

Inflation and Growth Equations Exam Handout

Basic Inflation Model:

(1) Phillips Curve: $\pi_t = \pi_t^e - \alpha(u_t - u_n)$

where π_t^e is expected inflation which assume equals π_{t-1}

(2) Aggregate Demand Growth: $g_{yt} = g_{NADt} - \pi_t$

where g_{NADt} is the growth rate of Nominal Aggregate Demand (what Blanchard in the text calls g_{mt}) and g_{yt} is the growth rate of real GDP

(3) Okun's Law: $u_{t-1} - u_t = \beta \cdot (g_{yt} - \bar{g}_y)$

where \bar{g}_y is the normal growth rate of GDP (approx 3%)

Combining (2) and (3) yields the AO line:

(4) AO Line: $u_{t-1} - u_t = \beta \cdot [(g_{NADt} - \pi_t) - \bar{g}_y]$

Reduced Form Equations (for what they are worth):

(5) $\pi_t = \frac{1}{1 + \alpha\beta} [\pi_{t-1} + \alpha(u_n - u_{t-1}) + \alpha\beta(g_{NADt} - \bar{g}_y)]$

(6) $u_t = \frac{1}{1 + \alpha\beta} [\beta\{\pi_{t-1} - (g_{NADt} - \bar{g}_y)\} + u_{t-1} + \alpha\beta u_n]$

The Fed Rule Line: which replaces the AO line if the Fed is in fact following an inflation/unemployment targeting rule:

(7) $\pi_t = \pi^T + \frac{1}{\alpha} \frac{b}{a} (u_t - u_n)$

Reduced Form Equations:

(8) $u_t = u_n + \left[\frac{\alpha \cdot a}{(\alpha^2 \cdot a) + b} \right] (\pi_t^e - \pi^T)$

(9) $\pi_t = \left[\frac{\alpha^2 \cdot a}{(\alpha^2 \cdot a) + b} \right] \pi^T + \left[\frac{b}{(\alpha^2 \cdot a) + b} \right] \pi_t^e$

Growth Theory Equations:

Note: I am not including the growth theory accounting equations (ie. the growth rate equations) because I want you to know them by heart.

(1) Production Function: $Y = K^\alpha (A \cdot N)^{(1-\alpha)}$

In terms of Effective Labor: $\frac{Y}{A \cdot N} = \left(\frac{K}{A \cdot N} \right)^\alpha$

Difference Equation for Change in Capital per Effective Labor:

(2) $\frac{\Delta(K/AN)}{\Delta t} = s \cdot \left(\frac{K}{A \cdot N} \right)^\alpha - (g_n + g_a + \delta) \left(\frac{K}{A \cdot N} \right)$

Setting (2) equal to zero gives the Reduced Form Equations for the Steady State:

(3) $\frac{K}{A \cdot N} = \left(\frac{s}{g_n + g_a + \delta} \right)^{1/(1-\alpha)}$

(4) $\frac{Y}{A \cdot N} = \left(\frac{s}{g_n + g_a + \delta} \right)^{\alpha/(1-\alpha)}$