Lance Martin   Econ 451 PSET #5
Dr. Köru

(2)   Policy curve: $r_t = \bar{r} + \alpha(Y_{gap}) + \lambda \pi_t$

IS-curve: $Y = \dfrac{C - mpc \cdot \bar{T} + \bar{I} + \bar{G}}{1 - mpc} - \dfrac{\delta}{1 - mpc} \cdot r_t$

AS-curve: $\pi_t = E[\pi_t] + \gamma(Y - Y^p) + \rho$

a.) We know the usual policy rule takes the form $r_t = \bar{r} + \lambda \pi$. The presence of the output gap in our policy rule is because:

$$r_t = \bar{r} + \lambda[E[\pi_t] + \gamma(Y - Y^p) + \rho]$$

$$r_t = \bar{r} + \lambda \pi^e + \lambda \gamma(Y - Y^p) + \lambda \rho^{\,0}$$

$$\boxed{r_t = \bar{r} + \alpha(Y - Y^p) + \lambda \pi^e} \rightarrow \text{correlation} \qquad \lambda\gamma = \alpha$$

• We should expect $\alpha < 0$ if it's meaning the price flexibility, since prices are inflexible within the economy. This policy is just alternate version of the Taylor rule, with target inflation rate $\pi^* = 0$.

• $r_t = \bar{r} + \alpha(Y - Y^p) + \lambda[\pi_t - \pi^*]$ if $\pi^* = 0$ we simplify to taylor rule.

$\cancel{\ast}$ $\boxed{r_t = \bar{r} + \alpha(Y - Y^p) + \lambda[\pi_t]}$ $\cancel{\ast}$

• The presence of output gap in policy rule tells us how the fed will behave regarding rates when $Y^p > Y$, or stagnation, vs $Y^p < Y$ which is overheating.

(2b.) $Y = \dfrac{C - mpc \cdot \bar{T} + \bar{I} + \bar{G}}{1-mpc} - \dfrac{\delta \cdot r}{1-mpc}$

$r = \bar{r} + d(Y - Y^p) + \lambda \cdot \pi$

$Y = \dfrac{C - mpc \cdot \bar{T} + \bar{I} + \bar{G}}{1-mpc} - \dfrac{\delta}{1-mpc} \cdot \left[\bar{r} + d(Y - Y^p) + \lambda \pi \right]$

$Y = \dfrac{C - mpc \cdot \bar{T} + \bar{I} + \bar{G}}{1-mpc} - \dfrac{\delta \left[\bar{r} + \alpha(Y - Y^p) + \lambda \pi \right]}{1-mpc}$

$$\boxed{Y = \dfrac{C - mpc \cdot \bar{T} + \bar{I} + \bar{G} - \delta \left[\bar{r} + \alpha(Y - Y^p) + \lambda \pi_t \right]}{1-mpc}}$$

$1-mpc(Y) = C - mpc \bar{T} + \bar{I} + \bar{G} - \delta \bar{r} - \delta \alpha(Y - Y^p) - \delta \lambda \pi_t$

$(1-mpc) Y + \delta \alpha (Y - Y^p) = \underbrace{C - mpc \cdot \bar{T} + \bar{I} + \bar{G} - \delta \bar{r} - \delta \lambda \pi_t}_{X_t}$

$1-mpc \cdot Y + \delta \alpha Y - \delta \alpha Y^p = X_t$

$1-mpc \cdot Y + \delta \alpha Y = X_t + \delta \alpha Y^p$

$Y \cdot \dfrac{[(1-mpc) + \delta \alpha]}{[(1-mpc) + \delta \alpha]} = \dfrac{X_t + \delta \alpha Y^p}{[(1-mpc) + \delta \alpha]}$

* π_t is just inflation *

(2b) $Y = \dfrac{X_t + \delta \alpha Y^P}{[(1-mpc) + \delta\alpha]}$

$Y_t = \dfrac{C - mpc\cdot\bar{T} + \bar{I} + \bar{G} - \delta\bar{r} - \delta\lambda\pi_t + \delta\alpha Y^P}{[(1-mpc) + \delta\cdot\alpha]}$

$$\boxed{Y_t = \dfrac{C - mpc\cdot\bar{T} + \bar{I} + \bar{G} - \delta[\bar{r} + \lambda\pi_t + \alpha Y^P]}{[(1-mpc) + \delta\cdot\alpha]}}$$

* $d = \delta \rightarrow$ I like delta better Notation-wise *

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(2c) · larger values of alpha will make Y more robust to changes in π, whereas smaller values of alpha will make Y more sensitive to changes in π. If π increases by 1 unit, Y will decrease by $(\delta\cdot\lambda\cdot\pi)$ units, scaled by $1/(1-mpc + \delta\cdot\alpha)$.

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(2d) · Equilibrium is at a value for which $Y > Y^P$, so output is greater than potential:
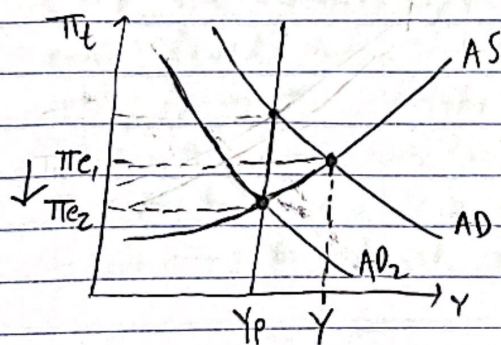
· $Y_i > Y^P$

· The AD curve will shift leftward, back to Y^P, decreasing the output, and decreasing the equilibrium level of inflation.

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(3)(a) • If we have an inflation shock, First short run inflation π_{SR} will be at a level higher than long-run inflation π_{LR}, corresponding to $\pi_{SR} > \pi_{LR}$. This will put increased pressure on inflationary expectations, increasing expected inflation $E[\pi_t]$. The aggregate supply curve will then shift leftward, and output Y will fall at a given level of π.

• If Central bank takes no action, we would expect inflationary expectations to fall along the transition path, and $\pi \rightarrow \pi_{LR}$, in the long run. Because π^e is decreasing, the AS curve will then shift rightward and output will begin to rise again.

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(b) • If the Central Bank wants to recover the initial level of π, they should raise interest rates, i.e $\bar{r}$, the autonomous component of the policy rule should increase. The AD curve in this case will shift leftward.

(c.) If the Central bank wants to recover the initial output level, they should decrease interest rates, and $\bar{r}$, easing the Monetary policy. This will increase π_{LR}, the long run inflationary level and output Y will be back at potential. This will be done by shifting the Aggregate demand curve rightward.