Effect of Parameters in a Two Country Trade Model

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Research Question

- What are the effects of shocks to consumer demand, sectoral productivity, and trade costs in a two-country trade model? How do these effects vary with model parameters?
  - Based on Eaton, Kortum, Neiman (2016) methodology
    - This model uses weak calibration for its parameters. How do the estimates from this model change if the parameters are estimated using strong calibration?

The Model

- N countries, indexed by n
- Differentiated goods within two sectors, Durables and Services
  - Durables output used for investment, traded
  - Services output used for consumption, non-traded
  - CRS Production function
    $y^j_{n,t}(z) = a^j_{n,t}(z)B(L^j_{n,t}(z))^{\beta_L}(K^j_{n,t}(z))^{\beta_k}$
    - $a^j_{n,t}$ drawn from a Type II extreme value distribution, dependent on θ
- K LOM: $K_{n,t+1} = \chi_{n,t}(I_{n,t})^{\alpha}(K_{n,t})^{1-\alpha} + (1-\delta)K_{n,t}$
  - α: adjustment costs
- Utility function: $U_n = \sum \rho_t \phi_{n,t} lnC_{n,t}$

Solving the Model

- Formulate Lagrangian, use FOC's to back out shadow values of consumption and investment, and to generate EE
- Calculate trade shares $\pi_{ni,t} = (\frac{b_{i,t} d_{ni,t}}{\lambda^D_{n,t} A^D_{i,t}})^{-\theta}$
- Computing the Competitive Equilibrium
  - Take shadow prices as prices
  - Given ***weakly calibrated*** parameters α, β_L, δ, σ, θ, ρ, ω_n
  - Given exogenous variables $K_{n,0}$, $L_{n,t}$, $A^j_{n,t}$, $\phi_{n,t}$,$\chi_{n,t}$, $d_{ni,t}$
  - Can back out path of factor prices, sector prices, trade shares, value of outputs in each sector
  - Assumes evolution to steady state
- I will use a simplified two-country version of the model for my project

Data and Estimation Strategy

- EKNR (2016) uses data from WIOD, IMF NFA, OECD and CEPII BACI.
- I will use data on GDP components, and BEA NIPA data on capital.
- Parameters are weakly calibrated
  - Adjustment costs $\alpha = 0.55$
  - C-D Labor coefficient $\beta^L = 2/3$
  - Investment depreciation rate δ
  - Elasticity of substitution σ
  - Parameter for T2EV: $\theta = 0.1$
  - Discount rate $\rho = 0.95$
- Focus on estimation of β^L, δ, and θ through GMM
  - β_L: Production data, perhaps apply Ackerberg, Caves, Frazer (2006) methodology with CRS
  - δ: Standard investment depreciation
  - θ: If possible

Proposal Conclusion

- Unclear on direction of how strong calibration will compare to EKNR methodology
- If β_L is lower than in EKNR, can affect price of sectoral goods in either direction, depending on magnitude of difference
- If δ increases, capital decreases at a faster rate
  - Perhaps increases in consumer demand lead to more exaggerated decreases in capital stock in future periods
- An interesting counterfactual:
  - If Coronavirus reduces productivity and leads to negative consumer demand shocks, what is the effect on endogenous variables? How does the outcome differ with parameters?