The New Global Invention Machine: A Look Inside the R&D Networks of U.S. Multinationals

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Since 1990, foreign R&D has grown 5-fold
…with particularly striking increases in information and in professional, scientific, and technical services.

R&D Expenditures by US MNC Foreign Affiliates by Industry of Foreign Affiliate, Indexed (1999=100)
MNC foreign R&D used to be concentrated in a few advanced economies, but its geographic distribution has dramatically expanded.
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One driver is the growing importance of software and IT hardware in innovation.

- IT- and software-biased shift in innovation
- Increased demand for software/IT-related human capital that was not fully met
- US MNCs do R&D abroad in “new hubs” that have large quantities of STEM workers
IT and software have become much more important in US innovation
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IT and software are also domains where geographic disaggregation is easier.

Source: USPTO
Demand for talent in these domains was partly addressed with imports of foreign talent...

Growth in US college-educated workforce, 1993-2010

- All workers
- IT Workers
- Foreign Workers
- Foreign IT Workers

68% 114% 185% 330%

...and partly addressed by accessing foreign talent abroad – especially when immigration restrictions were more constraining.

In 2004, the H-1B cap fell by ~75%.
Specialization according to comparative advantage?

R&D Performed by Affiliates in 2009, by Industry of Affiliate

China

Germany

India

Israel

Note: Traditional Manufacturing includes Chemical, Food, Machinery, Primary & Fabricated Metals, Transportation Equipment

Source: BEA
Could R&D globalization be a way to reverse the global productivity slowdown?

Source: Byrne, Fernald, and Reinsdorf, 2016
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Source: Jones (2009)
Could R&D globalization be a way to reverse the global productivity slowdown?

- The “burden of knowledge” concept implies that the *scale* of investment in innovation matters.
- Many of the “new” R&D hubs appear to have higher-than-typical R&D productivity within MNC networks.
Takeaways

- US MNCs have developed an innovation system that spans the globe
- The need for IT/software human capital has driven some of the surge in and location choice of foreign R&D
- Evidence suggestive of a global division of labor, where activities are located in regions where production is most efficient
- Foreign talent could power an acceleration in the rate of productivity growth
- Deglobalization could inhibit the productivity benefits that R&D globalization could bring
THANK YOU
BACKUP SLIDES
R&D has always been much more highly concentrated in the home country than other activities of the firm.
The US parent continues to be the core of US MNC innovative activity, but foreign activity is steadily becoming more important.