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0.1 The representative household

$$U = E_0 \sum_{i=0}^{\infty} \beta^t \; u(C_t^A, h_t^A), \tag{1}$$

$$U(C_t^A, h_t^A) = \frac{(C_t^A - \Gamma_{t-1}^F (h_t^A)^\kappa)^{1-\sigma} - 1}{1-\sigma},$$

$$h_t^A = h_t^F + h_t^I. \tag{2}$$

$$C_t^A = (a(C_t^F)^e + (1-a)(C_t^I)^e)^{1/e} \tag{3}$$

The sequential budget constraint is

$$q_t D_{t+1} = C_t^F + p_t C_t^I + I_t^F + p_t I_t^I + D_t - (W_t h_t^F + r_t K_t^F)(1-\tau^Y) - p_t Y_t^I. \tag{4}$$

The representative household faces a technology in the informal sector given by

$$Y_t^I = z_t^I (K_t^I)^{\alpha_I} (\Gamma_t^I h_t^I)^{1-\alpha_I} - \Gamma_{t-1}^F \chi^I (\frac{h_t^I}{h_{t-1}^I} - 1)^2 h_t^I \tag{5}$$

We assume that the laws of motion for the capital stock in the formal and informal sectors are respectively

$$K_{t+1}^F = I_t^F + (1-\delta^F) K_t^F \tag{6}$$

$$K_{t+1}^I = I_t^I + (1 - \delta^I)K_t^I \tag{7}$$

The representative firm that operates in the formal sector maximizes profits Π_t each period t, defined as

$$\Pi_t = Y_t^F - (1 + \tau^N)W_t h_t^F - r_t K_t^F \tag{8}$$

where τ^N is the tax on the wage bill. The technology faced by the formal sector is given by

$$Y_t^F = z_t^F (K_t^F)^{\alpha_F} (\Gamma_t^F h_t^F)^{1-\alpha_F} - \Gamma_{t-1}^F \chi^F (\frac{h_t^F}{h_{t-1}^F} - 1)^2 h_t^F \tag{9}$$

0.2 Formal and informal market clearing

Market clearing in the goods market for both types of goods are:

$$Y_t^F = C_t^F + I_t^F + G_t + D_t - q_t D_{t+1}$$

$$Y_t^I = C_t^I + I_t^I$$

Total aggregate output as

$$Y_t^A = Y_t^F + p_t Y_t^I.$$