



What magic can we do with linked data sets?

(and a new data set
for linking soon to be
available at NBER)



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**Conference on Linking NSF SED/SDR Data to Scientific
Productivity Data February 29, 2008**

Big Issues on which linked data can cast light (environmentally sound bulbs)

- 1) Changing nature of scientific & innovative production process
 - internationalization of research
 - more multi-authored work
 - tighter univ/industry link
 - more industry focus on applied
- 2) Impact of societal investments on eventual outcomes
 - fellowships
 - transfer of knowledge across organizations
 - work on machines, collaborative projects
 - culture of universities/firms

3 – How structure of careers affects life cycle of outcomes

women doing better outside academe in patents – why?

4 – Dynamics of network relations

birth of papers

birth/death of collaborations

impact of grad school/early links on behavior

US cannot play “quantity game”; must do smart network quality to maintain sci-tech lead

Questions for analysis

- Can link with papers/patents of foreign-born provide insight to what international returnees are doing?
- Can link with location of training/ post-doc explain part of globalization/falling US share of papers?
- Do local interactions give local groups an edge? – Darby-Zucker – but also training; past interactions.
- Do scientific trees of begets tell us where to provide funds? What are early signs of productivity?
- Dynamic development of networks and ideas as people move/change
- US needs ideal internal structure to compete in world with larger population countries

Rich structure of linked data

Persons, time, location at time

Location characteristics

**Papers, time, other authors, location at time
written**

**Citations, time, characteristic of citees
network of citations**

Patents, time, other authors, location at time

**New products – can we reverse engineer set
of important products?**

2. The New NBER WIPO data set ... coming to website soon

WIPO – UN World Intellectual Property Organization, covers 184 countries

Establishes Patent Cooperation Treaty (PCT)
Applications; still must file for country patent;
The content of the PCT application is openly disclosed by WIPO publication

Organized by Duke University group – to be turned over to NBER

What's in the data

PCT publication number, publication date, PCT international patent classification code (industry field(s))

Applicant(s) Name— may include company or corporation names; addresses; citizenship; residency at the time of filing

Inventor(s) Name – may include company or corporation names, addresses, citizenship, residency at time of filing

Possible to compare PCT with USPTO ... match among patents ... to names

Some intellectual property protected by US patents has also been filed under a PCT application.

Some successful PCT applications are used to file for US patents through the United States Patent and Trademark Office (USPTO). There is partial overlap and neither population is a subset of the other.

Fruitful way to examine globalization of patents

Duke group: Wadwha/Rissing

Analysis of all WIPO patent applications filed globally for 28 years that shows shift in IP creation from the U.S. to Europe and now to India/China

In 2006 one fourth of WIPO patents have foreign national authors compared to 8% in 1998

In 2006 17% had a Chinese-name and 14 had and Indian-name authors compared to 11% and 10% in 1998

But can also tell where they did work and nationality

If multiple names, the composition of teams

Missing from US data links

Measures of innovation -- implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations.” [Page 46, *Oslo Manual*]

NSF's 1995 Manufacturer's Innovation Survey Pilot,
1000 firm – low overall response rates--45% -
53%

EU, Canada, Australia, NZ have kept developing
innovation surveys

Measures of New products

Links to establishment/firm productivity

