The Phillips Curve

1. What is the Phillips curve?
2. A little history of thought
3. Four theories of the Phillips curve
   (a) RBC
   (b) Keynesian
   (c) Friedman - adaptive expectations
   (d) Lucas - rational expectations
4. A shifting Phillips curve
5. Where does this leave macro-policy?
6. The government budget constraint (again)
7. Rehabilitating a country from an inflation addiction

A little history of thought

- The idea originated in 1958 when A.W. Phillips showed a negative relationship between unemployment and nominal wage growth in Britain.
- In 1960 Paul Samuelson and Robert Solow found a Phillips curve in U.S. data.
- Milton Friedman Presidential Address in 1968. He argued the following
  - theory (his theory) predicts no stable relationship between unemployment and inflation.
  - According to his theory, policymakers do face a short-term tradeoff between unemployment and inflation due to the private sector’s failure to quickly adapt to changing environments.
  - long term costs to policymakers of exploiting short term tradeoff. If policymaker generates temporarily low unemployment by inflating, in future, higher and higher unemployment rates will be associated with each level of inflation. (Phillips curve shifts out.)
- This argument was formalized and refined by Lucas.

What is the Phillips curve?

- It is the negative relationship between unemployment and inflation that can be seen in the data.

What is all the fuss about?

- Is the Phillips curve exploitable by public policy? That is, can a government tradeoff inflation for unemployment?

- What happened after Friedman’s speech?
  - The economy was hit by the oil price shocks of 1973 - negative supply shock.
  - Policymakers still attempted to exploit the believed tradeoff between unemployment and inflation.
  - Higher and higher unemployment rates became associated with each level of inflation. (The Phillips curve shifted out.)
- Paul Volker finally reduces inflation by raising interest rates dramatically, throws the economy in the 1982 recession.
Four Theories of the Phillips Curve

1. **RBC theory (or the straight classical model)**

2. **Old time Keynesian IS-LM analysis**
   - The Phillips curve should be downward sloping and stable.
   - Question: When firms know they must set prices in advance and are then stuck with those prices, how do they decide what price to set?
   - The implicit answer in the Keynesian story above is that firms are always setting their price so that it would have been correct in the previous time period.

3. **Friedman - adaptive expectation**
   - Assume that private sector adapts to inflation.
   - This story accounts for the "shifting out" of the Phillips curve.

4. **Lucas and rational expectations**
   - Assume that private sector forms rational expectations regarding inflation.
   - Rational expectations simply implies that firms may be wrong in their guesses, but not stupid.
   - Implication: Distinction now is not between the long run and short run effects of inflation, but between anticipated and unanticipated money supply changes.
   - Get an expectation-augmented Phillips curve:
     \[ \pi = \pi^e - h(u - \bar{u}) \]
     where
     - \( \pi \) = actual inflation rate
     - \( \pi^e \) = expected inflation rate
     - \( u \) = actual unemployment rate
     - \( \bar{u} \) = natural rate of unemployment
   - What the natural rate of unemployment or NAIRU? Good question – in this class it is unemployment rate associated with output at the full employment level of output.

A digression on the natural rate of unemployment

- The natural rate sometime gets called the NAIRU - the non-accelerating inflation rate of unemployment.
- Is the NAIRU stable? Can we measure it?
- Big debate, since it is unclear where are we today
  - Currently low unemployment, low inflation ...
  - Is the low unemployment today going generate inflation?
  - What is the NAIRU today?
- Get’s us back to the issue about productivity gains.
How is Lucas’ model different from Keynes’s model and Friedman’s model?

- Example 1: Consider effect of increasing $M_s$ 10%, then 20%, then 30% and so on.
  - In Keynes, private sector would always expect prices to be whatever they were in the previous period. Bigger and bigger booms.
  - In Friedman, what happens depends on how one specifies how firms adapt. The usual specification is that firms expect inflation to be some average of past inflation levels. In this case, firms are always “behind the curve.” Constant boom.
  - In Lucas, firms are simply assumed to be relatively smart. The above pattern is not too hard to pick up.

- Example 2: Consider effect of high inflation country enacting observable and credible reforms which keep the money supply from growing.
  - In Keynes, recession.
  - In Friedman, recession.
  - In Lucas, nothing.

The shifting Phillips curve

- As we stated above, the expectation-augmented Phillips curve show the relationship between unemployment and inflation for a given expected rate of inflation and natural rate of unemployment.
- Changes in the expected rate of inflation
- Changes in the natural rate of unemployment
- Supply shocks

The long-run Phillips curve

- In the long-run the Phillips curve is vertical in both Keynesian and Classical theory.

Where does this leave macroeconomic policy regarding unemployment?

- This classical analysis essentially turns unemployment into a microeconomic issue.
  - What determines the natural rate - the rate associated with normal growth?
  - Given the shifting Phillips curve, not much a country can do using macroeconomic instruments such as the money supply or overall government spending to affect unemployment in the long run.
  - Microeconomic instruments such as the level of unemployment benefits, regulations and so forth may still be important. (they just don’t happen to be the subject of this class.)
- Recall Tobin’s quote from last week.

The government budget constraint (once again)

$$G_t + TR_t + (1 + r_{t-1})B_{t-1} = T_t + B_t + \frac{M_t - M_{t-1}}{P_t}$$

where

- $G_t$ = Government spending during period $t$
- $TR_t$ = Transfer payments (e.g. social security) during period $t$
- $B_{t-1}$ = Bonds that were issued last period $(t - 1)$ that are due this period $(t)$
- $B_t$ = New Bonds issued this period $(t)$
- $r_{t-1}$ = The interest rate last period
- $M_t$ = Stock of money outstanding this period $(t)$
- $M_{t-1}$ = Stock of money outstanding last period $(t - 1)$
- $P_t$ = Price level this period $t$
Fiscal Policy and Prices

- It is not hard to see fiscal authorities tend to like a little inflation.
  - play the Phillips curve
  - it is a tax increase

\[ G_t + TR_t + (1 + r_{t-1})B_{t-1} = T_t + B_t + \pi M_t T_t \]

- One of the main reasons we split monetary and fiscal responsibilities.
- But ultimately the fiscal authority can influence the price level.

Rehabilitating a country from an inflation addiction

- Is it possible to "cure" a country from high inflation without causing a recession?
  - In Lucas’ framework, yes.
- Much discussion about credibility of announced reductions in inflation.
- The success of deflating without causing an increase in unemployment hinges on credibility.
- Argentina attempted to create credible policy through constitutional changes.
- Robert Barro argues that personnel important.
- Hear no evil, see no evil ...