Firms collaborate by sharing technology and assemblies

- Multinational firms make complex decisions facing high (fixed) cost: entry costs, operation of plants, technology
- Collaboration through licensing or joint ventures allows firms to economise on costs
- Traditional models of multinational production (MNP) agnostic to technology choices and collaboration miss these important mechanisms that shape global production

Collaboration in platform technology is common and sizeable

- **Platform**: Production blueprint of chassis, development involves high fixed cost
  - Serve as basis for ~ 13 different varieties over 16 years
  - Define organisation of assembly lines
- **Collaboration**: owner and user of a platform have no ownership ties
  - 23% of all platforms are used collaboratively per year
  - 70% of firms use a licensed platform, 45% of firms offer platform licenses
  - Reliance on licensing varies by firm size and segment

RQ: How does collaboration shape firms’ multinational production decisions?

- Build a structural framework of multinational production, which:
  - Models the firms’ joint decision of input technology and assembly location
  - Allows for inter-firm collaboration in technology and assemblies
- Estimate effect on MNP choices using rich data on technology use and production pattern of the entire Auto industry from 2000-2019
- Determine gains from collaboration in variable cost and profits

Gains from collaboration w.r.t. MNP choice

1. Varieties are produced using specific platforms
2. Assemblies operate with already installed platforms → Choice of platform constrains set of potential plants
3. Collaboration allows to relax constraint on assembly choice set

Mean | SD | Median | Max
---|---|---|---
# w/o platform constraint, w/o collab | 18.132 | 7.26 | 18 | 34
# w platform constraint, w/o collab | 2.146 | 3.31 | 0 | 16
# w platform constraint, w collab | 2.318 | 3.46 | 1 | 17
Loss w platform constraint | -15.986 | 7.56 | -16 | 0
Gain w collab | 0.172 | 0.89 | 0 | 16

Model of endogenous technology and assembly choice

Firms choose optimal assembly conditional on optimal technology choice such that unit cost are minimised given GEV-distributed location - platform - variety productivities → **inclusive values** capture implied cost-advantage of each technology in terms of assembly choice sets

Collaboration trade-off

Larger set of platforms and assemblies to choose from → lower average cost to serve a market & higher expected profits vs. Cost of licensing

New mechanism in MNP: Comparative advantage in technology and collaboration → propagates through to expected profits, variety and firm entry

Main Findings

- Positive correlation of technology collaboration with sharing of assembly plants and access to new markets
- **Technology constraints** increase the firms’ costs of serving a market by 5% vs. a vis traditional MNP models agnostic to technology choices
- **Collaboration** relaxes constraints and reduces costs to serve a market by 16%

sophia.praetorius@sciencespo.fr