## Financial Constraints and Propagation of Shocks in Production Networks<sup>a</sup>

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<sup>&</sup>lt;sup>a</sup>The views and opinions expressed are those of the authors alone and do not necessarily reflect those of the Central Bank of Chile.

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## **Research Agenda and Motivation**

Exploding research on production networks and the propagation of shocks

- Driven by new tractable theories and access to rich firm-to-firm data
- This paper: How shocks propagate through production networks in the presence of financial frictions?

This research agenda has to deal with Hulten's theorem

$$\frac{d \log U}{d \log A_i} = \frac{Size_i}{Aggregate \ Value \ Added} \tag{1}$$

- More data + Richer models  $\Rightarrow$  Better economic understanding of the propagation of shocks
- Facts consistent with Hulten's conditions  $\Rightarrow$  Production networks might not be useful
- Two main conditions (ignore for now role of international trade):
  - 1. Non-linearities are not relevant (for global statement)
  - 2. Frictionless markets

- Non-linearities: Is it a small shock? ⇒ Not so relevant in this context
- Frictionless markets  $\Rightarrow$  This is where the paper stands
  - Contribution: Facts  $\Rightarrow$  Are financial frictions relevant for the propagation of shocks
  - $\blacksquare$  Hard to evaluate with only reduced-form facts  $\Rightarrow$  Next comment
- Framing: Misallocation due to financial frictions in a production network
- Connection to Macro policy: Inform design of policy-making for business-cycle stabilization?
  - E.g., where in the production network is it important to alleviate financial frictions?
  - With generic misallocation wedges  $\Rightarrow$  Should alleviate frictions upstream (Liu, 2019)

Connecting Facts to Theory: Three Research Designs

- Empirically ambitious paper  $\Rightarrow$  Start with theory to inform which reduced-form facts to focus on
- Relevant empirical findings for quantifying the role of financial frictions
  - 1. Temporary and negative direct effect on sales
  - 2. Effect is more negative for liquidity-constrained firms
  - 3. Effect is relatively permanent for liquidity-constrained firms
    - $\blacksquare$  Exploit more the dynamic moments  $\Rightarrow$  Can be useful for theory of financial frictions

• Corr(Size<sub>i</sub>,  $r_i$ )  $\neq 0 \Rightarrow$  Interaction of shock and  $r_i$  is not sufficient

- Current model: Correlation $(A_i, r_i)$  is crucial but equal to zero
- Separate empirical issue: is *liquidity* measure a good sufficient statistic for r<sub>i</sub>

Hulten-residual approach: Gap between observed propagation and Hulten's prediction

- $\blacksquare$  Extent of reallocation  $\Rightarrow$  Measure of the presence of frictions
- Dispersion of that residual could be a good approximation of welfare losses
- Test relevance of financial frictions with that gap
  - How much of the reallocation due to the shock is given by the role of financial frictions?
  - Industry heterogeneity: Capital-intensive industries have a bigger dispersion of the Hulten-residual?
  - Aggregate relevance: Safer to use the model

Second research design: In which margin do financial frictions matter more?

- 1. Permanent and positive direct effect on domestic input expenditure share
- 2. Permanent and positive direct effect on new domestic suppliers

Potential mechanism: Liquidity-constrained firms have difficulties in getting new suppliers?

- Theory of formation of production networks linkages and financial frictions
- Current model already has some predictions that are not empirically tested

If not pushing this mechanism, not sure about the relevance of the extensive margin moments

Besides informing elasticities of substitution in production and demand

## Comment 2: Which are the relevant moments in the data?

**\blacksquare** Third research design: Trade policy  $\Rightarrow$  Exploit more international trade part of the framework

- Import shock  $\Rightarrow$  Different Hulten approximation  $\Rightarrow$  Different Hulten-residual
- Current model has some implications on this that are not used empirically

Propagation of trade policy under misallocation due to financial frictions

- Baqaee and Farhi (2020) + Bai et al. (2019)
- In a second best world, could higher import tax improve welfare? (Antras and Caballero, 2010)
- E.g., Unproductive firms are relatively too big  $\Rightarrow$  Fix that with higher import tax?
- Interesting for trade policy debate  $\Rightarrow$  Optimal allocation of trade policy in the production network
- Real debate in Chile during the Great Recession

Improve framing and connection of facts with theory and policy

Good news: Several and interesting routes to take

## **Final Remarks**

- Relevant and interesting topic, great setting and data, super interesting facts
- Looking forward to future versions and more research in these topics