Macroeconomic Theory: IS-MP-PC Practice

## A Note on the Phillips Curve

So far we have pretty good practice using the IS curve and the MP curve. Let’s take a minute to look at the Phillips Curve in equation form.

The Phillips Curve has three basic components derived from the following inflation equation:

$$π\_{t}= π^{e}+\frac{\left(Y-Y^{P}\right)}{Y^{P}}+v$$

Each of these components should be familiar:

$π^{e}$: this is expected inflation. If the central bank is trusted by households and businesses, then their best prediction of future inflation will be the inflation target set by the central bank. In the US, the Federal Reserve has set a target of 2%.

$\frac{\left(Y-Y^{P}\right)}{Y^{P}}$: this is the output gap in percentage form. It tells us what percent of potential output the gap is. When we are below potential inflation, $π\_{t}= π^{e}$. This implies that $v$ is zero (covered below).

$v$ : this is what we will use to represent any cost push inflation factors. So if there is an oil price shock, or anything else that affects the cost of production for firms in general, we will use $v$ to represent it.

When it comes time to plot the Phillips Curve, we will convert it to the “unexpected” inflation form:

$$π\_{t}- π^{e}=\frac{\left(Y-Y^{P}\right)}{Y^{P}}+v$$

## Practice

Consider the following full, 3 equation economy:

**IS:** $Y=4\*(750-1,000\*r)$

(where 4 is the multiplier, 750 is the sum of autonomous expenditures, and -1,000 is the sensitivity of spending to interest rates)

**MP:** $r= 0.04-0.02+0.03$

(where 0.04 is the policy rate ($i$), 0.02 is expected inflation ($π^{e}$) and 0.08 is the risk premium ($x$)

**PC:** $π\_{t}- 0.02=\frac{\left(Y-Y^{P}\right)}{Y^{P}}+0 $

(where 0.02 is expected inflation, and 0 is the cost push factors).

1. Explain what factors affect the multiplier in general.
2. Explain what kinds of spending are empirically most sensitive to interest rates and credit conditions.
3. Explain what factors affect the risk premium.
4. Explain why the output gap might affect inflation.
5. Solve for equilibrium.
6. Assume that the equilibrium you solved for in 4 is potential output. Plot this situation in the graphs below. You don’t need to be accurate in your slopes, but do label the axes and label equilibrium points:
7. We’ve talked about 3 kinds of shocks a macroeconomy can face: a financial shock, a spending shock, and a supply shock. Which equations do each affect?
8. Consider a scenario in which a global pandemic has caused production and distribution of goods to be much more costly. In particular, now *v = .02*. Solve for the new inflation rate *at current equilibrium* (the level you solved for in 4). In particular, we are assuming for now that potential output will remain the same.
9. If Fed policy makers really wanted the inflation rate to be at their target, what output gap would they have to achieve?
10. If Fed policymakers want to achieve that output gap, what interest rate should they set? What will the consequences be for unemployment of achieving their target inflation rate?