

Business Cycles: A New Keynesian Model: Key

1. The hallmark of the Keynesian tradition is that prices are not completely flexible. In this model, only an exogenous fraction of firms are able to change their price each period.
2. The Old Keynesian Model was heavily criticized for straying too far from microeconomic foundations. In this model, the demand side results from household utility maximization and the supply side from firm profit maximization.
3. There are many ways to do this, here is one. Start by assuming that consumption follows:

$$C_t = (\bar{a}_c - \bar{d}(R_t - \bar{r}))\bar{Y}_t \quad (1)$$

Inserting (1) into the national income accounting identity, along with the unmodified assumptions yields:

$$\tilde{Y}_t = \bar{a} - (\bar{b} + \bar{d})(R_t - \bar{r}) \quad (2)$$

4. When π_t is exogenous, a change in nominal interest rates has a one-to-one affect on real interest rates. With thus modification, however, the change in interest rates affects both consumption and investment. recall in the baseline model that only investment is affected.
5. The real interest rate is the nominal interest rate less inflation. It thus equals -5% in this example. Unlike nominal interest rates, real interest rates may be negative.
6. True, in the short run. This tradeoff is captured in the New Keynesian Phillips Curve. In the long run, however, no such tradeoff exists.
7. This represents a negative demand shock (negative value of g_t in our model). The Central Bank can offset this shock by lowering nominal inters rates. As long as i_t does not reach its zero lower bound, the monetary authority can offset the shock.
8. A liquidity trap is when $i_t \approx 0$. In a liquidity trap, the Central Bank can no longer stimulate the economy by further lowering i_t .
9. All else equal, an adverse supply shock increases inflation. In order to offset this effect, the Fed must conduct open market sales which reduce the monetary base.
10. Imposing this assumption yields:

$$\bar{v}\tilde{Y}_t = -u_t \quad (3)$$

The output gap is thus a function only of the exogenous supply shock. Monetary policy can no longer affect its value.

11. There are many ways of doing this. Here is one. Start by changing the assumption regarding G_t so that:

$$G_t = \bar{a}_g\bar{Y}_t - dY_t \quad (4)$$

Now, when actual output increases, government spending declines. Inserting this assumption into the national income accounting identity:

$$Y_t = (\bar{a}_c + \bar{a}_I + \bar{a}_G + \bar{a}_{EX} - \bar{a}_{IM})\bar{Y}_t - \bar{b}(R_t - \bar{r}) - dY_t \quad (5)$$

Algebraic manipulation, similar to class, then yields:

$$\tilde{Y}_t = \frac{\bar{a} - \bar{b}(R_t - \bar{r})}{1 + d} \quad (6)$$

Evaluating this at the steady state, it must be true that $\frac{\bar{a}}{1+d} = 0$. Defining g_t as short run deviations from zero (demand shock), and using the Fisher Equation:

$$\tilde{Y}_t = g_t + \frac{\bar{b}}{1+d}(i_t - \pi_t - \bar{r}) \quad (7)$$

So the main effect is that, for $d > 0$, which implies that government spending increases when output falls, An increase in the interest rate now has a smaller effect on the output gap. This occurs because when lower interest rates stimulate the economy, some of this effect is offset through less government spending.

12. Such a policy requires that the Fed lower interest rates through open market purchases. Such a policy increases the output gap, and output, in the short run. In the long run, it has no effect on output. To see this, suppose that the economy is at its steady state with an initial steady state level of inflation, $\bar{\pi}_0$. Now suppose that the Central Bank decides that it wants to move the economy to a higher inflation target, $\bar{\pi}_1$. Re-writing aggregate supply and aggregate demand for these conditions yields:

$$\pi_t - \bar{\pi}_0 = \tilde{Y}_t \quad (8)$$

$$\tilde{Y}_t = -b(m - 1)(\pi_t - \bar{\pi}_1) \quad (9)$$

Inserting (8) into (9) and re-arranging yields:

$$\tilde{Y}_t = \frac{b(m - 1)(\bar{\pi}_1 - \bar{\pi}_0)}{1 + b(m - 1)} \quad (10)$$

Increasing the inflation target implies that $(\bar{\pi}_1 - \bar{\pi}_0) > 0$. It follows from (10) that $\tilde{Y}_t > 0$. Eventually, the economy moves to the new, high inflation, steady state. But during the transition, output rises above potential output.

13. The output gap is actual output less potential output, the value of output that would exist if labor were fully employed and capital fully utilized.