

# International Money and Banking:

## 15. The Phillips Curve: Evidence and Implications

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# Central Banks and Economic Conditions

- Modern economists tend to see inflation to be determined, not by the money supply, but by the overall demand for goods and services being strong relative to the economy's capacity to supply them.
- Central banks play an important role in influencing the demand for goods and services by controlling interest rates and credit conditions.
- Lower interest rates can
  - ① Give more disposable income to those who have borrowed money, thus allowing them to spend more on goods and services.
  - ② Make it more likely that households, businesses and governments will borrow money for consumption or investment purchases.
  - ③ Increase the value of assets like shares or houses.
  - ④ Increase lending from banks because credit risk for borrowers is lower when interest rates are low.
- Central banks can also directly affect the supply of credit via macro-prudential policies.
- Via all these channels, central banks can influence inflation.

# Inflation Due to a Strong Economy

- So how does the economic strength of the economy translate into inflation?
- An early version of this idea was the so-called Phillips curve, named after LSE economist A.W. Phillips who published a paper on this in 1958.
- The idea behind the Phillips curve was that inflation would be high when the unemployment rate was low and inflation would be low when unemployment was high.
- The mechanism through which this would work was as follows.
  - ① When the economy is doing well and there is a lot of demand for buying goods and services, employers hire more workers and the unemployment rate is low.
  - ② Workers are in high demand and are able to get higher wage increases.
  - ③ This increase in wage costs raises costs for firms and this results in higher price inflation.
- A 1960 study by MIT economists Solow and Samuelson replicated these findings for the US and emphasised that the relationship also worked for price inflation. The Phillips curve tradeoff quickly became the basis for the discussion of macroeconomic policy.

# Some of A. W. Phillips's Graphs

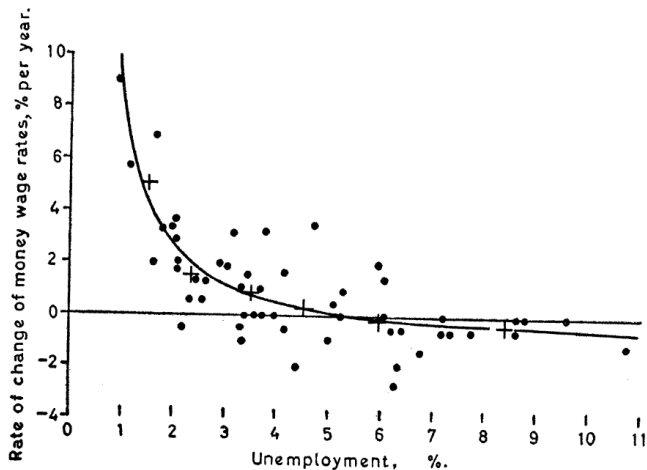


Fig.1.1861 - 1913

# Some of A. W. Phillips's Graphs

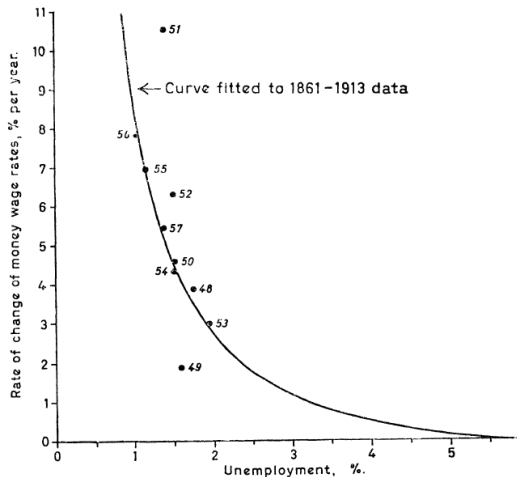


Fig. 11. 1948-1957, with unemployment lagged 7 months

# Solow and Samuelson's Description of the Phillips Curve

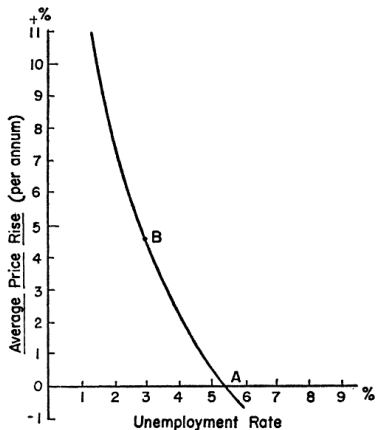


FIGURE 2

MODIFIED PHILLIPS CURVE FOR U.S.

This shows the menu of choice between different degrees of unemployment and price stability, as roughly estimated from last twenty-five years of American data.

# The Expectations-Augmented Phillips Curve

- Friedman pointed out that it was expected real wages that affected wage bargaining.
- If low unemployment means workers have strong bargaining position, then high nominal wage inflation on its own is not good enough: They want nominal wage inflation greater than price inflation.
- Assuming wage inflation gets passed through to price inflation, this gives us the following model of price inflation, known as the **expectations-augmented** Phillips curve:

$$\pi_t = \pi_t^e - \gamma(U_t - U^*)$$

- Friedman pointed out if policy-makers tried to exploit an apparent Phillips curve tradeoff, then the public would get used to high inflation and come to expect it:  $\pi_t^e$  would drift up and the tradeoff between inflation and output would worsen.
- In the long-run, you can't fool the public ( $\pi_t^e \approx \pi_t$ ) so you can't keep unemployment away from its "natural rate"  $U_t \approx U^*$ .

# Friedman's 1977 Graph on the Phillips Curve

Rate of inflation

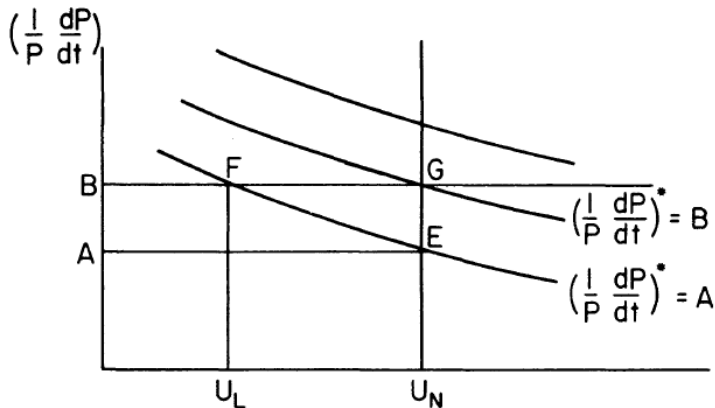


FIG. 2.—Expectations-adjusted Phillips curve

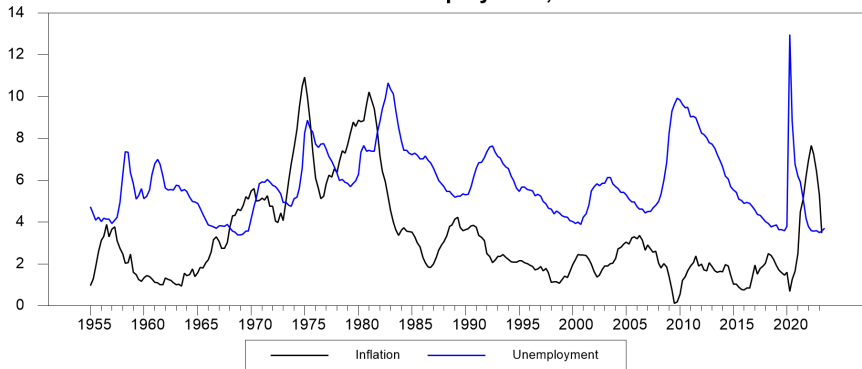


# The Demise of the Basic Phillips Curve

- US monetary and fiscal policy in the 1960s were very expansionary.
- At first, the Phillips curve seemed to work: Inflation rose and unemployment fell.
- However, as the public got used to high inflation, the Phillips tradeoff got worse. By the late 1960s inflation was still rising even though unemployment had moved up.
- This **stagflation** combination of high inflation and high unemployment got even worse in the 1970s.
- This was exactly what Friedman predicted would happen.
- Today, the data no longer show any sign of a negative relationship between inflation and unemployment and the original formulation of the Phillips curve is widely agreed to be wrong.
- The 1960s are now seen as an example of what goes wrong when monetary policy pursues the wrong goals.

# The Evolution of US Inflation and Unemployment

## US Inflation and Unemployment, 1955-2023



# The Failure of the Phillips Curve

## US Inflation and Unemployment, 1955-2023

*Inflation is the Four-Quarter Percentage Change in GDP Deflator*



# The Accelerationist Phillips Curve

- What determines inflationary expectations?
- Friedman argued they are determined **adaptively**. For instance, people use last year's inflation rate as a guide to what to expect this year.
- In this case, this would mean  $\pi_t^e = \pi_{t-1}$ , so the expectations-augmented Phillips curve becomes

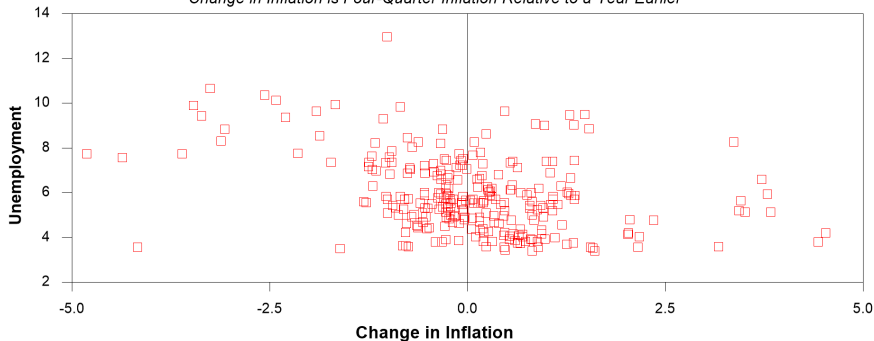
$$\pi_t = \pi_{t-1} - \gamma(U_t - U^*)$$

- This relates the **change in inflation** to the gap between unemployment and its natural rate. When unemployment is below its natural rate, inflation will be increasing; when it is above it, it will be decreasing.
- Because it relates the rate of acceleration of the price level to unemployment, this is known as the **accelerationist** Phillips curve.
- This model fitted the data pretty well for a long time.

# The Success of the Accelerationist Phillips Curve

## Unemployment and Annual Changes in US Inflation, 1955-2023

*Change in Inflation is Four-Quarter Inflation Relative to a Year Earlier*



# Real-World Complications

- The accelerationist Phillips curve relationship between the change in inflation and the unemployment rate seems to offer a key tool to central bankers, and it is indeed useful.
- However, as with all models, the real world is a bit more complicated than the simple model. Two complications are worth noting:

- 1 **Supply shocks** such as big increases or decreases in food or energy prices can temporarily shift the inflation-unemployment tradeoff, so that it becomes

$$\Delta\pi_t = -\gamma(U_t - U^*) + s_t$$

Bad supply shocks are ones that raise inflation even though the unemployment rate hasn't changed (oil price shocks are a good example).

- 2 **The natural rate**,  $U^*$ , is not a universal constant. It probably changes over time and, at any point in time central bankers must guess it. For instance in Europe the natural rate rose substantially in the 1980s and 1990s. More generally, central bankers are usually unsure of how fast the economy can grow without triggering inflationary pressures.

# Tradeoffs Offered by The Accelerationist Phillips Curve

- Over the short-term, the accelerationist model describes a new tradeoff for central bankers. For instance, they can choose to keep the unemployment rate below the natural rate for a while at the expense of increasing inflation.
- But it doesn't really offer an exploitable long-run tradeoff.
- Even if central bankers wanted to be popular and maintain unemployment below the natural rate, the cost of seeing ever-increasing inflation would be too high.
- Also, if they did decide to exploit this relationship, people would recognise it, take it into account, and then they probably wouldn't set  $\pi_t^e = \pi_{t-1}$  anymore, so the relationship would break down.
- Policy-makers thus have to accept that, over the long run, unemployment will be close to its natural rate. In which case, they should **make a commitment to a low inflation rate**.
- Note, though, this tension between something that can be exploited a bit in the short run but not in the long run.

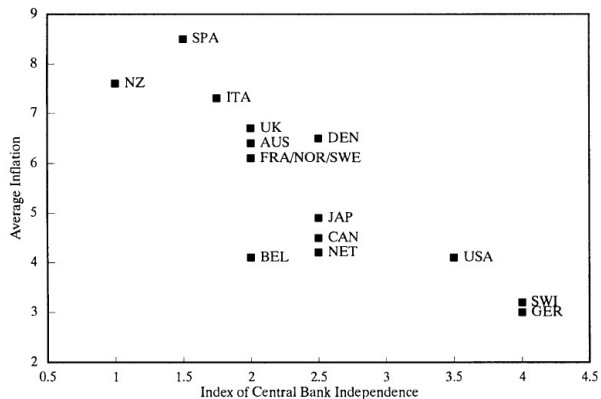
# Implications for Central Bank Institutional Design

The expectations-augmented Phillips curve suggests the best outcome is obtained if the central bank can commit to a low inflation, and this commitment be believed by the public. This suggests the following ideas.

- 1 Political Independence:** A central bank that plans for the long-term (and does not worry about economic performance during election years) is more likely to stick to a low inflation commitment. So, independence from political control is an important way to reassure the public about the bank's credibility. Influential research by Alesina and Summers (1993) showed that more independent central banks meant lower inflation.
- 2 Conservative Central Bankers:** If the central banker really doesn't like inflation—and the public believes this, the economy gets closer to the ideal low inflation outcome without having to raise the unemployment rate. So the government may choose to appoint a central banker who is more inflation-averse than they are (Paul Volcker's appointment as Fed chair in 1979 might be an example of this happening.)
- 3 Consequence for Bad Inflation Outcomes:** Introducing laws so that bad things happen to the central bankers when inflation is high is one way to make the public believe the they will commit to a low inflation rate.



# Alesina and Summers's (1993) Evidence on Central Bank Independence and Inflation



## Influence of this Research

These ideas had a considerable influence on the legal structure of central banks around the world:

- 1 **Political Independence:** There has been a substantial move around the world towards making central banks more independent. Close to home, the Bank of England was made independent in 1997 (previously the Chancellor of the Exchequer had set interest rates) and the ECB/Eurosystem is highly independent from political control.
- 2 **Conservative Central Bankers:** All around the world, central bankers talk much more now about the evils of inflation and the benefits of price stability. Mainly, this is because they believe this to be the case. But there is also a marketing element. Perhaps they can face a better macroeconomic tradeoff if the public believes the central bank's commitment to low inflation.
- 3 **Consequence for Bad Inflation Outcomes:** Many central banks now have legally imposed inflation targets and bad things happen when the inflation target is not met. For instance, the Governor of the Bank of England has to write a letter to the Chancellor explaining why the target was not met.

# Long-Run Benefits of Low Inflation

- Because central banks now believe they can't really control the unemployment rate or the growth rate for long periods of time, they tend to focus a lot on what they think they can control: Inflation.
- In particular, most central banks in recent years have aimed for keeping inflation low and stable as their main goal.
- Former Fed chair, Ben Bernanke (see his speech, "The Benefits of Price Stability") argued that *"the mandated goals of price stability and maximum employment are almost entirely compatible."*
- Low inflation helps to boost economic growth over the long run by
  - ① Saving the time and energy associated with dealing with high inflation: Having to reset prices regularly, re-write contracts to deal with inflation.
  - ② Facilitating long-run decision making, with consumers and businesses not having to worry about uncertainty about the future price level.
  - ③ Enhancing the price signals and thus the functioning of the market system.
- But it is hard to argue on these grounds that, for example, there is a large welfare gain going from 4% inflation to 2% inflation.

## Problems with a Low Inflation Target

- Most central banks have adopted a target inflation rate of about 2 percent over the past two decades. And inflation is been kept in check in most advanced countries since the mid-1980s.
- More recently, there has been a debate about whether 2 percent is too low an inflation target. When inflation averages two percent, then relatively small shocks can bring the economy close to deflation.
- Perhaps with a higher inflation target, central banks would have more room to cut interest rates before hitting lower bounds on policy rates and conducting unorthodox policies like QE.
- See the paper by Blanchard et al (Rethinking Macroeconomic Policy) and the blog post on “The zero lower bound on interest rates” by Ben Bernanke for a discussion of the potential benefits and costs of higher inflation targets.
- There are also some signs now that some policy makers are reconsidering the idea of focusing purely on inflation targeting. The New Zealand central bank, the first pure inflation targeter back in the 1990s, was given a changed mandate in March 2018 to also take employment into account when making monetary policy decisions.

## Low Inflation Prior to 2021

- Prior to 2021, inflation had been low in advanced economies for years despite many of them experiencing very low rates of unemployment.
- Many speculated that “the Phillips curve is dead” so central banks no longer needed to worry about economies over-heating and generating higher inflation.
- A few explanations for this pattern:
  - ① The unemployment rate probably became a poor summary for the balance between supply and demand in the economy.
  - ② With an increasingly globalised economy, the relevant measure of “supply capacity” determining inflation is a global one rather than a national one and low inflation reflected the world economy having spare capacity.
  - ③ After many years of low inflation, the public’s inflation expectations remained “anchored” around 2%.
- In my 2021 paper “Central Banks and Inflation: Where Do We Stand and How Did We Get Here?” I wrote *“the laws of supply and demand have not been repealed. There is a strong body of empirical evidence telling us that macroeconomic policy can influence aggregate demand and there is little reason to doubt that stimulating aggregate demand sufficiently can raise inflation.”* Recent experience supports this.

# The Phillips Curve and Current Inflation

- Much of the current high inflation (particularly in the euro area) is due to supply shocks, which are not part of the Phillips curve relationship.
- However, central bankers are clearly continuing to use the expectations-augmented Phillips curve to frame their thinking about reducing inflation.
- Central banks such as the Fed and ECB have raised interest rates to slow the economy and reduce inflation.
- And they have also expressed concerns that high inflation could “de-anchor” inflation expectations and lead to a return of stagflation.
- So far, increases in longer-term inflation expectations in surveys of consumers and professional economists have been pretty restrained, suggesting the public largely expects the high inflation rates to be temporary.
- Inflation seems to have peaked, so fears about “de-anchoring” are probably not as great a concern now.

# Key Points

- 1 The original Phillips curve and its demise.
- 2 The expectations-augmented Phillips curve.
- 3 The accelerationist Phillips curve.
- 4 Tradeoffs implied by the expectations-augmented Phillips curve.
- 5 The influence the expectations-augmented Phillips curve theory has had on central banks.
- 6 Benefits from low inflation.
- 7 Problems caused by a low inflation target.
- 8 Explanations for sustained low inflation prior to 2021.
- 9 How central bankers are using the expectations-augmented Phillips curve to think about current high inflation.