

Discussion of:
"Specialization in a Knowledge Economy"
by Yueyuan Ma

Seula Kim

University of Maryland

WEAI 96th Annual Conference

June 30, 2021

Summary

- This paper:
 - ▶ Studies the effect of pro-patent policies promoting patent transactions on firm specialization
 - ▶ Finds data evidence about:
 - ▶ Production scope (NAICS 6-digit) narrowed down over time
 - ▶ Increased (decreased) innovation intensity for small (large) firms
 - ▶ Research scope (basic research / total R&D) has been widened
 - ▶ Increased patent reassignments, patenting licensing activities
 - ▶ Analyzes the role of patent market efficiency on specialization through a model
 - ▶ ↑ Matching efficiency
 - ↑ (↓) Prod. scope & R&D intensity for low (high) prod. type firms
 - ↑ The social value of innovation and economy growth rate
 - ↑ Research scope

Discussion

- A novel linkage between patent market efficiency and firm specialization
 - ▶ Great! I learned a lot. But ...
- Some links are missing in the paper, for which more explanation can help!
- **Three comments** about:
 - ▶ Construction of data evidence
 - ▶ Identification of the effect of pro-patent policy
 - ▶ Linkage between empirics and theory
- Many interesting/potentially important results that I would like to know in more detail and link up tightly

Data Construction & Evidence

- Changing Industry Scopes

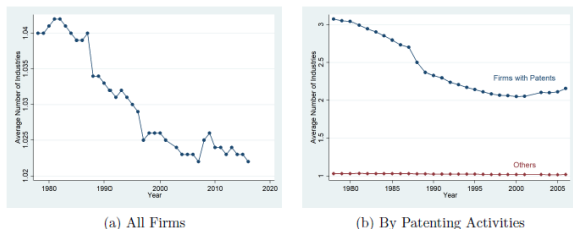


Figure 1: Trend of Production Scope

- ▶ This is great to see the composition of firms in the change of industry scopes!
- ▶ But here, R&D activity is defined by patent grant dates, not application dates
- ▶ What about median or weighted average based on firm size? Is it pronounced for any other specific firm types (such as firm size, age, etc.)?
- ▶ What about at the more agg. industry or disagg. product levels?

Data Construction & Evidence

- Large vs Small/Medium Firm Comparison

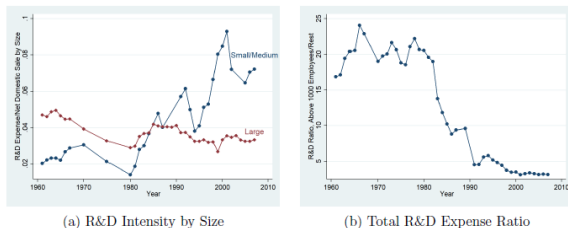


Figure 2: Trend of R&D Activities

- ▶ How is it linked to your story? (you argue it is as a result of firms taking comparative advantage through more active patent transaction, which I don't quite see so far..)
- ▶ Pre- vs post-policy difference?
- ▶ Adding more evidence is suggested in terms of:
 - (i) Patent transaction changes across diff. firm size
 - (ii) Changes in production scopes across diff. firm size
 - (iii) Pairwise correlation b/w innov. intensity and firm productivity

Pro-patent Policy

- The paper brings up various pro-patent policy examples in the U.S. & presents the time series of patent reassignments
 - Does it imply the increase in patent transaction activities after the policy?
 - It might also be corr. with the increasing trend of M&A activity
 - The effect of pro-patent policy is not well identified
 - Hard to see the connectedness to the previous data evidence
 - Proper DID types of regressions identifying its effects on
 - ▶ Patent transactions over time
 - ▶ Firms' production scope and innov. intensity
 - ▶ The interaction w/ firm characteristics (firm size, R&D activity, etc.)
- would help to validate your hypotheses as well as to test the model implications

Empirics vs Theory

- The model builds on Akcigit et al. (2016): endog. growth + idea propinquity
- Nicely captures the effect of patenting market efficiency on
 - (i) Firm innovation: better monetization vs more dependence on others
 - (ii) Prod. scope: increased odds of having inside-scope innov. vs opportunity cost to sell/buy patents
- Still, would be great to know more detailed mechanism behind:
 - Why production ability matters: high (low) type firms \downarrow (\uparrow) innov. and scope
 - How much is the increment of better match (or reduction in distance) through patent transactions? How does it vary across firm types?

Empirics vs Theory

- Firm size and production ability?
 - ▶ The paper has used firm "size" and "prod. types" interchangeably
 - Is that a plausible assumption?
 - A pairwise corr. b/w firm size and estimated production ability in data?
 - How does firm size look like in the model?
 - ▶ Enrich the model with continuous production ability
 - Different thresholds of prod. ability above/below which firms innov. more/less or expand/contract scopes w.r.t. the increase in market efficiency
 - Match it to firms of diff. size in data

Empirics vs Theory

- Production scope vs innovation output: NAICS/SIC vs IPC

VARIABLE	Log(within-scope prob.)
Log(num. of Industries)	0.7643*** (0.0134)
Constant	-4.443*** (0.0370)
Observations	150 ⁵
R-squared	0.9547

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Relationship between Within-Scope Probability and the Number of Industries

- ▶ Estimate the within-scope probability by # of industries and the fraction of patents having IPC = NAICS/SIC
- ▶ IPC vs CPC? (Is IPC consistent across time?)
- ▶ Any noise from mismatch issue b/w IPC-NAICS/SIC?
- ▶ Industry dynamics over time? (Did you use continuing industries only?)
- ▶ What about using a set of IPCs of patents assigned by firms?