Discussion of “China’s Rising IQ and Growth: Firm-level Evidence”

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Overview of the Paper

• Conflicting views on Chinese patent boom

“China is all over the news on total patents applied and granted: Innovators in China powered global patent applications to a new record in 2015, filing more than a million applications for the first time ever within a single year” – WIPO

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Open question: what contributed to the dramatic rise of patent applications?
Aggregate Facts

Figure 1

(share)

Source: Authors’ calculations based on the methodology and data sources detailed in Online Appendix A.
Note: See Appendix for details of the estimation.
Innovation Policy I

- Patent application subsidies at central/local government level: patent is essentially free to obtain.

![Graph showing diffusion process of patent subsidy programs among Chinese provincial regions.](image-url)
Innovation Policy II

- Huge tax break for High Tech enterprises (one invention or six utility patents a necessity after 2008)
So, is the Chinese firm’s innovation for real?
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- I am quite convinced by the paper that patent is “real”

- But, there is non-trivial distortions in this whole process...

- Questions:
  - What is the elasticity of firm profitability wrt. patent
  - What is the elasticity of patent wrt. R&D or other innovation inputs
  - How do these numbers compare for China vs. other countries
Suggestion I

- A potential literature to organize the estimation and benchmark towards is the CDM model (Crepon, Duguet, Mairesse).

- Three stage linkages
  - Output: \( \ln r_{it} = \beta_k \ln k_{it} + \beta_v \ln v_{it} + \omega_{it} + u_{it} \)
  - Productivity evolution: \( \omega_{it} = g(\omega_{it-1}, s_{it}) + \epsilon_{it} \)
  - Patent evolution: \( s_{it} = f(s_{it-1}, r_{dit-1}, \omega_{it-1}) \)
  - Potentially also model \( rd_{it-1} \)

- Identification is closely related to \( ACF \) and dynamic panel, which the paper already utilizes.

- Typically rely on innovation surveys in OECD countries
Suggestion II

Investigate mechanisms and their quantitative magnitudes

- Patent improve firm profit via
  - new products
  - markups
  - high quality/efficiency

Can we separate out these channels
- markup: DLW measure not significant, is labor share a good measure? Would prefer variable inputs.
- export increases much more than domestic: informative about quality/products? (Customs data)
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More work on the patent data

- Invention, Utility, and Design patents have almost identical effects on
  - Output/Input
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- Puzzling given the fact that Invention is a lot more “selective”, does the result stand with better empirical strategies? (i.e. IV)
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• Negative medium run effect
  • 2-3 years impact of patent is mostly negative, mean reversion?
  • Control for lagged outcomes.
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- Explore more the technological field of patent vs a firm’s industrial classification.
Suggestion IV

- Patent is one of the most widely used measures of firm’s innovation output.

- Knowledge production function literature often firm-level TFP as another innovation outcome.

- Often share the same set of determinants like R&D inputs and other firm-level observables.

- Both have a reasonable level of persistence.

- Hard to be bullet-proof, the IV regression seems a promising direction.
  - But needs to pay attention to geographical confounding factors (like local economic growth).
  - Needs ideally overtime variation in IPR protection.
  - Could also consider local government subsidies for patent application.