

1 Parameters and Variables by type

1.1 Endogenous Variables (var)

Variable Name	Code name
Links:	
Spot rate	S
Real Exchange rate	ϵ
Terms of Trade	τ
Fundamentals	f
Risk Premium	δ_t
Holdings of (local) Currency*	M_{co}
Interest rate*	r_{co}
Price Level*	P_{co}
Consumption*	C_{co}
Firm Level:	
Consumption of Good*	X_{co}
Capital*	K_{co}
Return to Capital*	R_{co}
Investment*	I_{co}
State of Productivity*	A_{co}

*: For each country.

1.2 Exogenous Variables - Stochastic Shocks (varexo)

Variable Name	Code name
Productivity Shocks*	u_t^{co}
Money Supply Shocks*	e_t^{co}

*: For each country.

1.3 Parameters

Parameter	Symbol	Value
Discount Factor	β	0.997
Risk Aversion	γ	2.000
Consumption Share	λ	0.850
Consumption Elasticity	θ	0.740
Depreciation Rate	δ	0.010
Capital Share	η	0.360
Productivity AR(1) Coefficient	ϕ	0.980

1.4 Non-Explicit Parameters (i.e. not of the form $x = \text{const.}$)

$$\varphi = \frac{\lambda(2\lambda - 1 + 2\theta\gamma(1 - \lambda))}{(2\lambda - 1)^2 + 4\gamma\theta\lambda(1 - \lambda)} \approx 0.781 \quad (1.1)$$

$$\zeta = \frac{2\lambda\theta(1 - \lambda)}{(2\lambda - 1)^2 + 4\gamma\theta\lambda(1 - \lambda)} \approx 0.152 \quad (1.2)$$

$$\sigma = \frac{1}{\nu} (\exp(r) - 1)^{-1} \quad (1.3)$$

The r comes from linearizing around $r_t^{co} = r$ at a steady state value.

$$\nu = 2 \quad (1.4)$$

See p.36 and p.49 for using this value.

$$\chi > 0 \quad (1.5)$$

How much bigger than 0? I just used it to make the FOC residual less.

1.5 Model

1.5.1 Definitions and household/firm specifications

Consumption Functions (1.1):

$$C^H(X^H, X^F) = \left(\lambda^{\frac{1}{\theta}} (X^H)^{\frac{\theta-1}{\theta}} + (1-\lambda)^{\frac{1}{\theta}} (X^F)^{\frac{\theta-1}{\theta}} \right)^{\frac{\theta}{1-\theta}} \quad (1.6)$$

$$C^F(X^F, X^H) = \left(\lambda^{\frac{1}{\theta}} (X^F)^{\frac{\theta-1}{\theta}} + (1-\lambda)^{\frac{1}{\theta}} (X^H)^{\frac{\theta-1}{\theta}} \right)^{\frac{\theta}{1-\theta}} \quad (1.7)$$

Price Index (1.4):

$$P = \left(\lambda (P^H)^{1-\theta} + (1-\lambda) (P^F)^{1-\theta} \right)^{\frac{1}{1-\theta}} \quad (1.8)$$

1.5.2 Equilibrium

Household Optimality Conditions

Household FOC2 (1.38), (1.41):

$$C_t^{co} : (C_t^{co})^{-\gamma} = \beta \mathbb{E}_t \left[(C_{t+1}^{co})^{-\gamma} \exp(r_t^{co} - \Delta p_{t+1}^{co}) \right] \quad (1.9)$$

Household FOC3 (1.39), (1.42):

$$(\alpha^{co})_t^m : \frac{M_t^{co}}{P_t^{co}} = \chi^{1/\nu} (1 - \exp(-r_t^{co}))^{-1/\nu} (C_t^{co})^{\gamma/\nu} \quad (1.10)$$

Gross Rate of Depreciation (contains implicit household FOC1) (1.44):

$$\Rightarrow \frac{\epsilon_{t+1}}{\epsilon_t} = \left(\frac{C_{t+1}^H}{C_t^H} \right)^\gamma \left(\frac{C_{t+1}^F}{C_t^F} \right)^{-\gamma} \quad (1.11)$$

Firm Optimality Conditions

Firm FOC (1.74), (1.77):

$$1 = \beta \mathbb{E}_t \left[\left(\frac{C_{t+1}^{co}}{C_t^{co}} \right)^{-\gamma} \exp(\Delta p_{t+1}^{co} - \Delta p_{t+1}) (R_{t+1}^{co})^k \right] \quad (1.12)$$

Goods Market Clearing (1.79):

$$(Y_t^{co} =) \quad A_t^{co} (K_t^{co})^\eta = X_t^{co} + I_t^{co} \quad (1.13)$$

Capital Stock Dynamics (1.80):

$$K_{t+1}^{co} = (1 - \delta) K_t^{co} + A_t^{co} (K_t^{co})^\eta - X_t^{co} \quad (1.14)$$

Marginal Product of Capital:

$$(R_{t+1}^{co})^k = 1 - \delta + \eta A_{t+1} (K_{t+1}^{co})^{\eta-1} \quad (1.15)$$

Terms of trade implications of optimal investment policy (1.82) (combined and linearized firm FOCs):

$$\mathbb{E}_t (r^h)_{t+1}^k - \mathbb{E}_t (r^f)_{t+1}^k \left[= \mathbb{E}_t \left(\Delta p_{t+1}^f - \Delta p_{t+1}^h \right) \right] = \mathbb{E}_t \Delta \tau_{t+1} \quad (1.16)$$

1.5.3 Spot Rate Dyamics:

Equilibrium Spot Rate: (1.84)

$$s_t = f_t + \mathbb{E}_t \sum_{i=1}^{\infty} b^i \Delta f_{t+i} \quad (1.17)$$

with $b = \sigma/(1 + \sigma) < 1$ and f_t as before.

where f_t , Fundamentals, (NB: $\ln(\tau_t)$) (1.84+):

$$f_t = m_t^H - m_t^F - \sigma \delta_t + \frac{(\nu - 1)(2\lambda - 1)}{\nu} \tau_t \quad (1.18)$$

where the risk Premium Compared to UIP is (1.47):

$$\frac{\exp(r_t^H)}{\exp(r_t^F)} = \exp(-\delta_t) \mathbb{E}_t [S_{t+1}/S_t] \quad (1.19)$$

1.5.4 Stochastic Processes

Productivity AR(1) Process: (1.78)

$$a_t^{co} = \phi a_t^{co} + u_t^{co} \quad (1.20)$$

Money Supply (RW+D). Bottom of p.37:

$$m_t^{co} = m_{t-1}^{co} + \mu_m + e_t^{co} \quad (1.21)$$

$0 < \mu_m < 1$ constant (log) growth in money supply term.