

MEDIUM-TERM ADJUSTMENT AND THE INFLATION DYNAMIC: NEW CLASSICAL ECONOMICS

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AGENDA

- ~~Keynesian~~
- ~~Monetarist~~
- **New Classical**
- New Keynesian

NEW CLASSICAL ECONOMICS

- The heritage of the Monetarism school.
 - Developed around early of 1970s: **Lucas, Sargent and Wallace.**
 - Emphasize at the role of “**Rational expectation**” in macroeconomics
 - Developed notion of **Augmented-rational expectation Phillips curve.**
 - Developed a famous proposition: **The irrelevant of anticipated policy.**
 - Point out some fundamental flaws in traditional macroeconomics: **The Lucas’s critique and micro-founded for macroeconomics**

AUGMENTED-RATIONAL EXPECTATION PHILLIPS CURVE

- The curve is often called “**New Classical Phillips curve**”.
- Consider as the extension of **Phelps-Friedman Philips** curve.
- Agents instead form their forecast using the **rational expectation**, rather than the **adaptive expectation**.
- Why rational expectation?

RATIONAL EXPECTATION

- Expectation is so pervasive in economics decision making.
- Form of expectation: **adaptive v.s. rational expectation.**
- The expectation formed under the adaptive hypothesis has ignored some information in the forecasting.
 - Previous inflation is high; current is expected to be high.
 - The expected rate will NOT be higher than the past experience.
- Adaptive expectation is often called a **backward looking expectation.**

RATIONAL EXPECTATION

- Workers that incorporate only past information into wage bargaining tend to **systematically under-predict** the inflation rate: hurting themselves.
 - **Why would all the workers allow this to happen?**
 - **Why don't they behave as a *forward-looking* agent?**

- Rational expectation that makes use all relevant information might be welfare-improving to agents.

RATIONAL EXPECTATION

- John Muth (1952) adopted this notion in his classical work “**Rational expectation and the theory of price movements**”
 - Agents can make more profit if their forecasts are *more accurate*.
- Rational expectation-based forecast is the **optimal forecast** from the statistical point of view.
 - Let $Y_t^e = E(Y_t | \Omega_t)$ be optimal forecast of Y_t where Ω_t is information set.
 - Unbiased: $E(Y_t - Y_t^e) = 0$
 - Efficient: $E(Y_t - Y_t^e)^2$ is minimum

RATIONAL EXPECTATION IN MACROECONOMICS

- In 1971 and 1972, Robert Jr. Lucas provided two elaborative frameworks that argue for the *neutrality of money* under the *rational expectation*.
 - Strong neutrality of money: *money does not cause the change in output.* (Classical dichotomy)
- Classical dichotomy: the *separation between real and nominal variable.*

RATIONAL EXPECTATION IN MACROECONOMICS

- Neutrality of money under Lucas's concept is less strong
 - Surprise in the level of money creation can **affect output** whereas anticipated money creation **is neutral** under the rational expectation.
- The notion is developed under the model commonly known as "Money surprise model"
 - Phelps-Friedman-Lucas money surprise model

PHELPS-FRIEDMAN-LUCAS MONEY SURPRISE MODEL: MODEL ENVIRONMENT

1. Labor can renegotiate a new **wage scheme** every period; however, **(fixed/variable) wage must be set one-period in advance.**

- **fixed wage contract**: fixed nominal wage; irrelevant to the number of hours worked.

- **variable wage contract**: fixed nominal wage, but nominal wage is rising as the number of hours worked increase.

PHELPS-FRIEDMAN-LUCAS MONEY SURPRISE MODEL: MODEL ENVIRONMENT

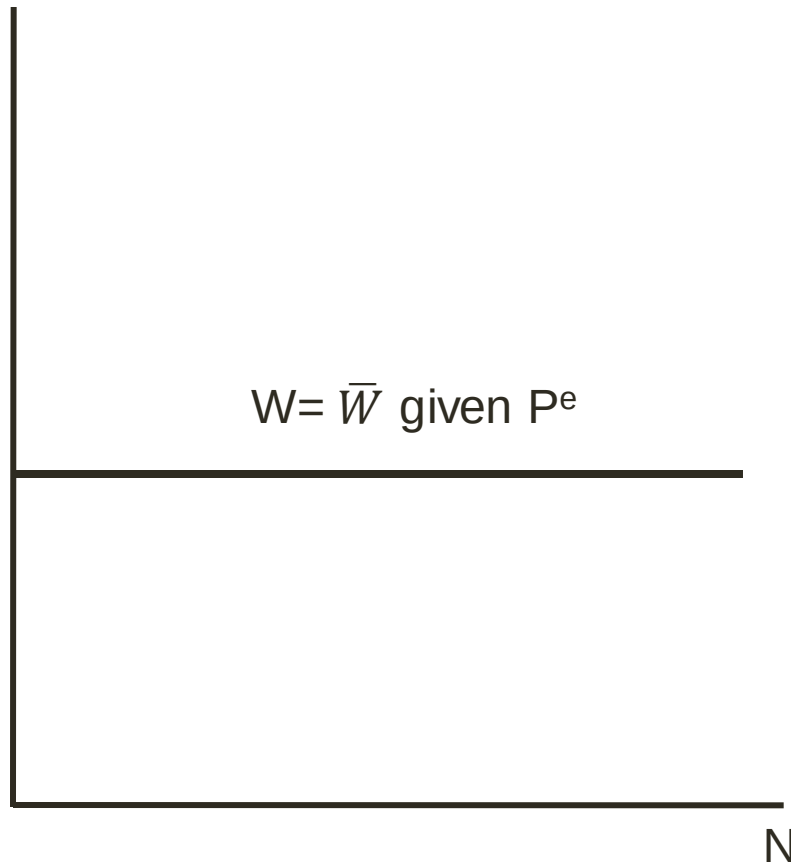
2. When labor engages in wage bargaining activity, laborers take into account all relevant and available information in the market.

- Labor uses the **most up-to-date information** to make a best forecast in the level of **price and inflation**, namely **expected price and expected inflation**.

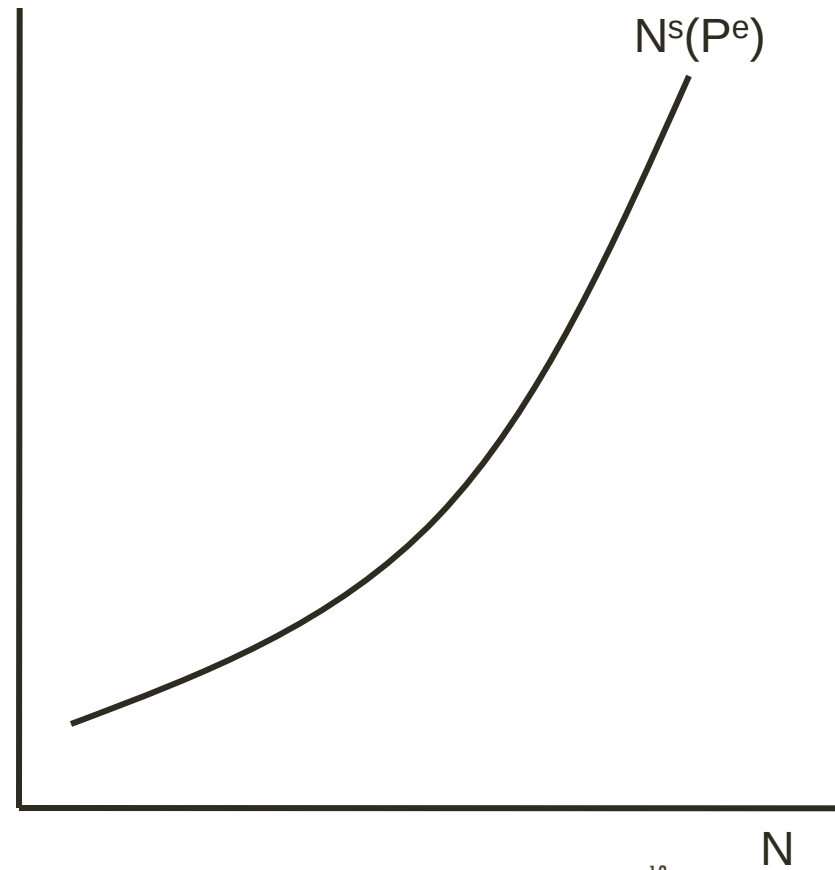
- Then, labor demand for the predetermined nominal wage and supply the amount of labor hours at given wage contract agreed.

PHELPS-FRIEDMAN-LUCAS MONEY SURPRISE MODEL: MODEL ENVIRONMENT

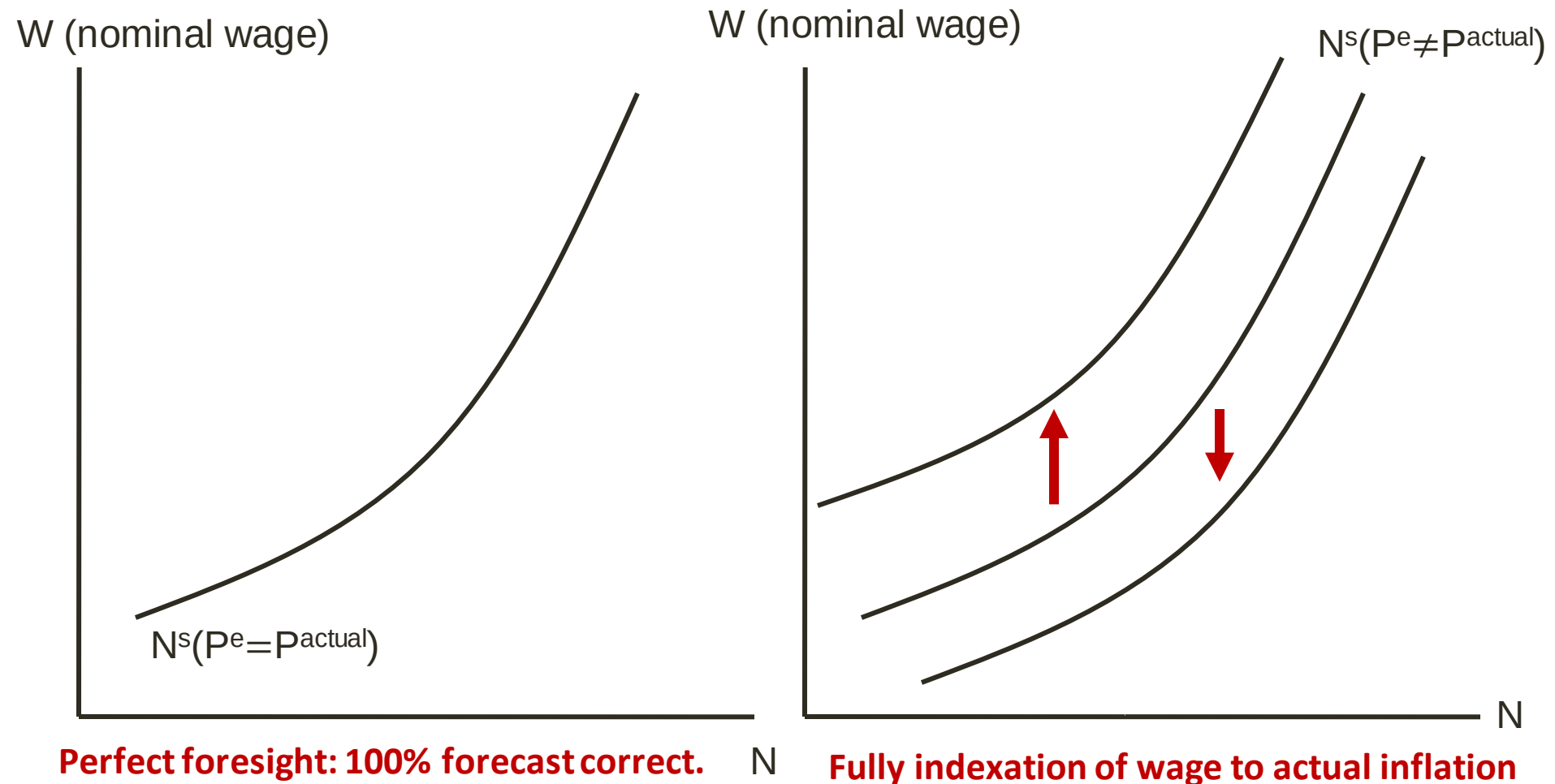
W (nominal wage)



W (nominal wage)



CLASSICAL WAGE SCHEME: PERFECT FORESIGHT AND FULL INDEXATION

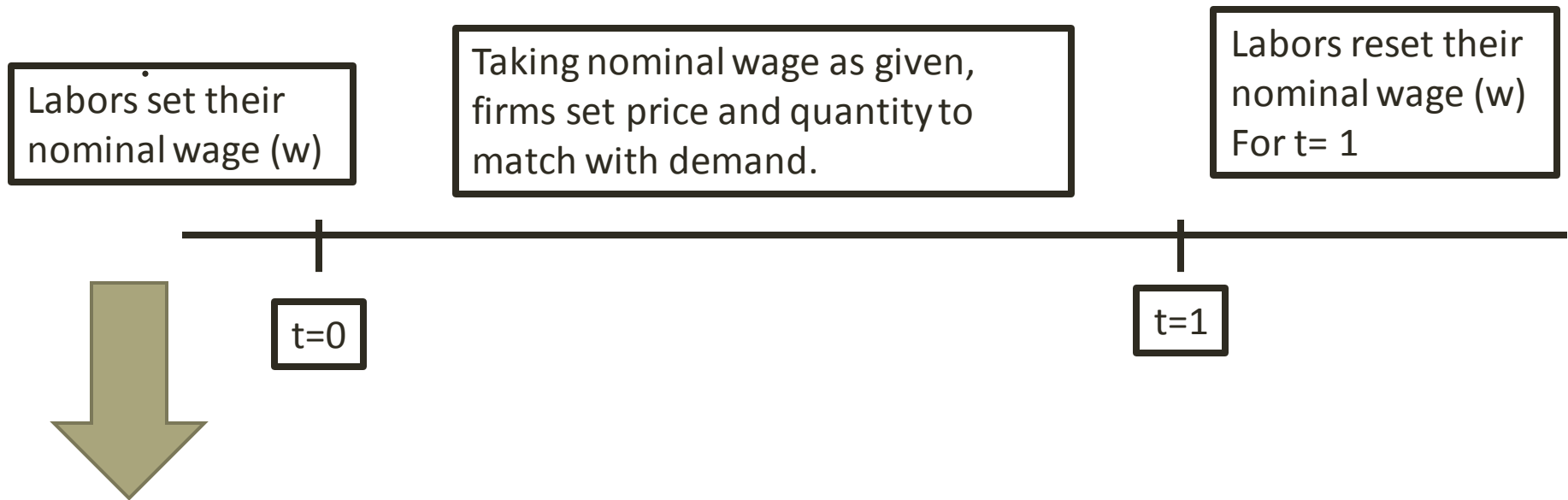


PHELPS-FRIEDMAN-LUCAS MONEY SURPRISE MODEL: MODEL ENVIRONMENT

3. Firms can set price freely; price is adjusted instantaneously to demand conditions.

- If demand rises, firms can suddenly raise their price.

TIMELINE OF DECISION/ACTION



Rational expectation: Based on all relevant information.

Future events; behavior of governments shocks; (anticipation in oil price/labor market conditions) → setting wage in the way that benefits worker most.

TIMING OF DECISION MATTERS

➤ The Phelps-Friedman-Lucas money surprise model:

- Workers do not perceive the actual price/inflation --- **expected price/inflation**.
- Workers' perception lags behind *actual* inflation. (no perfect foresight / no indexation)

➤ The delay in wage adjustment (lag behind) has lead to a real effect of monetary surprise.

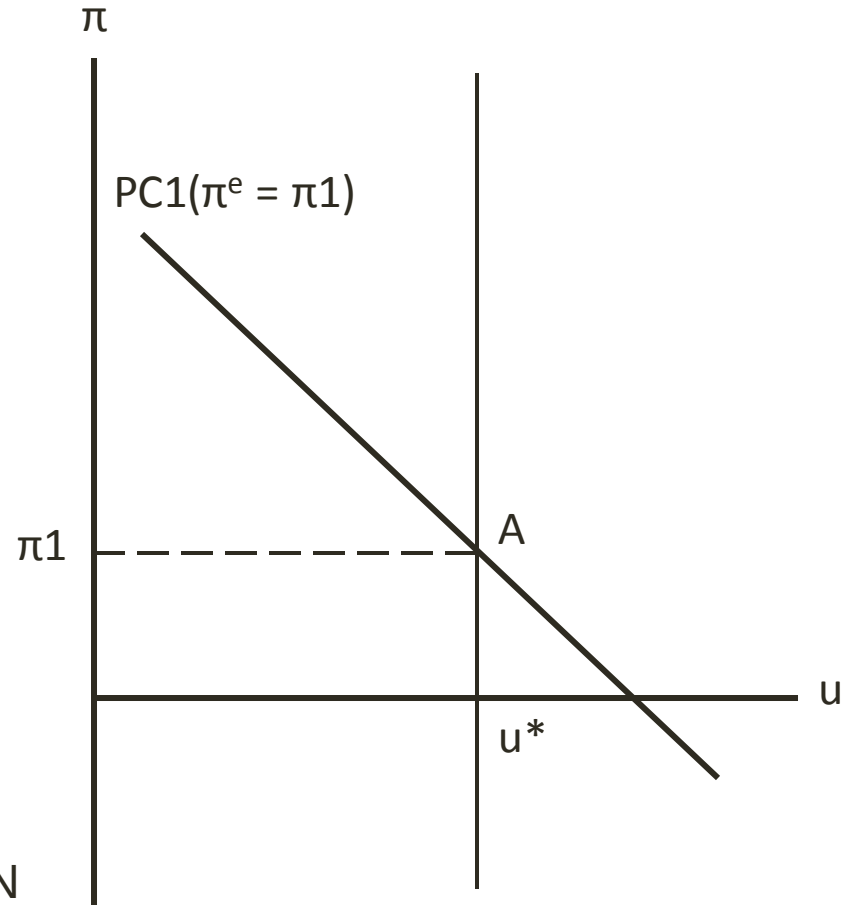
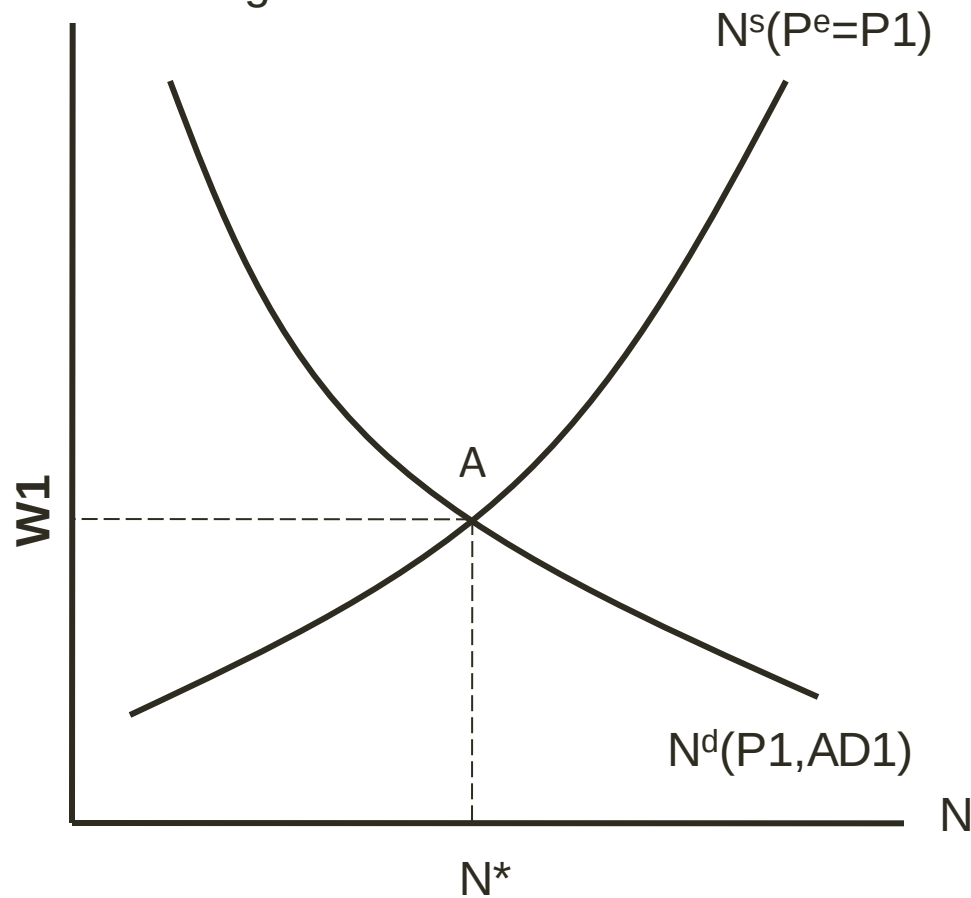
- *The effect should be temporary*

MECHANISM TOWARD THE NEUTRALITY RESULT

- Suppose we start from a natural rate equilibrium (N^*).
 - Natural unemployment rate is u^*
- Actual price is P_1 ; labor perfectly anticipates this. ($P^e = P_1$)
- Actual inflation is π_1 ; labor perfectly anticipates the correct value ($\pi^e = \pi_1$)
- At the P_1 and π_1 , aggregate demand condition is equal to AD_1 .
 - Suppose that central bank adopt 10% money growth rule.

WORKERS' EXPECTED PRICE AND BARGAINED WAGE SETTING

Nominal wage



MONEY SURPRISE....

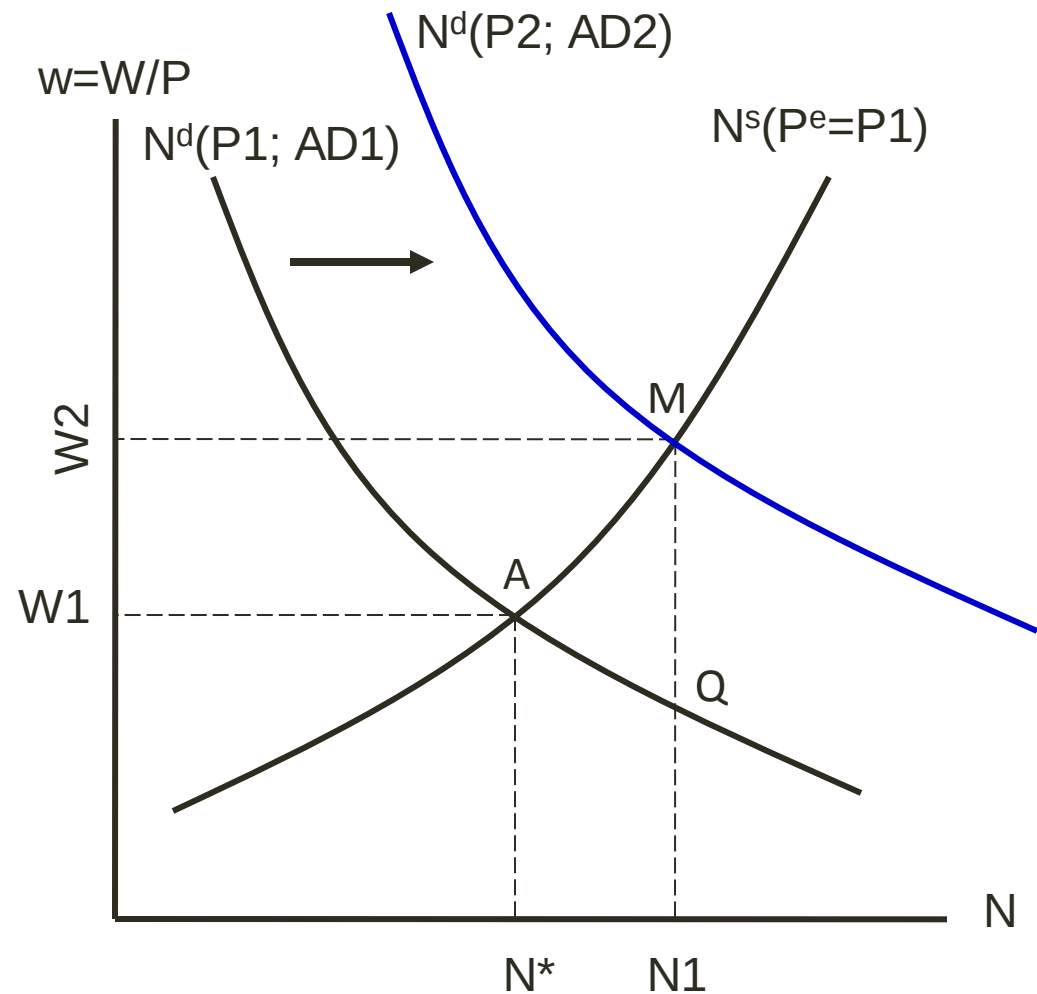
- The central bank temporarily increases the money-supply growth rate (*unanticipated* money growth), i.e. $x1\% \rightarrow x2\%$ ($x2 > x1$)
- Product prices increase **faster** than money wages (under both fixed and variable wage contract).
 - The actual **real wage (W/P) falls** and firms **demand more labor**.
 - With the given wage contract, labor must supply as they've agreed with the employer.
 - Alternative interpretation could be that workers **mistakenly** see higher money wages as higher real wages at the previous price level.
 - Workers supply more labor; employment/output increases.

EXPECTED P^E LAGS BEHIND ACTUAL P

➤ Money wages increase from $W1$ to $W2$ and the price from $P1$ to $P2$.

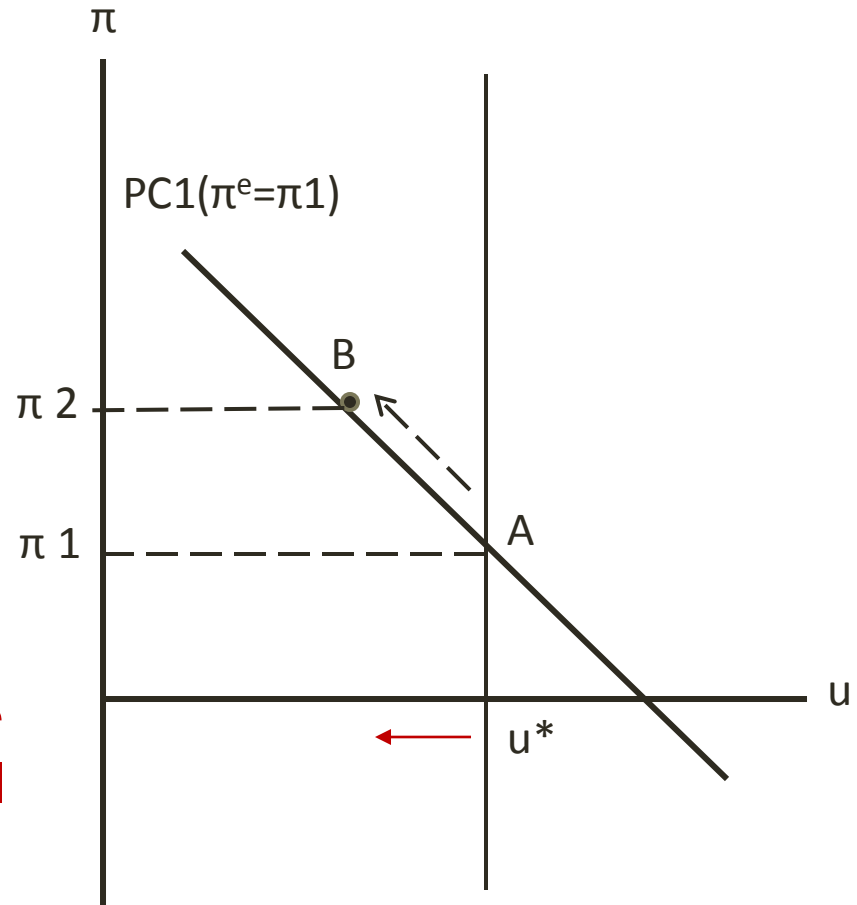
- $\Delta P/P > \Delta W/W$

➤ Labor supply and employment increase.



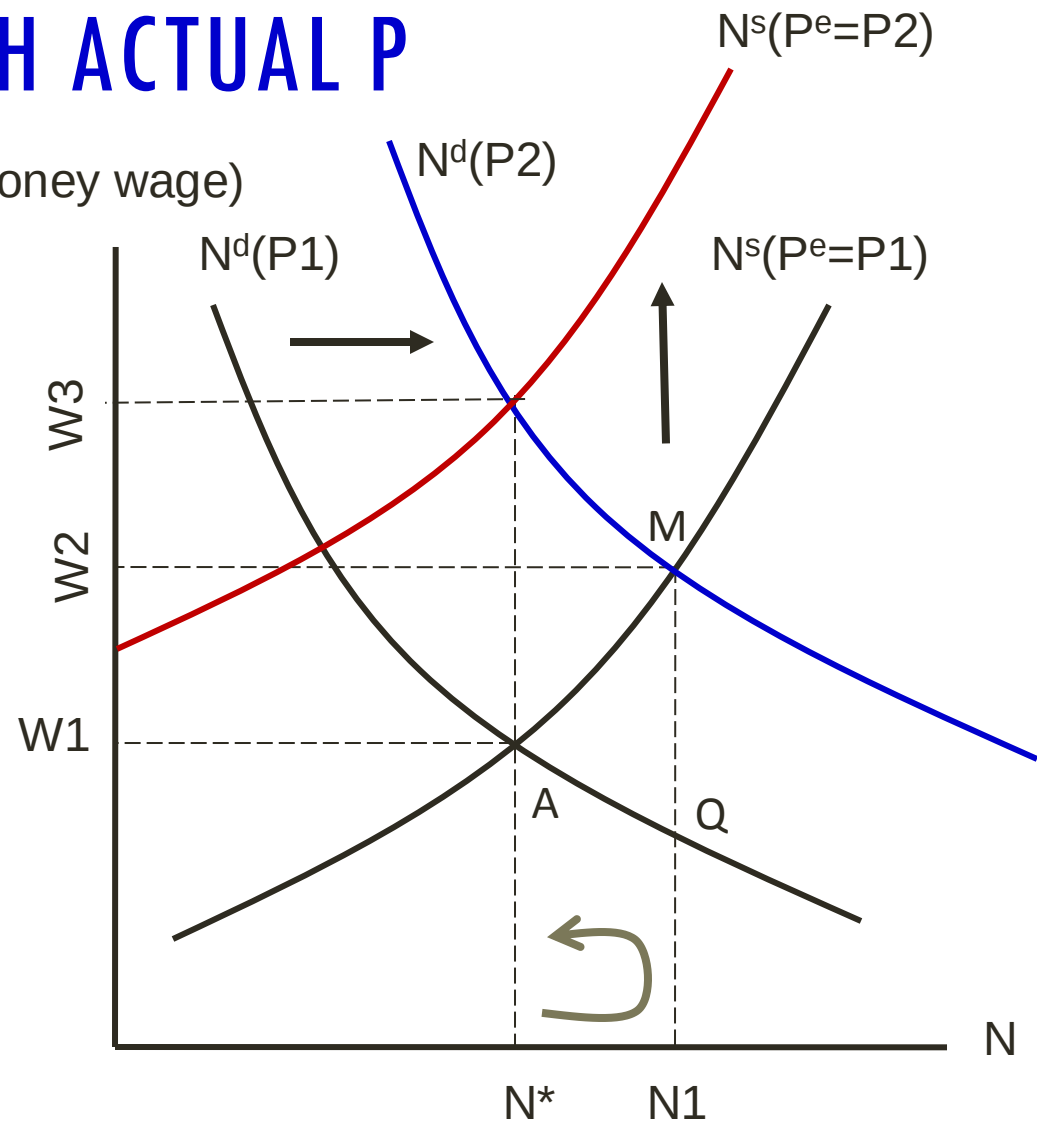
FALLING U AND RISING π

- Higher money growth means higher inflation.
- Unemployment falls below u^* .
- The economy moves from A to B.
- Unanticipated error in the price and inflation expectation (due to the surprise) causes worker to supply more labor; if nominal wage can be fully indexed with the actual price and inflation rate, they would not have done that.



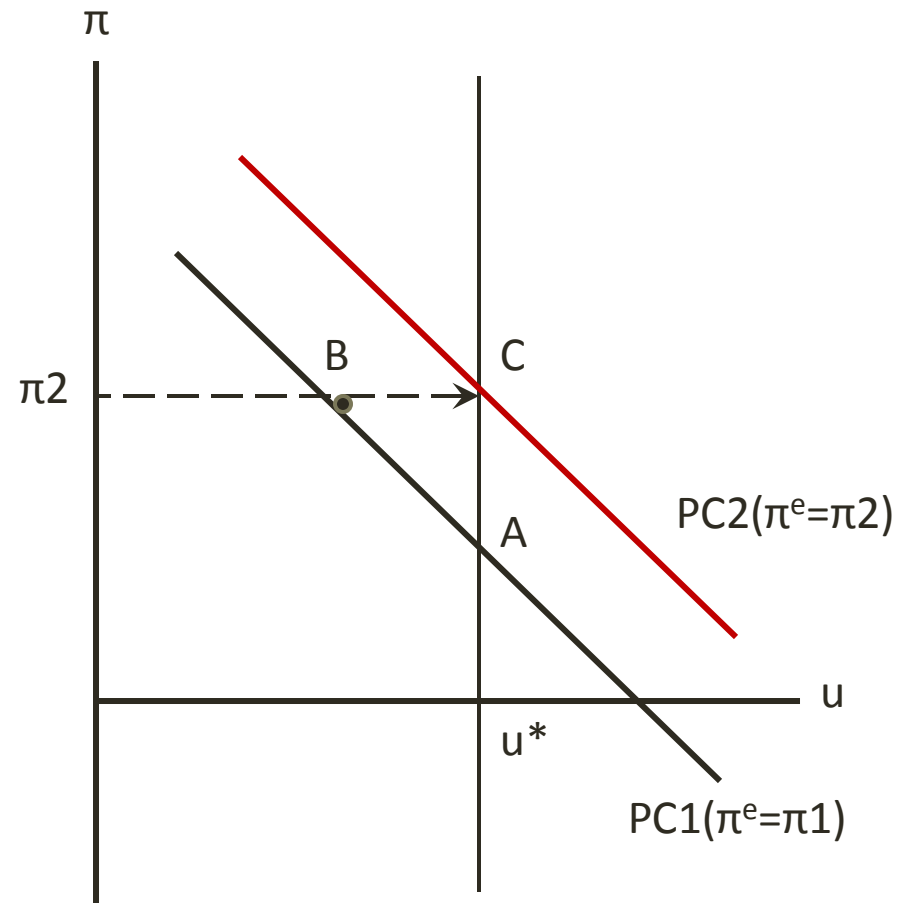
P^E CATCHES UP WITH ACTUAL P

- Finally, workers realize that the actual price is $P2$ and demand higher money wages in the next period.
- Employment drops to the natural rate.



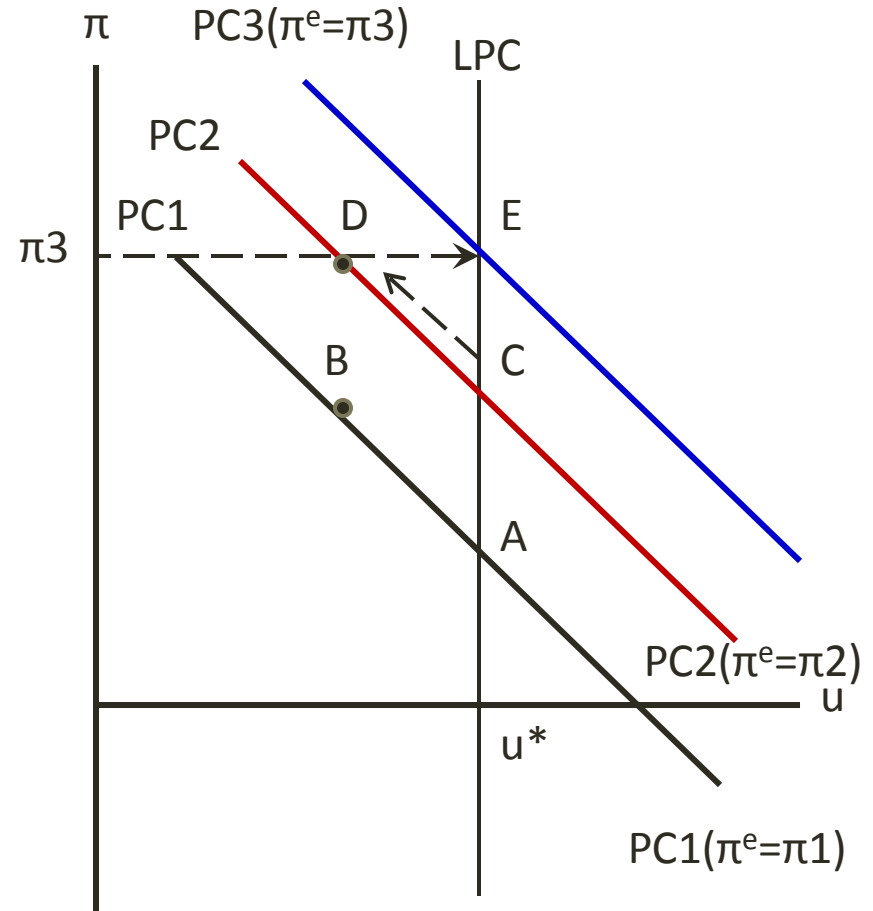
ACTUAL u RETURNS TO u^*

- Workers adjust their expected inflation upwards.
- Unemployment returns to u^* .
- PC1 shifts to PC2 because of **higher expected inflation**.
- The economy moves from B to C.



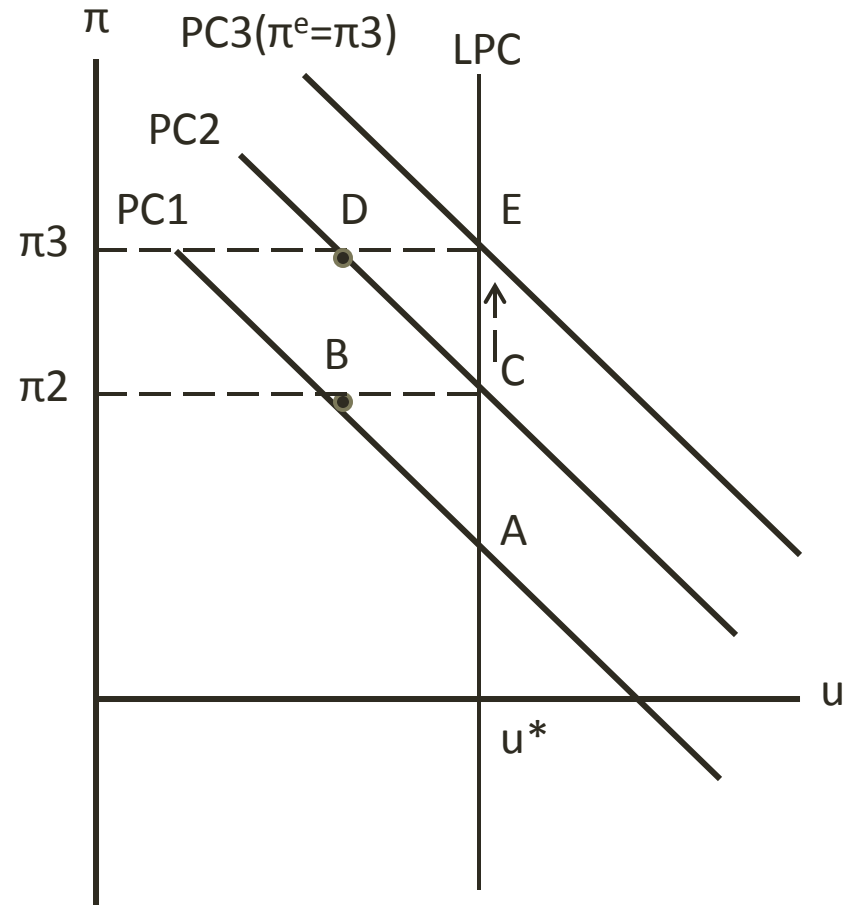
THE PROBLEM OF AMBITIOUS POLICY: THE WAGE-PRICE SPIRAL I

- Attempt to surprise the market would end up badly; **wage-price-inflation spiral will occur.**
- The central bank repeats the ambitious policy; opportunistic approach and surprise the market.
- The economy moves from C to D in the short run, but to E in the long run with higher expected inflation.



THE PROBLEM OF AMBITIOUS POLICY: ANTICIPATED POLICY IS NEUTRAL

- At C, higher money growth is anticipated.
- Workers adjust their P^e and π^e immediately.
- The real wage is the same, so employment and output are the same.
- Only higher inflation; no real effects.

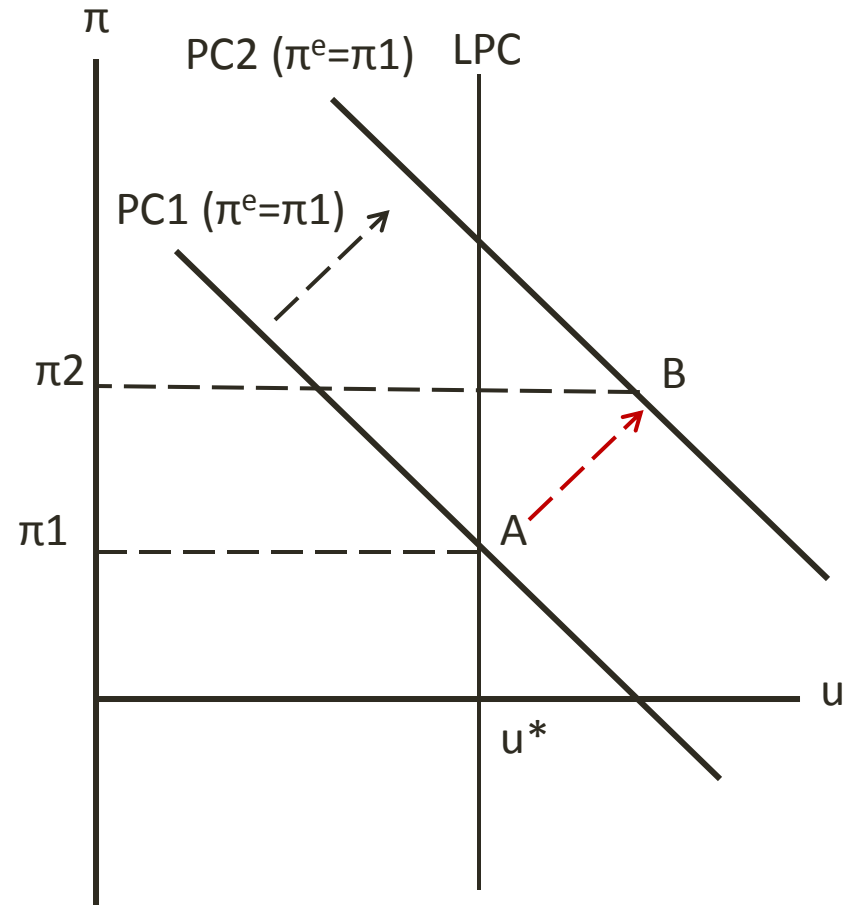


POLICY IMPLICATIONS: SUM UP.

- Policymakers **cannot fix the unemployment rate** at an arbitrary target rate.
 - **Continual attempts to peg the actual rate **below** the natural rate result only in long-term higher inflation with no gain in employment and output.**
- **Sargent and Wallace (1975)** *“Irrelevance of stabilization policies under the rational expectation”*
 - Don’t unnecessarily surprise the market; avoid being the source of instability.
- The benefit of anchoring low inflation expectation is one again supported.

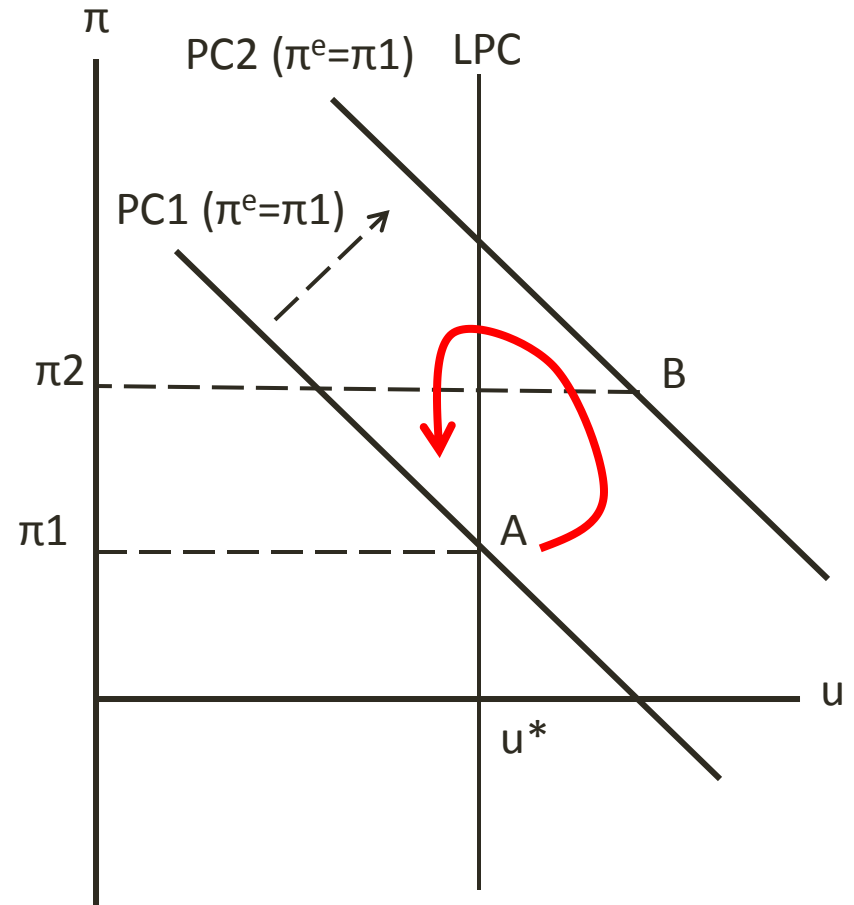
WHY ANCHORING LOW INFLATION CAN HELP MITIGATING THE EFFECT OF NEGATIVE SUPPLY SHOCKS?

- Negative shocks temporarily hit the economy
 - Phillips curve will temporarily shift up to PC2 ($\pi^e = \pi_1$).
- Responding to negative shocks, central bank raises the interest rate to show their commitment in keeping inflation low.
 - Stagflation problem → equilibrium is B.
 - Actual inflation rises, but not rapidly.
- Good thing: Inflation expectation remains anchored at π_1 even the actual inflation is π_2 .



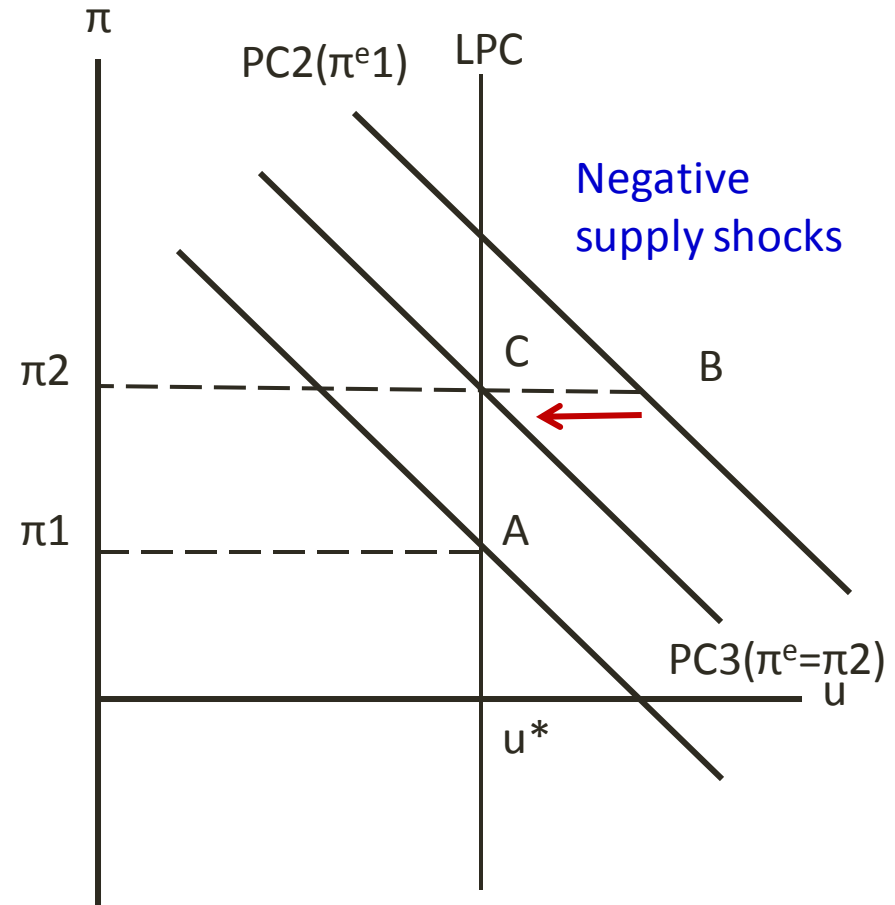
WHY ANCHORING LOW INFLATION CAN HELP MITIGATING THE EFFECT OF NEGATIVE SUPPLY SHOCKS?

- Consider **next period** when shocks have been gone; everything is back to PC1 ($\pi^e = \pi_1$)
 - This is because the inflation expectation remains anchored at π_1 , not being revised to π_2 .
 - **Return to natural equilibrium with the same level of inflation as before $\rightarrow A$**
- Benefit from anchoring the low inflation expectation makes the transition path less painful.
 - **Benefit from a temporary stagflation**



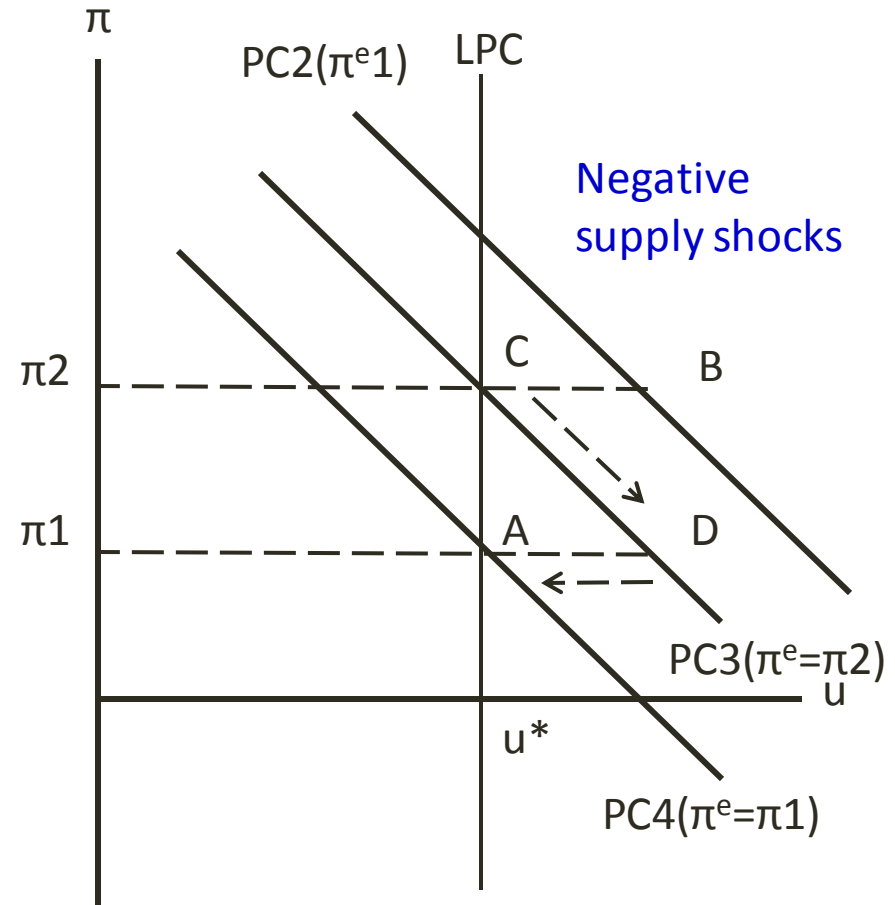
WHY ANCHORING LOW INFLATION CAN HELP MITIGATING THE EFFECT OF NEGATIVE SUPPLY SHOCKS?

- Instead, if the central bank does not commit to a low inflation, the effect of negative shocks will last, and cause high inflation economy.
- Even if the period of shocks have passed by, economy would still remain at “C” when we have high inflation ($\pi^e = \pi_2$).
- The attempt to bring down inflation would require another stagflation, i.e. require a strong medicine.



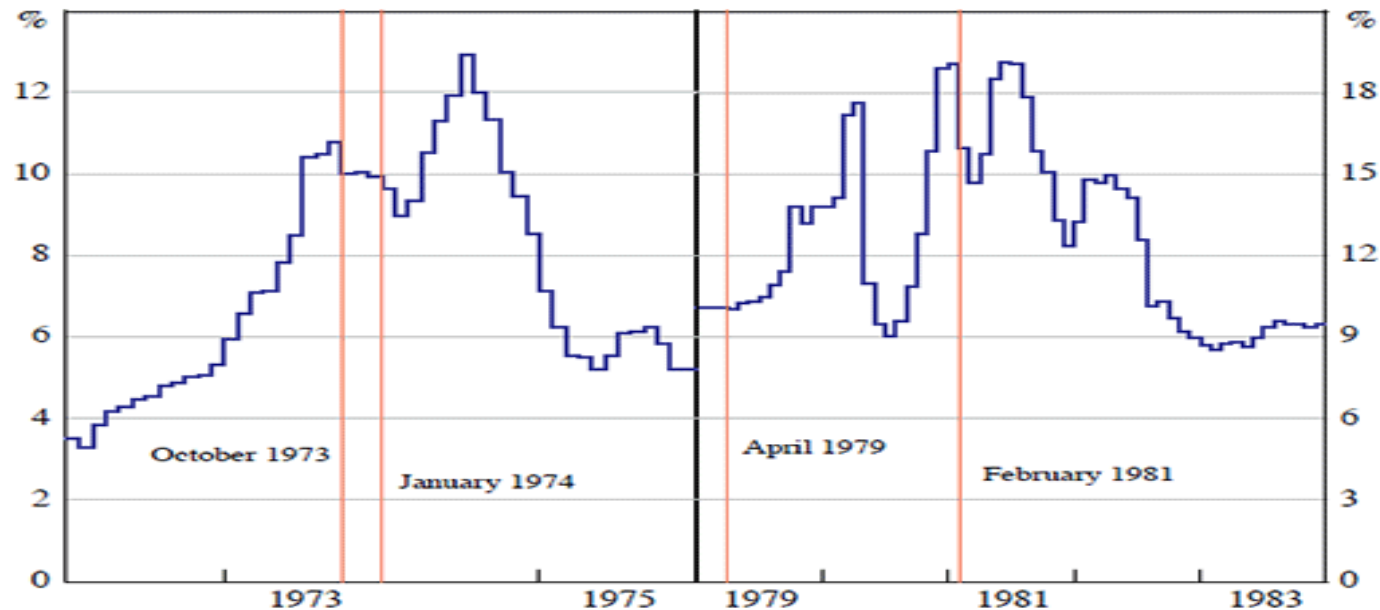
WHY ANCHORING LOW INFLATION CAN HELP MITIGATING THE EFFECT OF NEGATIVE SUPPLY SHOCKS?

- To fight the inflation, central bank must aggressively raise interest rate and show their intention to create the disinflation come down; equilibrium stagflation occurs at D
- Once public starts to believe this, inflation expectation will gradually come down, given by $PC4(\pi^e = \pi 1)$
- However, it is more painful transition.



BENEFIT FROM A CREDIBLE COMMITMENT: FIGHT AGAINST THE INFLATION

Figure 3: The Evolution of the Federal Funds Rate during the Oil Price Shocks of the 1970s and Early 1980s



Notes: In October 1973 and January 1974 the nominal price of oil doubled. April 1979 marks the beginning of the 1979 oil price surge; in February 1981 the price of imported crude oil peaks.

Source: Board of Governors of the Federal Reserve System

SUBOPTIMAL RESPONSE TO INFLATION MAKE INFLATION PERSISTS TOO LONG AND INSTABILITY

$$i_t = \text{constant} + \text{beta} * \text{inflation} + \text{gamma} * (\text{output gap})$$

	beta	Gamma
1970s (Pre-Volcker)	0.83	0.27
After 1980s (Volckey-Greenspan)	2.15	0.93

TABLE I
AGGREGATE VOLATILITY INDICATORS

	<i>Standard Deviation of:</i>			
	Inflation		Output	
	<i>Level</i>	<i>hp</i>	<i>Gap</i>	<i>hp</i>
Pre-Volcker	2.77	1.48	2.71	1.83
Volcker-Greenspan	2.18	0.96	2.36	1.49
post-82	1.00	0.79	2.06	1.34