European Macroeconomics

V. The monetary policy of the ECB

Lecture 9

Monetary Policy Strategy of the ECB

ECB plans a „Strategic Review"
(Press conference by Christine Lagarde on Dezember 12th, 2019)

- (…) that strategic review needs to be comprehensive, needs to look at all and every issue, will turn each and every stone (…)

- (…) It is the point of every strategic review by all central banks (…) to actually look at their objective, how they define their medium-term objective in particular, how they give content to the price stability that is in their mandate, (…)

- (…) it will also address (…) the massive technological change (…) the immense challenge that climate change (…) It will include aspects of inequality that are certainly rising in our economies"

Source:
https://www.ecb.europa.eu/press/pressconf/2019/html/ecb.is191212~c9e1a6ab3e.en.html

Image source: https://commons.wikimedia.org/wiki/File:New_ECB_Chief_Lagarde_to_address_plenary_for_first_time_(49521491987).jpg

The strategy developed in 1998

The ECB's monetary policy strategy comprises

- A quantitative **definition of price stability**, and

- A **two-pillar approach** to the analysis of the risks to price stability

    - **Economic analysis**: Analysis of economic dynamics and shocks

    - **Monetary analysis**: Analysis of monetary trends

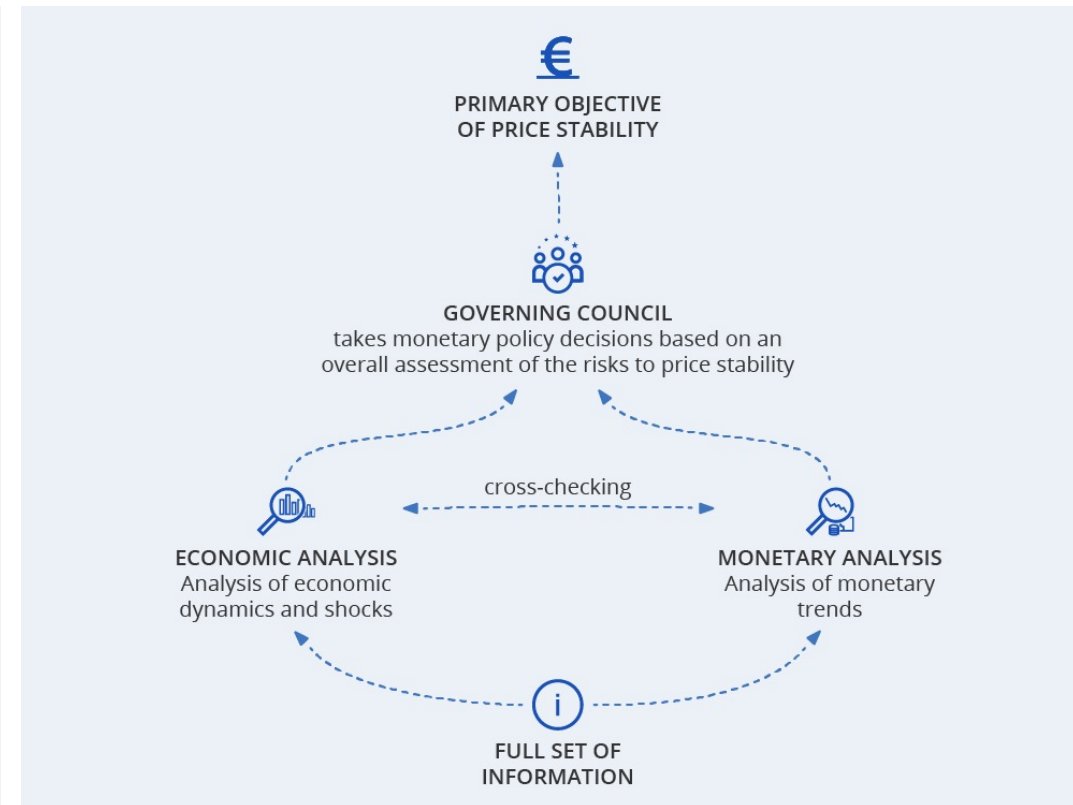Main problem: two-pillar approach is very vague

Image source: ECB

What is the function of a monetary policy strategy?

- A strategy can be viewed in terms of a **heuristic**:
    - It serves to reduce a complex decision problem to a simple **rule of thumb**
    - It helps to understand why the central bank changes its key interest rates and/or adopts unconventional measures?

- Heuristics are mainly discussed in the field of **"behavioral economics".** Key assumption: Due to a **lack of information** and **limited processing capacities of the human brain**, human action is often guided by heuristics

Behavioral Economics focuses on the the limitations of the human brain

"Think of the human brain as a personal computer with a very slow processor and a memory system that is both small and unpredictable.

I don't know about you, but the PC I carry between my ears has more disk failures than I care to think about."

– **Richard Thaler**,
Nobel laureate in Economics, 2017

Image source: https://commons.wikimedia.org/wiki/File:
Richard_Thaler_Chatham.jpg

The function of heuristics

- Ideally: Good decisions with little and, above all, readily available information.
  - Studies by Gerd Gigerenzer, MPI Berlin. See also for example: Simple Heuristics That Make Us Smart (1999).
  - Behavior guided by heuristics is conservative, i.e. oriented to the status quo.
- Heuristics can lead to systematic errors ("**biases**")
  - Example: "Anchor Heuristics
  - Studies by Daniel Kahneman and Amos Tversky

Gerd Gigerenzer

Image source: https://commons.wikimedia.org/wiki/ File:Keynote_Gerd_Gigerenzer_(26970155108).jpg

Anchor heuristic leads to biased decisons

Forecast example

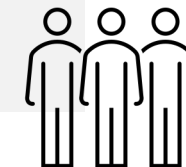| Group 1 |
| --- |
| Will the HangSeng Index be above or below **17,000 points** at the end of the year? |
| At what level do you expect the HangSeng Index to end the year? |

Group 2
Will the HangSeng Index be above or below **24,000 points** at the end of the year?
At what level do you expect the HangSeng Index to end the year?

19,800	Ø Answers	22,200

Functions of a monetary policy strategy

- Simplification of the **internal decision-making process** in a central bank.
  → Particularly beneficial in the case of the ECB, since Governing Council has 26 members

- **Communication with the public** to explain why the central bank has taken a certain decision
  - Greater **transparency** and consequently
  - greater **credibility** of the central bank
  - Criticism by the **German Constitutional Court** shows that there are deficits at the ECB in this regard

Image source: ECB

Monetary policy strategies are shaped by economic paradigms

- The **classical paradim**: monetarism and the strategy of **monetary targeting**

- **Keynesian paradigm**
  → Inflation targeting: Phillips Curve and inflation expectations

- A mix of the **classical** and the **Keynesian paradigm**:
  → **Taylor rule**: central bank interest rate anchored by a neutral interest rate with deviations determined by the rate and the inflation gap and output gap

Strategy of monetary targeting

- Theoretitical basis: Classical theory with the quantity theory of the price level and monetarism

"***Inflation is always and everywhere a monetary phenomenon*** *in the sense that it is and can be produced only by a more rapid increase in the quantity of money than in output.*" (Milton Friedman*, The Counter-Revolution in Monetary Theory*, 1970)

- **Assumptions:**
    - Milton Friedman (1961) "monetary actions affect economic conditions only after a lag that is both long and variable." JPE 1961 Vol 69 (5), p. 447
    - Classical dichotomy: the monetary has no effect on the real sphere (at least in the medium- and long-term)
- **Implications for monetary policy**
    - Targeting the money stock without taking into account demand and supply shocks
    - Focus on price stability

ECB strategy 1998: „assigning a prominent role to money"
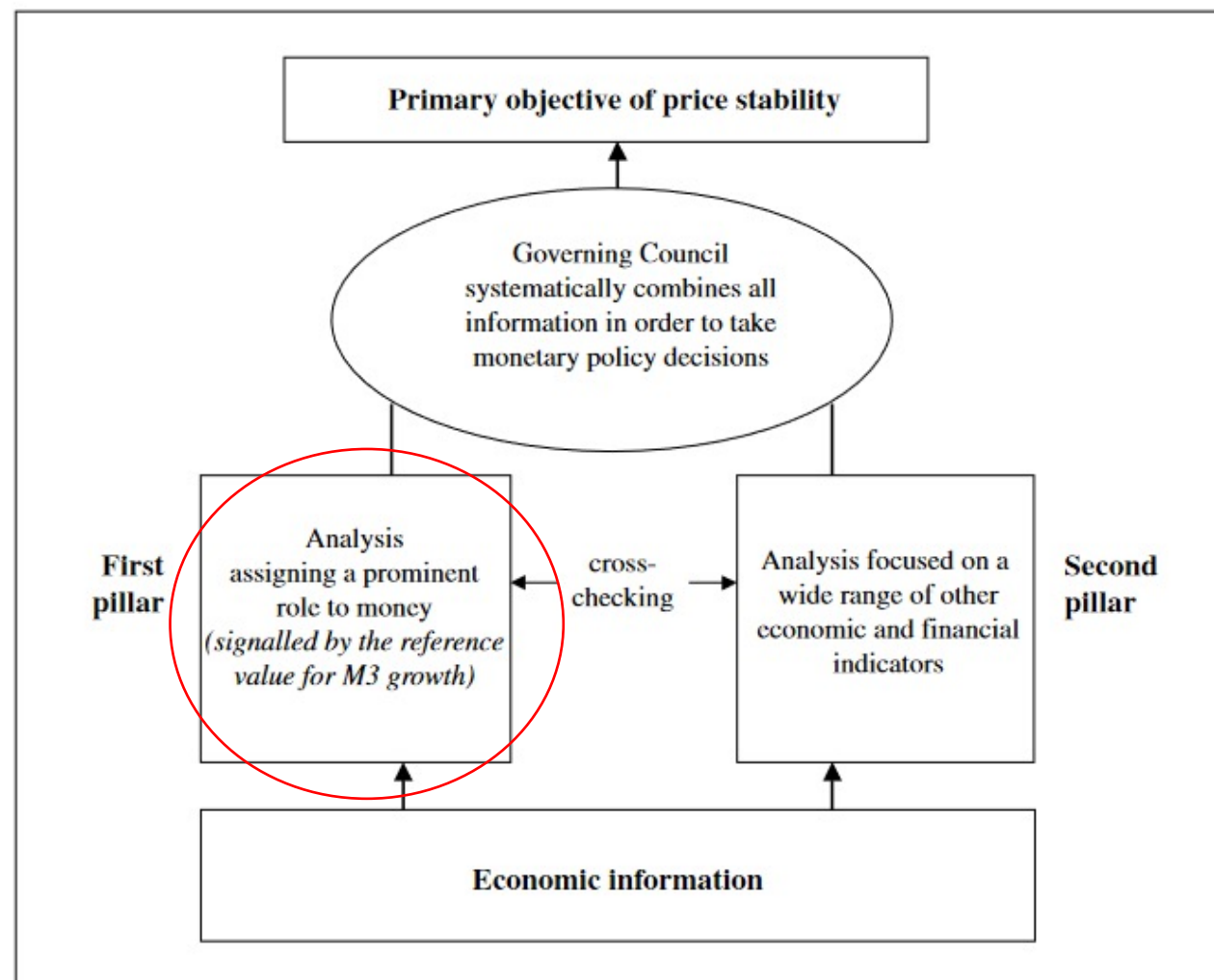
Source: https://www.ecb.europa.eu/pub/pdf/other/pp37_48_mb200011en.pdf

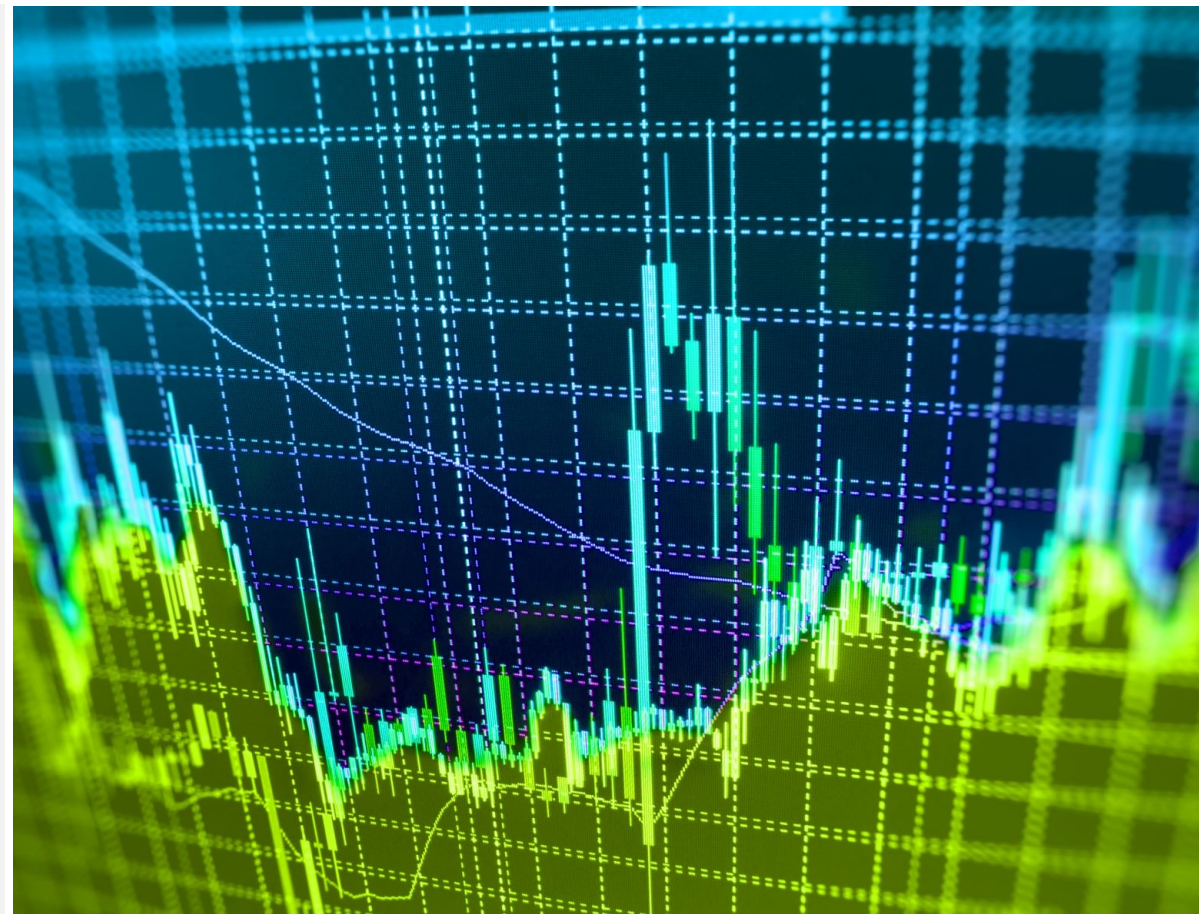# Determining the target value for the growth rate of the money stock

- Quantity Equation:

$$M \cdot v = P \cdot Y$$

- Transformed in growth rates:

$$\widehat{M}^* = \pi_0 + \widehat{Y} - \widehat{v}$$

- The **optimum growth rate** of the money stock $\left(\widehat{M}^*\right)$ can derived from the

  - Inflation target (π_0)
  - Trend GDP growth $(\widehat{Y})$
  - And the trend of change in the velocity of money $(\widehat{v})$

How the ECB determined the „reference value" for the growth rate of M3

- π_0 : ECB inflation objective (EZB $\approx$ 1,5 %)
- $\hat{Y}$: growth rate of potential output (ECB $\approx$ 2 % - 2 1/2 % p.a.)
- $(\hat{v})$: Trend decline of the velocity of M3 (EZB $\approx$ 1/2 % - 1 % p.a.)
- Reference value for M3 growth:

$$\widehat{M}^* = 1,5\% + 2,25\% -(-0,75\%)= 4,5 \%$$

- In 2003 the ECB stopped checking the reference value

Implementation of monetary targeting by the Deutsche Bundesbank – Annual corridors for the M3 growth
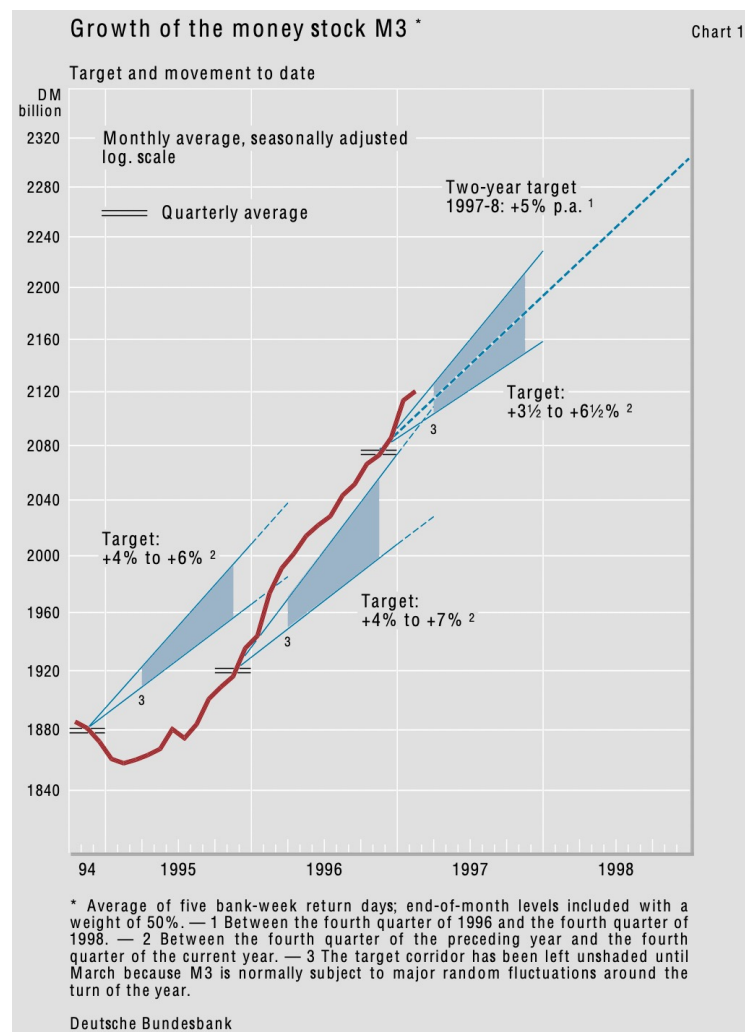

Source: Bundesbank, Annual Report 1996, p.71

The performance of the Bundesbank's monetary targeting from 1975 to 1998

- 24 target corridors for monetary growth from 1975 to 1998 with, at times, a very wide range (fluctuation range of up to 3.9 percentage points, i.e. from 3.5% to 7.4%)

- Targets were missed in eleven years

- No correction for missed targets

- Despite the Bundesbank's frequent misses of targets, Bundesbank policy is considered very successful

# The experience of the ECB with its reference value for M3

- Official reference value of 4.5% for the growth rate of the money stock M3 since 1999.

- No update since then.

- Role of the reference value increasingly relegated to the background. In 2003 from "first pillar" downgraded to "second pillar"

- No longer reported in ECB bulletins

- Permanent overshooting of the reference value until the financial crisis
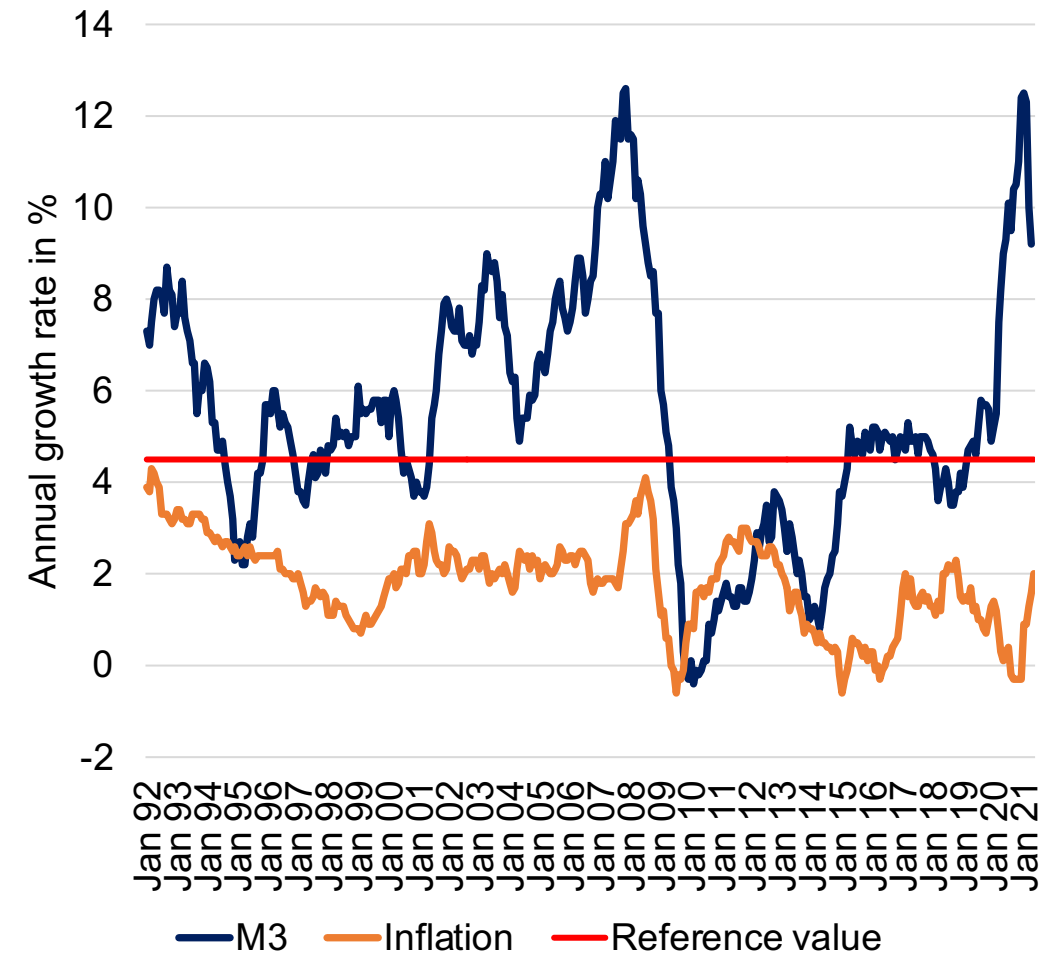
Source: ECB, Statistical data warehouse.

Monetary targeting as a heuristic for monetary policy

- If monetary growth is **above the target**, there is a risk of inflation: a restrictive interest rate policy is required

- If monetary growth is **below target**, there is a risk of deflation: a more expansionary interest rate is required

- The ECB's interest rate policy cannot be explained with the developments of M3
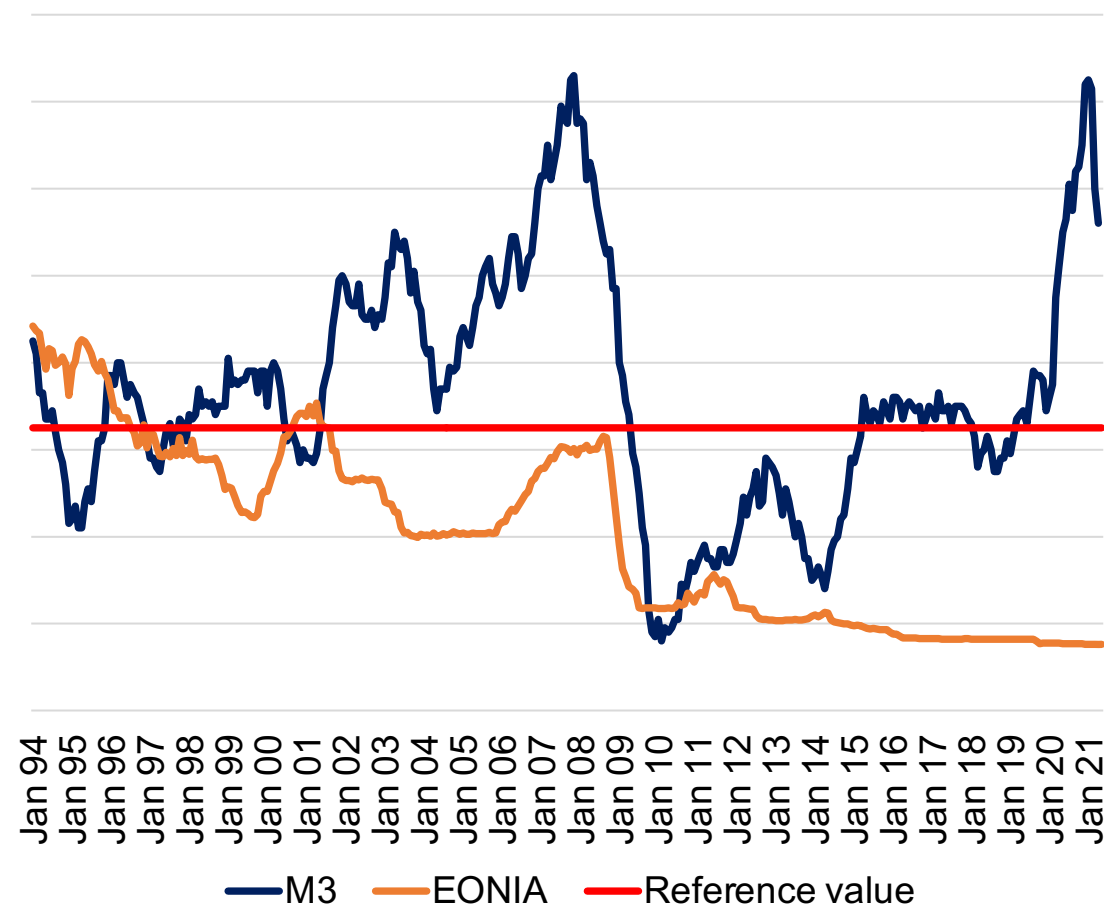
Source: ECB, Statistical data warehouse.

Assessment of the ECB monetarist strategy

- Overall: No systematic correlation between the growth rate of the M3 money supply and the euro area inflation rate.

- Money growth has not played a role in the ECB's interest rate policy. It cannot be explained by comparing M3 growth and the reference value of 4.5%

- While the importance of money as a determinant of the ECB's decision-making processes was emphasized in the 1998 ECB strategy, in practice the reference value of M3 has never played an important role
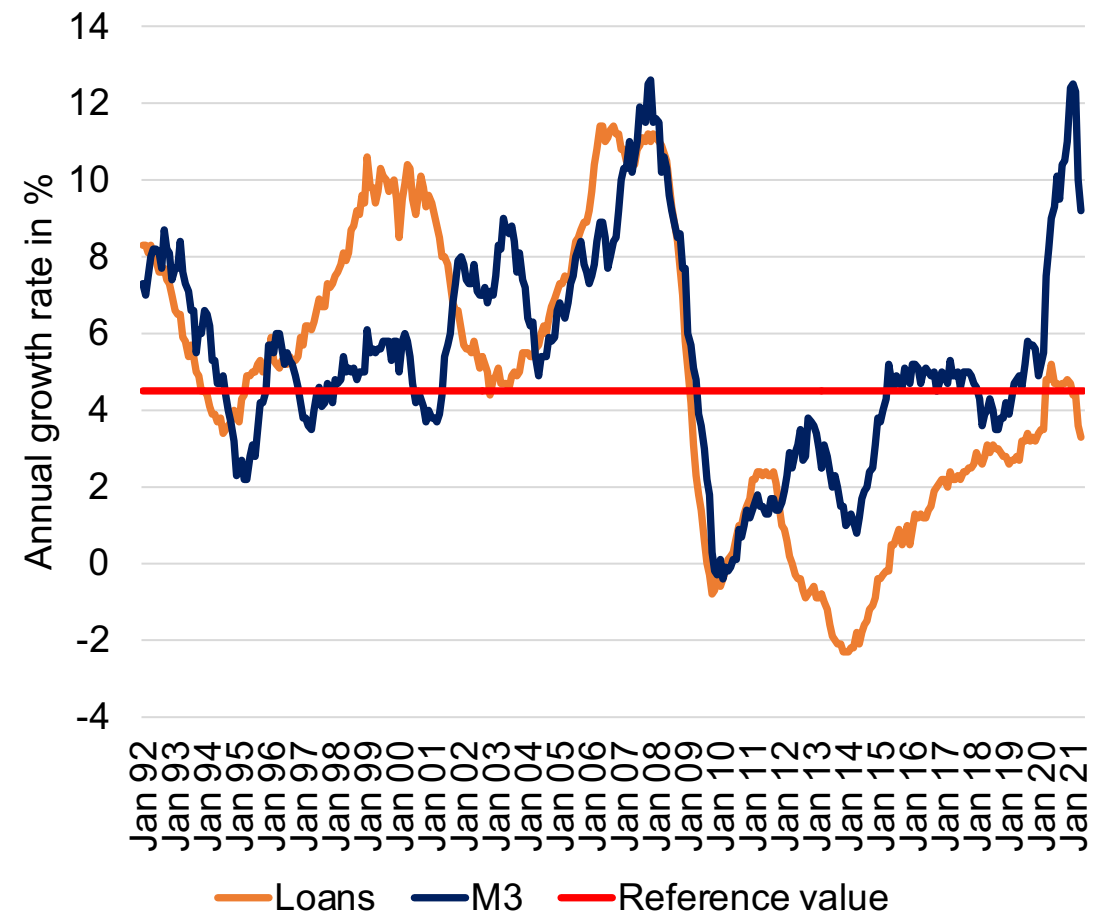
What is wrong with monetary targeting?

- M3 is not only used as a **means of payment** (assumption of the Quantity Theory), but to a large degree also as a **store of value**

- An increase in M3 does not automatically mean higher private sector spending.

- Important cause of fluctuations in M3: **portfolio reallocations**. About 50% of M3 contains interest-bearing assets

- Increase in short-term interest rates leads to a reallocation within M3, but not to a deceleration of its growth rate

- While the Quantity Theory describes a long-term relationship, the Bundesbank used the concept for **short-term analysis**

A re-interpretation of the ECB's monetary pillar

- As money is created by bank loans, M3 and loans move mostly in the same direction
- Strong M3 growth signals strong credit growth (situation in the years 2005-2007)
- M3 growth rate is an indicator of developments in the financial system, not as an indicator of the inflation trends

Source: ECB, Statistical data warehouse

Source: ECB, Statistical data warehouse.

Strategy of inflation targeting

- Developed at the end of the 1980s without a theoretical foundation.

- Countries with monetary targeting (New Zealand, Canada) or exchange rate strategies (England and Sweden) failed with these strategies.

- Today used in practice in a large number of countries (44), including many developing countries (19).

Theoretical framework (IS/PC/MP-model)

- Phillips Curve and the role of inflation expectations for monetary policy

$$\pi = \pi^e + dy + \varepsilon_2$$

- If the inflation target is credible, i.e. if $\pi^e = \pi^*$, the central bank can achieve the „bliss point" with $\pi = \pi^*$ and $y = 0$
- If inflation expectations are below or above π^*, the bliss point cannot be realized, i.e. $L > 0$.

Main features of IT

- Price stability as the main objective of monetary policy
- Central bank specifies **concrete value for target inflation** (index, fluctuation band, exceptions)
- Target value can also be determined by government (United Kingdom)
- Central bank publishes **inflation forecasts** under the assumption of
  - constant money market interest rates
  - money market rates in line with market forecast
- Central bank communicates intensively with the public (**inflation reports**)
- Money supply or exchange rate do not receive greater attention

Source: https://www.bankofengland.co.uk/inflation-report/2019/august-2019
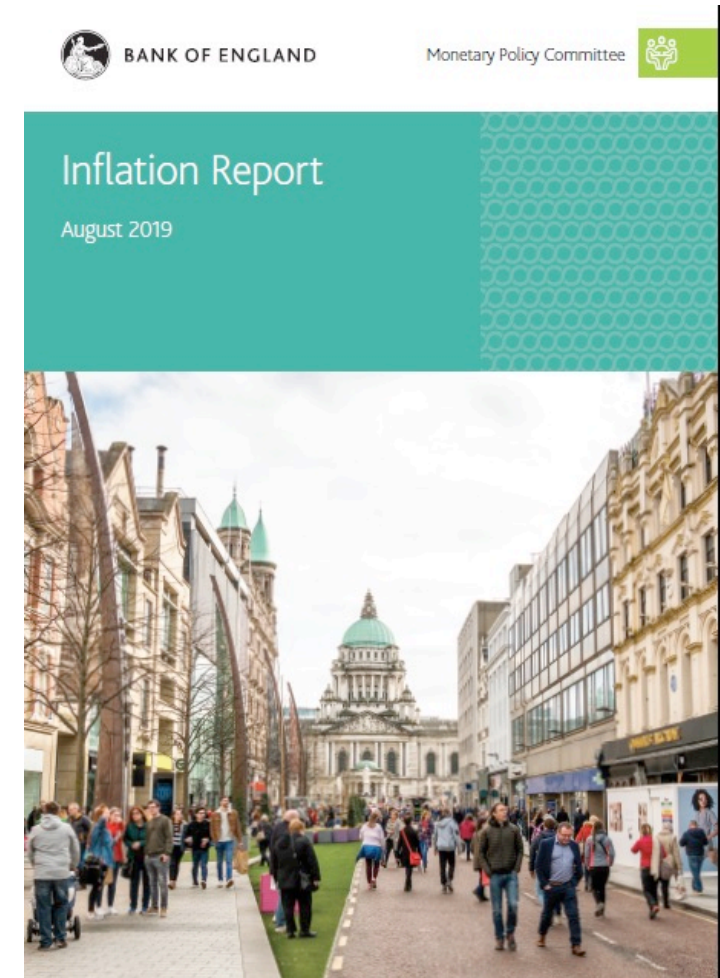
IT as a heuristic

Recommended action if central bank prepares its inflation forecasts assuming

- of **constant money market interest rates**:
  - If inflation forecast is **above** target, money market rates should be raised
  - If inflation forecast is **below** the target value, money market interest rates should be lowered

- of a **path of money market interest rates** as expected by market participants:
  - If inflation forecast is **above** target: stronger increase in interest rates than expected by market participants
  - If inflation forecast is **below** target: weaker in increase in market interest rates than expected by market participants

Christine Lagarde at the ECB Press Conference on June 10th, 2021

- "We expect underlying price pressures to increase somewhat this year owing to temporary supply constraints and the recovery in domestic demand. Nevertheless, the **price pressures will likely remain subdued overall**, in part reflecting low wage pressures, in the context of still significant economic slack, and the appreciation of the euro exchange rate."

- This assessment is broadly reflected in the baseline scenario of the June 2021 Eurosystem staff **macroeconomic projections** for the euro area, which foresees

  - annual inflation at 1.9 per cent in 2021,
  - 1.5 per cent in 2022 and 1.4 per cent in 2023.

Image source: https://commons.wikimedia.org/wiki/File:New_ECB_Chief_Lagarde_to_address_plenary_for_first_time_(49521491987).jpg

ECB pursued de facto the strategy of *inflation targeting*

While the ECB never explicitly adopted IT, it uses a elements of IT in its communication with public. Interest rate forecasts are based on market expectations

	June 2021				March 2021			
	2020	2021	2022	2023	2020	2021	2022	2023
Three-month EURIBOR (percentage per annum)	-0.4	-0.5	-0.5	-0.3	-0.4	-0.5	-0.5	-0.4
Ten-year government bond yields (percentage per annum)	0.0	0.2	0.5	0.7	0.0	0.0	0.1	0.3
Oil price (in USD/barrel)	42.3	65.8	64.6	61.9	42.3	59.3	55.7	53.7
Non-energy commodity prices, in USD (annual percentage change)	3.2	39.0	0.1	-8.0	3.2	19.0	-2.1	-1.4
USD/EUR exchange rate	1.14	1.21	1.21	1.21	1.14	1.21	1.21	1.21
Euro nominal effective exchange rate (EER42) (Q1 1999 = 100)	119.4	122.0	122.2	122.2	119.4	121.4	121.4	121.4

Source: https://www.ecb.europa.eu/pub/projections/html/ecb.projections202106_eurosystemstaff~7000543a66.en.html

Forecast for the HICP inflation rate

Chart 3

Euro area HICP

(annual percentage changes)

Source: https://www.ecb.europa.eu/pub/projections/html/ecb.projections202106_eurosystemstaff~7000543a66.en.html

ECB provides a survey of other forecasts which allows to check the ECB's projection

Comparison of recent forecasts for euro area real GDP growth and HICP inflation

(annual percentage changes)

	Date of release	Real GDP growth				HICP inflation			
		2020	2021	2022	2023	2020	2021	2022	2023
Eurosystem staff projections[1]	June 2021	-6.8	4.6	4.7	2.1	0.3	1.9	1.5	1.4
OECD	May 2021	-6.7	4.3	4.4	-	0.3	1.8	1.3	-
Euro Zone Barometer	May 2021	-6.6	4.3	4.4	1.9	0.3	1.7	1.4	1.5
Consensus Economics	May 2021	-	4.2	4.3	2.2	-	1.7	1.3	1.5
European Commission	May 2021	-6.6	4.3	4.4	-	0.3	1.7	1.3	-
Survey of Professional Forecasters	April 2021	-	4.2	4.1	1.9	-	1.6	1.3	1.5
IMF	April 2021	-6.6	4.4	3.8	1.9	0.3	1.4	1.2	1.4

Source: https://www.ecb.europa.eu/pub/projections/html/ecb.projections202006_eurosystemstaff~7628a8cf43.de.html

How useful is IT?

- IT helps structure discussions about interest rate decisions (medium-term orientation): "Is the medium-term inflation forecast consistent with the inflation target?"

- Critics of the central bank's policy are forced to present their own forecasts

- But, there remains the question of how inflation forecasts are made

- Comparison of central bank forecasts with other forecasts helps reduce central bank's discretionary space

- Serious problem: IT can lead to one-sided interest rate policy, which loses sight of other objectives, especially stability of the financial system

The ECB's not so convincing arguments against IT

While there are many similarities between the ECB's strategy and strategies of other central banks, the ECB decided not to pursue a direct inflation targeting strategy

- First, focusing entirely on a forecast inflation figure **does not provide a comprehensive and reliable framework for identifying the nature of threats to price stability.** The appropriate monetary policy response generally depends on the sources of these risks to price stability. (…)

- Second, various aspects of the textbook inflation targeting approach – such as the **fixed horizon (e.g. two years) of the forecast** from which monetary policy decisions feed back – are **somewhat arbitrary** and in many circumstances do not appear to be optimal.

- Third, it is nevertheless difficult to integrate **the information contained in monetary aggregates** into inflation forecasts that are based on conventional macroeconomic models.

- Finally, the ECB takes the view that **relying on a single forecast** would not be appropriate, given the considerable uncertainty relating to the structure of the euro area economy.

Source: https://www.ecb.europa.eu/pub/pdf/other/monetarypolicy2011en.pdf

Taylor-Rule

- Not explicitly derived from a macroeconomic theory
- In 1993, John Taylor „discovered" this rule by trying to decribe the actual interest rate policy of the FED during the years 1987
- Original Taylor-Rule for the Federal Funds Rate (i)
$$i = \pi + 2 + 0.5\,(\pi - 2) + 0.5\,y$$
- More general version
$$i = \pi + \bar{r} + 0.5\,(\pi - \pi^*) + 0.5\,y$$
- In real terms
$$r = \bar{r} + 0.5\,(\pi - \pi^*) + 0.5$$
- Decisive variable is $\bar{r}$ which is defined as the „real rate" or „natural rate „in terms of the classical model
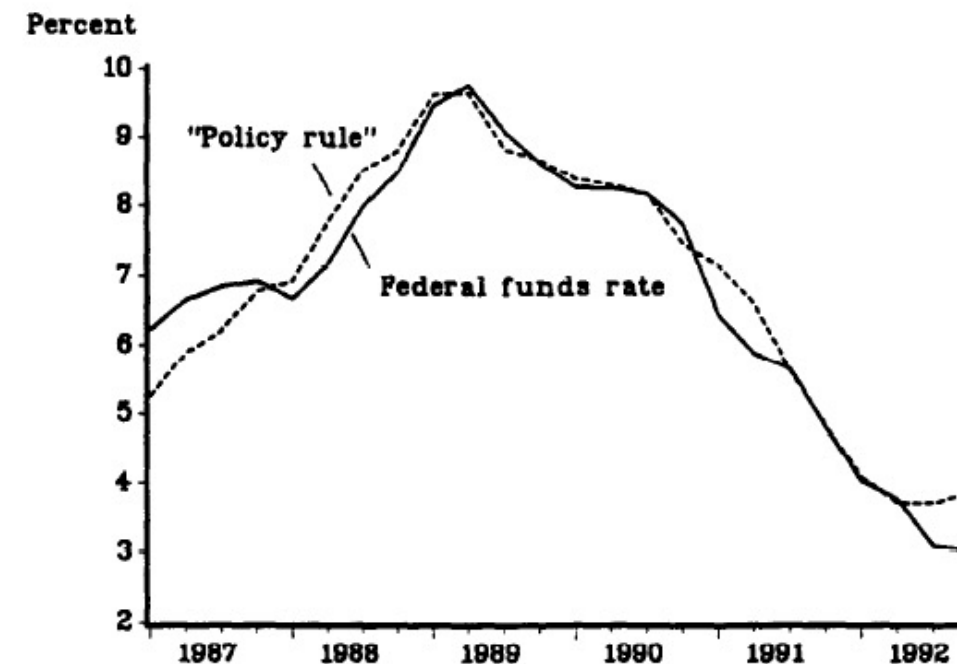
Figure 1. Federal funds rate and example policy rule.

Taylor, John B. 1993. "Discretion Versus Policy Rules in Practice." Carnegie-Rochester Conference Series on Public Policy 39, pp. 195–214

Heuristic for the central bank

- In an **equilibrium situation** without an output or an inflation gap: the policy rate should be at the level of the real rate
  → Laubach/Willimams (2001): "the natural rate of interest, represents a medium-run real rate 'anchor' for monetary policy"[1]

- With a positive (negative) inflation and/or output gap, a higher (lower) policy rate is required

- This logic goes back to the theory of Knut Wicksell who in tried to develop a synthesis of the classical and the monetary model

[1] https://www.federalreserve.gov/pubs/feds/2001/200156/200156pap.pdf

Knut Wicksell: "Geldzins und Güterpreise" (1898)[1]

The natural/neutral rate of interest:

"There is a certain rate of interest on loans which is neutral in respect to commodity prices, and tends neither to raise or lower them.

This is necessarily the same as the rate of interest which would be determined by supply and demand if no use were made of money and all lending were effected in the form of capital goods.

It comes to much the same thing to describe it as the current value of the natural rate of interest on capital."

– Wicksell, K. (1898) "Interest and Prices", edition of 1936 in English published by Macmillan, London, p 102.

[1] http://digi.ub.uni-heidelberg.de/diglit/wicksell1898

Wicksell

If the **monetary rate of interest equals the natural rate**, the mechanism of the classical paradigm apply:

"Now if **money is loaned at this same rate of interest**, it serves as nothing more than a cloak to cover a procedure which, from the purely formal point of view, could have been **carried on equally well without it**. The conditions of economic equilibrium are fulfilled in precisely the same manner."

  – Wicksell, K. (1898) "Interest and Prices", edition of 1936 in English published by Macmillan, London, p 104.

Wicksell

If **money rate deviates from neutral rate**, the mechanics of the monetary paradigm start to operate:

▪ "The 'supply of money' is thus furnished by the demand Itself.

▪ (…) it follows that the banks, or rather the aggregate of banks taken as a whole, can within limits to be stipulated in a moment lend any desired amount of money for any desired period of time **at any desired rate of interest, no matter how low**, without affecting their solvency, even though their deposits may be falling due all the time.

▪ It follows that if the rest of our theory is correct the **banks can raise the general level of prices to any desired height**."

– Wicksell, K. (1898) "Interest and Prices", edition of 1936 in English published by Macmillan, London, p 110.

The Taylor rule for the euro area: Why has the strong deviation of the policy rate im the years 2014-2019 not led to inflation?

Taylor Rule for the euro area

Legend: Taylor Rule with GDP Deflator — Taylor Rule with Core Inflation — Interest Rate ECB Main Refinancing Operation
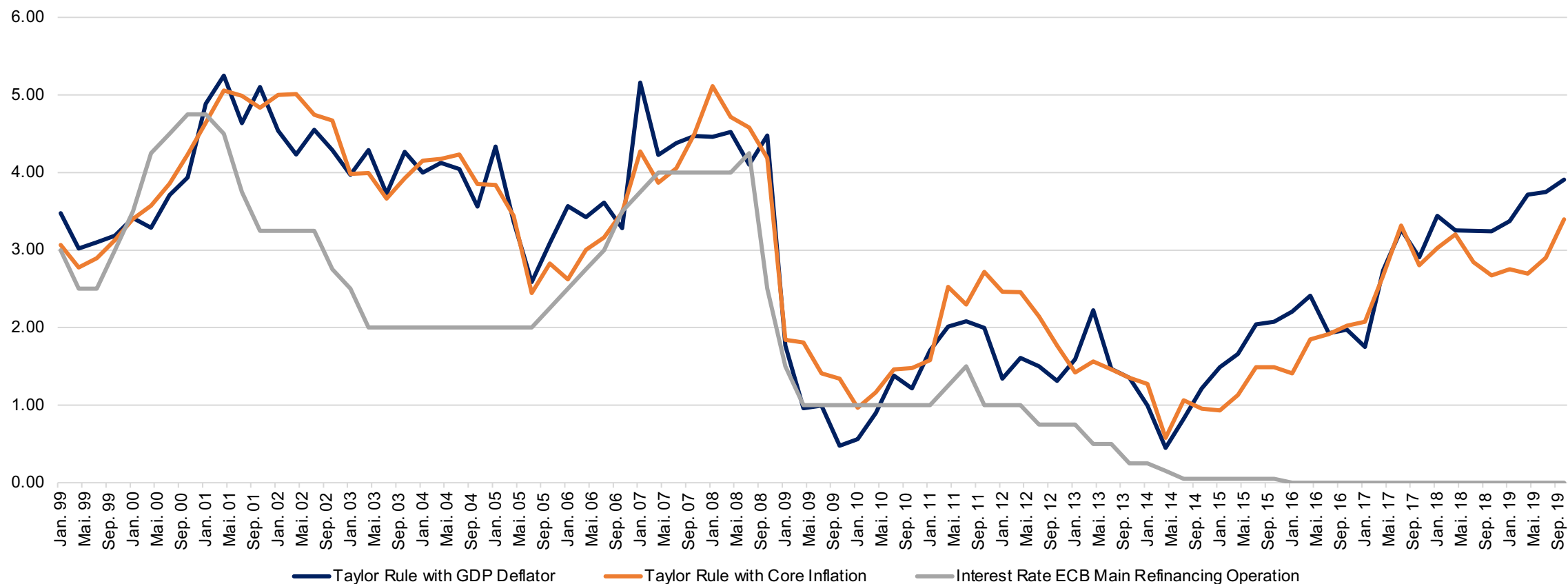
Main problem: The real interest rate is difficult to grasp
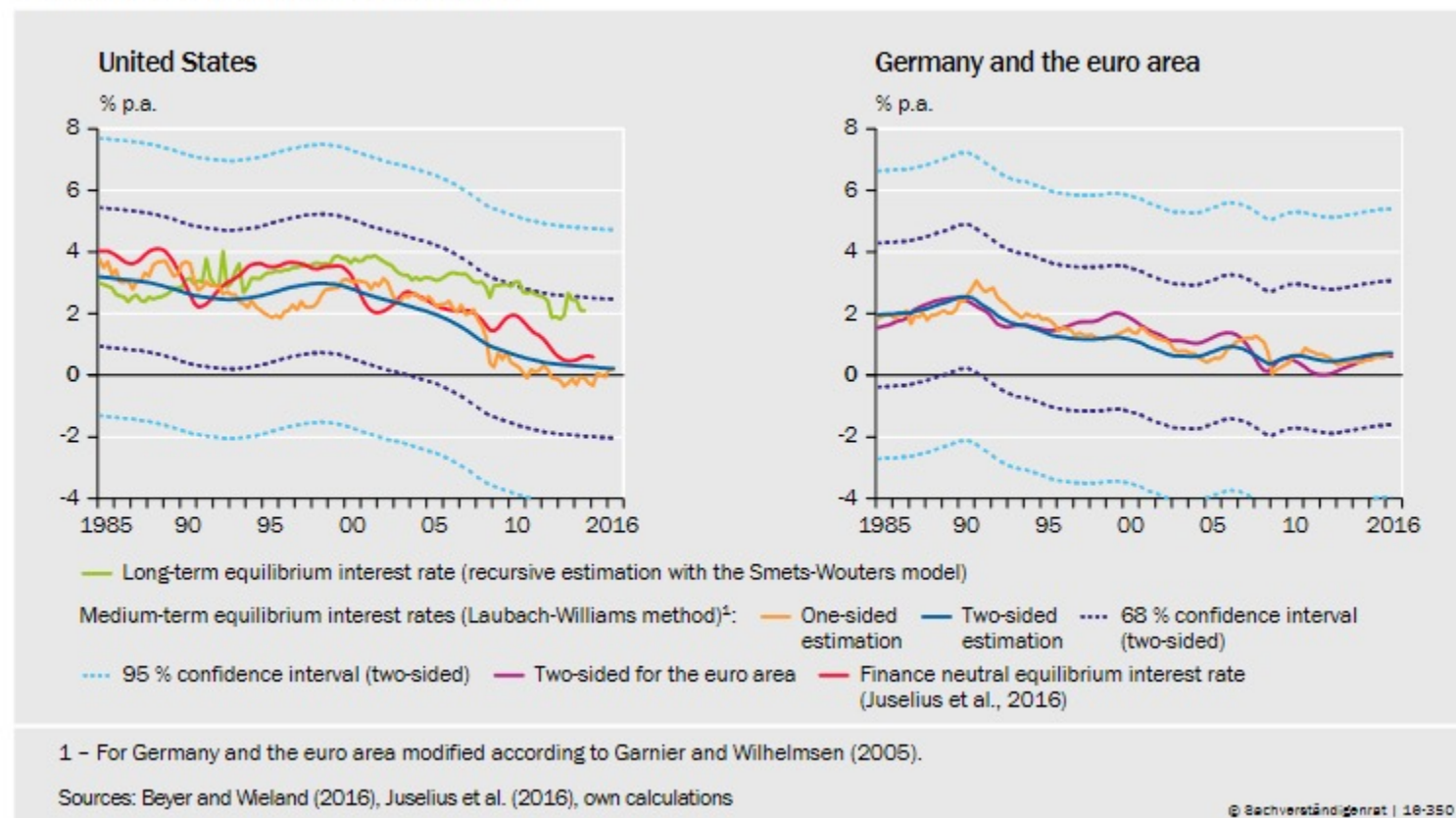
Source: German Council of Economic Experts, Annual Report 2016/17, Figure 54

Estimates for r* by the Federal Reserve Bank of New York

Source: https://www.newyorkfed.org/research/policy/rstar

Assessment of the Taylor rule

- Taylor rule comes very close to the **principles** of a heuristic

- With a **simple formula**, one can quickly assess whether current interest rate is appropriate or not

- The **neutral interest rate** provides an **anchor** for the appropriate interest rate level, which is missing in inflation targeting or monetary targeting

- Serious problems in practice:
  - The **neutral real interest is difficult grasp**. In fact, it only exists in the world of the classical model with its all-purpose good.
  - The **output gap** is also a complicated concept which is difficult to identify in real-time.

- In the 2010s, the Taylor rule has led to **serious mis-judgements** of the ECB's monetary policy stance

LOW INTEREST RATES NOT APPROPRIATE FOR EITHER EURO AREA OR GERMANY

Source: German Council of Economic Experts (Annual Report 2016/17)

Implications for the ECB's strategic review

- The 1998 ECB strategy was flawed: The reference value for money was bound to fail and the real analysis was too vague for a heuristic

- Monetary targeting is not an option

- Taylor rule worked well in the past, but it failed in the 2010s. Main problem: There is no such thing as a neutral interest rate outside the classical model world.

- *Keynes (1936 [1973], p. 243): "I am no longer of the opinion that the concept of a 'natural rate' of interest…has anything useful to contribute to our analysis.…If there is any such rate of interest, which is unique (…) it must be the rate (…) which is consistent will full employment, given the other parameters of the system; though this rate might better be described, perhaps, as the 'optimum rate'."*

- Inflation targeting is the best solution. The ECB should switch from an implicit to an explicit inflation targeting

Grafical illustration of the Taylor rule

Basic principles

- If the output gap increases (decreases), the real policy rate must increase (decrease)

- If the inflation rate increases (decreases), the real policy rate must increase (decrease). This is the so-called „Taylor principle" which is required to aviod that an increase in inflation leads to destabilizing effects

Grafical illustration of the Taylor rule in the (y,r)-diagram
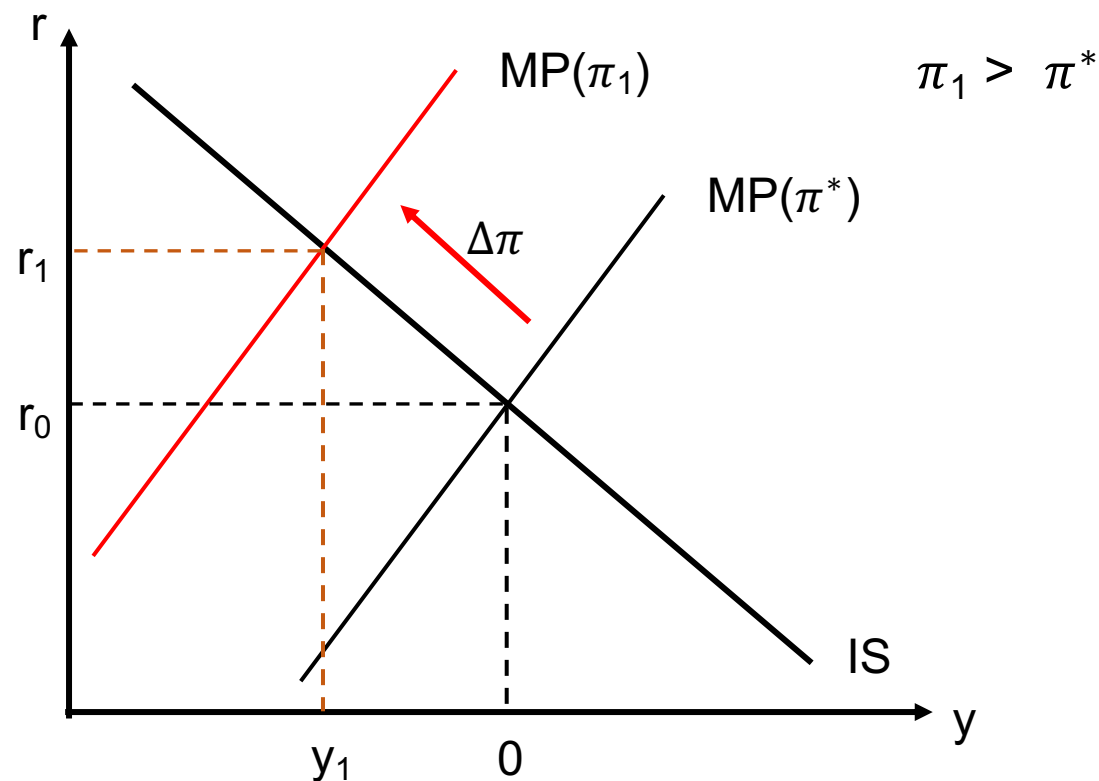
- The MP curve has a **positive slope** as the real rate incraeses with the **output gap**.

- The MP-curve **shifts upwards** with higher **inflation rate**

Grafical illustration of the Taylor rule in the (y,r)-diagram

The Taylor rule can be translated into the (y,π)-diagram as follows:

- Insert a general Taylor rule: $r = \bar{r} + e\,(\pi - \pi^*) + fy$
- in the IS curve of the IS/PC/model: $y = a - by + \varepsilon_1$
- Solving for π gives:

$$\pi = \pi^* + \frac{\varepsilon_1}{be} - \frac{1 + bf}{be}y$$

Grafical derivation of the Taylor rule in the (y,π)-diagram

- Start at equilibrium, i.e. with the MP(π*) line and an output gap of zero.
- By this point, we get inflation/output combination in the bottom diagram (point A).
- Now: Draw alternative MP line for higher inflation, i.e. $\pi_1 > \pi^*$.
- According to the "Taylor Principle" the real interest rate should be raised by higher inflation, this means the new MP line is above the old one.
- The new equilibrium is accompanied by a negative output gap, y_1. Combining y_1 and π_1, results in point B in the (y;π) diagram.
- Connecting the two points, i.e. A and B, yields the demand curve AD_0.
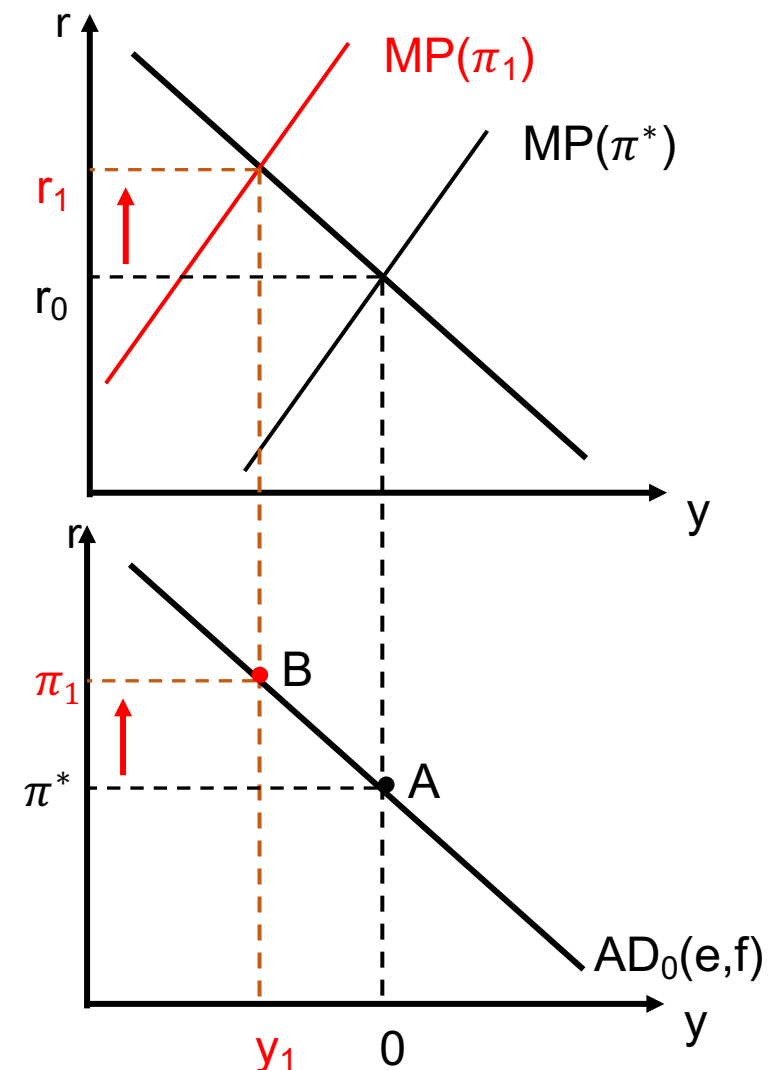
Effects of a demand shock: IS curve shifts to the left
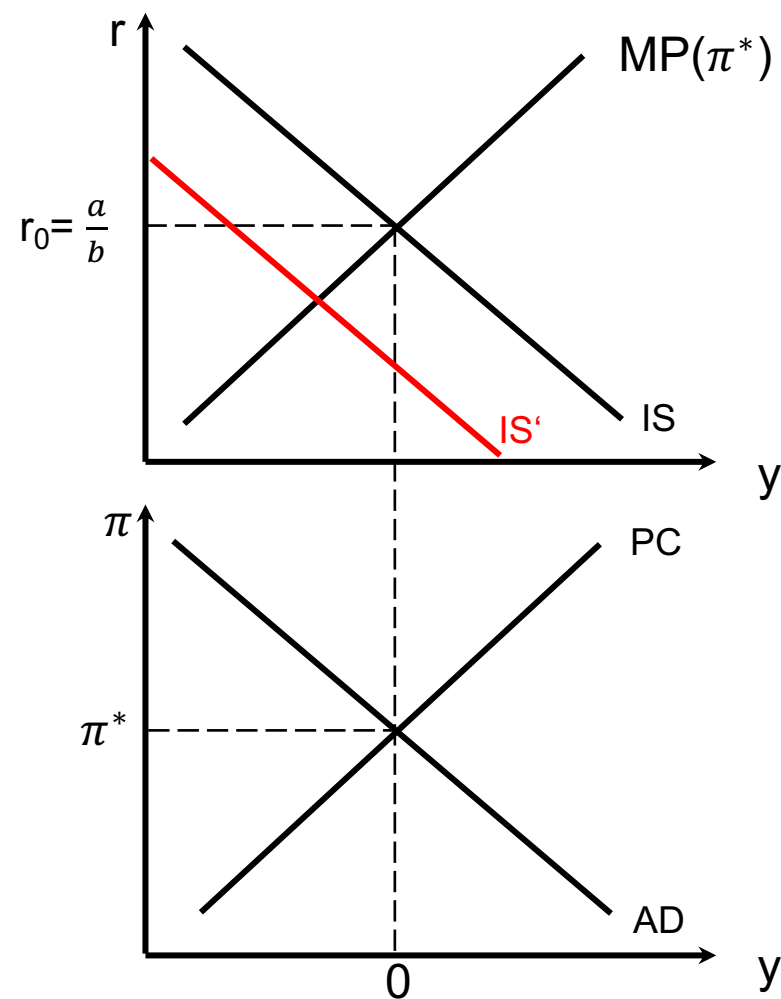
Effects of a demand shock: AD line shifts to the left
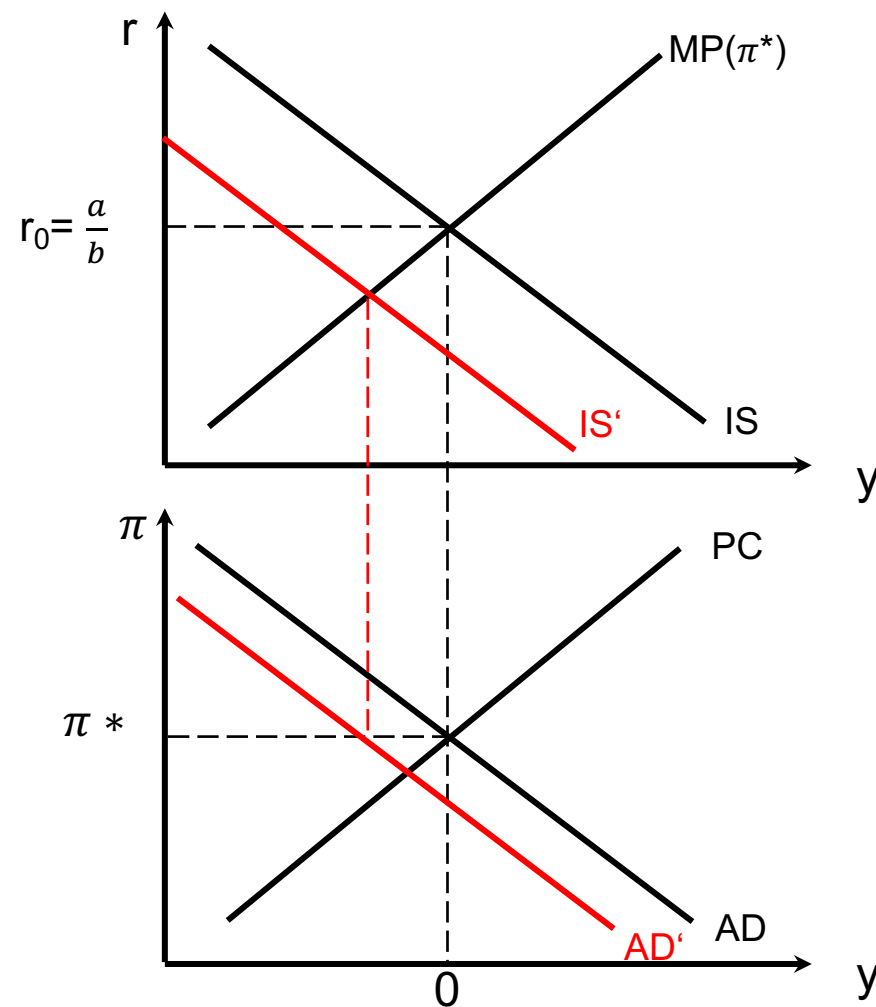
Sticky prices:
see
IS/LM-AS/AD model

New equilibrium at the intersection of AD'-line and Phillips curve. Additional shift of the MP line in the r-y diagram, since inflation is lower in the new equilibrium.
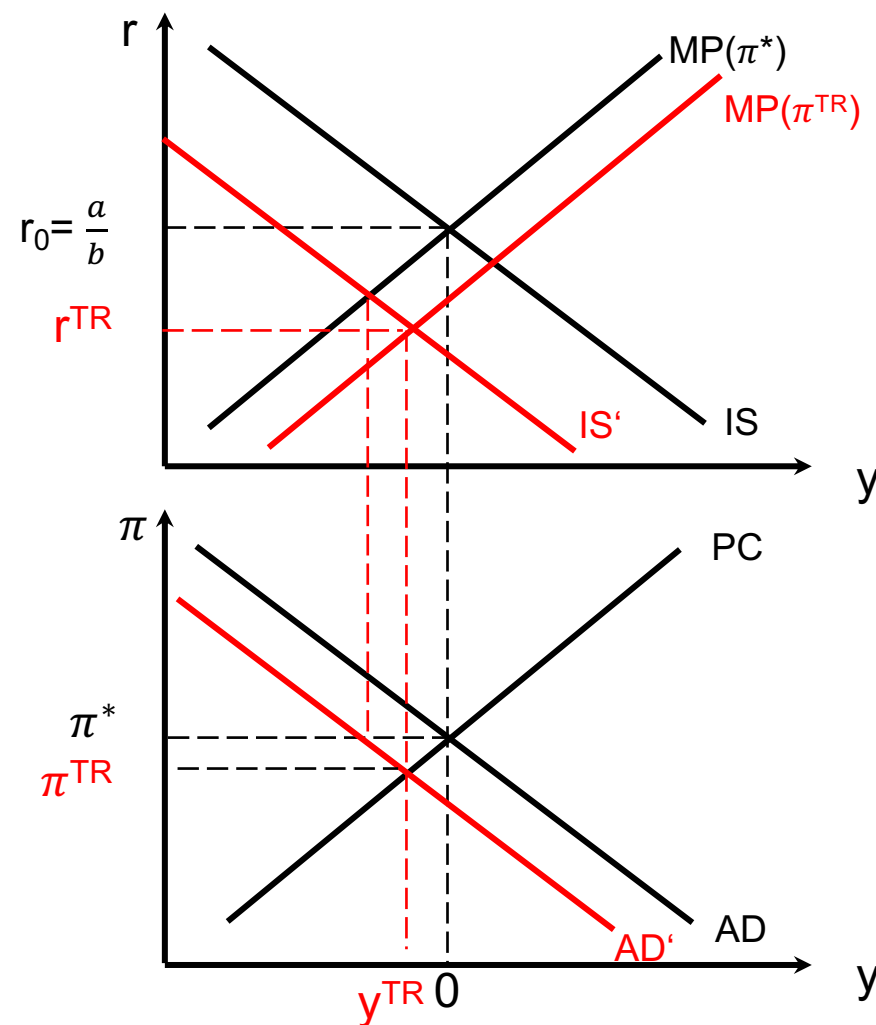
Result for demand shock

- For a negative demand shock, the Taylor rule calls for a reduction in real interest rates

- Response is thus in the right direction,

- but is weaker than for a non-rule-based policy

- Logic: rule in the strict sense of a heuristic cannot be as good as policy with perfect information

Comparing policy outcomes under a demand shock: Optimal policy versus Taylor rule
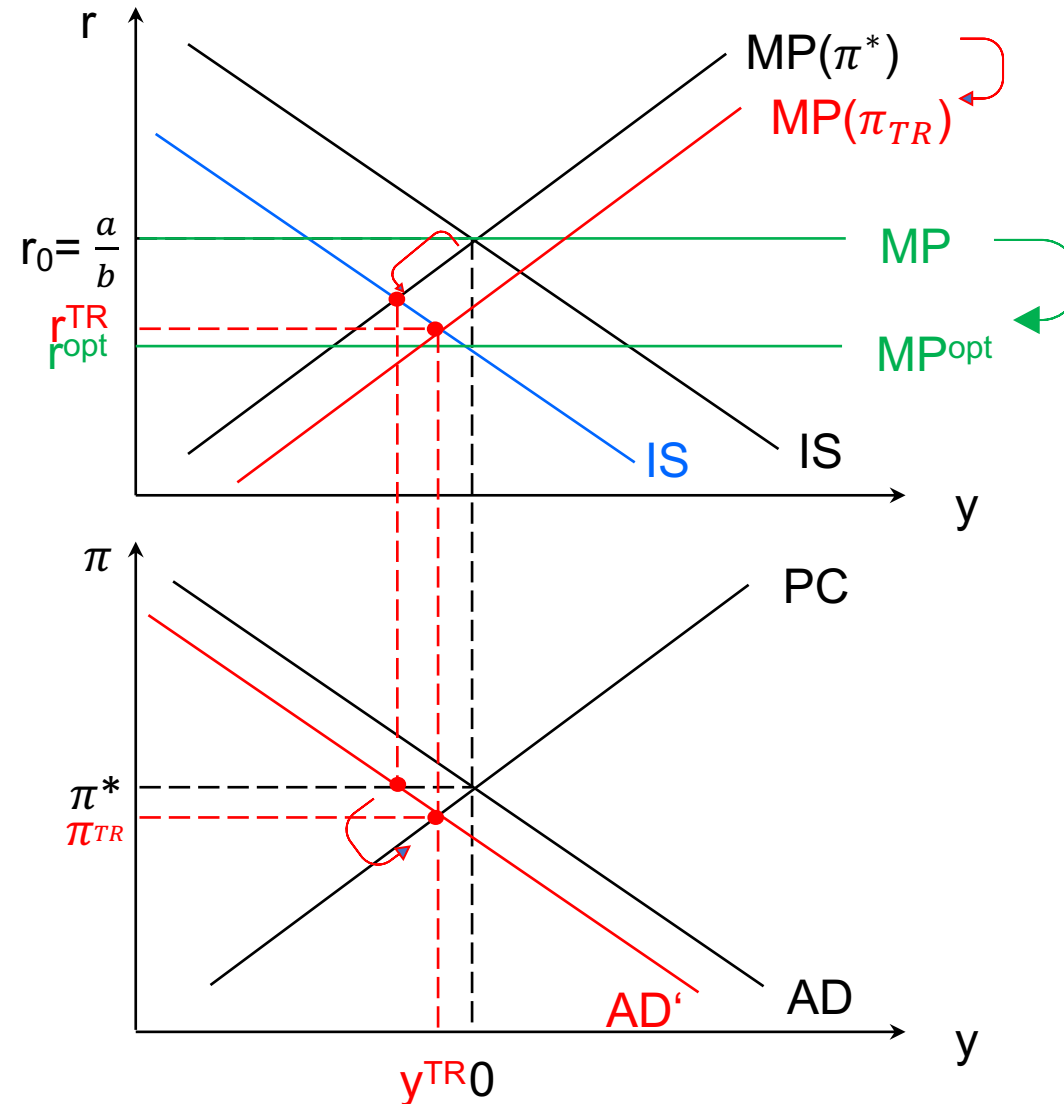
Price-increasing supply shock and Taylor rule: Leftward shift of the PC
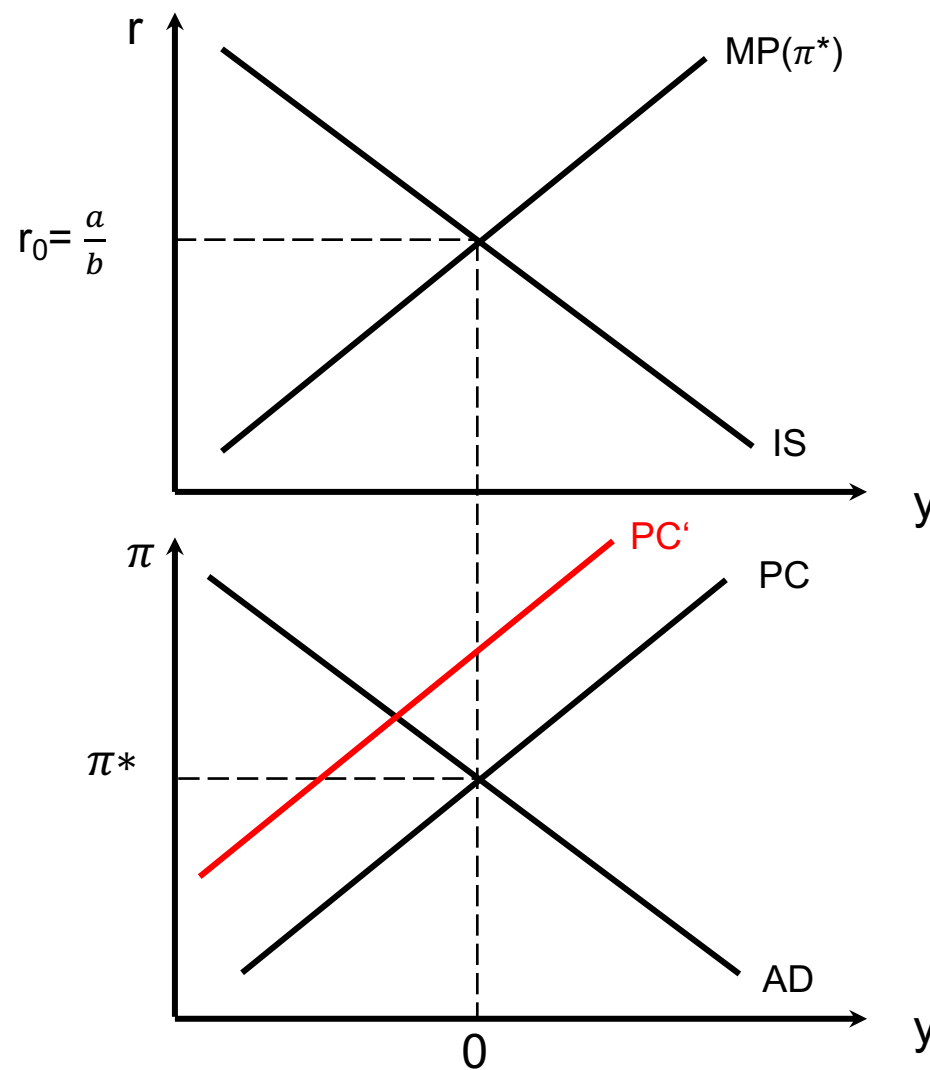
Price-increasing supply shock and Taylor rule: Feedback to MP line, as inflation increases
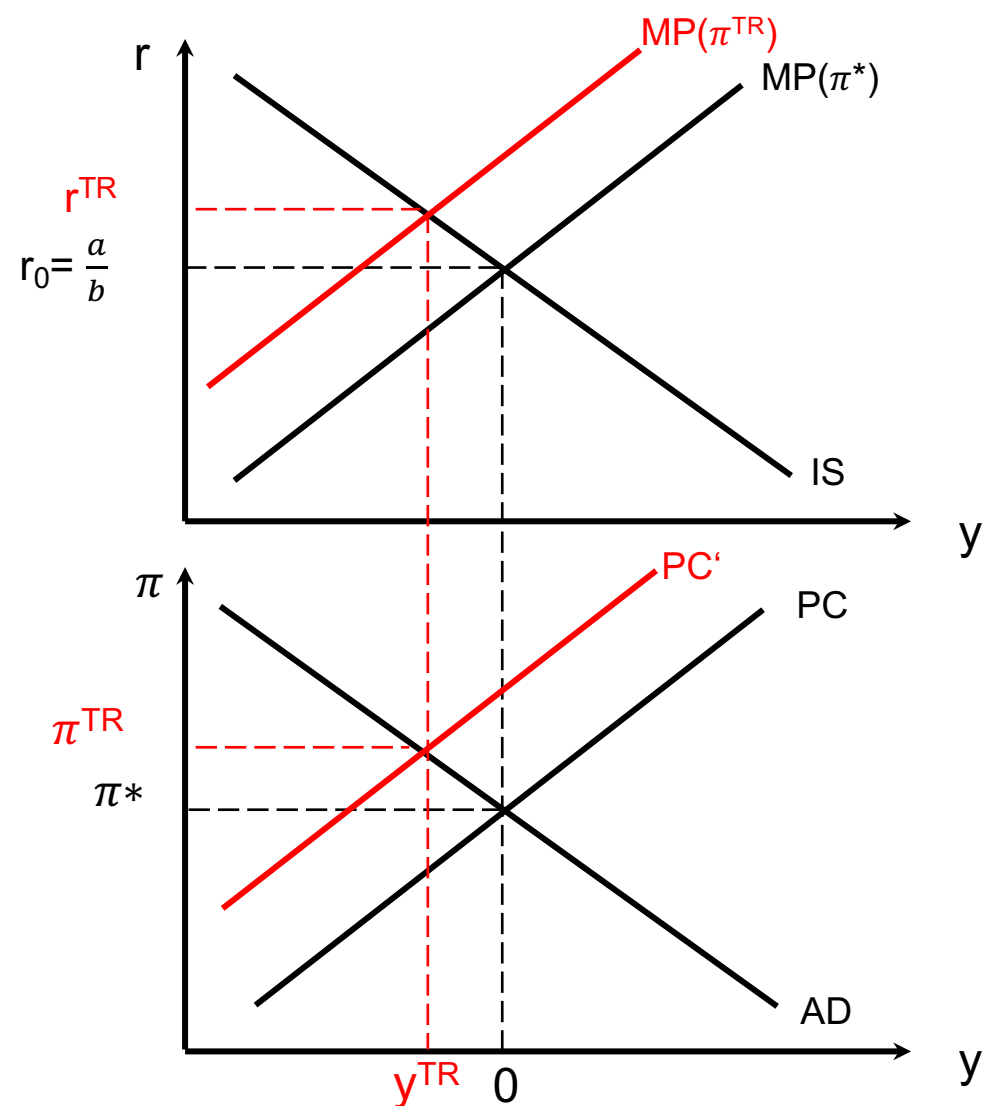
Result for supply shock

- Taylor rule causes real interest rates to rise in the face of a price-increasing supply shock

- Reaction again goes in the right direction and

- comes close to optimal solution

Comparison of results after a supply shock
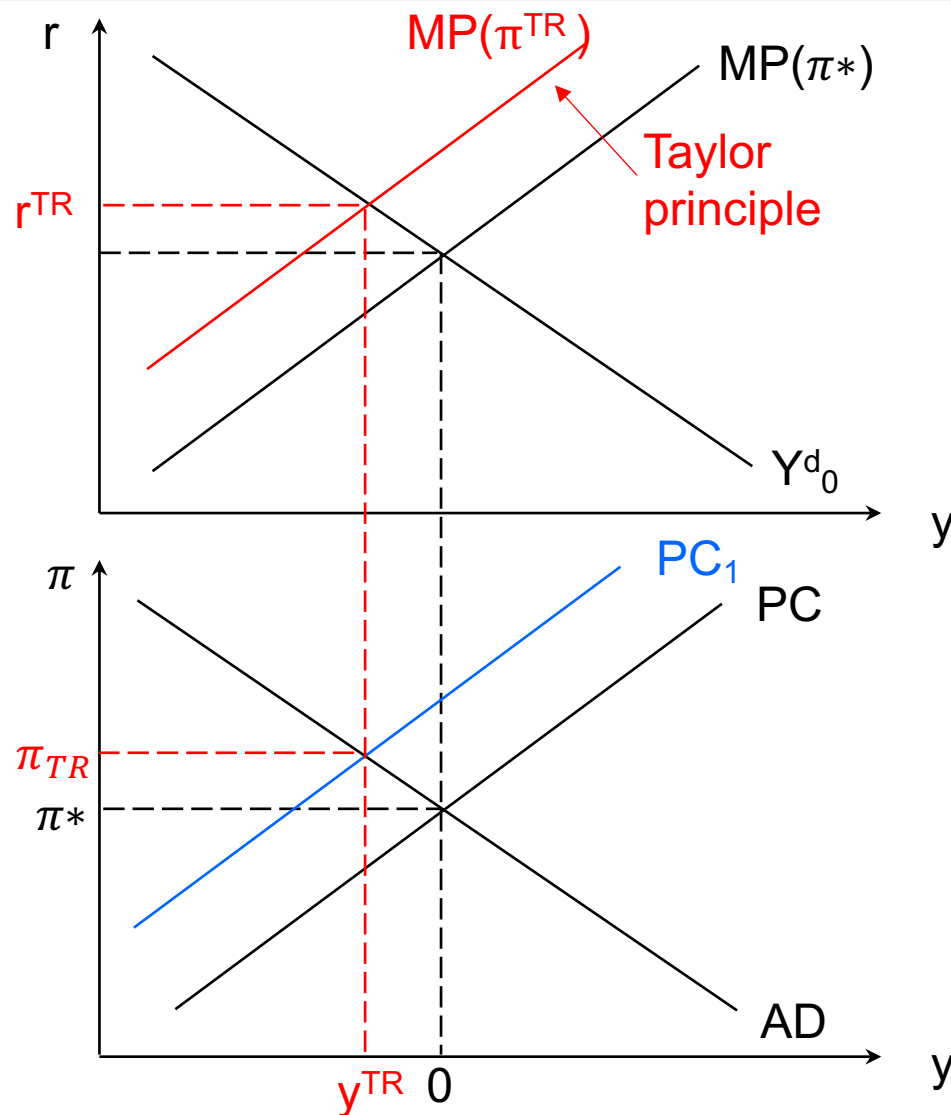
Optimal policy vs. simple rule

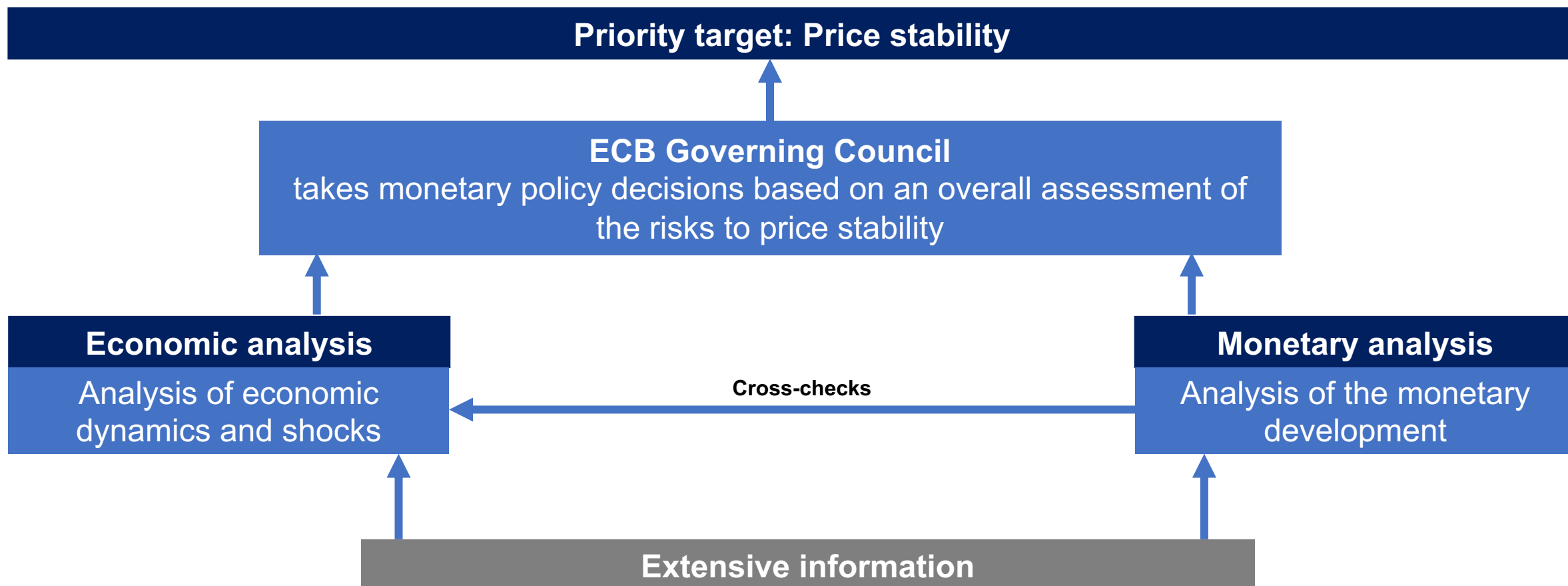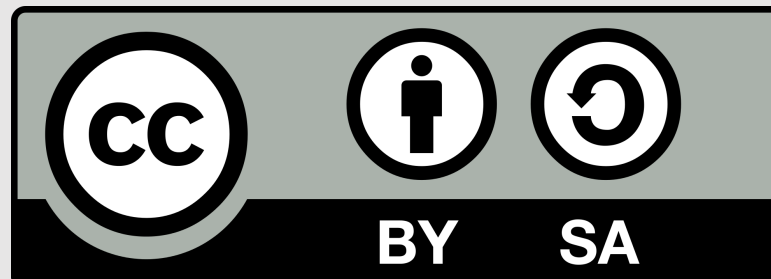| **Optimal policy**		**Heuristic**
$$L = (\pi - \pi^*)^2 + \lambda \cdot y^2$$ Insert the PC and derive to y. Then insert the optimal y value into IS curve	Procedure	Taylor rule
$$r = r_0 + \frac{1}{b}\varepsilon_1 + \frac{d}{(d^2+\lambda)b}\varepsilon_2$$ Interest rate is function of the shocks	Determination of interest rate	$$r = r_0 + e \cdot (\pi - \pi^*) + f \cdot y$$ Interest rate is function of target variables
$$y = -\frac{d\varepsilon_2}{(d^2+\lambda)}$$ $$\pi = \pi* + \frac{\lambda}{d^2+\lambda}\varepsilon_2$$	Policy result	(see tutorial) $$y = \frac{1}{1+bf+dbe} \cdot \varepsilon_1 - \frac{be}{1+bf+dbe} \cdot \varepsilon_2$$ $$\pi = \pi^* + \frac{d}{1+bf+dbe} \cdot \varepsilon_1 + \frac{1+bf}{1+bf+dbe} \cdot \varepsilon_2$$
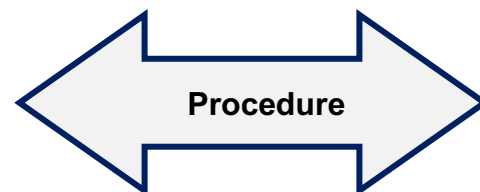
Summary

- Taylor rule comes very close to the principles of a good heuristic
- Guided by a simple rule, one can quickly assess whether current interest rate is appropriate or not
- Important information about the appropriate interest rate level, which is missing in inflation targeting
- Serious problems in practice:
  - Is the neutral real interest rate still at 2%?
  - Output gap is complicated concept. Also, large revisions in the data.
  - Which inflation rate is appropriate (HICP, core HICP inflation, GDP deflator)?
  - How to weight output gap and inflation gap?

The ECB's two-pillar strategy to date

Source: Own representation based on „Die Geldpolitik der EZB", 2011
https://www.ecb.europa.eu/pub/pdf/other/monetarypolicy2011de.pdf?0651d17c4b69dd55f5d21d93aa600694