Industry Heterogeneity and Exchange Rate Pass-Through

by Camila Casas

Discussion by Javier Cravino

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Summary

- **Goal:** Estimate ERPT by industry, evaluating the role of:
  - Imported intermediate inputs
  - Strategic complementarities
- **Methodology:**
  - Unit values from customs data to measure ERPT
  - Imported inputs share from industrial census
  - De Loecker and Warzynski to estimate markups
- **Findings:**
  - Large differences in imported intermediate input share
  - Smaller differences in markup variability
  - Low correlation with ERPT

Theoretical framework: Export prices

- Assumptions:
  - Price in sector k: $p^k_{Ci} = \mu^k_{Ci} + mc^k_C$
  - $mc^k_C = \left[1-\alpha^k\right] w_C + \alpha^k \sum_{l=C,i,j} \left[\gamma^k_l p_{ln} + e_l\right]$
  - Wages, productivities and foreign prices are constant

- CDGG '17: $\Delta p^k_{Ci} = \frac{1}{1+\Gamma^k}\left[\frac{\alpha^k \gamma^k_i}{1-\alpha^k \gamma^k_H} + \Gamma^k\right]\Delta e_i + \frac{1}{1+\Gamma^k}\frac{\alpha^k \gamma^k_j}{1-\alpha^k \gamma^k_H}\Delta e_j$
  - $\Gamma^k \equiv \frac{\partial \mu^k_{ni}}{\partial\left[p^k_{ni}+e_n-p^k_i\right]}$: 'markup elasticity'

- If $\Delta e_i = \Delta e_j$: $\frac{\Delta p^k_{Ci}}{\Delta e} = 1 - \frac{1}{1+\Gamma^k}\frac{1-\alpha^k}{1-\alpha^k\gamma^k_H}$
  - $\frac{\Delta p^k_{Ci}}{\Delta e} = 0$ when $\Gamma^k = 0$ & $\gamma^k_H = 1$
  - Decreases with γ^k_H, increases with Γ^k

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Comment I: Taking model to the data

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- In the data: $\Delta e_i \neq \Delta e_j$. Empirical implementation:

$$\Delta p^k_{Ci,t} = \beta_i \Delta e_{i,t} + \beta_j \Delta e_{j,t} + \varepsilon_{i,t}$$

- $\beta_i = \frac{1}{1+\Gamma^k} \left[\frac{\alpha^k \gamma^k_i}{1-\alpha^k \gamma^k_H} + \Gamma^k \right]$
  - Increases with γ^k_H (keeping γ^k_i constant). Increases with Γ^k

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Import prices

- If $\Delta e_i = \Delta e$: $\frac{\Delta p^k_{iC}}{\Delta e} = \frac{1}{1+\Gamma^k} + \frac{\Gamma^k}{1+\Gamma^k} \frac{1-\gamma^k_H}{1-\alpha^k \gamma^k_H}$
  - $\frac{\Delta p^k_{iC}}{\Delta e} = 1$ if $\Gamma^k = 0$
  - Increases with γ^k_H (if $\Gamma^k > 0$), Decreases with Γ^k

- If $\Delta e_i \neq \Delta e_j$:

$$\Delta p^k_{iC} = \beta_i \Delta e_i + \beta_j \Delta e_j$$

- $\beta_i = \frac{1}{1+\Gamma^k} \left[1 + \frac{\gamma^k_i \Gamma^k}{1-\alpha^k \gamma^k_H} \right]$
  - Increases with γ^k_H (keeping γ^k_i constant), Decreases with Γ^k
- $\beta_j = \frac{\Gamma^k}{1+\Gamma^k} \frac{\gamma^k_j}{1-\alpha^k \gamma^k_H}$
  - Increases with γ^k_H, Increases with Γ^k

Comment II: Measuring imported input shares

- Paper measures $1-\gamma_H^k$
  - but γ_i^k and γ_j^k enter separately in the model
  - **Suggestion:** link import data to recover γ_i^k and γ_j^k?
- α^k can also vary across sectors
  - **Suggestion:** measure from the Industrial survey

Comment III: Measuring complementarities

- Paper measures markups by industry, computes CV across years
  - Larger CV may reflect more variable markups, or larger shocks
  - Hard to map to Γ^k

- A more direct approach:

$$p^k_{Ci,t} = \mu^k_{Ci,t}\left(p^k_{Ci,t} + e_{i,t} - p_{i,t}\right) + mc^k_{n,t}$$

$$\Delta p^k_{Ci,t} = \frac{-\Gamma^k}{1+\Gamma^k}\Delta e_{i,t} + \frac{1}{1+\Gamma^k}\Delta mc^k_{n,t}$$

- Estimate: $\Delta p^k_{Ci,t} = \beta_i \Delta e_{i,t} + \frac{1}{1+\Gamma^k}\Delta mc^k_{n,t}$
  - Control for Δmc^k_n with firm FE (so that Δe_j won't matter)
  - Assumption: Δmc^k_n common across destinations

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Summary

- Interesting paper with lots of potential
  - Impressive data work, linking customs with industrial surveys
  - Provides

- Main comments:
  - Tighten relation between theory and model
  - Alternative measurement of import shares and complementarities