



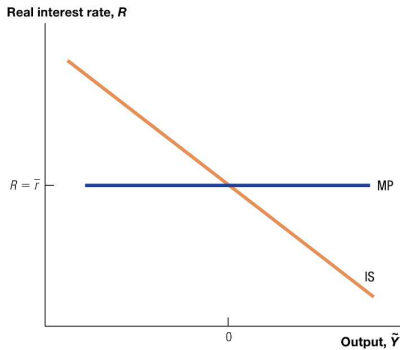
# Session 12: Stabilization Policy and Expectations

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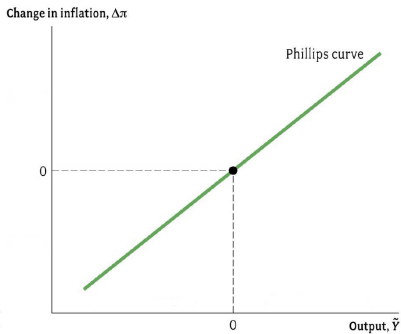
## Outline: Stabilization Policy and Expectations

- Monetary policy rules
- Expectations
- The Taylor Rule
- Understanding inflation in the past decade

## The Short-Run model: IS-MP + Phillips Curve



Demand Shocks + MP  $\Rightarrow \tilde{Y}$



Expectations +  $\tilde{Y} + \bar{o} \Rightarrow \Delta\pi$

## Monetary Policy Rules

- Until now we considered a very simple monetary policy: set  $R_t$
- When the Fed wants to stimulate the economy...
- When the Fed wants to reduce inflation...
- Can we create a more systematic policy response?
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- A **monetary policy rule** is...

*a set of instructions that systematically details how monetary policy responds to situations that might arise*

## A Simple Monetary Policy Rule

$$R_t - \bar{r} = \bar{m}(\pi_t - \bar{\pi})$$

$R_t$  is the real interest rate

$\bar{r}$  is the marginal product of capital

$\pi_t$  is the inflation rate

$\bar{\pi}$  is a **target inflation rate** ( $\approx 2\%$ )

$\bar{m}$  central bank's willingness to fight inflation



*... in the pursuit of price stability, it aims to maintain inflation rates below, but close to, 2% over the medium term.*

*ECB Governing Council, 2003*

## Inflation Targeting: $\bar{\pi}$

- An increasing number of countries have formal, explicit inflation targets
- Some examples:
  - U.S. = 2% (as of 2012)
  - U.K. = 2%
  - Japan = 2% (as of 2013, part of “Abenomics”)
  - Euro area = below, but “close to” 2%
  - India = 4%  $\pm$  2%
  - China = around 3%
  - Brazil = 3.75%  $\pm$  1.5%
  - Mexico = 3%  $\pm$  1%

<http://www.centralbanknews.info/p/inflation-targets.html>

## Monetary Policy Rule: What and Why?

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- What does our simple rule do?
  - Automatically raise interest rates when inflation rises
- Why is it useful?
  - Automates Paul Volcker!
  - Whenever inflation rises above the inflation target, policy tightens automatically
  - Slows the economy — the Phillips curve brings inflation back down

*A good monetary policy rule commits the central bank to keeping inflation close to its target rate.*



## Expectations

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$$\pi_t^e = \pi_{t-1}$$

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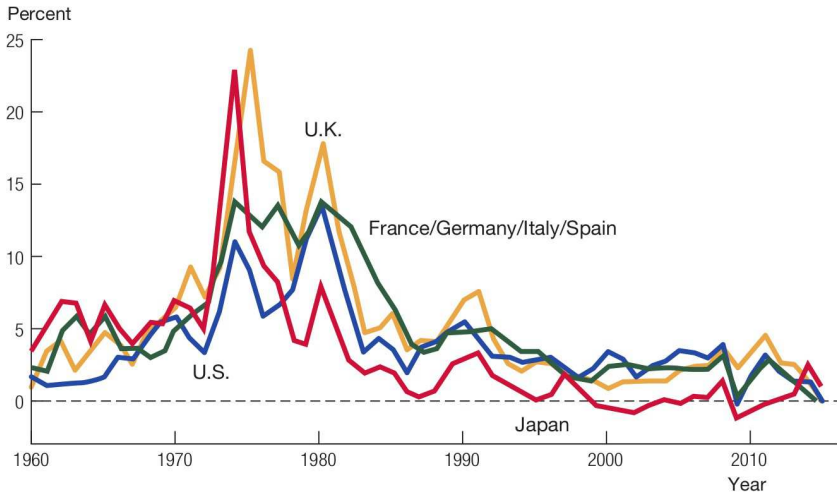
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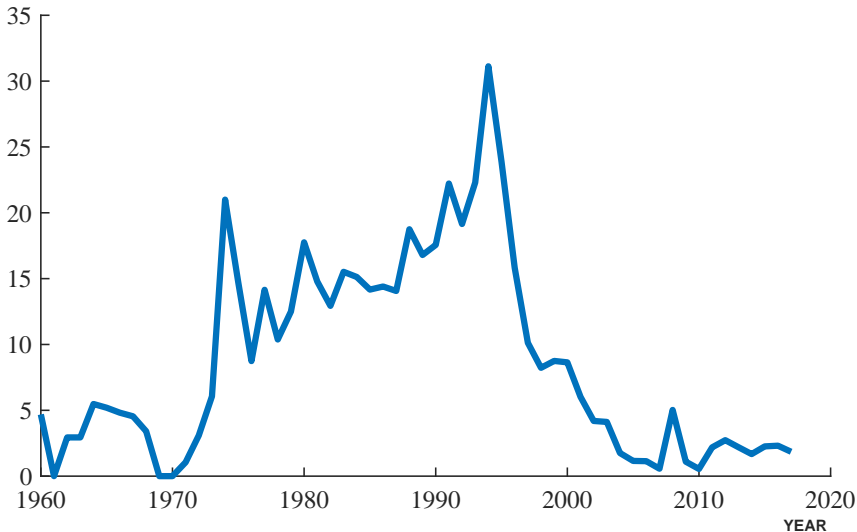


## The taming of inflation around the world



## Percent of countries with inflation rates above 25%

PERCENT OF COUNTRIES



## Expectations

- Central banks dislike inflation and have the power to bring it down by inducing recessions
- But then shouldn't people expect (temporary) inflation to come down?
  - Credibility
  - How are expectations formed?

## Rational Expectations

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- What are rational expectations?

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- Statements by the central bank (e.g. inflation target)
  - Credibility and reputation
  - State of the economy
  - History
- Lucas 1995 Nobel Prize (also Friedman, Phelps, Sargent)

## Managing Inflation Expectations

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- How can the central bank reduce inflation by **managing expectations**?
- With rational expectations and a central bank's commitment to a low stable inflation rate, price-setters will themselves keep inflation close to the target!
- **Example:**
  - An explicit monetary policy rule helps people form expectations
  - What if there is an explicit 2% inflation target? ( $\bar{\pi}$ )
  - Or central bank has a strong reputation as an inflation hawk? ( $\bar{m}$ )



## Costless Disinflation by Coordinating Expectations

- Recall the Phillips curve

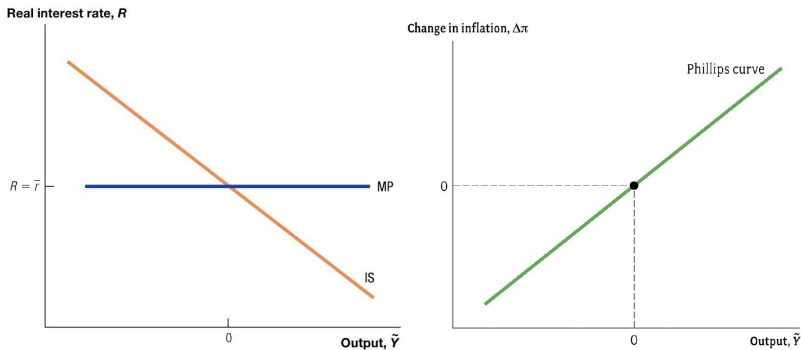
$$\pi_t = \pi^e + \bar{v} \tilde{Y}_t + \bar{o}$$

- What happens if
  - $\bar{\pi} = 4\%$  initially (and  $\pi_t = 4\%$  for past several years)
  - Central bank announces a new inflation target  $\bar{\pi}' = 2\%$
- On next two slides:
  - First with adaptive expectations (e.g. 1980s)
  - Then with rational expectations and a credible central bank

## Disinflation with Adaptive Expectations

- This is the same as the Volcker disinflation studied previously
- Logic
  - Monetary policy rule says  $\uparrow R$  since inflation is above its new target
  - Causes a recession
  - Brings inflation down via the Phillips curve

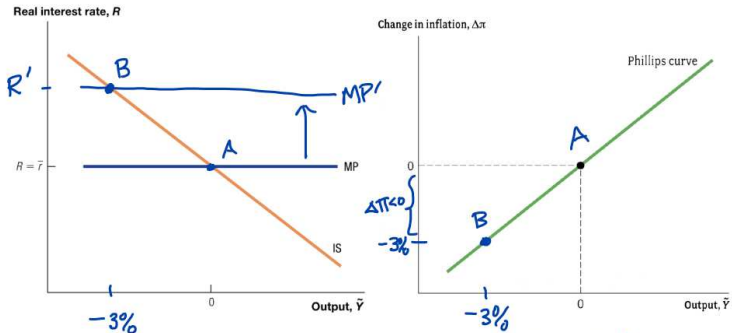
## Disinflation with Adaptive Expectations



$$\text{PC:} \quad \pi_t = \pi_{t-1} + \bar{v} \tilde{Y}_t + \bar{o}$$

$$\text{MPR:} \quad R_t - \bar{r} = \bar{m}(\pi_t - \bar{\pi})$$

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## Disinflation with Rational Expectations and Credible Central Bank

- Key: everyone understands the previous exercise. They know the central bank can put the economy in a recession and bring down inflation

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- If everyone believes the central bank is fully committed to the new target inflation rate and will achieve it...
  - Then let expectations do the work:  $\pi_t^e = 2\%$ !
  - If everyone expects 2% inflation, the Phillips curve implies they raise their prices by 2% instead of 4%  $\Rightarrow \pi_t = 2\%$
  - No recession is required!!!!

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  - If everyone expects 2% inflation, the Phillips curve implies they raise their prices by 2% instead of 4%  $\Rightarrow \pi_t = 2\%$
  - No recession is required!!!!
- This is like the “adoption of the euro” example in Session 9 on Inflation in the Long Run

*Central bank credibility can lead expectations to adjust quickly,  
limiting the need for a recession!*

## Costless Disinflation by Coordinating Expectations

- Phillips curve with expectations term:

$$\pi_t = \pi^e + \bar{v} \tilde{Y}_t + \bar{o}$$

- **Suppose expectations managed by inflation target:  $\pi^e = \bar{\pi}$**



## Costless Disinflation by Coordinating Expectations

- Phillips curve with expectations term:

$$\pi_t = \pi^e + \bar{v} \tilde{Y}_t + \bar{o}$$

- **Suppose expectations managed by inflation target:**  $\pi^e = \bar{\pi}$

$$\text{Initial: } \pi_t = 4\% + \bar{v} \tilde{Y}_t + \bar{o}$$

$$\text{New: } \pi_t = 2\% + \bar{v} \tilde{Y}_t + \bar{o}$$

- Important: In “new” equation above, Fed is happy with  $\pi_t = 2\%$ , so it doesn't need a recession:
  - No change in interest rates, so that  $\tilde{Y} = 0$

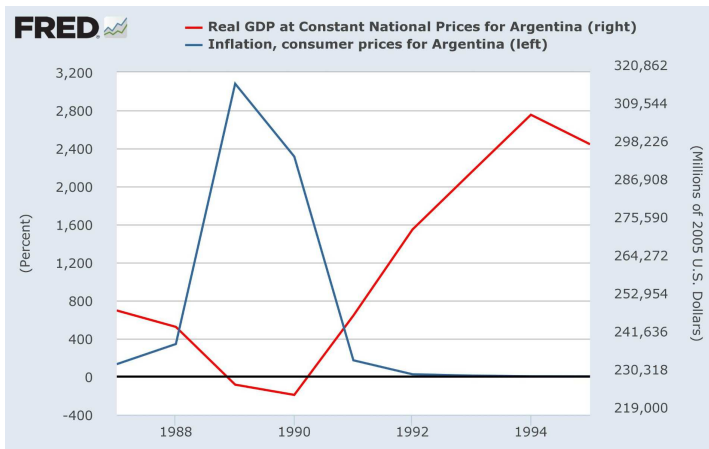
## Argentina: How costly was the end of hyperinflation?



New peso pegged 1 for 1 to the dollar in 1991.

→ Inflation in 1994 was 4%!

## Argentina: How costly was the end of hyperinflation?



GDP fell by 10% between 1987 and 1990, recovered all in 1991!

## Summary

- If a central bank has a credible commitment to an explicit inflation target...
- ... then this **anchors** the inflation expectations of businesses and workers
- ... which reduces the need for the central bank to cause recessions to fight inflation

*A reputation for fighting inflation and keeping it on target  
means fewer recessions are needed!*



## The Taylor Rule

## An inflation targeting monetary policy rule

- Recall our simple policy rule for the fed funds rate:

$$R_t - \bar{r} = \bar{m}(\pi_t - \bar{\pi})$$

- Rearranging and adding inflation (to get the nominal rate):

$$i_t = R_t + \pi_t = \bar{r} + \pi_t + \bar{m}(\pi_t - \bar{\pi})$$

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- What if we use “2” in picking every parameter:

John Taylor's choice:  $\bar{r} = 2\%$ ,  $\bar{\pi} = 2\%$ ,  $\bar{m} = 1/2$

$$i_t = 1\% + 1.5\pi_t$$

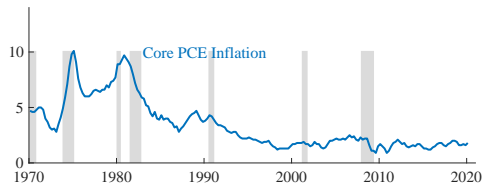
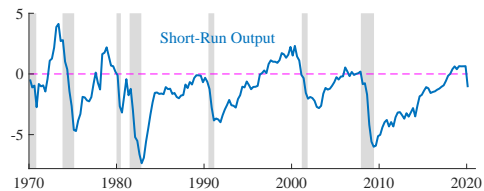
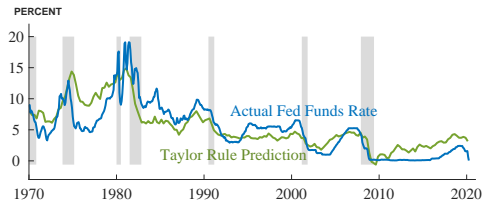
## The Taylor Rule

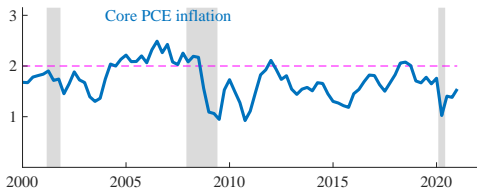
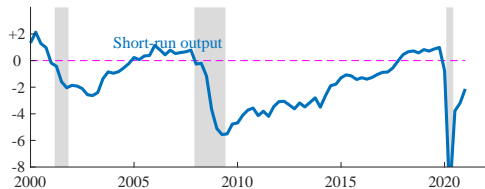
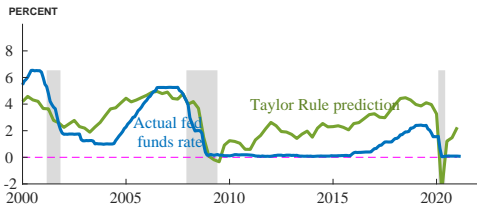
- John Taylor (Stanford) adds  $\tilde{Y}$ :

$$i_t = 1\% + 1.5\pi_t + 0.5\tilde{Y}_t$$

- Why add  $\tilde{Y}$ ?
- Why is the coefficient on inflation larger than one?
- What does this imply about the value of the fed funds rate in normal times?







## Deviations since 2010

- John Taylor is somewhat critical of Fed, saying they should have returned to “normal” sooner
  - If you include financial frictions, the Taylor Rule comes down a bit
  - Would have created “ammunition” for this recession
- Has  $\bar{r}$  changed?
  - “Secular Stagnation”
  - Maybe 1% instead of 2% (e.g. because of growth slowdown)
  - Lowers long-run FF rate to 3% instead of 4%



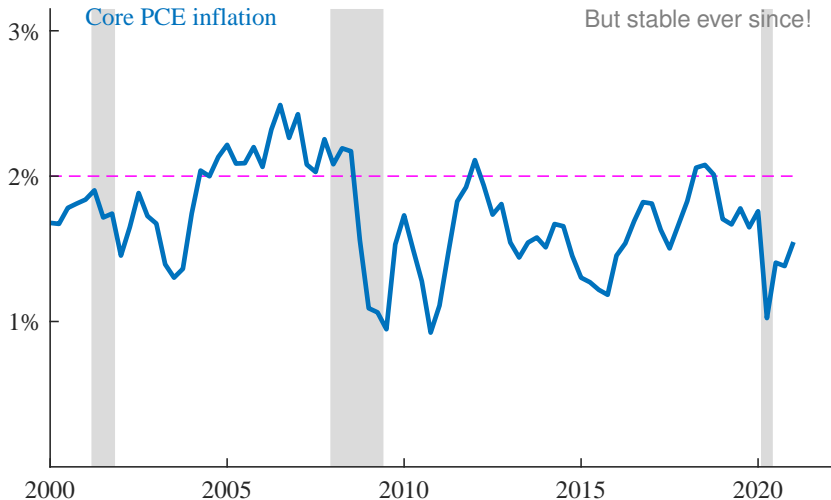
## Inflation and Expectations Recently

## Puzzle: Why didn't inflation fall more in 2009 and 2020?

2007Q4 = 2.3%

2010Q4 = 0.9%

But stable ever since!



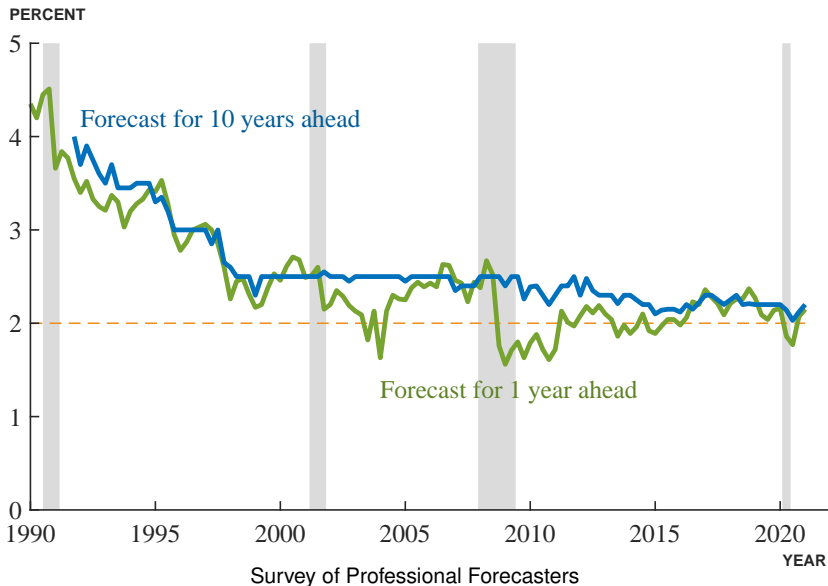
## Why didn't U.S. inflation keep falling given very weak economy?

- One possible explanation: **Anchored inflation expectations**
  - Suppose  $\pi_t^e = \bar{\pi} \approx 2\%$ .
  - Then the Phillips curve becomes (ignoring shocks):

$$\underbrace{\pi_t}_{1.5\%} = \underbrace{\bar{\pi}}_{2\%} + \bar{v} \underbrace{\tilde{Y}_t}_{-3\%}$$

- Anchored inflation expectations help avoid the “slumping economy leads inflation to fall” logic of the Phillips curve with adaptive expectations
- We will contrast with the Great Depression in the next class

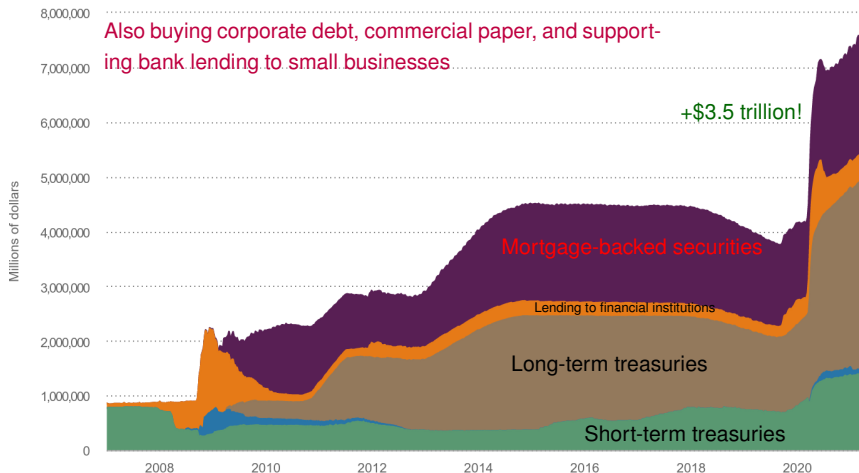
## Expected CPI Inflation in the U.S.



# Unconventional Monetary Policy: Quantitative Easing

Lending to financial institutions: +\$1 trillion in April 2020

Also buying corporate debt, commercial paper, and supporting bank lending to small businesses



## Assets on the Fed Balance Sheet

Source: <https://www.clevelandfed.org/en/our-research/indicators-and-data/credit-easing.aspx>

More info: <https://www.brookings.edu/research/fed-response-to-covid19/>



## Forward guidance

*To support continued progress toward maximum employment and price stability, . . . a highly accommodative stance of monetary policy will remain appropriate for a considerable time after the economic recovery strengthens*

*– FOMC Statement September 13, 2012*

*Forward guidance combined with the term structure of interest rates can lower long-term rates*

## Higher inflation target

- How does a higher  $\bar{\pi}$  help stimulate the economy?
- In August 2020, Chairman Powell: "target average inflation of 2% over the long-run"
- How does this fit into current debates about inflation?

## Covid as a Shock to Potential Output

- Think about COVID-19 in a Solow model?
- How does this show up in our Short-Run Model?

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  - “tax” on working and shopping
  - Lowers potential GDP
- How does this show up in our Short-Run Model?
  - Lower  $\bar{Y}$  — but where is  $\bar{Y}$  in the SR Model?
  - A reduction in TFP lowers both  $Y$  and  $\bar{Y}$ , leaving  $\tilde{Y}$  unchanged
  - Explains why a 10% decline in GDP in 2020Q1/Q2 may not put huge downward pressure on inflation: most was a decline in  $\bar{Y}$ !
- What about the recent jobs numbers?

## Questions for Review

- What is a monetary policy rule and an inflation target? Why are these important?
- Did Bernanke, Yellen, and Powell follow a Taylor Rule? What are the arguments for and against following such a rule?
- What are rational expectations?
- How is managing expectations a crucial part of monetary policy?