Can Sticky Quantities Explain Export Insensitivity to Exchange Rates?

Comments

Romain Ranciere (USC)

A persistent puzzle

- Exports are insensitive to movements in real exchange rates
  - Exchange Rate Disconnect

- Explanations
  - Price Stickiness
    - Bhattarai-Schoenle, 2012
  - Pricing to Market
    - Variable Mark-Ups (Bernal, Martin, Mayer (2012), Hellerstein (2008))
  - **Quantity Stickiness (conditional on mark-ups)**
    - Distribution Cost (Corsetti-Dedola, 2005)
    - Forward Looking Investment in (Persistent) Customer Base

A puzzle even worse

- Regression based on Irish Firm-Product-Destination Data (1996-2009)
    - Identification same firm same product to different markets
    - Major Destinations (94% of Exports)
    - Controlling for Marginal Cost
    - Ad Valorem Tariff Fall (Uruguay Round: Trade Liberalization)
- Real Exchange Rate Movement vs. Tariff Changes: Elasticities

β	Revenue		Quantity		Price	
	coeff	s.e.	coeff	s.e.	coeff	s.e.
rer_t^k	0.50	(0.08)**	0.32	(0.09)**	0.18	(0.04)**
$tariff_t^{jk}$	-3.13	(0.65)**	-3.10	(0.67)**	-0.02	(0.35)

A puzzle even worse: Implied Demand Elasticities

▶ Demand for firm i in market k:

$$Q_t^{ik} = Q_t^{k*} d\left(\frac{P_t^{ik*}}{P_t^{k*}}\right) \Phi_t^{ik} = Q_t^{k*} d\left(\frac{(1+\tau_t^{ik})\mu_t^{ik} C_t^i}{E_t^k P_t^{k*}}\right) \Phi_t^{ik}$$

▶ Holding Q_t^{k*}, C_t^i, Φ_t^{ik} fixed

$$\theta_t^{ik} = -\frac{\partial \ln Q_t^{ik}}{\partial \ln P_t^{ik*}} = \frac{\frac{\partial \ln Q_t^{ik}}{\partial \ln E_t^k P_t^{k*}}}{1 - \frac{\partial \ln \mu_t^{ik}}{\partial \ln E_t^k P_t^{k*}}} = \frac{-\frac{\partial \ln Q_t^{ik}}{\partial \ln \left(1+\tau_t^{ik}\right)}}{1 + \frac{\partial \ln \mu_t^{ik}}{\partial \ln \left(1+\tau_t^{ik}\right)}}$$

▶ What do firm-level elasticities say about θ_t^{ik}?

$$\theta_{RER} = \frac{\beta_{rer}^Q}{1 - \beta_{rer}^P} = \frac{0.32}{1 - 0.18} = 0.39 < 1$$

$$\theta_{tariff} = \frac{-\beta_{tariff}^Q}{1 + \beta_{tariff}^P} = \frac{3.10}{1 - 0.02} = 3.16 > 1$$

Summing Up

- Some Evidence of Pricing-to-Market (for RER only) but insufficient to explain Low Revenue Elasticity (for RER).
  - **Quantity Stickiness Focus**
- A missing explanation on the quantity side: unexplained time-varying demand shifter.
- What is different between RER fluctuation and Tariff changes
  - Volatile and Mean Reverting RER Shocks
  - Persistence in Tariffs (Trade Liberalization)

A customer base build-up explanation

- Forward Looking Decision to build a customer base
  - Dynamic Pricing to Accumulate Customers
- Persistent Customer Based Investment
- Foreign Cost increases with RER depreciation
- Based on Previous Work ("How Exporters Grow" (2022))
- Model-Based Explanation

Direct Evidence on Customer Base

- Patault and Lenoir (2023)

- French firm-to-firm trade data with matched employer-employee data, sales managers' transitions from one firm to another.

- Recruiting a sales manager increases by 36% the probability to export to the buyers of her former firm.

- Business stealing is only partial

- The model could build more on the evidence of Patault and Lenoir (2023): Not Easy / Different Model (i.e Future Work)

The Demand Shifter: Customer Base

- ▶ Partial equilibrium model of firm decision
- ▶ Demand faced by firm i in market k at time t is:

$$Q_t^{ik} = Q_t^{k*} \underbrace{\left(\frac{1 + \tau_t^{ik}}{E_t^k P_t^{k*}} P_t^{ik} \right)^{-\theta}}_{d(\cdot)} \underbrace{\left(D_t^{ik} \right)^{\alpha} \exp\left(\varepsilon_t^{ik} \right)}_{\Phi_t^{ik}}$$

- ▶ ε_t^{ik}: exogenous idiosyncratic demand
- ▶ D_t^{ik}: customer base, depends on D_{t-1}^{ik}, investment A_t^{ik}

$$D_t^{ik} = (1 - \delta) D_{t-1}^{ik} + A_t^{ik}$$

- ▶ Expenditure on investment in customer base:

$$INV_t^{ik} = E_t P_t^{k*} \left(A_t^{ik} + \phi \frac{(A_t^{ik})^2}{D_t^{ik}} \right)$$

Model Calibration and Simulation

- Flexible or Sticky Prices (needs some clarification)

- Match Post-Entry Export Dynamics

- Long Run Trade Elasticity (theta=3)

- VAR Estimation of the Macro Dynamics (ER, P, Demand) as base for RER simulation.

- Surprise Permanent Tariff Shock (Uruguay Round)

- Simulated Firm Level Response to RER and Tariff

Model works beautifully for Tariffs!

Baseline parameter values

Revenue	Quantity	Price	$\partial \ln \Phi / \partial \ln tariff$	θ
		Data		
-3.13	-3.10	-0.02	n.a.	n.a.
		Model		
-3.00	-3.00	0.00	-1.23	1.77

..but less so for RER!

Baseline parameter values*

	Revenue	Quantity	Price	$\partial \ln \Phi / \partial \ln RER$	θ
	Data				
	0.50	0.32	0.18	n.a.	n.a.
Invoice currency	Investment in foreign currency				
Foreign	1.77	1.22	0.55	0.42	1.77
Domestic	2.20	2.20	0.00	0.43	1.77
Invoice currency	Investment in home currency				
Foreign	2.47	1.92	0.55	1.12	1.77
Domestic	2.90	2.90	0.00	1.13	1.77

Discussion of the Results

- The model goes some way to reduce the elasticities but far from all the way

- Introducing Sticky Prices helps a little bit but not too much

- Problem: High Persistence in Macro Variables

  - CPI: rho: 0.99
  - ER: rho: 0.85
  - Q: rho: 0.95

- There is a tension:

  - For the Model to work well we would need a much less persistent real exchange rate (with rho: 065) the model can get <1 (most favorable case)

Going from there

- Heterogeneous Beliefs on Macro Variables
  - Heiperz, Ouazad, Ranciere (2020)
  - Instead of VAR; Factor Model with Different Loading for Each Firm
- Focusing on the Effects of Large Shocks
  - Global Financial Crises
  - Covid
- Understanding better Heterogeneity in Demand Shifter
  - In the Spirit of Berman-Martin-Mayer (2012)
  - Cross-Sectional Hypotheses on the Customer Base.
- Tariff Shocks:
  - Curious to know for *a priori* less persistent shocks: China-US trade war