Inflation and the Phillips Curve

Short-Run Supply
Why is Aggregate Supply not Vertical in Short Run?

- Would like some theoretical reason why aggregate supply is horizontal/sloped in short-run
- Why can we treat prices as fixed in short run?
  - Alternatively: why do we have short-run and long-run supply curves, but only one aggregate demand curve?
Theoretical Model of Nominal Rigidity

• *Sticky Long-term Nominal Wages*

  (Gray/Fischer/Taylor): unions fix nominal wages in short run (≈ three years?)
Shock to Aggregate Demand

– Unexpected increase in demand raises prices, hence lowers real wages, induces hiring; employment and output are boosted (boom)
Two Serious Problems

1. How important are unions?
   - Also, are unions foolish enough to set *nominal* wages?

2. Are real wages counter-cyclic in practice?
Worker Misperceptions (Friedman)

- Similar, but with flexible nominal wages.
  - Labor supply depends on real wages set with expected prices because workers look at many prices
  - Labor demand depends on actual prices as firms looks at a few prices
- Unexpected price increase leads to same sequence of events
  - Still have counter-cyclic real wages
  - Are information problems so serious in reality?
- Other models exist too
Common Problems with Theories

• Difficult to discriminate between models of aggregate supply empirically

• All models yield positively-sloped/flat aggregate short-run supply curve

• Most hard to believe (e.g., if they predict counter-cyclic real wages)
Empirical Motivation for Short-Run Aggregate Supply

• Data clearly indicate that short-run supply is not vertical
  – Dis-inflation via aggregate demand contraction costs recession

• Ongoing research on short-run aggregate supply – most historic focus on demand
Phillips Curve

• The negative, short-run relationship between unemployment and inflation

• Initially, Phillips created, then plotted historical inflation and unemployment
Graphically
Formal Theory for Phillips Curve

• Start from the aggregate short-run supply curve, and manipulate it:

\[ y = y_{NR} + \alpha(p - p^e) \]
\[ \Rightarrow p = p^e + \frac{1}{\alpha}(y - y_{NR}) \] \( \alpha > 0 \)
\[ \Rightarrow p - p_{-1} = p^e - p_{-1} + \frac{1}{\alpha}(y - y_{NR}) \] \( \text{Rearrange} \)
\[ \Rightarrow \Pi = \Pi^e + \frac{1}{\alpha}(y - y_{NR}) \] \( \text{Subtract} \)
\[ \Rightarrow \Pi = \Pi^e - \beta(u - u_{NR}) + \varepsilon \] \( \text{Define inflation} \)

• End up with negative “Phillips Curve” inflation/unemployment relationship
Notes

1) prices not wages matter

2) expected inflation matters

3) supply shocks (ε) imply there is no deterministic relationship between unemployment and inflation
Interpretation of Phillips’ Empirical Finding

• The *negative* relationship found empirically indicates that Phillips was essentially tracing out aggregate supply
  – Hence the inflation/unemployment tradeoff is *only generally valid for demand shocks*
Graphically

Equilibrium

Demand Shocks

Supply Shocks
More on Phillips Curve Interpretation

- Phillips' correlation means that most shocks were demand shocks for his sample of data
  - Historically though, many shocks are demand shocks
Transition from Business Cycles to Long Run

• Changing expectations of inflation shift short-run aggregate supply curve, provide link between short-run (prices fixed) and long run (prices flexible)
Graphically

Large Open or Closed Economy

Expansionary Monetary Shock

\[ \frac{M^s}{P} = L(y^+, i\rightarrow) \]

Eventually... Inflation

\[ \frac{M^s}{P} = L(y, i) \]

Andrew Rose, Global Macroeconomics 13
Notes

• Demand shocks (monetary/fiscal/investment) raises inflation by lowering U/raising y above natural rate

• Key question for dis-inflations: how are inflation expectations formed/changed?

• Lowering inflation through contractionary aggregate demand policy is costly unless expectations can be changed quickly
Key Takeaways

• Phillips Curve: tradeoff between inflation and unemployment
• Tradeoff only for a) demand shocks, and b) in short run