



Bilkent University
Department of Economics

The Phillips Curve and Supply Shocks

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Phillips Curve (Original Evidence)

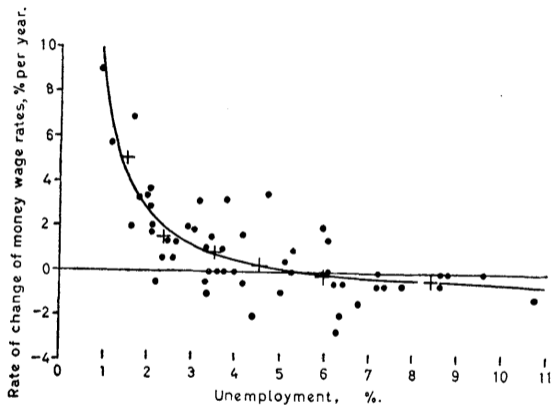
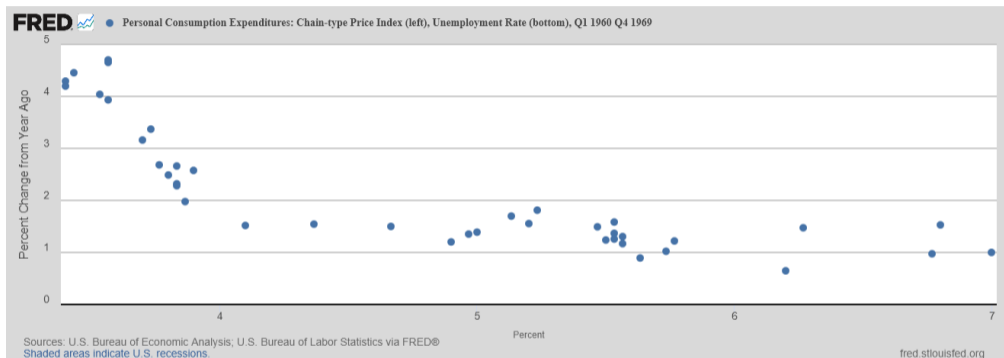


Fig.1.1861-1913

Phillips, A.W. (1958), The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957. *Economica*, 25: 283-299.

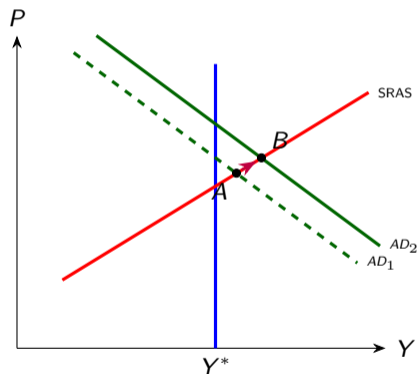
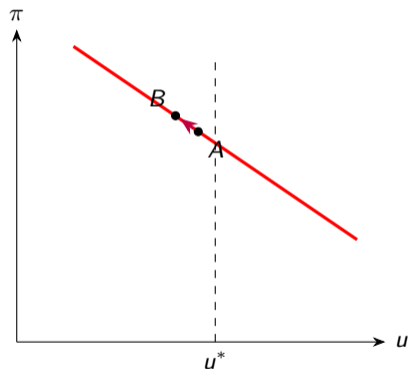
US Phillips Curve in the 1960s



- ▶ Data appear to show a stable, negative relationship.
- ▶ It was interpreted as a policy tradeoff.

When Does the Phillips Curve Work Well?

$$\pi = -\alpha(u - u^*)$$



- ▶ Demand expansion $\Rightarrow u \downarrow, \pi \uparrow$ Stable, downward-sloping Phillips Curve
- ▶ No tradeoff breakdown because there are no supply shocks

Oil shock in 1973



- ▶ After Oil Shock of 1973-74, the simple trade-off between unemployment-inflation turned out to be misleading once expectations are considered.

The Augmented Phillips Curve

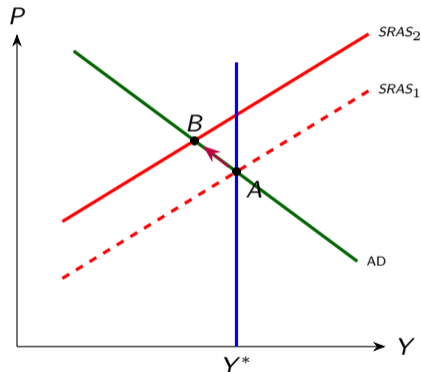
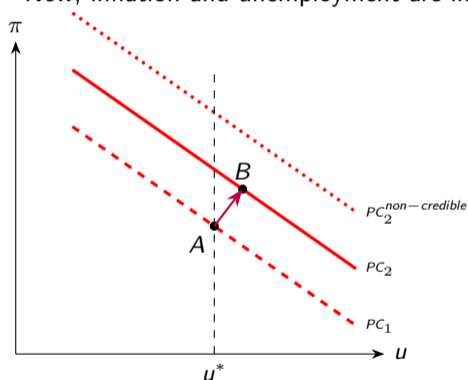
$$\pi = \pi^e - \alpha(u - u^*) + \gamma \frac{\Delta P^m}{P}$$

- ▶ If $u < u^*$, inflation rises.
- ▶ If $u > u^*$, inflation falls.
- ▶ The **unemployment gap** is the inverse of the output gap ($Y - Y^*$).
- ▶ Changes in unemployment move the economy **along** the Phillips Curve.
- ▶ Changes in expected inflation or **commodity prices** **shift** the Phillips Curve.
- ▶ As a result, inflation and unemployment can increase at the same time (stagflation).

Oil Shock Shifts the Phillips Curve

Oil price $\uparrow \Rightarrow$ costs $\uparrow \Rightarrow$ higher inflation for any u

Now, inflation and unemployment are increasing at the same time.



- ▶ The shift in SRAS consists of both a change in commodity prices and inflation expectations. However, the effect of commodity prices is temporary, while the inflation expectations depend on the central bank credibility.

Non-credible central bank:

- ▶ π^e stays high
- ▶ Inflation falls slowly
- ▶ Requires high unemployment for recovery

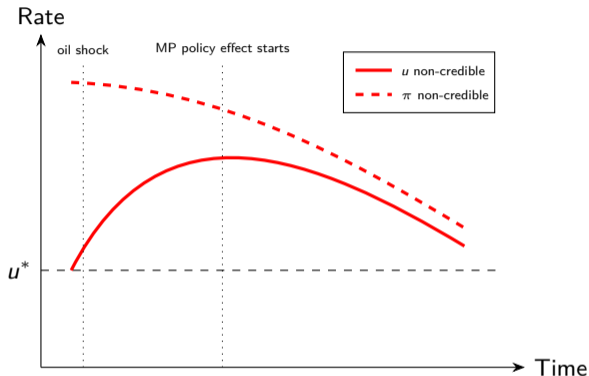
Credible central bank:

- ▶ π^e falls quickly
- ▶ Inflation falls faster
- ▶ Lower unemployment cost for recovery

Fully credible central bank:

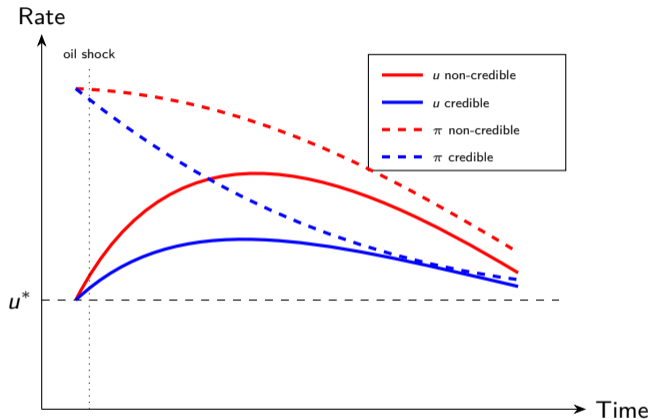
- ▶ $\pi^e = \pi^*$

Non-Credible Central Bank



- ▶ Inflation declines slowly because expectations remain high.
- ▶ Unemployment rises sharply and stays elevated for longer.
- ▶ Inflation expectations increase with the oil shock. Although the shock is temporary, short run PC shifts up.
- ▶ In such case, CB creates a recession to make expectations achieve the target.

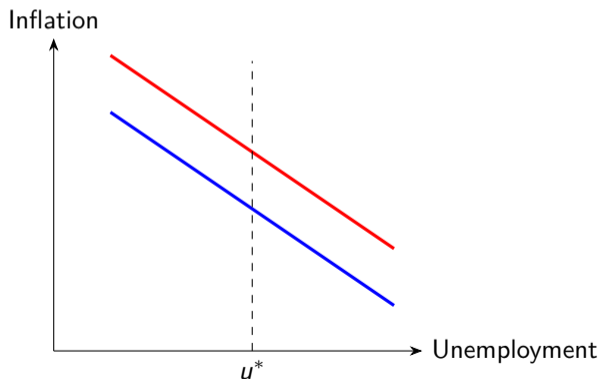
Credible vs Non-Credible Central Bank



- ▶ In case of full credibility, what we're observing is **solely** effect of commodity price shock.
- ▶ However, note that the situation worsens and u increases **further** as the credibility level decreases.

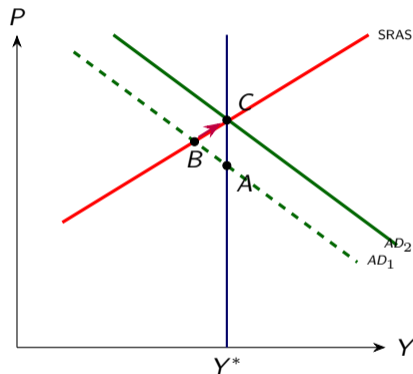
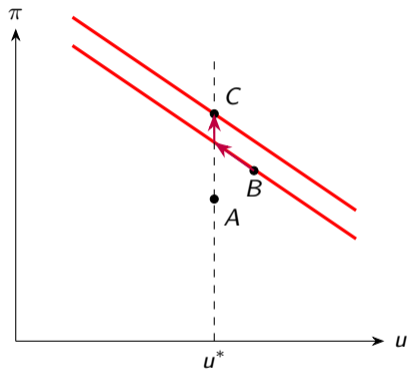
Credibility Shifts the Phillips Curve

$$\pi^e \downarrow \quad \pi = \pi^e - \alpha(u - u^*) + \gamma \frac{\Delta P^m}{P}$$



Fiscal Policy Response to Oil Shock-1

Government increases spending ($G \uparrow$) to reduce unemployment.



Result:

$u \downarrow$ but $\pi \uparrow$ further

No free lunch: Fiscal policy reduces unemployment at the cost of higher inflation.

Fiscal Policy Response to Oil Shock-2

- ▶ Although, do not forget that the major reason of upward shifting is permanent increase in inflation expectations.
- ▶ In a nutshell:

Variable	Initial Response ($G \uparrow$)	Long-Run (Expectations Adjusted)
Unemployment (u)	Decreases (\downarrow)	Returns to Natural Rate (u^*)
Inflation (π)	Increases (\uparrow)	Increases Further ($\uparrow\uparrow$)
Output (Y)	Increases (\uparrow)	Returns to Potential Level (Y^*)

1. Augmented Phillips Curve:

$$\pi = \pi^e - \alpha(u - u^*) + \gamma \frac{\Delta P^m}{P}$$

2. Demand vs supply:

- ▶ Unemployment changes \Rightarrow movement along the curve
- ▶ Commodity prices / expectations \Rightarrow shifts of the curve

3. Oil shocks:

$$\pi \uparrow \quad \text{and} \quad u \uparrow \quad (\text{stagflation})$$

4. Policy tradeoffs:

- ▶ Monetary tightening reduces inflation but increases unemployment
- ▶ Fiscal expansion reduces unemployment but increases inflation

5. Credibility matters:

- ▶ Faster adjustment of expectations
- ▶ Lower unemployment cost of disinflation