MONETARY POLICY AND AGGREGATE DEMAND

Week 5

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Recall: The Fisher Equation

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

$$r = i - \pi$$

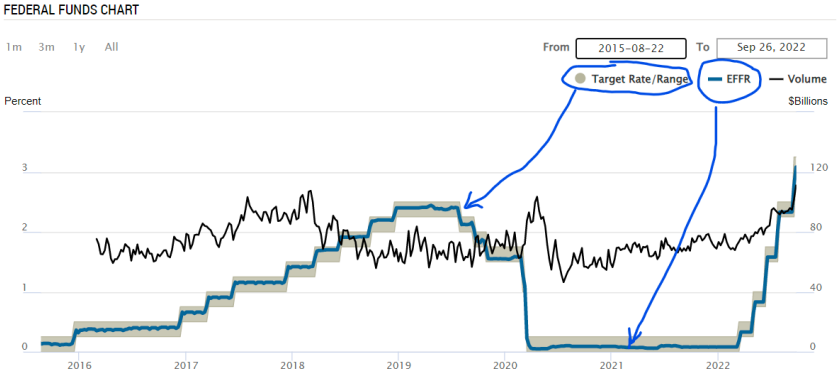
  r is the real interest rate
  i is the nominal (short-term) interest rate
  π is the rate of inflation

- In the short-term, *from one day to the other*, the Fed can change its short-term interest rate.
- 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

The Fed and the FFR

The Fed has changed its target rate quite regularly. EFFR is known as the "Effective Fed Funds Rate" (the overnight interest rate), highly influenced by Fed decisions. Source: Fed New York



The Monetary Policy Curve (MP)

- The Fed bases its decisions to change short term interest rates on 3 factors:
  - The natural real interest rate: $\bar{r}$ (corresponds to the marginal productivity of capital MPK)
  - The rate of inflation: π
  - The output gap: $real\ GDP - Potential\ GDP$

- To simplify the exposition, this chapter (and most of the textbook) avoids the output-gap impact upon the Fed's decision making process.

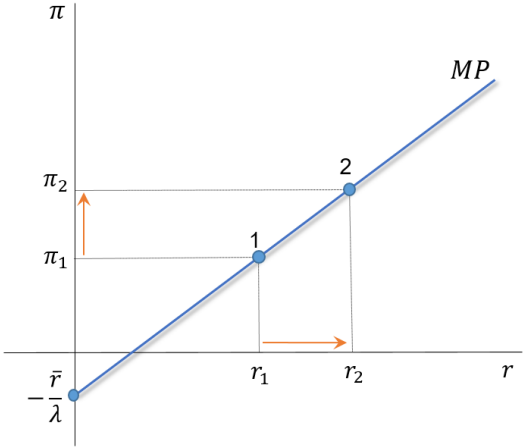
- Therefore, the **monetary policy rule** (MP) becomes:

$$r = \bar{r} + \lambda\pi \tag{1}$$

where λ gives how much the central bank dislikes inflation.

Representation of the MP Curve

We represent the MP curve with the (r, π) axis, while the textbook reverses them (π, r). Our approach saves time and the exercises are much easier to understand.



The Taylor Principle

The upward slope of the MP curve indicates that the central bank raises real interest rates when inflation rises because monetary policy follows the Taylor principle:

$$\lambda > 0$$

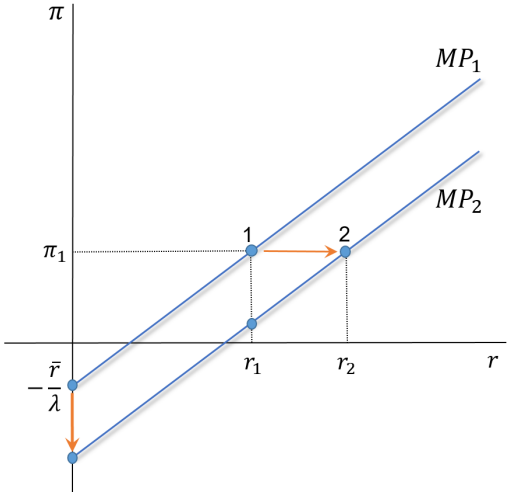
- If $\lambda > 0 \Rightarrow \Delta i > \Delta\pi$ always
- A numerical example. Suppose $\lambda = 0.5$; $\Delta\pi = 1$
  - From the MP function: $\Delta r = \Delta\bar{r} + \lambda \times \Delta\pi = 0 + 0.5 \times 1 = 0.5$
  - From the Fisher equation: $\Delta r = \Delta i - \Delta\pi \Rightarrow \Delta i = 1 + 0.5 = 1.5$
  - So: $\Delta i = 1.5 > \Delta\pi = 1$
- Otherwise, we ended up in an inflationary spiral:

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

Shifts in the MP Curve

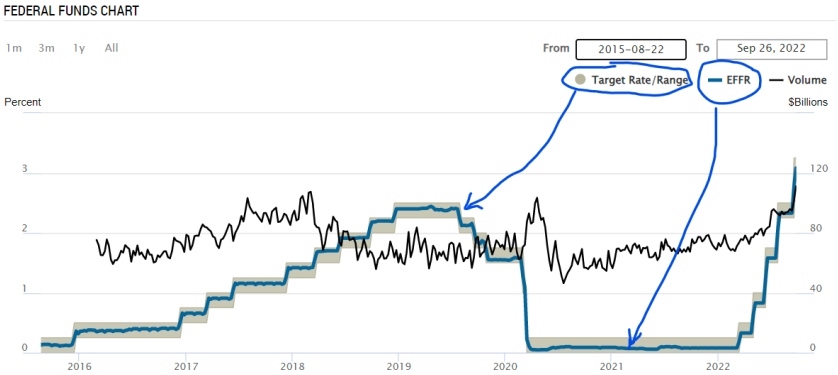
Changes in monetary policy shift the MP curve.

If $\bar{r}$ increases, the MP curve shifts to the right, and vice-versa.



Policy and Practice

Can we distinguish between an accommodating monetary policy (movement along the MP curve) and an aggressive monetary policy (a shift in the MP curve) in the figure below? Why one? Why the other?



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 3 showed that changes in interest rates, in turn, affect the equilibrium output.

With these two curves, we can now link the quantity of aggregate output demanded with the inflation rate.

In a simple way:

$$MP = IS \;\rightarrow\; AD$$

Derivation of the AD Curve

Recall the **IS curve**

$$Y = m \cdot \overline{A} - m \cdot \phi \cdot r \tag{2}$$

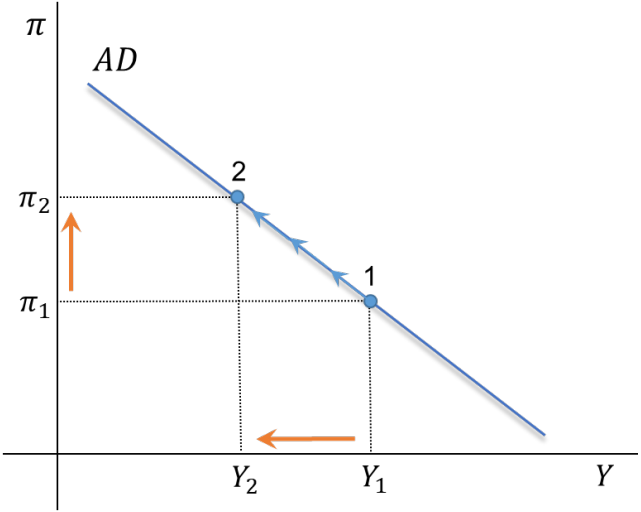
Now the **MP curve**:

$$r = \overline{r} + \lambda \cdot \pi \tag{3}$$

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

$$Y = m \cdot \bar{A} - m \cdot \phi \cdot (\overline{r} + \lambda\pi) \tag{4}$$

Representation of the AD Curve



Movement along the AD Curve

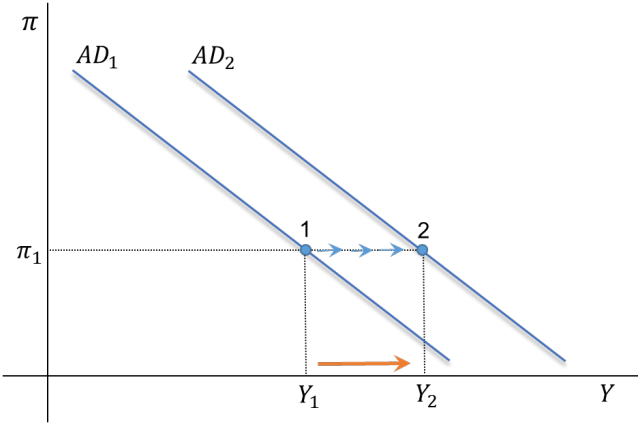
π goes up, Y goes down

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

Everything else remaining constant

$$\overline{A} = \overline{C} + \overline{I} - d \cdot \overline{f} + \overline{G} + \overline{NX} - c \cdot \overline{T}$$

Shifts in the AD Curve: I



Shifts in the AD Curve: II

Natural real interest rate goes up, *Y* goes down

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

Autonomous demand goes up, *Y* goes up

π remains constant

$$\overline{A} = \overline{C} + \overline{I} - d \cdot \overline{f} + \overline{G} + \overline{NX} - c \cdot \overline{T}$$

3. 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 spend time studying the graphical analysis in Figures 10.4, 10.5, and 10.6. In these slides, we simplify the graphical analysis presented in this chapter of the textbook a lot. Those figures do not add any significant point to what is presented in the slides, and they will take too much of your time.

  2. Section "The Money Market and Interest Rates", which starts on page 263, will be postponed to next week's materials.