Comment on Financial Shocks, Productivity, and Prices (S. Lenzu, D. Rivers, J. Tielens)

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In a nutshell

- Negative credit shock, instrumented via exposure of firms' lenders to assets that depreciate via Greek shock 2009, impacts on TFPR and prices on impact, on innovation and TFPQ longer term.
- Price fall especially strong for firms with large inventories, and those with less liabilities due soon, and those with less committed costumers
- Fantastic data: administrative financial and input use+P and Q for individual products+credit registry+firm2firm
- Novel evidence: prices vs. TFPQ after credit shock, innovation after shock, innovation to TFPQ channel

Interpretation: TFPR vs TFPQ

$$\begin{aligned} Q_i &= TFPQ_i * L_i \\ Q_i + \Delta_- I_i &= P_i^{-\varepsilon} * S_i \\ \text{or } P_i &= \left(Q_i + \Delta_- I_i\right)^{-\frac{1}{\varepsilon}} D_i \end{aligned}$$

where $D_i = S_i^{\frac{1}{\varepsilon}}$ is a demand shifter, such that firm can sell a given quantity at higher price (e.g. Hottman-Redding-Weinstein 2016). Where from? For instance, $D_i = d_i * D$ where d_i defined by

$$U = \left(\sum_{I_t} d_i Q_i^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}} = equil.funct\left(d, TFPQ\right)$$

e.g. quality, appeal, costumer base (Hsieh-Klenow, 2009, HRW 2019, Eslava-Haltiwanger 2019)

Interpretation: TFPR vs TFPQ (2)

- Prices reflect inventories, but also quality.
- Is *TFPQ* rather than prices the object of concern?
- Prices should also reflect innovation. Shouldn't we also see long run effect? WHat type of innovation is being affected? Reason to expect that credit shock affects process innovation but not product innovation?
- $TFPR = TFPQ * P$ because $R = PQ$. But, what when $R = P\left(Q + \Delta\_I\right)$

Price setting

Stage 1	Stage 2	Stage 3
Inherit -Inventory - Debt Choose -L (therefore Q)	- Learn D - Learn credit shock λF Choose - Δ_I (and therefore Price) - Choose innovation	- Learn whether can obtain additional credit - If not, and P(Q+ Δ_I)> λF+WL Default - Otherwise survive

Price setting

Replacing demand function, chooses Δ_I to maximize

$$Max \left\{ \left(TFPQ * L + \Delta\_I_i \right)^{1-\frac{1}{\varepsilon}} D_i - \lambda F - WL + E\left(add \;\; credit \right), 0 \right\}$$
$$s.t. \; \Delta\_I \leq I;$$

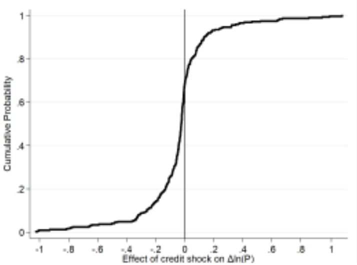
where $E\left(add \;\; credit \right)$ is exogenous (?)

- Solution depends on ε
- Why would ever choose Δ_I negative (increase prices?). An example of a demand function with plausible elasticity that would deliver would be useful

Price setting

- Moreover, not clear evidence of price increases, but rather increases relative to average price decrease

Figure 4: Heterogeneous pricing response to credit shocks



$$\beta_j = \left(\frac{\tilde{Sov}_j - \tilde{\mu}_{Sov}}{\tilde{\sigma}^2_{Sov}}\right) \times \left[\left(\Delta \ln(P_j) - \tilde{\mu}_{\Delta \ln(P_j)}\right) - \beta\left(\tilde{Sov}_j - \tilde{\mu}_{Sov}\right)\right],$$

Firm level prices

- Availability of micro level prices great: allows decomposing *TFP* vs. $TFRPR = TFPQ * P$, and dealing with ommitted price bias in estimating the production function

$$
\begin{aligned}
Q &= TFPQ * K^{\alpha} L^{\beta} \\
& vs. \\
P\left(Q + \Delta_{-I}\right) &= \left(TFPQK^{\alpha}L^{\beta}\right)^{1-\frac{1}{\varepsilon}} D
\end{aligned}
$$

- Why estimate the revenue function?
- Not only revenue coefficients, but exogeneity conditions based on the logic of the production function residual applicable to revenue function residual?
- Plus could actually separately estimate production and demand function (Eslava-Haltiwanger, 2019), and directly

Firm level prices

- Current calculation of firm prices either for main product or basket of products averaging price levels.
- Problematic due to heterogeneity in units and product attributes, especially at 6-digit level.
- More standard, and better suited, to aggregate price *changes*, and create index from some base year
- No need to lose dispersion in base year (unlike Eslava et al 2004,2013): base year can be base *on average*, and keep dispersion around that average (Eslava-Haltiwanger).