Nontradable Goods

Applied International Economics.

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The Nontradable Goods Model

In this model

Objectives

- Given two goods in our basic model of Lecture 1, the relative price adjusts in response to various shocks

Assumptions

- Two goods, tradable (foreign) and nontradable (home)
- Supply of tradable goods is infinitely elastic
- Supply of nontradable goods is inelastic

Budget constraints

For the two periods we have

$$b_1 = y_1^T + p_1 y_1^N - c_1^T - p_1 c_1^N, \tag{1}$$

$$0 = (1+r)b_1 + y_2^T + p_2 y_2^N - c_2^T - p_2 c_2^N, \tag{2}$$

where c_t^T and c_t^N represent the consumption of tradable and nontradables at time t, respectively; y_t^T and y_t^N are the endowments of tradable and nontradable goods, respectively. p represents the relative price of nontradable goods in terms of tradable goods.

Combining the budget constraints yields the intertemporal budget constraint (IBC)

$$y_1^T + p_1 y_1^N + \frac{y_2^T + p_2 y_2^N}{1+r} = c_1^T + p_1 c_1^N + \frac{c_2^T + p_2 c_2^N}{1+r} \tag{3}$$

Households

The households' utility function has the following form:

$$W = \gamma log(c_1^T) + (1-\gamma)log(c_1^N) + \beta[\gamma log(c_2^T) + (1-\gamma)log(c_2^N)], \tag{4}$$

where γ represents the preference parameter that will allow us to examine shocks in the demand of tradables relative to nontradables.

Households choose c_1^T, c_1^N, c_2^T, and c_2^N to maximize Equation (4) subject to Equation (3). The first-order conditions are (assuming $\beta(1+r) = 1$):

$$\frac{\gamma}{c_1^T} = \lambda, \tag{5}$$

$$\frac{1-\gamma}{c_1^N} = \lambda p_1, \tag{6}$$

$$\frac{\gamma}{c_2^T} = \lambda, \tag{7}$$

$$\frac{1-\gamma}{c_2^N} = \lambda p_2, \tag{8}$$

Households (continued)

If we combine Equations (5) and (7) we obtain that:

$$c_1^T = c_2^T = \bar{c}^T. \tag{9}$$

Due to separability in preferences, consumption of tradable goods is *smoothed* over time. Conversely, from Equations (6) and (8):

$$\frac{c_1^N}{c_2^N} = \frac{p_2}{p_1} \tag{10}$$

If the relative prices were the same across periods ($p_1 = p_2$), then consumption of nontradables would also be smoothed over time.

Now, the *static* equilibrium is as follows (combining Equations (5) and (6) and (7) and (8)):

$$\frac{c_t^N}{c_t^T} = \left(\frac{1-\gamma}{\gamma}\right)\frac{1}{p_t}, \quad t = 1, 2. \tag{11}$$

This condition can be interpreted as a demand function for nontradable goods relative to tradable goods.

Equilibrium conditions

The consumption of nontradable goods must equal their fixed supply:

$$c_t^N = y_t^N, \quad \text{for } t = 1, 2. \tag{12}$$

Imposing the equilibrium in the nontradable goods market, we have that

$$b_1 = y_1^T - c_1^T, \tag{13}$$

$$-b_1 = rb_1 y_2^T - c_2^T, \tag{14}$$

which are the current account balances. Combining the two equations above, we obtain the economy's resource constraint:

$$y_1^T + \frac{y_2^T}{1+r} = c_1^T + \frac{c_2^T}{1+r} \tag{15}$$

Stationary equilibrium

Assuming endowments over time (i.e., $y_1^T = y_2^T, y_1^N = y_2^N$), we know from Equations (9) and (15) that:

$$\bar{c^T} = \bar{y^T}. \tag{16}$$

As the endowment of nontradables is also constant over time, Equation (12) implies:

$$\bar{c^N} = \bar{y^N}. \tag{17}$$

Furthermore, from Equation (11) we have that:

$$\bar{p} = \left(\frac{1-\gamma}{\gamma}\right)\frac{\bar{y^T}}{\bar{y^N}}. \tag{18}$$

Determination of p

In order to determine p, we need to understand supply and demand dynamics. Recall the demand function (Equation (11)):

$$D(\bar{p}) = \left(\frac{1-\gamma}{\gamma}\right)\frac{1}{\bar{p}}. \tag{19}$$

Since there is no production in this economy, the supply line is vertical:

$$S(\bar{p}) = \frac{\bar{y}^N}{\bar{y}^T} \tag{20}$$

As usual, the intersection of these curves will yield the equilibrium price.

Determination of p (continued)

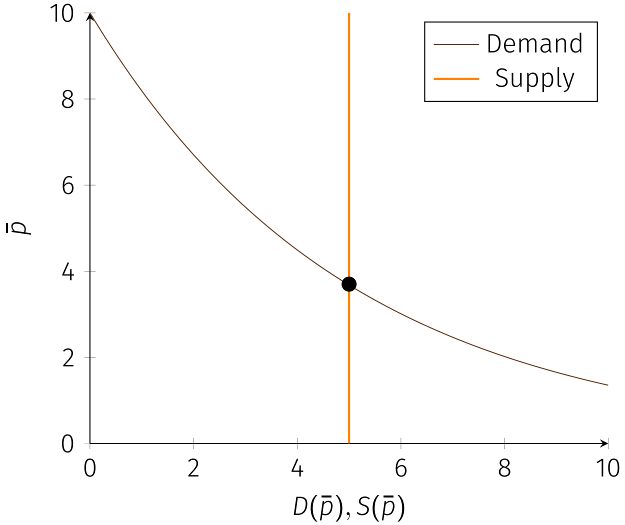

Figure 1: Determination of relative price of non-tradable goods

Comparative statics in the stationary equilibrium

Let us consider several scenarios:

- An increase in $\bar{y}^T$
- An increase in $\bar{y}^N$
- An increase in the demand of tradable goods γ

Trade imbalances and the real exchange rate

Let us illustrate the association between trade imbalances and the real exchange rate. Suppose both y^T and y^N are low relative to period 2. However, the ratio y^T/y^N remains the same in both periods.

Key implications

- Nontradable goods introduce a key relative price in the economy.
- The supply of nontradable goods is not infinitely elastic (as that of tradable goods) and hence the relative price of nontradables will need to adjust in response to shocks.
- We expect trade deficits to be accompanied by a high relative price of non-tradables reflecting excess demand for both tradables and nontradables. Conversely, trade surpluses will be accompanied by a low relative price of nontradables.