INFLATION, MONETARY POLICY AND THE PHILLIPS CURVE

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Inflation has risen substantially.
Inflation and the Phillips Curve

- New Keynesian formalization:
  \[ \pi_t = \beta E_t \pi_{t+1} - \kappa (u_t - u^n_t) + \nu_t \]

- Drivers of inflation:
  - Expected inflation: \( E_t \pi_{t+1} \)
  - Measure of “output gap”: \( u_t - u^n_t \)
  - Supply shocks: \( \nu_t \)

- Slope of the Phillips curve: \( \kappa \)
  - In a Neoclassical model, \( \kappa \) is large
  - In a Keynesian model, \( \kappa \) is small
Pre-COVID “Puzzles”

Unemployment (right axis)
Core CPI Inflation (left axis)
Conventional Wisdom (Pre-Covid)

- Volcker disinflation:
  - Tight policy $\rightarrow$ high unemployment $\rightarrow$ lower inflation
  - Suggests the Phillips curve is steep

- Since 1990:
  - Muted response of inflation to unemployment
  - Great Recession: missing disinflation
  - Late 2010s and 1990s: missing rise in inflation

- Phillips curve is getting flatter or hibernating (or dead)
  - Perhaps an important flaw in the Keynesian model
Assume adaptive expectations: $\beta E_t \pi_{t+1} = \pi_{t-1}$

In this case,

$$\pi_t = \beta E_t \pi_{t+1} - \kappa (u_t - u^n_t) + \nu_t$$

becomes

$$\Delta \pi_t = -\kappa (u_t - u^n_t) + \nu_t,$$

Stock and Watson (2019):

- $\Delta \pi_t$: Annual change in 12-month core PCE inflation
- $u_t - u^n_t$: CBO unemployment gap
- Refer to $\kappa$ as “Phillips correlation”
Flattening Phillips Curve

- Year-over-year change in inflation
- Unemployment Gap

Data periods:
- 1960-1983
- 1984-1999
- 2000-2019
Volcker disinflation:
- Sharp regime shift
- Rapid fall in long-run inflation expectations
- Rapid fall in inflation

Since 1990:
- Long-run inflation expectations have become anchored
- Consequently, inflation has become more stable

Apparent “flattening” of Phillips curve due to anchoring of inflationary expectations (Bernanke, 2007; Mishkin, 2007)
LONG-RUN INFLATION EXPECTATIONS

Core CPI Inflation - Research Series
Long-Run SPF Forecast of CPI Inflation

Year

0 1 2 3 4 5 6 7 8 9 10


Core CPI Inflation - Research Series
Long-Run SPF Forecast of CPI Inflation

Nakamura
Inflation
May 2022
TWO STORIES (PRE-COVID)

1. Flattening Phillips Curve Story:
   - Volcker lowered inflation by moving along a steep Phillips curve
   - Phillips curve has since flattened

2. Anchored Expectations Story:
   - Volcker lowered inflation by engineering a rapid fall in expectations
   - Expectations then became anchored
   - Phillips curve always had modest slope
How Can We Tell the Difference?

- Many confounding shocks in macro time series!
- Can regional data help?

Example:
- Texas goes into recession but Illinois does not
- How much does inflation fall in Texas relative to Illinois? (diff-in-diff approach)
- Advantages of panel data
  - More datapoints, more options for identification
  - Citation: Hazell, Herreno, Nakamura, Steinsson, “The Slope of the Phillips Curve: Evidence from U.S. States” (*QJE*, Forthcoming)
Regional Business Cycles

Date

CA
TX
PA

Inflation

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Regional identification (RHS) yields more stable Phillips curve; Much less flattening

**Figure:** Scatterplots—Non-Tradeable Inflation and Unemployment
**Main Conclusions**

- Apparent “flattening” mainly due to anchoring of expectations
  - No time fixed effects: Factor >100 flattening
  - With time fixed effects: Factor 2 flattening
  - Interpretation: Time fixed effects absorb movements in long-run inflation expectations
- Demand-driven inflation:
  - 1% increase in unemp. $\rightarrow 1/3\%$ decrease in inflation
  (if inflation expectations remain unchanged)
**The Role of Regime Change**

- Results suggest beliefs about monetary regime are important
- But how does the monetary authority change (keep control over) long-run inflation expectations
  - Fundamentally hard!!
  - Sometimes beliefs do change rapidly
    (e.g., Volcker disinflation, ends of hyperinflations)
  - How does the central bank convince people that it is “serious” about inflation?
Digression: War Against the US Great Inflation

- Many (unsuccessful) attempts to curb inflation in 70’s
  - Nixon 1971: Wage and price controls
  - Ford 1974: Inflation “public enemy number one”
    
    WIN: Whip inflation now

- Carter:
  - “Persistent high inflation threatens the economic security of our country”
  - Oct 1979: Appoints Paul Volcker Chairman of Fed
In 1979/80 the newly appointed chairman of the U.S. Federal Reserve, Paul Volcker

- Sets as a goal to bring inflation below 4%
- Dramatically raises interest rates
- Fed funds rate reached record high of 20% in 1980!

Volcker tightened policy dramatically

- Caused massive recession
- Didn’t get fired

Perhaps this was crucial in changing beliefs about long-run monetary regime
1. **Long-run inflation expectations key driver of inflation**

2. Demand-driven inflation:
   - 1% increase in unemp. → 1/3% decrease in inflation

3. Shelter/rent has strongest relationship with unemployment

4. Hard to explain experience of 1970s/80s without supply shocks
Inflation Expectations Rose Modestly
Lessons from the Past

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Pre-COVID:
Core CPI and Unemployment: 1990-2022

Including COVID:

[Graph showing unemployment rate and Consumer Price Index for All Urban Consumers: All Items Less Food and Energy in U.S. City Average from 1985 to 2022.]

Source: U.S. Bureau of Labor Statistics
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CPI: Shelter vs. Non-shelter

- Green line: Unemployment
- Red Line: CPI shelter
- Grey Line: CPI Non-shelter

Source: U.S. Bureau of Labor Statistics
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Supply shocks are back!

- Ukraine war; China’s zero-COVID policy
- Labor market: Declining labor force participation
- COVID sick days, safety precautions etc.

Also, relative price shocks

- Massive structural shift from services to goods
- “Looks like” supply shock in a model
Labor Force Participation

Source: U.S. Bureau of Labor Statistics
GOODS SPENDING: FRACT. TOTAL CONSUMER EXPENDITURES

Personal Consumption Expenditures: Goods/Personal Consumption Expenditures

Source: U.S. Bureau of Economic Analysis
The Fed has long believed that both demand and supply shocks are transitory.

Inflationary pressure would dissipate without aggressive action.

Still possible that inflationary pressure will diminish:
- Supply shocks may normalize
- Relative demand may mean-revert
- Demand may moderate
In the 1970s, supply shocks, relative price shocks led to inflation expectations to become unhinged
  - Pulled up nominal anchor
Recently Fed has dramatically tightened monetary policy
Designed to demonstrate Fed will “do whatever it takes” to bring inflation down
Crucial for maintaining credibility
Zero Coupon Yields: 1, 5, 10 Years