

Welfare and Trade Policy Exercise

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A small open economy taxes its imports. Imports enter consumption but have no domestic counterpart. GDP consists of exports and a nontraded good, with Ricardian production, implying that the relative price of the nontraded good is invariant to tariffs in general equilibrium.

1. Show the invariance.

Good 0 (the nontraded good and domestic consumption of exports, and any untaxed imports) is untaxed, while goods 1 and 2 are subject to tariffs. Preferences for consumption goods are described by a CES expenditure function $e(\pi, u) = \Pi u$; $\Pi = [(\beta_0 \pi_0^*)^{1-\sigma} + (\beta_1 \pi_1)^{1-\sigma} + (\beta_2 \pi_2)^{1-\sigma}]^{1/(1-\sigma)}$.

1. Show that $e_i = \beta_i^{1-\sigma} (\pi_i / \Pi)^{-\sigma} u$ and that $\pi_i e_{ij} \pi_j = -\sigma e (\delta_{ij} - s_j) s_i$ where $s_i = \pi_i e_i / e = \beta_i^{1-\sigma} (\pi_i / \Pi)^{1-\sigma}$, the expenditure share on good i .
2. Derive a useful expression for B_2 .
3. Derive an expression for the shadow price of foreign exchange.
4. Show that the concertina rule holds for this economy.
5. Suppose that all external prices are equal to one, and $\beta_0 = 0.75$, $\beta_1 = 0.15$, $\beta_2 = 0.10$. $g = 100$ and the external transfer is equal to zero. Tariff revenue is redistributed to the representative consumer. Initially, $\pi_1 = 1.5$, $\pi_2 = 1.1$. The elasticity of substitution σ is equal to 2. Solve for the initial level of welfare. (This requires a calculator or computer program.) Solve for B_1 and B_2 .

6. Solve for the welfare equivalent uniform tariff and the trade-weighted average tariff. (The former calculation requires a computer or programmable calculator capable of implicit solutions.)
7. Plot the welfare contours in tariff factor space for this economy, and the locus of 'best' tariffs for each good given a fixed tariff for the other good. (In principle you could generate these with an appropriate programming in GAUSS or Mathematica, but a qualitative sketch is sufficient.)
8. Suppose that a fixed amount of revenue must be raised with tariffs. Show that the (Ramsey) optimal tariff structure is uniform.