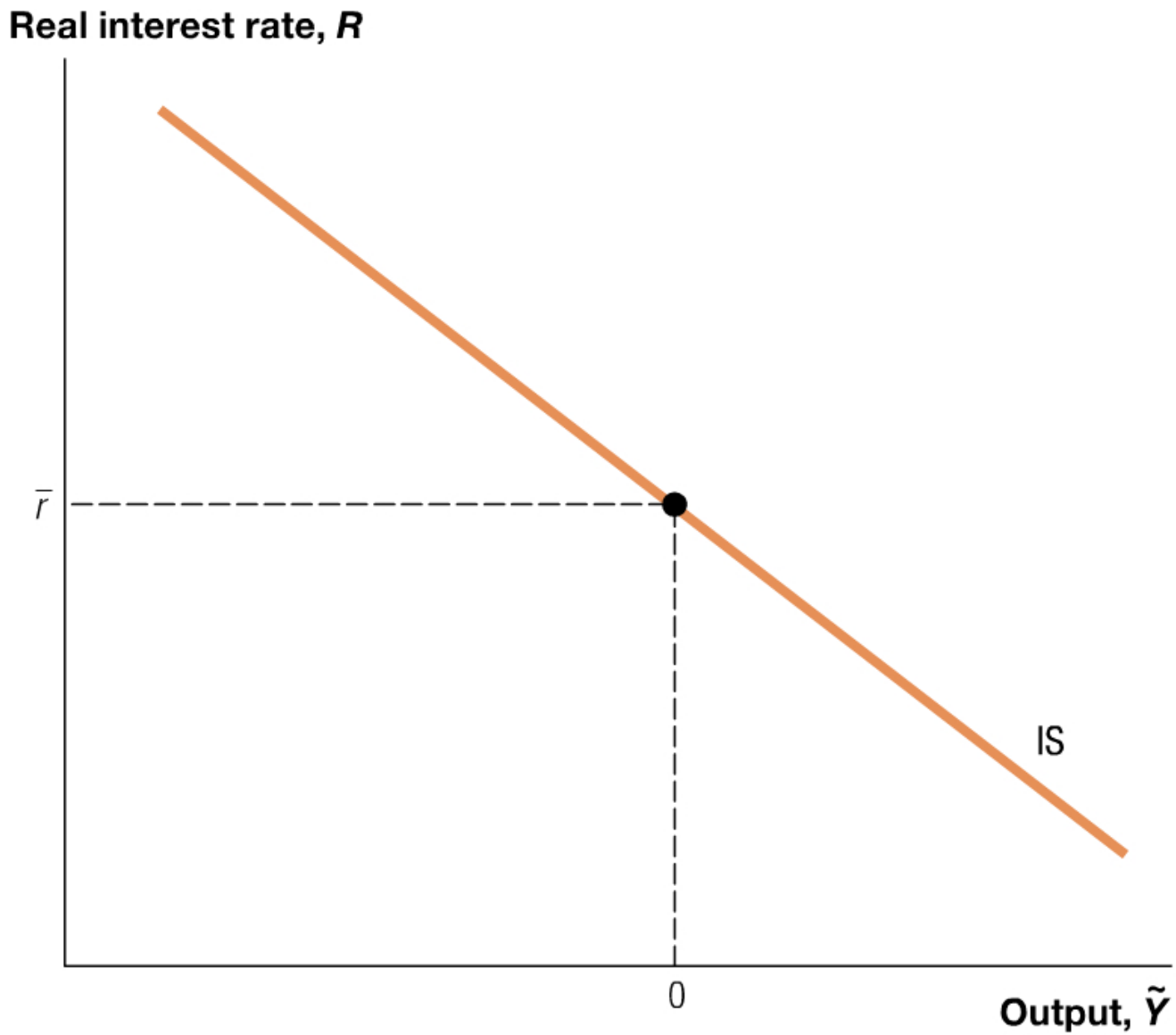
The IS Curve



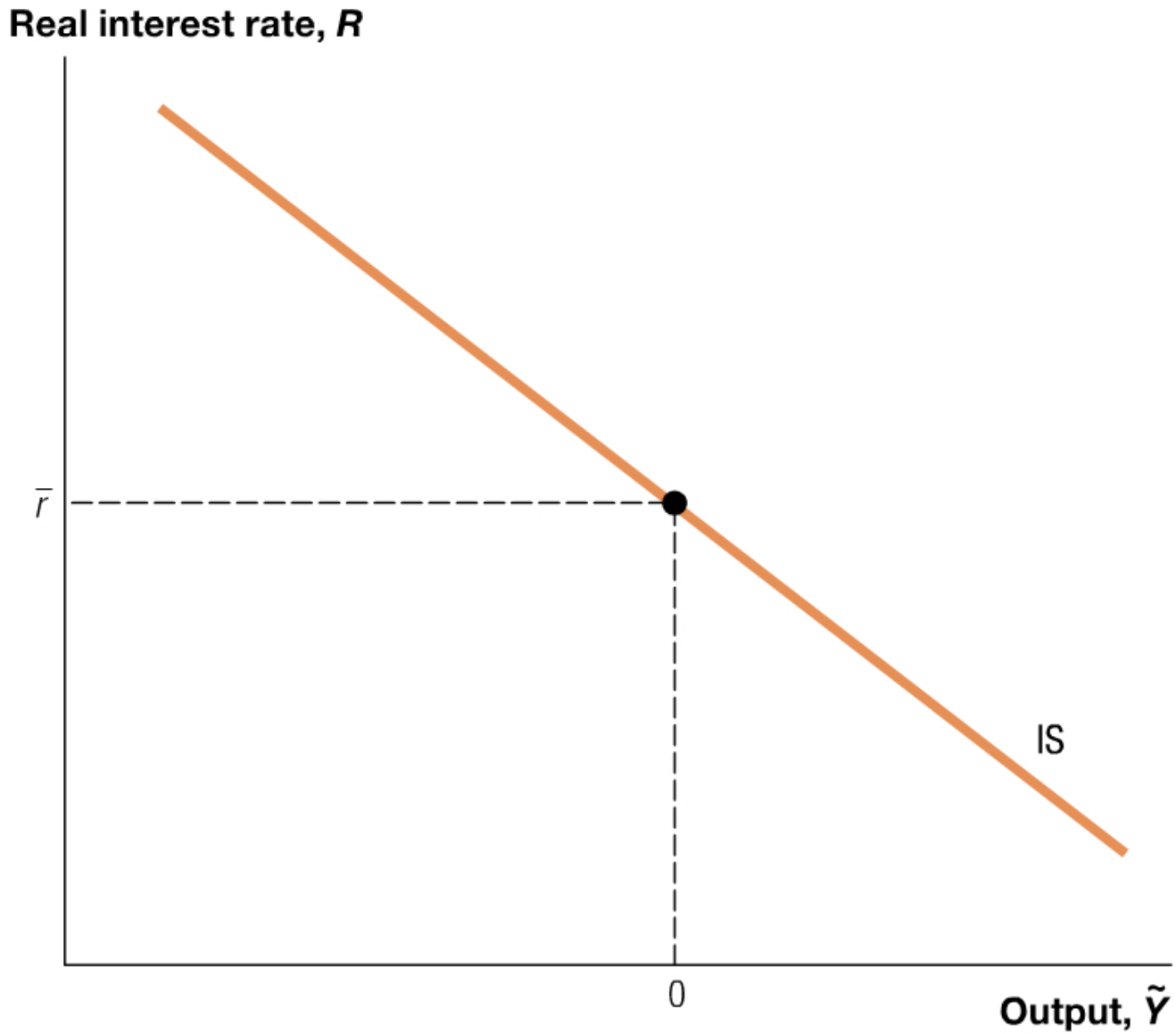
What happens if the Fed raises the interest rate?



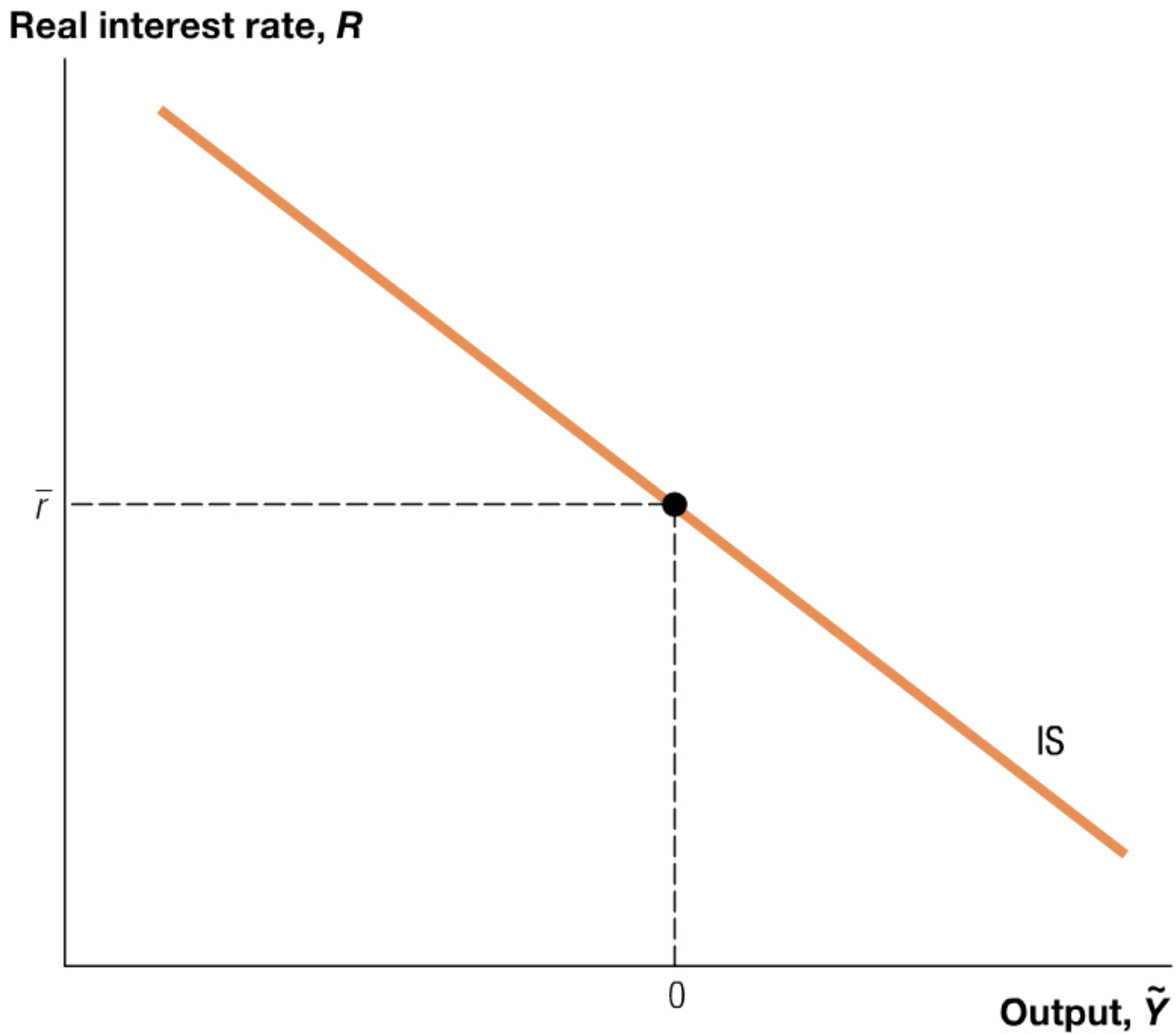
What if IT improvements $\Longrightarrow$ investment boom?



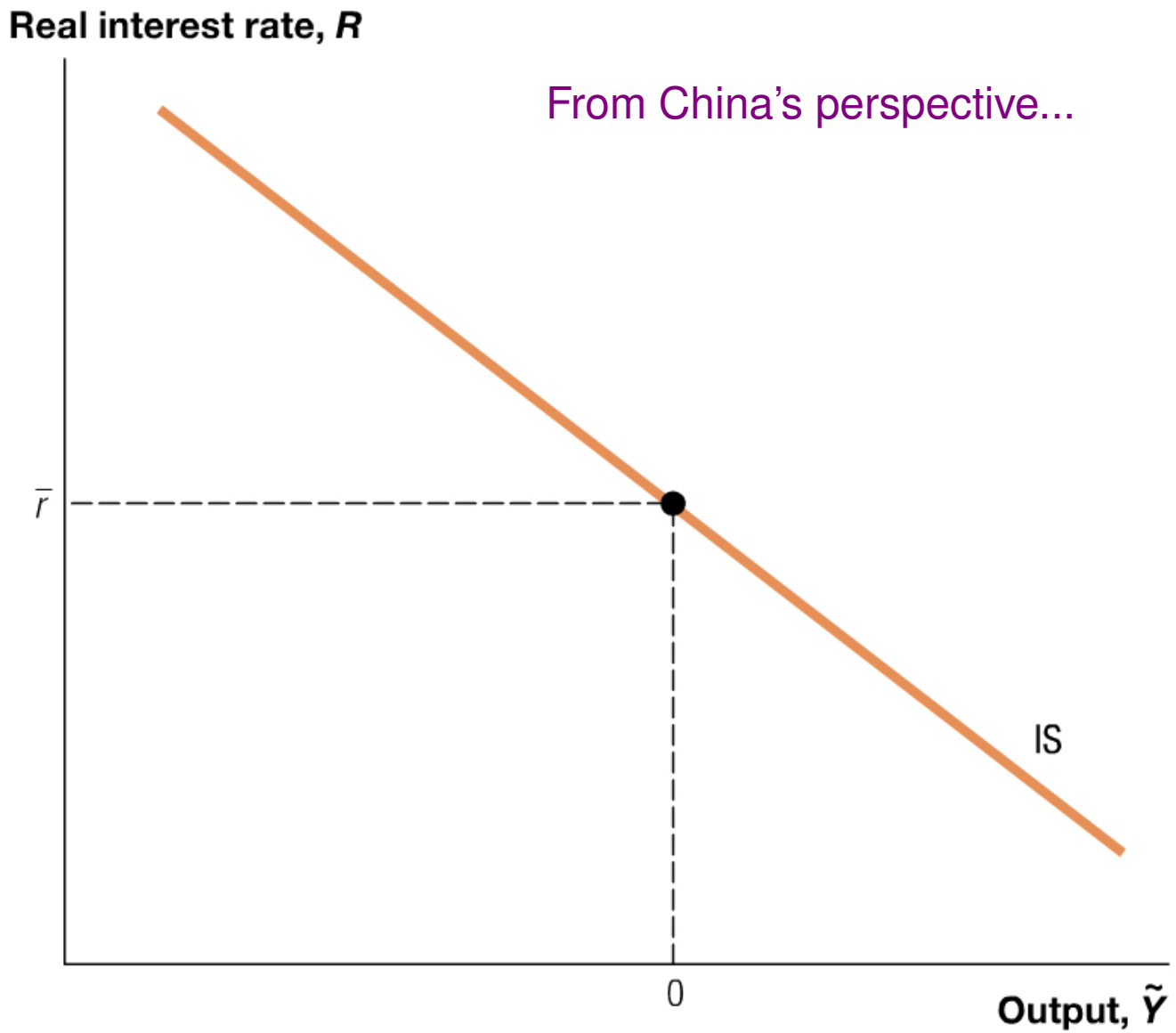
What about the COVID-19 crisis?



CARES Act response to the COVID-19 crisis?



How did the 2008 U.S. financial crisis spillover into China?



Microfoundations

The Permanent Income Hypothesis for Consumption

- Milton Friedman and Franco Modigliani, two Nobel Prize winners
- Consumption depends mostly on expected average income in the future ("permanent income")
  - Why? People prefer to smooth their consumption because of diminishing marginal utility.
  - Example: Suppose you win a lottery that — 5 years from now — pays you $10 million. What happens to your consumption today?
- Empirically, the permanent income hypothesis has some merit, but current income also seems to matter more than this theory would suggest. Why?

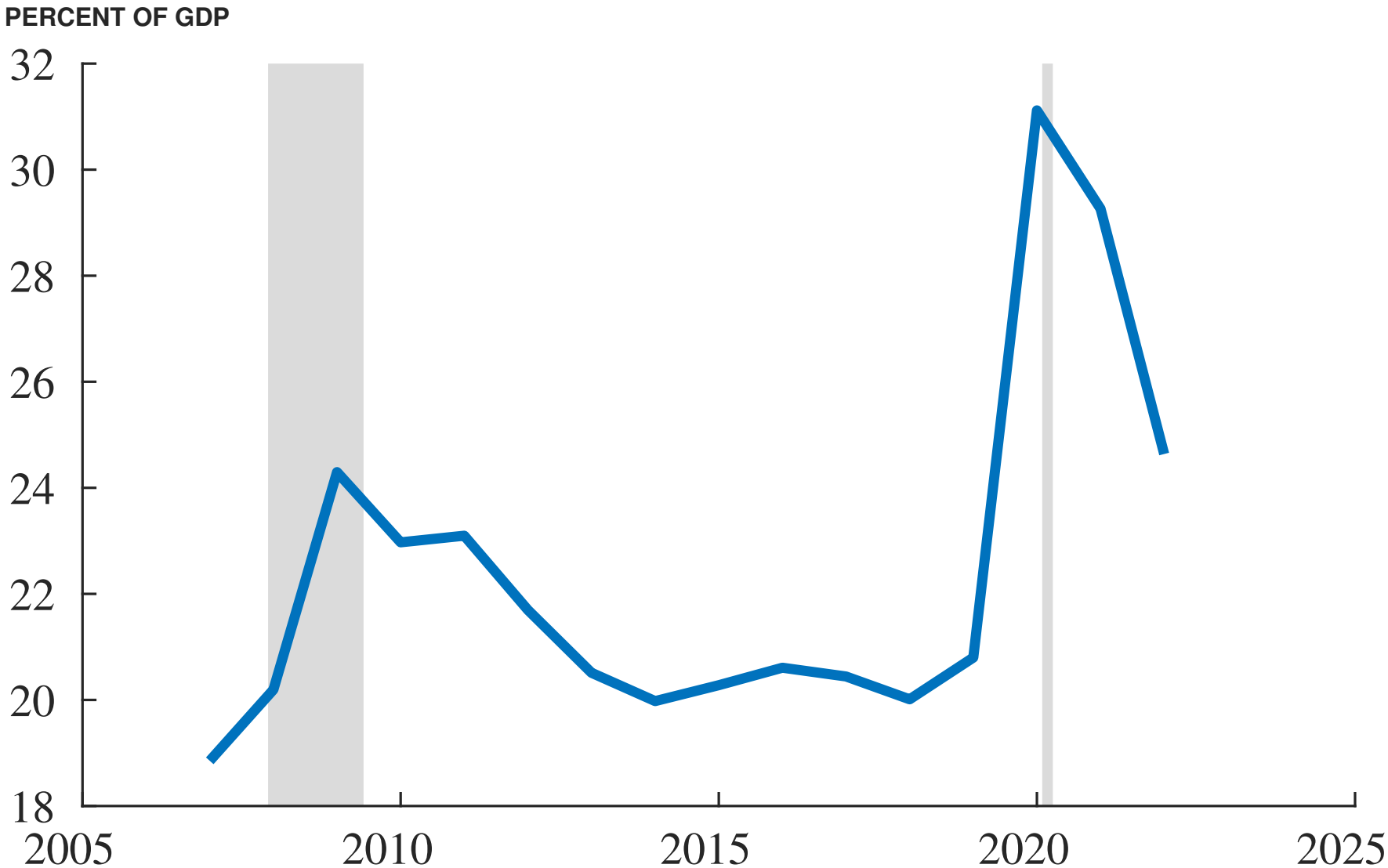
Fiscal Stimulus and Austerity

- Does an increase in G_t stimulate the economy?

Fiscal Stimulus and Austerity

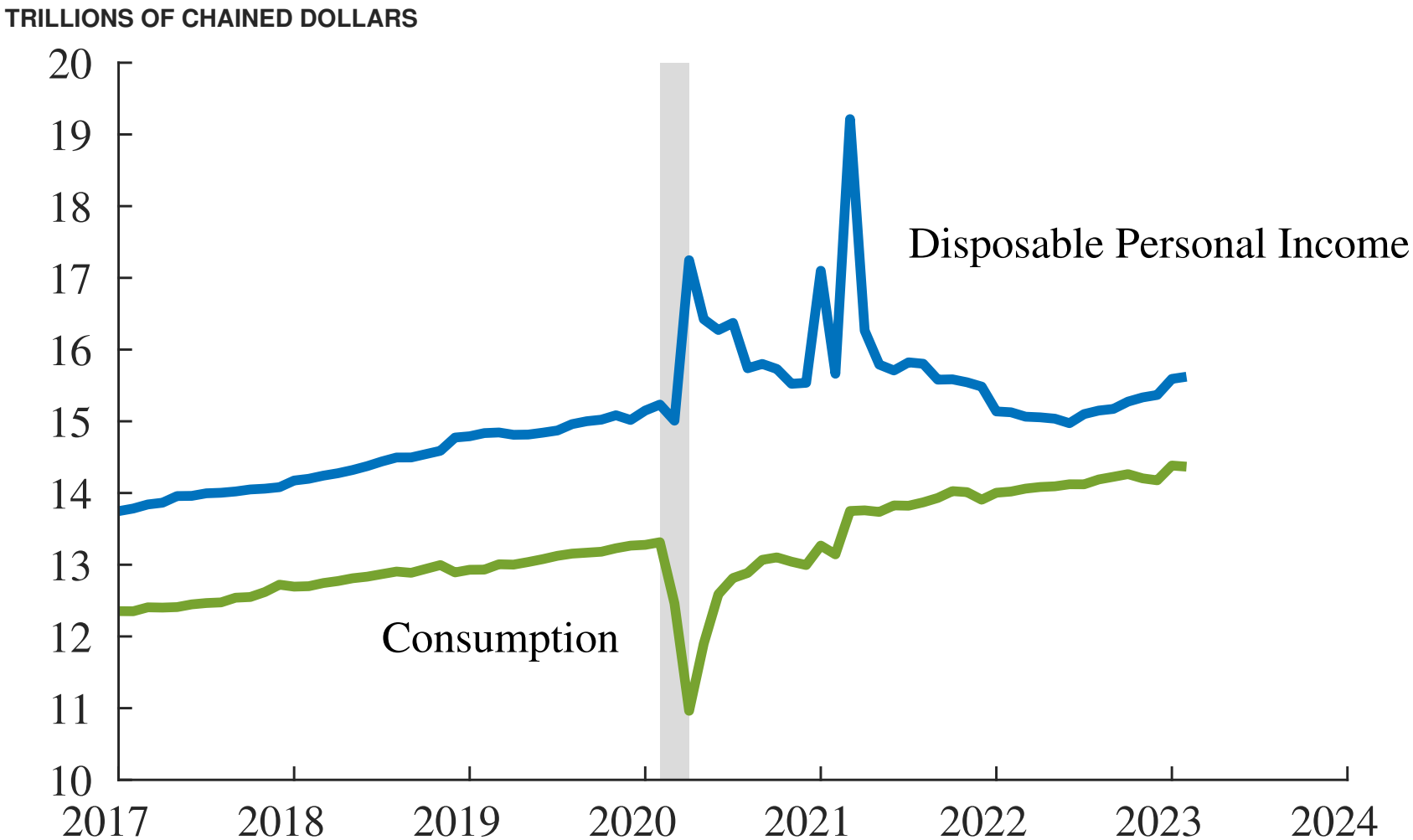
- Does an increase in G_t stimulate the economy?
- Probably yes, but not by as much as you might think in normal times
  - No free lunch: An increase in G today must be paid for with taxes
  - Either today or in the future
- Ricardian equivalence: it doesn't matter how we finance G_t
- Monetary offset
- Empirical evidence is hard to come by
  - No "parallel universe machine"
  - Multipliers are likely positive but less than one — e.g. 0.8

Government Spending and COVID-19

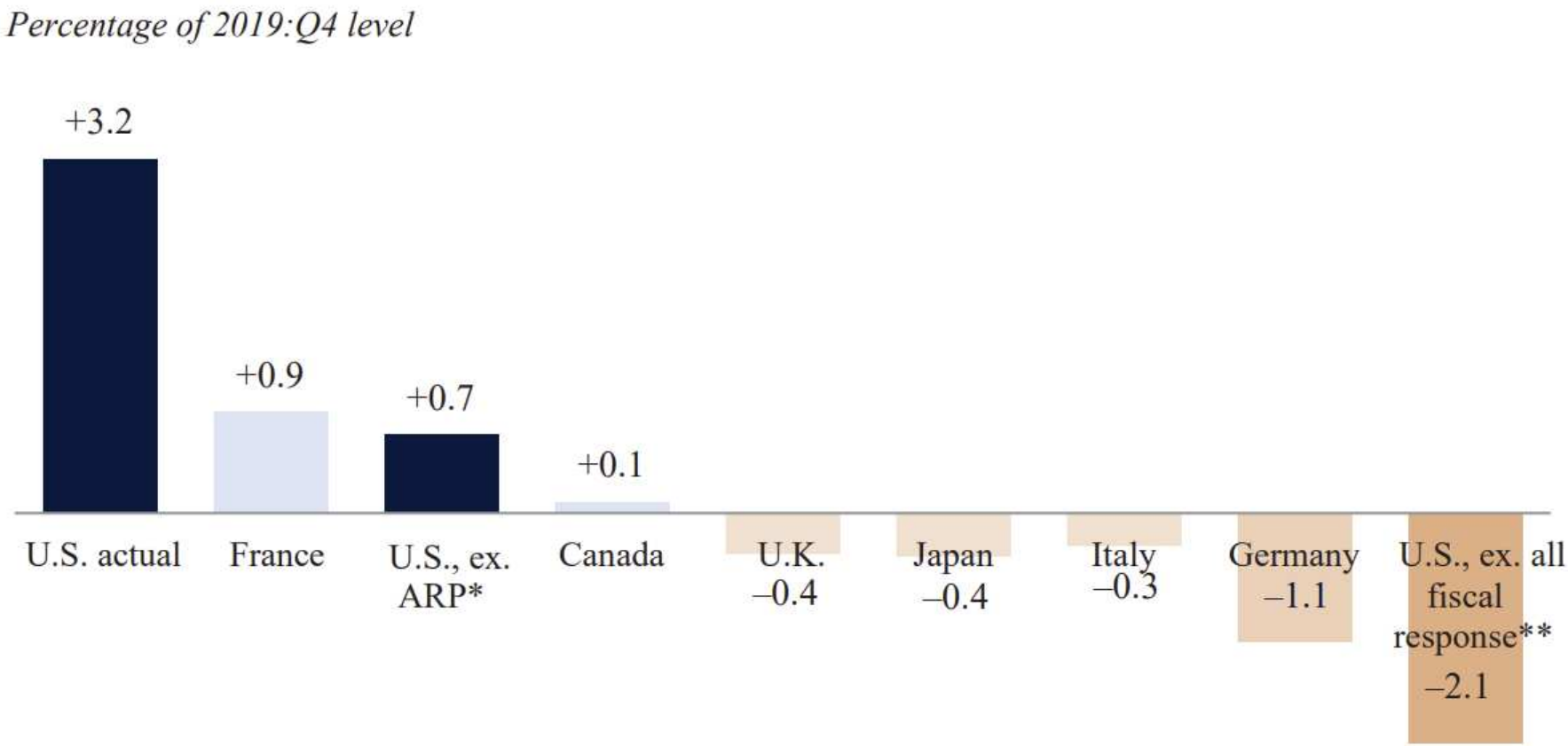


$\uparrow G$: Payments to poor/middle income households, extended unemployment insurance

Consumption and Disposable Personal Income

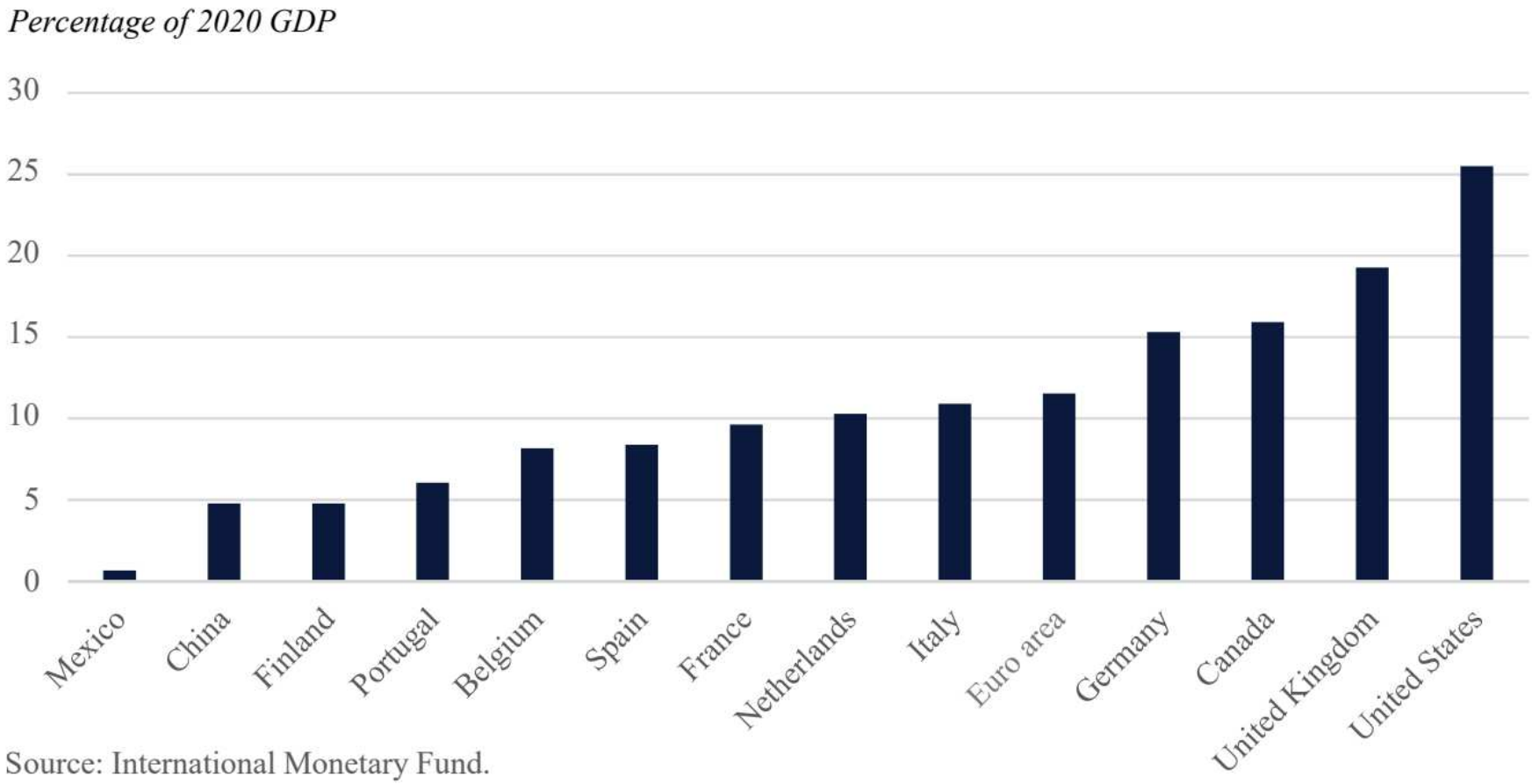


Real GDP 2021:Q4 vs. Before the Pandemic



Economic Report of the President, 2022, Figure 2.4

Discretionary Fiscal Response, 2020:Q1–2021:Q3



Economic Report of the President, 2022, Figure 3.4

Questions for Review

- How do the Short-Run Model and the Long-Run Model (Solow+Romer) fit together?
- What is potential output? What is short-run output? How are they related to actual output?
- What is Okun's Law and why is it useful?
- What is the IS curve, and why does it slope downward?
- What causes a movement along the IS curve?
- What causes the IS curve to shift?
- Why is it called the "IS curve"?