**Economics 21** **Spring 2015**

**Inflation and Growth Equations Exam Handout**

**Basic Inflation Model:**

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

where $\pi^e_t$ is expected inflation which assume equals $\pi_{t-1}$

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

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

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