

Partial Equilibrium Trade Applications: Part 1: Commercial Policy Analysis with GAMS

Edward J. Balistreri

University of Nebraska—Lincoln

Edward.Balistreri@unl.edu

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Overview

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Background: Applied trade-policy analysis

- General-equilibrium Multi-Region Trade (CGE-MRT) models:
Welfare analysis: Multilateral WTO 'rounds'; FTAs; BREXIT; Trade War.
- Open-economy models (CGE for one region):
Welfare analysis: one country; trade is treated *parametrically*; SOE/LOE.
- Multi-region partial equilibrium:
Spatial analysis: one (or few) products; no general-equilibrium *closure* (demand is not linked to endogenous factor payments); gravity/transport costs.
- Partial-equilibrium trade models:
Import competition analysis: one (or few) products; import supply is treated parametrically.
- Other hybrids...

Commercial Policy Analysis and Dispute Settlement

- Under WTO rules discriminatory trade restrictions are allowed under specific exceptions:
 - Anti-dumping (AD) and Countervailing duties (CVD)
 - Safeguard measures (import surges)
 - National security (critical industries)
 - Intellectual property infringement
- Economic analysis is used in litigation
- Product-level actions:
 - Solar cells
 - Washing Machines
 - Aluminum oxide from China
 - Straw brooms from Mexico
 - Steel

Steel Case (LOE application)

- Open “Steel Tariffs.pptx

- See Balistreri's submission to the USITC (public version)
- The document includes the model code, but the data files have been deleted for confidentiality reasons.
- There are simplified working examples included (e.g., COMP1.gms, COMP2.gms, COMP3.gms).
- These are all versions of the Francois and Hall (1997) COMmercial Policy Analysis System (COMPAS): which is really just an Armington partial equilibrium model. (see section IV.2 of their chapter)

Basic COMPAS structure (coefficient and calibrated-share form)

Aggregate demand (in the US):

$$Y = kP^\eta = y_0 \left(\frac{P}{p_0} \right)^\eta, \quad (1)$$

where $\eta < 0$. Armington aggregation (the CES import demand system)

$$Q = \left(\sum_r \alpha_r X_r^\rho \right)^{1/\rho} = y_0 \left(\sum_r \theta_r (X_r/x_0)_r^\rho \right)^{1/\rho}. \quad (2)$$

Market for the Armington composite:

$$Q - Y \geq 0. \quad (3)$$

Import (and domestic) supply:

$$X_r = \kappa(\tau_r p_r)^{\eta_r} = x0_r \left(\frac{\tau_r p_r}{\text{pref}_r} \right)^{\eta_r}. \quad (4)$$

Market clearance for imports (and domestic) goods:

$$X_r - d_r(Q, P, p_r) \geq 0. \quad (5)$$

COMPAS structure in GAMS (coefficient and calibrated-share form)

- COMP1.gms (calibration in natural units)
- COMP2.gms (calibration in benchmark dollars)
- COMP3.gms (calibration in using calibrated-share form)

Hands-on Exercises

- Show the Armington units problem using COMP1.gms:
In the benchmark we have 35 domestic and 30 foreign units contributing to 65 composite units. Let's say these are physical units: the consumer buys 65 Candy Bars at an average price of \$1.538.
 - ① Under the scenario (counterfactual) how many candy bars are imported?
 - ② Under the scenario (counterfactual) how many candy bars are produced domestically?
 - ③ Under the scenario (counterfactual) how many Armington composite candy bars are consumed?
 - ④ Under the scenario (counterfactual) how many total candy bars are consumed and at what price?

Do you see a problem with explaining this to Lawyers and Scientists?
Is there a better way?

- Show that the elasticities are critical to domestic revenue impacts.
- Illustrate the Henning Conundrum (domestic revenues fall with trade barriers) by setting the substitution elasticity below the aggregate demand elasticity? How do we explain this in economic terms?