b_{T}

c_{T}

X_t

$$U^{I} = \sum_{t=1}^{2} (V_t + e_t X_t)$$

V_t e_1 e_2

π^I

$\hat{\pi}^I$

V_2

π^{O}

π^{x}

π^{O} π^{x}

V_2

$$\hat{\pi}^I p b_2 + (1-\hat{\pi}^I) q b_2 > \pi^O p b_2 + (1-\pi^O) q b_2 \quad \Rightarrow \quad \hat{\pi}^I > \pi^O$$

$$\hat{\pi}^I_c = \frac{\pi^I p}{\pi^I p + (1-\pi^I)q}$$

$$\hat{\pi}^I_r = \frac{\pi^I(1-p)}{\pi^I(1-p) + (1-\pi^I)(1-q)}$$

$$\hat{\pi}^I_r < \pi^I < \hat{\pi}^I_c$$

$$2b_1 + [G(\hat{\pi}^I_c) - G(\hat{\pi}^I_r)][X_2 + (\hat{\pi}^I_c - \pi^O_e)(p-q)b_2] > 0$$

π^O_e

π^O

---

b_1 $2b_1$

$\hat{\pi}_c^I$

$\hat{\pi}_c^I$

$G(\hat{\pi}_c^I) > G(\hat{\pi}_r^I)$

$$c_1 + [G(\hat{\pi}_r^I) - G(\hat{\pi}_c^I)][X_2 + (\hat{\pi}_r^I - \pi_e^O)(p-q)b_2] > 0$$

$G(\hat{\pi}_r^I) < G(\hat{\pi}_c^I)$

X_2

X_2

π^O $\hat{\pi}_c^I$

X_2

π^I

$\hat{\pi}_r^I$

$$2b_1 + [G(\pi^I) - G(\hat{\pi}_r^I)][X_2 + (\hat{\pi}_c^I - \pi_e^O)(p-q)b_2] > 0$$

$$-c_1 + [G(\pi^I) - G(\hat{\pi}_r^I)][X_2 + (\hat{\pi}_r^I - \pi_e^O)(p-q)b_2] > 0$$

X_2

$$\frac{c_1}{G(\hat{\pi}_c^I) - G(\hat{\pi}_r^I)} < X_2 + (\hat{\pi}_r^I - \pi_e^O)(p-q)b_2 < \frac{c_1}{G(\pi^I) - G(\hat{\pi}_r^I)}$$

$$\hat{\pi}^I_{cm} = \frac{\pi^I[p + (1-p)\gamma]}{\pi^I[p + (1-p)\gamma] + (1-\pi^I)[q + (1-q)\gamma]}$$

$$\pi^I < \hat{\pi}^I_{cm} < \hat{\pi}^I_c$$

$\hat{\pi}^I_r$

$$2b_1 + [G(\hat{\pi}^I_{cm}) - G(\hat{\pi}^I_r)][X_2 + (\hat{\pi}^I_c - \pi^O_e)(p-q)b_2] > 0$$

$$X_2 + (\hat{\pi}^I_r - \pi^O_e)(p-q)b_2 = \frac{c_1}{G(\hat{\pi}^I_{cm}) - G(\hat{\pi}^I_r)}$$

$\hat{\pi}^I_{cm}$

$½ < s < 1$

$(1-s)$ $½ < f < 1$

$(1-f)$

$\pi^I < \hat{\pi}_s^I < \hat{\pi}_c^I$

$$\hat{\pi}_f^I = \frac{\pi^I[p(1-s) + (1-p)f]}{\pi^I[p(1-s) + (1-p)f] + (1-\pi^I)[q(1-s) + (1-q)f]}$$

$\hat{\pi}_r^I < \hat{\pi}_f^I < \pi^I$

$$-c_1 + [G(\hat{\pi}^I_s) - G(\hat{\pi}^I_r)][X_2 + (\hat{\pi}^I_r - \pi^O_e)(p-q)b_2] > 0$$

$G(\pi^I)$ $G(\hat{\pi}^I_s)$

$\hat{\pi}^I_s > \pi^I$

$$\hat{\pi}^I_{scm} = \frac{\pi^I[ps + (1-p)(1-f)\gamma]}{\pi^I[ps + (1-p)(1-f)\gamma] + (1-\pi^I)[qs + (1-q)(1-f)\gamma]}$$

$$X_2 + (\hat{\pi}_r^I - \pi_e^O)(p-q)b_2 \ = \ \frac{c_1}{G(\hat{\pi}_{scm}^I) - G(\hat{\pi}_r^I)}$$