From imitation to innovation: Where is all that Chinese R&D going?

Discussion

Michael König (University of Zurich), Zheng (Michael) Song (Chinese University of Hong Kong), Kjetil Storesletten (University of Oslo), Fabrizio Zilibotti (Yale University)

Discussant: Simon Alder (University of North Carolina at Chapel Hill)

Second IMF-Atlanta Fed Research Workshop on China's Economy
May 18-19, 2017

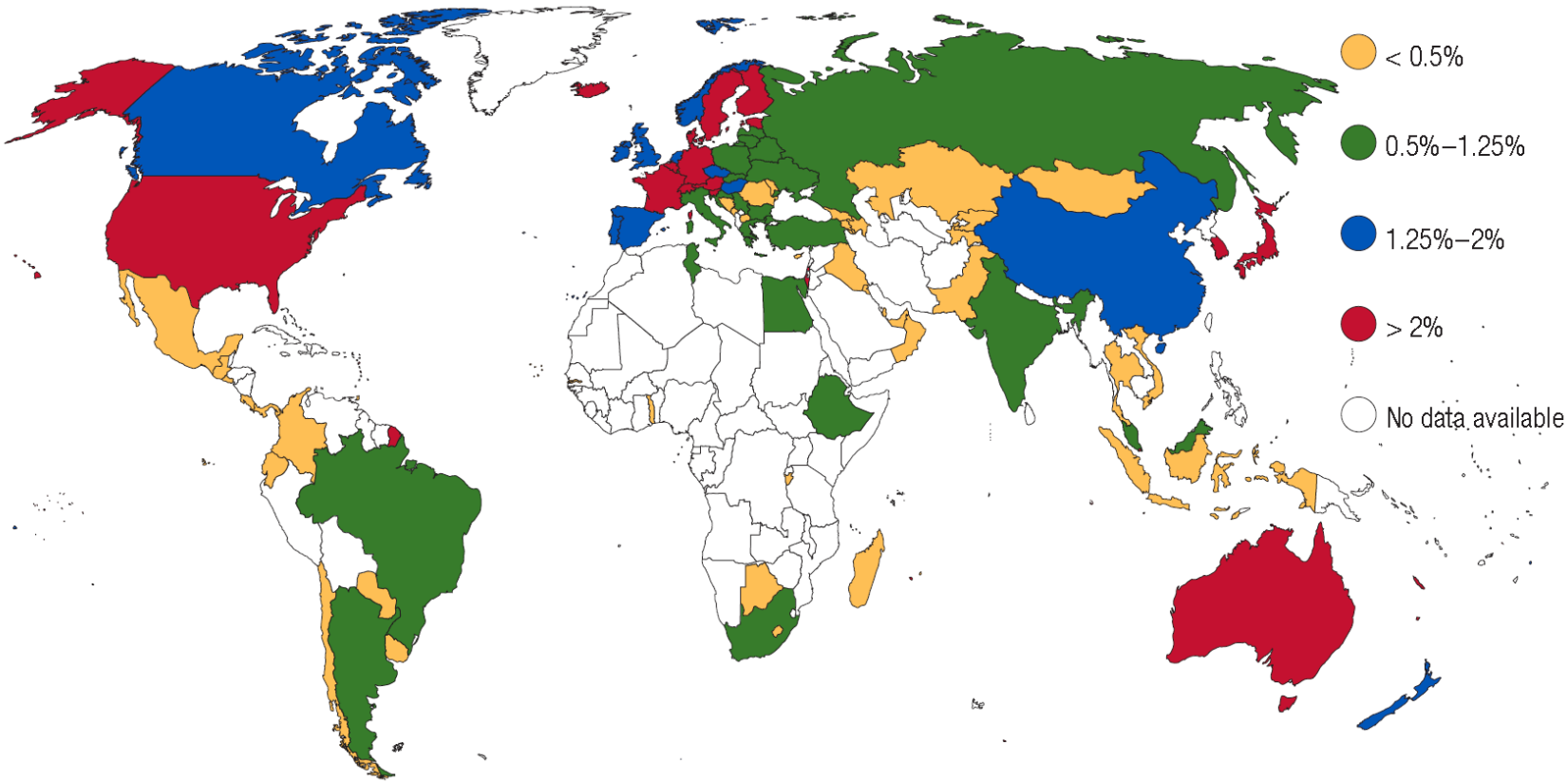
Overview of the paper

Motivation

- China invests a large fraction of GDP in R&D
  - $\Rightarrow$ Approximately as much as the OECD total
  - $\Rightarrow$ More than the UK
- Proactive industrial policies

Overview of the paper

Total Research and Development Spending, 2011-15



Sources: World Bank; and IMF staff calculations.

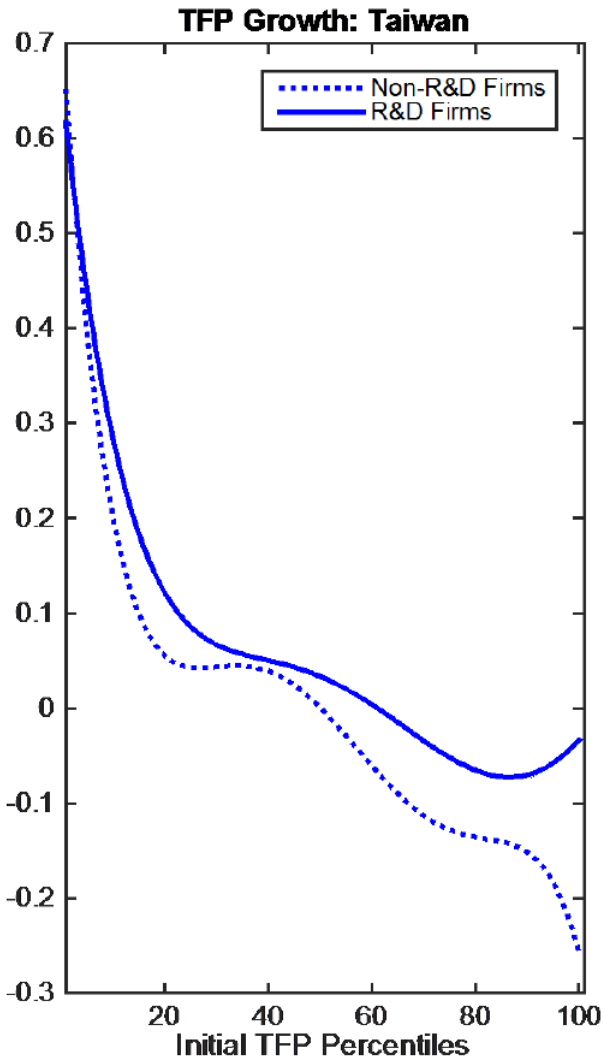
Overview of the paper

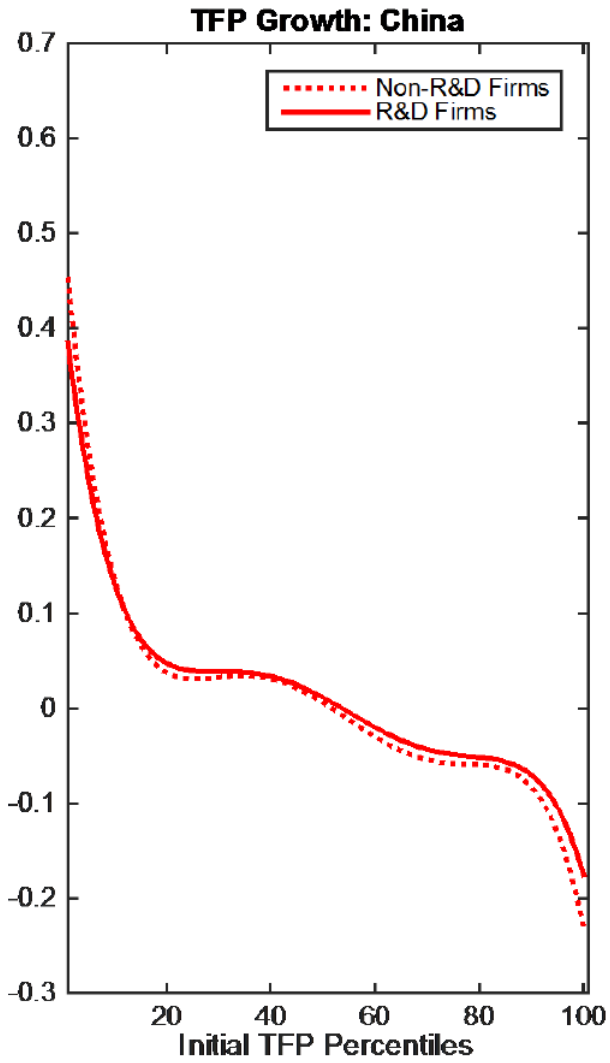
Motivation

- How effective is this investment?
  1. Does R&D investment translate into productivity growth?
  2. Is the allocation of R&D investment efficient?
  3. Which firms do R&D?

Overview of the paper

TFP growth in Taiwan and China





Overview of the paper

Approach

- Chinese and Taiwanese firm-level data on R&D
- Theoretical model with innovation and imitation to measure wedges and TFP
- Estimate model parameters based on Taiwanese data
- Use estimates in the model and make predictions for China

Overview of the paper

Findings with baseline model

- Find that baseline model prediction doesn't fit the data well
  - TFP growth increases too much in initial TFP level (too much selection)
  - e.g. difference in TFP growth between R&D and non-R&D firms too large (R&D too effective)
- Estimating model based on Chinese data suggests very low productivity of R&D

Overview of the paper

Findings with different versions of the model

- Analyze the implications of various modifications:
  1. Increasing the variance in the cost of R&D (c)
  2. Reducing probability of success of R&D (p)
  3. Assuming firms can fake R&D
     - Informational asymmetries lead to moral hazard and adverse selection
     - Model now matches the data better

Comment I

Survival bias

- Convergence in TFP
  - Data shows that firms with the lowest initial productivity have the highest subsequent productivity growth rate
  - Model is written in this way as well (next comment)
- Is there a survival bias and how important is it?
  - Firms with lower initial TFP may need to have better prospects of TFP growth to be able to continue their business (e.g. get credit)

  $\Rightarrow$ Only those with high expected TFP growth survive

Comment II

Matching process for imitation

- The model predicts convergence through a simple mechanism:
  - Imitation successful with probability $q(1 - F(A_t))$
  - Low productivity firm has the same probability to be matched with a firm of given A_t as a high productivity firm
  - Low productivity firm more likely to meet a firm with higher productivity than itself

  $\Rightarrow$ Higher probability to imitate successfully
- Why and how do firms meet?
- Could the matching depend on the firm's productivity?

Comment III

Moral Hazard

- There seems to be both moral hazard and adverse selection
- It would be great to have more information about the form of the subsidies, the informational problems, and how it is formalized in the model
- Show that this is the more plausible explanation than low productivity of R&D

Comment IV

Intellectual Property Rights

- Protection of intellectual property rights may differ in Taiwan and China
- Would like to know more about how this matters for the estimation and for the descriptive statistics

Comment V

Anecdote from France: Crédit d'Impôt Recherche

Crédit Impôt recherche : une niche fiscale hors de contrôle

Publié le vendredi 28 avril 2017 à 8h00 par Marjolaine Koch

Le crédit d'impôt recherche, réel coup de pouce donné aux entreprises innovantes, voit ses dépenses exploser, mais la fraude est devenue monnaie courante.

Crédit Impôt recherche : une niche fiscale hors de contrôle © AFP / ABO/Science Photo Library

Comment V

Crédit d'Impôt Recherche

- France introduced the "Crédit d'Impôt Recherche (CIR)" in 1983 and expanded it further in 2008
- The number of firms that claimed tax credit doubled from 9800 to 17900 during 2007 to 2011, claims almost tripled (France Inter, 2017)
- Appears to lead to moral hazard problems
  - $\Rightarrow$ Firms try to find ways to ex post label outcomes as the result of research
  - $\Rightarrow$ A smaller share of researchers spend 100% of their time in research

Conclusion

- Great project on an important topic
- I like the use of Chinese and Taiwanese firm-level data and using the model to measure wedges and perform counterfactuals
- Introducing informational asymmetries seems a natural way to think about the puzzle of high R&D but small difference in TFP growth. This is something I would like to know more about.
- Still preliminary but very interesting and promising research