Discussion of Alessandria, Kaboski and Midrigan (2008), 'Inventories, lumpy trade and large devaluations '

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Introductory remarks

3 stylised facts concerning trade after large devaluations

1. Sharp rise in wholesale and slower rise in retail price of imported goods
2. $|\triangle \text{IMPORTS}| > \triangle(\text{RELATIVE PRICE})$, exports rise slowly
3. Number of goods imported falls, then recovers slowly

Organising assumptions

- A large devaluation is a rise in the wholesale price of imported goods
- International trade implies delivery lags and transactions costs
  - importers hold larger inventories than do other firms

Evidence on firm-level frictions

delivery lags and transactions costs

- Data for 6 developing economies that experienced large devaluations
  - Argentina, Brazil, S. Korea, Mexico, Russia and Thailand
  - Average time to import (from U.S.) is 0.7 months.
  - Average transaction cost is 0.11 (median)/ 0.03 (mean) shipment value

- These provide lower bounds on delivery lags and transactions costs
  - Additional time for inland transportation and international shipping (roughly 0.6 months)
  - Additional costs for transportation and tariffs

Comment: Implication for inventory investment

Firms may face less demand uncertainty than suggested by delivery lags. They may pass on these frictions if their own shipments lag orders. This is often the case with large capital goods.

Evidence on firm-level frictions

Chilean manufacturing establishment-level data

- Importers hold higher materials and finished goods inventories
  - materials inventories relative to purchases $i^m_{jt} = \frac{\bar{I}^m_{jt}}{M_t}$
    - non-importing firms: 12.9 percent, importing firms: 17.4 percent
  - goods-in-process inventories relative to sales $i^f_{jt} = \frac{\bar{I}^f_{jt}}{Y_t}$
    - non-importing firms: 4.9 percent, importing firms: 6.9 percent

- overall inventory-sales ratio defined as $i_{jt} = i^m_{jt} + i^f_{jt}$,
  - I'd use $i_{jt} = \frac{p^m_{jt}\bar{I}^m_{jt} + \bar{I}^f_{jt}}{p^m_{jt}M_t + Y_t}$ where p^m_{jt} is relative price of materials

Evidence on firm-level frictions

Chilean manufacturing establishment-level data

- Importers hold higher materials and finished goods inventories
- $s_{jt}^{im} = \frac{M_{jt}^{im}}{M_{jt}}$ share of materials that are imported
  - mean is 0.299 and standard deviation is 0.281
- using industry-fixed effects and comparing no imports ($s^{im} = 0$) to importing of all materials
  - i^m rises from 0.204 to 0.277
  - i^f rises from 0.056 to 0.093

Remark

Firms importing materials hold higher levels of inventories, *all firms hold substantial inventories*

Evidence on firm-level frictions

U.S. Steel Wholesaler Transactions and Lumpy International Trade

- Average import order is 50 percent larger than domestic transaction
  - Placed every 204.5 days (100 days for domestic)

Comment

This is less relevant, it involves a firm that imports a narrow set of goods into the U.S. What are the exporting countries?

- US Exports to relevant economies are lumpy
  - Excluding Mexico, average Herfindahl-Hirschman index is 0.37 (0.0833 - 1.0)

Comment

These figures are a lower bound on lumpiness, in many instances the data must aggregate firm-level transactions.

demand

$$y_j\left(\eta^t\right) = e^{v_j\left(\eta^t\right)} p_j\left(\eta^t\right)^{-\theta}$$

- No aggregate consumption term scaling firm's demand

sales

$$q_j\left(\eta^t\right) = \min\left\{y_j\left(\eta^t\right), s_j\left(\eta^{t-1}\right)\right\}$$

- one period delivery lag and demand uncertainty may lead to stockout

inventory investment

$$s_j\left(\eta^t\right) = (1-\delta)\left[s_j\left(\eta^{t-1}\right) - q_j\left(\eta^t\right) + i_j\left(\eta^t\right)\right] \text{ where } i_j\left(\eta^t\right) \geq 0$$

Model of industry equilibrium

Decision rules

- wholesale price ω and order cost $(1-\lambda)\, p_j\left(\eta^t\right) q_j\left(\eta^t\right)$
- time-invariant discount factor β
- inventory investment follows a one-sided (S,s) rule
  - firms adopt a target inventory policy
  - $v_j\left(\eta^t\right)$ is i.i.d.

pricing in stationary state

- $p_j\left(\eta^t\right)$ is falling in $s_j\left(\eta^t\right)$
  - higher $s_j\left(\eta^t\right)$ implies less chance of stockout
  - longer time until next order
  - lower expected discounted future order costs

Devaluation

- The relative price of imports, ω, rises exogenously
- Reduction in target inventory level

retail prices after devaluation

- inventories have risen, relative to target, hence markups are reduced
- Retail prices increase by less than ω (wholesale price of imports)

imports after devaluation (ω rises)

- Given the initial distribution of firms over inventories, devaluation reduces the distance to the new target for many firms
- Drives a sharp drop in active firms, magnifies the drop in imports
- Some firms, near the pre-devaluation target, would want to disinvest

Comments

Stochastic discount factors and general equilibrium

- *My experience:* general equilibrium mitigates aggregate effects of (S,s) policies
  - **Aggregate investment volatility** is 13 times higher in partial equilibrium (Khan and Thomas, March 2008)
  - Equilibrium changes in firms' stochastic discount factors prevent large movements in the extensive margin

- *In the current study*, changes in shareholders' marginal utility of consumption might dampen initial response to ω
  - Already exploring effect of permanent changes (Figure 7). Might instead use time series on consumption (and infer time-varying discount factors)
  - May raise persistence in the model's extensive margin

Comments

Stochastic discount factors and general equilibrium

- Firms' stochastic discount factors will fall following a devaluation, driven by increases in shareholders' marginal utility of consumption
- In the current model this will affect firm's pricing policies, reducing markups further. Shareholders are impatient for current dividends.
  - *Retail prices* will rise less
- Studies of capital adjustment find that general equilibrium movements in relative prices lead to sharp increases in persistence.

Comments

Allowing firms to sell inventories on world markets

- The model assumes that inventory investment is irreversible
- This is rationalised by assuming that one-time re-exports involve transactions costs that are prohibitively expensive *in ordinary times* (footnote 28).
- Such costs may be tolerable after a sharp rise in the relative price of imported goods, held as inventory, and a drop in domestic demand
- Might allow firms to reduce inventories internationally at high transactions costs, and see what level of costs are necessary to prevent this during devaluation
  - A devaluation is an aggregate event, hence the fixed costs of setting up re-export arrangements might be borne by a consortium of firms. An opportunity for intermediation.

Comments

The timing of a devaluation is unanticipated

- It's arguable that the probability of a devaluation rises over time
  - Central Bank borrowing and currency interventions
- At some point, foreign exchange market participants force the Central bank to abandon the exchange rate.
- *Some* import evidence that might support this view.
  - Argentine import values were falling before devaluation (Figure 1).
  - Import values were also falling for Korea (Figure 5, trade with U.S.).
- Given the central role of inventories, might present evidence on firms' inventory policies during devaluations.
  - It would be useful to know that existing stocks were not diverted
  - How did inventory-to-sales ratios respond?