

Heterogeneity in Knowledge Flows of Regions: Impact on Invention Quality

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20 June, 2017

Outline

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Data and Method

Future Work

Mobility Trends

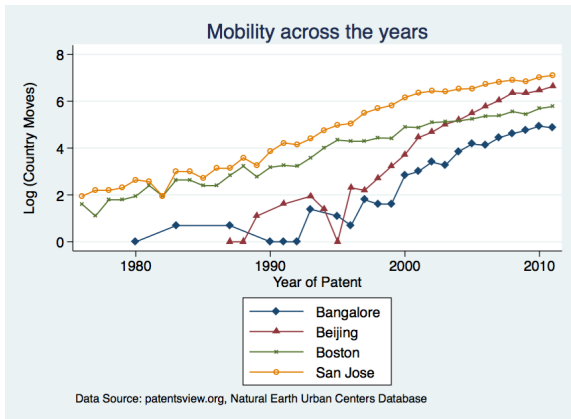


Figure: Country moves by year

Mobility Trends

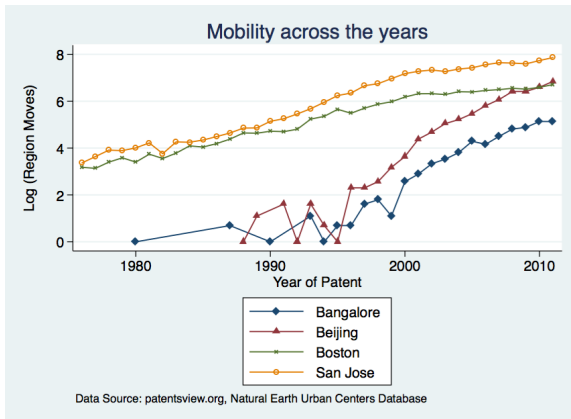


Figure: Region moves by year

Mobility Trends

Table: Summary statistics

Variable	Mean	Std. Dev.	N
moved region	0.08	0.271	8537410
moved country	0.029	0.166	8537410
log(complexity)	-1.004	2.383	7957162
inventor pool	8.542	46.674	8537410
team pool proxy	27.901	112.154	6875208

Research Question

- What is the relationship between the movement of some inventors into or out of a region and the average complexity of inventions from those inventors?

Hypotheses

- H1: An increase in the average mobility of inventors in a region increases the average complexity of innovation generated
- H2: The effect in H1 is moderated positively by the relative strength of the intellectual property rights regime of the region

Geographic Mapping

San Jose

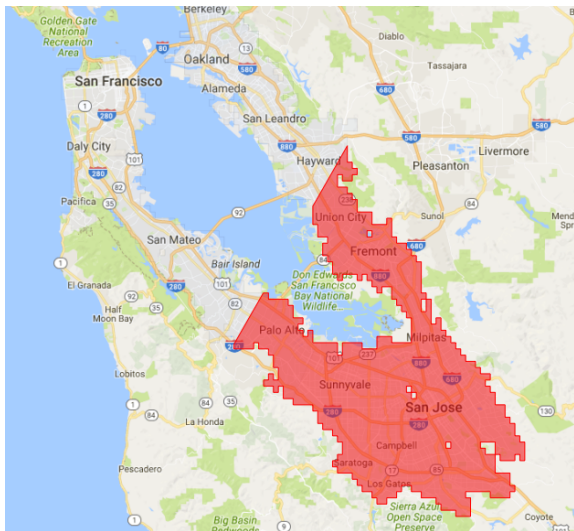


Figure: Geographic Definition of San Jose, CA

Geographic Mapping

Bangalore

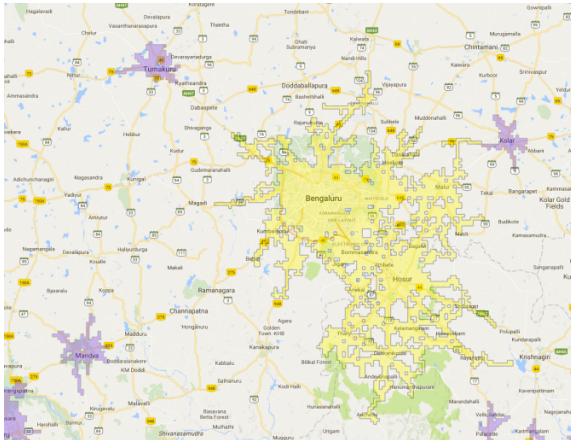


Figure: Geographic Definition of Bangalore

Complexity and Technology Classes

Table: Most complex technology subclasses in 2010

id	Avg Complexity	Technology
32	6.691109	Surgery & Med Inst.
25	6.583521	Electronic business methods and software
24	6.361433	Information Storage
22	5.941292	Computer Hardware & Software
21	5.627072	Communications

Complexity and Technology Classes

Table: Least complex technology subclasses in 2010

id	Avg Complexity	Technology
11	2.533947	Agriculture, Food, Textiles
33	3.468262	Genetics
66	3.488879	Heating
52	3.518574	Metal Working
63	3.661588	Apparel & Textile
53	3.667615	Motors & Engines + Parts
55	3.712974	Transportation

Methodology

- Data Source: Patents from USPTO, source: patentsview.org
- Data Source: Regions using Remote Sensing Data, source: naturalearthdata.com
- Unit of Analysis: Inventor-Year
- Dependent Variable: $\log(\text{Complexity of Invention})$
- Primary Explanatory Variable: Mobility of innovators (Between-Region Mobility, Between-Country Mobility)
- Moderating Variable: IPR Strength
- Control Variables: Technology classes, Region-Firm (Assignee) effects, Year effects

Addressing Potential Issues

- Direction of Causality
- Alternative measures of complexity
- Cluster Standard Errors at Region - Assignee
- Control for Inventor - Technology Class
- IPR measures - Ginarte Park Index

Results

Limitations and Future Work

- Causal forces in determining mobility effects on invention complexity - Learnings from 9/11 shock
- Explore alternate identification measures for causality
- Estimate the extent of under reporting of mobility, consider alternative sources as linkedin
- Industry specific studies with relevant IPR scores
- Alternate measures of complexity