Discussion of
"Supply Chain Network Structure and Firm Returns"
Birge and Wu (2015)

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Overview

- Main focus: study the relationship between supply chain linkages and firms' stock returns

- Main hypothesis: if firm-level shocks propagate over supply chain linkages, they should have an impact on stock prices.

- Two key questions:
  (1) Micro: Do the returns of a firm's *immediate* suppliers and/or customers impact its own returns?
  (2) Macro: Does a firm's position within the supply chain *network* impact its return?

Why Should We Care?

- Very important question!

- Propagation and amplification of shocks over supply chain linkages have first-order implications for ...

  - firm operations (surprise)!

  - business cycles: Foerster, Sarte and Watson (2011) Acemoglu, Carvalho, Ozdaglar and Tahbaz-Salehi (2012, 2015)

  - explaining firm-level volatility: Lustig et al. (2013)

  - macroeconomic impact of natural disasters: Barrot and Sauvagnat (2014), Carvalho, Neiri, Saito and Tahbaz-Salehi (2015)

  - large productivity differences across countries: Ciccone (2002), Jones (2011, 2013)

  - international trade and cross-country comovements: Johnson (2014), diGiovanni, Levchenko and Mejean (2015)

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Contributions

- Very little prior work on the relationship between supply chain linkages and firm returns.
    - Notable exceptions: Cohen and Frazzini (2008); Boyarchenko and Costello (2015)

- The first paper to document the relative importance of supplier vs. customer shocks

- Most of supply chain literature focuses on anecdotal evidence on the role of shocks. One of the few papers that studies the problem at a larger scale.

Findings

- Document comovements between a firm's returns and those of its customers and suppliers
    - significant supplier and customer contemporaneous effect
    - significant supplier lagged effect
- Interpretation:
    - supply chain linkages do matter for shock transmission.
    - inefficient markets (e.g., due to investor inattention)

- More "central firms" in manufacturing exhibit lower excess returns, whereas more central firms in logistics exhibit higher excess returns.
- Interpretation: manufacturing firms can better hedge supplier risk relative to logistic firms.

This Discussion

(1) Reconciling the empirical findings

(2) Technical comment: the notion of centrality

(3) Interpretation of the results

(4) Empirical robustness checks

Comment: Reconciling the Empirical Results?

- First result: shocks propagate from one firm to its customers.
- Second result: "more central" (manufacturing) firms exhibit less excess returns.

- But are these two observations consistent with one another?
- Put differently: is it always true that in any model with shock propagations, firm centrality matters for excess stock returns, or is there something else going on?

- What is the underlying theory that can explain the two observations simultaneously?

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Comment: The "Right" Notion of Centrality

- The paper uses eigenvector, Bonacich and in-degree centralities (among others) as notion of firm centrality in supply chains.

- All very standard notions in the literature

- But are they the "right" notions?

Comment: The "Right" Notion of Centrality

- Very simple, reduced-form model of contemporaneous, downstream propagation with i.i.d. firm-level shocks:

$$x_i = \sum_{j=1}^{n} w_{ij} x_j + \epsilon_i$$

- Firm-level output:

$$x_i = \sum_{j=1}^{n} \ell_{ij} \epsilon_j$$

where ℓ_{ij} is the element of the Leontief inverse matrix $L = (I - W)^{-1}$.

$$\text{var}(x_i) = \sigma^2 \sum_{j=1}^{n} \ell_{ij}^2$$

- Distinct from Bonacich/eigenvector/in-degree centralities.

- The notion of centrality has to be informed by the underlying structural model that one has in mind.

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Comment: Interpretation

- The paper documents that more central manufacturing firms exhibit lower excess returns.

- Suggested interpretation: manufacturing firms can choose less correlated suppliers compared to firms in logistic industries.

- But it may be that more central firms are different on many other dimensions as well.

  - For example, maybe less volatile manufacturing firms end up being more attractive customers.

- Can we find any evidence that it is indeed the supply chain position that is the cause of excess returns?

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Comment: Identification

- Empirical result: firm's returns comove with returns of its suppliers (and customers).

- Paper's interpretation: shocks propagate from one firm to its supply chain partners.

- But these can be due to confounding factors/omitted variables.

- Alternative interpretations: industry-level shocks, regional shocks, etc.

- Potential (imperfect) solution:
  - run a placebo test, as in Boyarchenko and Costello (2015): test for return predictability of linked firms in the period *before* they form contractual relationships.

Summary

- Key question with first-order implications for operations and beyond
  Caution: the discussant may be biased!

- Important contribution.

- What is the theoretical framework (even a simple one) that can explain
  the documented empirical observations *simultaneously*?

- Consider alternative notions of firm centrality (specially informed by
  theory).

- Provide evidence to support the interpretation of the empirical
  regularities documented in the paper.