

Monetary Policy and Aggregate Demand

Week 04

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Recall: The Fisher Equation

- In Week 2 we discussed a very important concept: the **Fisher Equation**

$$r = i - \pi$$

i : nominal interest rate ; r : real interest rate ; π : rate of inflation

- In the **short-term**, from one day to the other, the Fed can change its short-term interest rate (i).
- But prices are sticky (rigid); they take time to change given new circumstances. So, π **is rigid in the short-term**.
- Therefore, the Fed can affect the real interest rate (r) in the short-term, when it announces a change in its (nominal) rates.

1. The Monetary Policy Curve (MP)

The Fed and the FFR

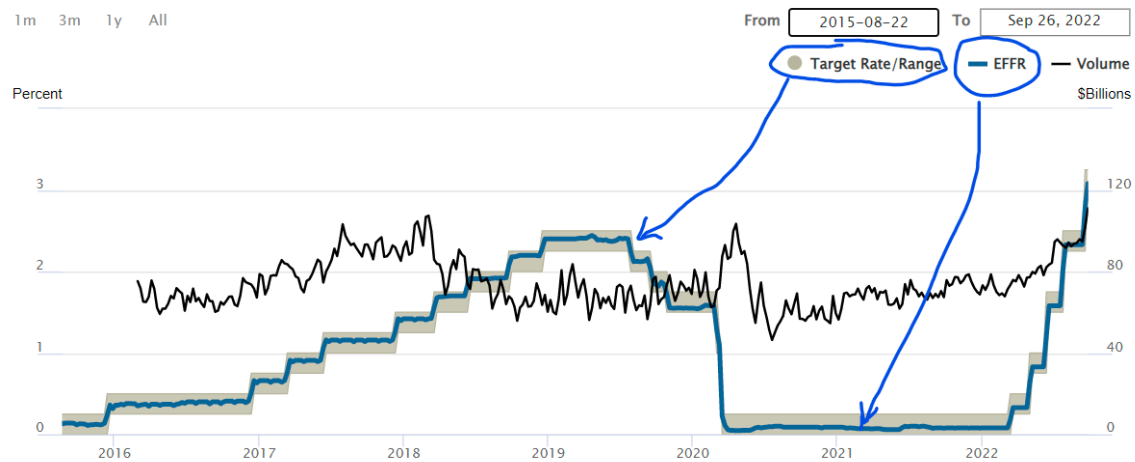
It is useful to highlight some acronyms:

- **Fed**: Federal Reserve Board (the central of the USA)
- **FFR** : Federal Funds Rate
 - The overnight interest rate that commercial banks charge each other when lending amounts of funds (also called reserves) in a uncollateralized basis
- **Target rate range**: the range set by the Fed (by law) for the short term interest rate
- **Volume of trade**: the amounts of uncollateralized funds (reserves) that are traded between commercial banks in everyday

The Fed and the FFR

- A single image obtained from Fed New York shows all in a simple way:

FEDERAL FUNDS CHART



The Monetary Policy Curve (MP)

- The Fed bases its decisions to change short term interest rates on 3 factors:
 - The natural real interest rate: $(\bar{r})^1$
 - The gap the inflation rate and its target level: $(\pi - \pi^T)$
 - The output gap: $(realGDP - PotentialGDP)$
- To simplify the exposition, the textbook avoids the impacts of the output-gap and π^T on the Fed's decision making process until later chapters.
- So, the simple version of the monetary policy curve (MP) is:

$$r = \bar{r} + \lambda\pi$$

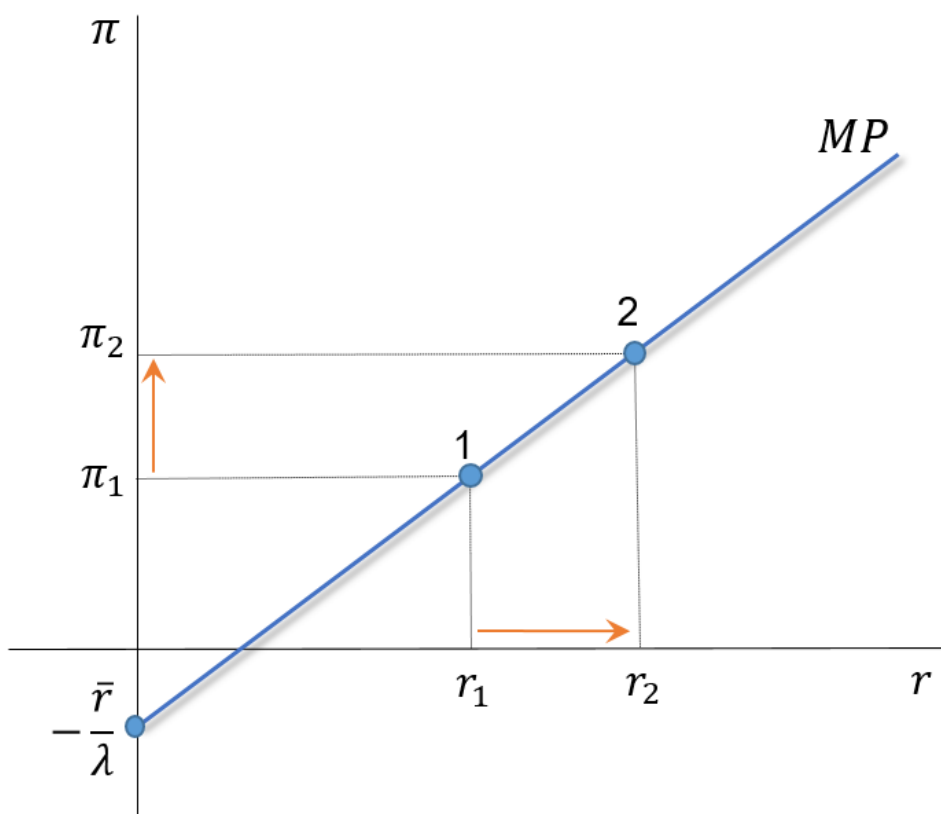
- λ is a parameter and tells how much the central bank dislikes inflation.

The MP Curve: Graphical Representation

The MP curve is given by: $r = \bar{r} + \lambda\pi$

...

¹The textbook calls it the autonomous (or exogenous) component of the real interest rate set by the monetary policy authorities. The relevant issue, is that it is determined by some exogenous force in the economy.



From point 1 to 2:

- As inflation raises from π_1 to π_2
- The Fed is forced to increase real interest rates from r_1 to r_2 .
- $\Delta \bar{r} = 0$
- If $\Delta \bar{r} \neq 0$, the curve shifts

The Taylor Principle

i Definition. The Taylor principle

The Taylor principle states that to avoid inflationary spirals—inflation that gets higher and higher over time—the central bank must increase the nominal interest rate by more than the change in the inflation rate.

- The Taylor principle will be satisfied when

$$\lambda > 0$$

- If $\lambda > 0 \Rightarrow \Delta i > \Delta \pi$ always

The Taylor Principle: An Example

- Suppose that: $\lambda = 0.5$; $\Delta\pi = +1pp$
- From the **MP curve**:

$$\Delta r = \Delta \bar{r} + \lambda \times \Delta\pi = 0 + 0.5 \times 1 = 0.5$$

- From the **Fisher equation**:

$$\Delta r = \Delta i - \Delta\pi \Rightarrow \Delta i = 1 + 0.5 = 1.5$$

- So, we have: $\Delta i = 1.5 > \Delta\pi = 1$
- The increase in inflation will be controlled:

$$\pi \uparrow \Rightarrow r \uparrow \Rightarrow Y \downarrow \Rightarrow \pi \downarrow \Rightarrow \text{inflation is controlled}$$

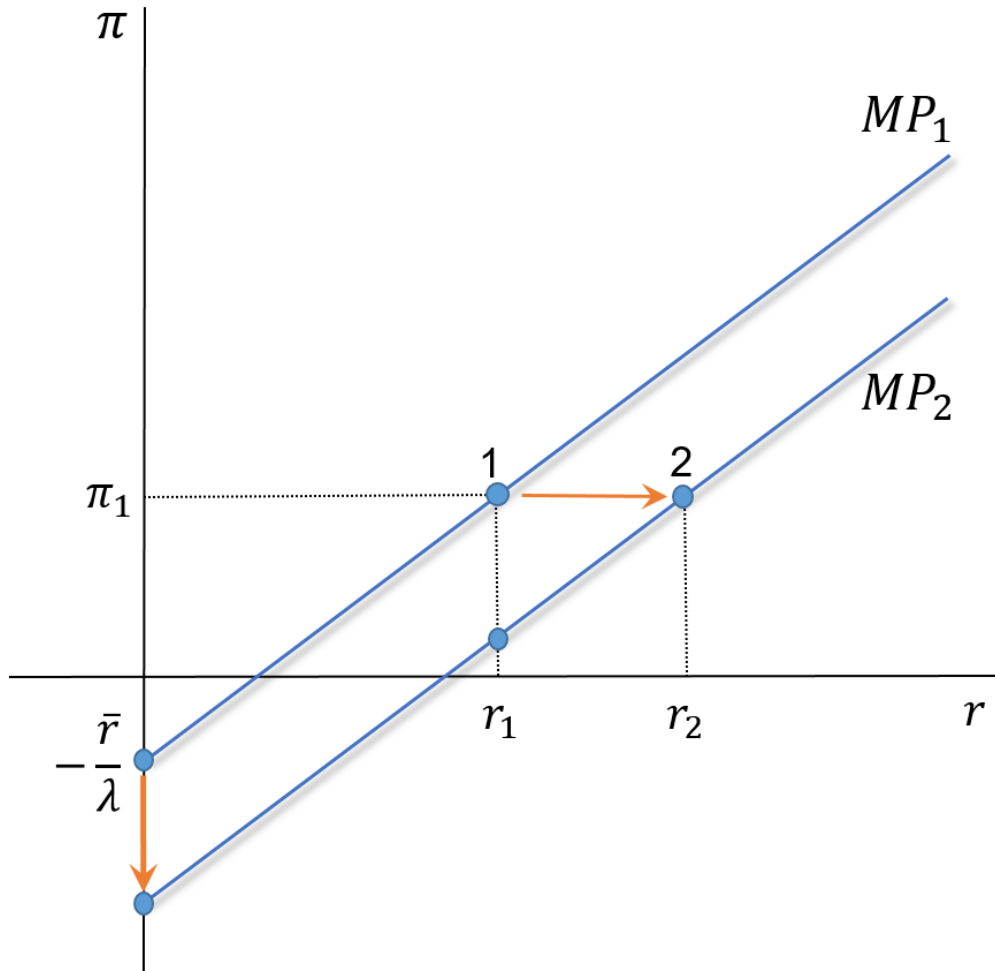
- Otherwise, we would end up in an inflationary spiral:

$$\pi \uparrow \Rightarrow r \downarrow \Rightarrow Y \uparrow \Rightarrow \pi \uparrow \Rightarrow r \downarrow \Rightarrow Y \uparrow \Rightarrow \pi \uparrow \dots$$

MP Curve: Shifts

The MP curve is given by: $r = \bar{r} + \lambda\pi$

...



From point 1 to 2:

- If $\bar{r}$ increases, the MP curve shifts to the right, and vice-versa.
- Notice that r increases, but π remains constant.

Policy and Practice

There are two types of reaction by the central bank:

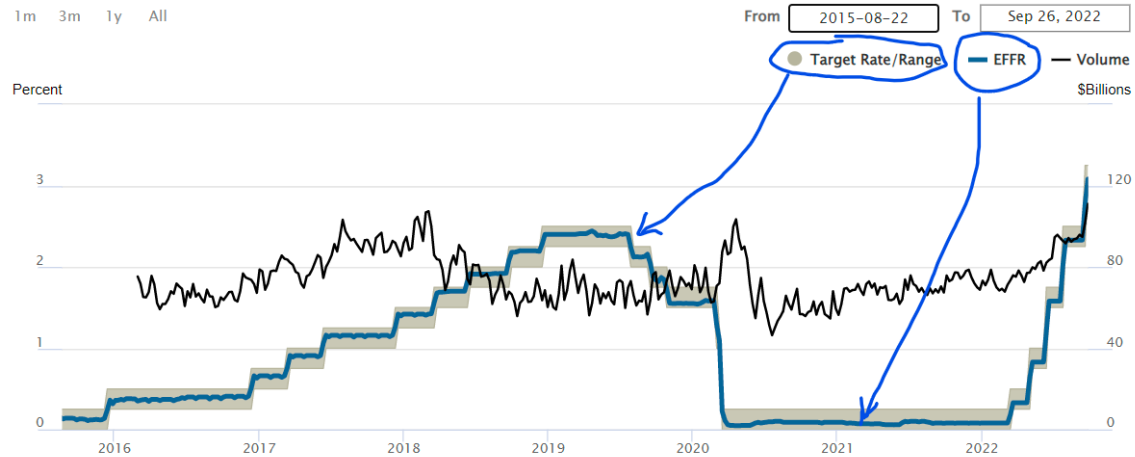
- An accommodating monetary policy (**movement along** the MP curve)
- An aggressive monetary policy (**a shift** in the MP curve)
- In the figure below, can we distinguish between those two reactions?



Policy and Practice

- Two types of reactions? Why one? Why the other?

FEDERAL FUNDS CHART



2. The Aggregate Demand Curve (AD)

The Logic Behind the AD Curve

- The **MP curve** demonstrates how central banks respond to changes in inflation with changes in interest rates, in line with the Taylor principle.
- The **IS curve** we developed in Week 4 showed that changes in interest rates, in turn, affect GDP.
- Using these two curves, we can link the level of **GDP_e** to the level of the **inflation rate**.
- In a simple way:

$$MP = IS \rightarrow AD$$

Derivation of the AD Curve

...

Recall the **IS curve**

$$Y = m \cdot \bar{A} - m \cdot \phi \cdot r$$

...

Now the **MP curve**:

$$r = \bar{r} + \lambda \cdot \pi$$

...

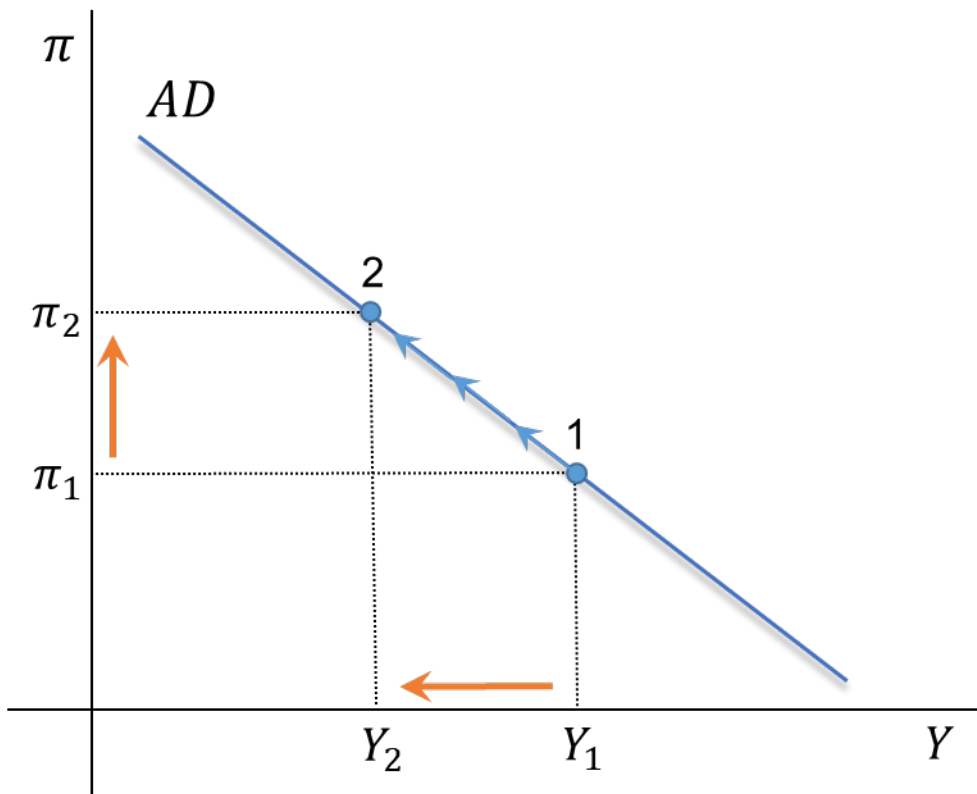
Insert eq. (3) into eq. (2), and we get the **AD curve**:

$$Y = m \cdot (\bar{A} - \phi \bar{r}) - m\phi\lambda \cdot \pi$$

AD Curve: Graphical Representation

The AD curve is given by: $Y = m \cdot (\bar{A} - \phi \bar{r}) - m\phi\lambda \cdot \pi$

...



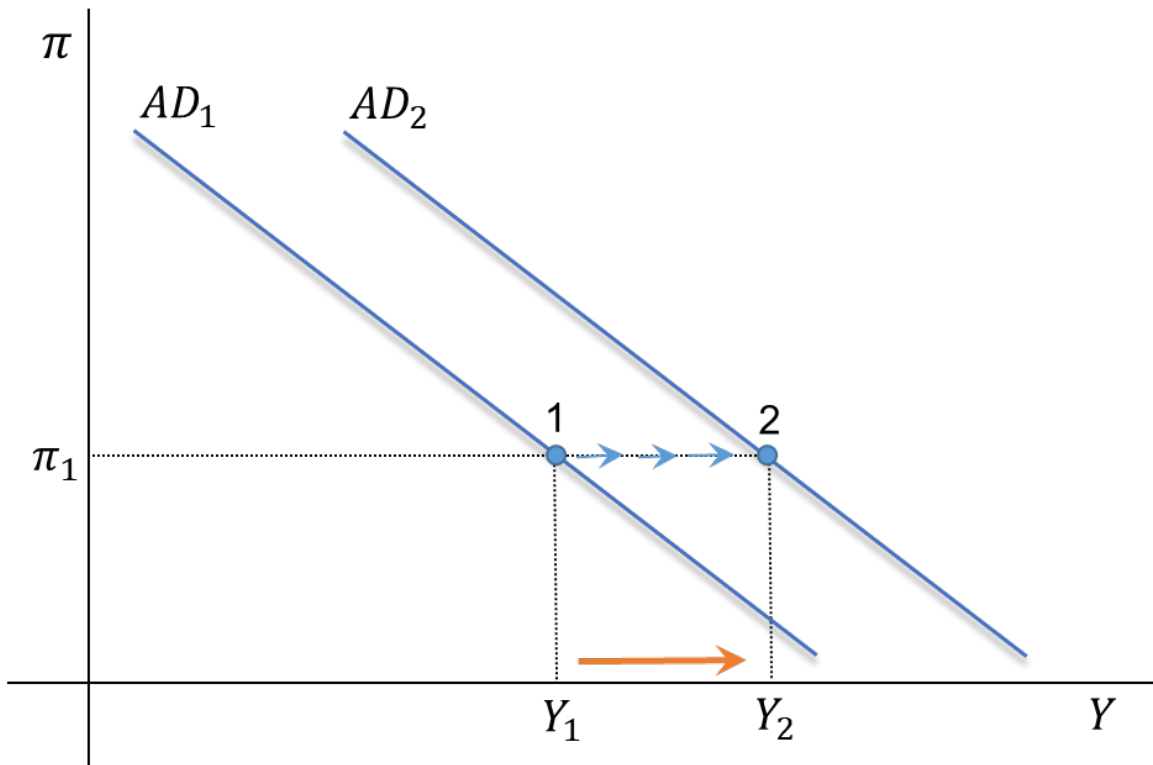
From point 1 to 2:

- If π increases, the central bank will raise i and r
- As i and r go up, demand will go down, and GDP will follow.
- This occurs if $\Delta(\bar{A} - \phi \bar{r}) = 0$

AD Curve: A Shift

The AD curve is given by: $Y = m \cdot (\bar{A} - \phi \bar{r}) - m\phi\lambda \cdot \pi$

...



From point 1 to 2:

- If π remains constant, the central bank will keep i and r constant.
- If those rates are constant, and $\Delta(\bar{A} - \phi\bar{r}) > 0$, then demand and GDP go up.

3. AD Curve: Summary

A Movement Along the AD Curve

- Moving from one point to another on the same curve
-

$$Y = m \cdot (\bar{A} - \phi\bar{r}) - m\phi\lambda \cdot \pi$$

Remains unchanged

Remains unchanged

Changes

A Shift of the AD Curve

- The curve shifts to the right or to the left

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The diagram shows the equation $Y = m \cdot (\bar{A} - \phi \bar{r}) - m\phi\lambda \cdot \pi$. A green arrow curves from the word "Changes" (in a cyan box) above the equation to the variable $\bar{A}$. Another green arrow curves from the word "Changes" (in a cyan box) below the equation to the variable $\phi \bar{r}$. A green arrow points from the word "Remains unchanged" (in a yellow box) below the equation to the variable π .

4. Readings

Readings

Read **Chapter 10** of the adopted textbook:

Frederic S. Mishkin (2015). *Macroeconomics: Policy & Practice*, Second Edition, Pearson Editors

Two important notes:

1. Do not study the graphical analysis in Figures 10.4, 10.5, and 10.6 in the chapter above. These slides simplify the graphical analysis presented in this chapter of the textbook a lot. Those figures do not add any significant point to the presentation and will take up too much of your time.
2. The section “The Money Market and Interest Rates” in the chapter above, which starts on page 263, will be postponed to next week’s materials.

Bibliography