Heterogeneity in Knowledge Flows of Regions: Impact on Invention Quality

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Outline

Prior art from patent citation analysis

Economic Geography Literature

- Knowledge spillovers are localized (Jaffe, Trajtenberg, & Henderson, 1993)
- Innovation is more spatially concentrated than is production (Feldman, 1994)

International Business Literature

- Firms profit from offshoring R&D by leveraging better organizational linkages (Zhao, 2006)
- Subsidiary - MNC parent flows are as strong as MNC parent - Subsidiary knowledge flows (Singh, 2007)

Knowledge flows as search?

Region and firm boundaries

	Same Region	**Different Region**
Same Assignee	Independent Research Center	Geographic Diversification
Different Assignee	Cluster	Diffusion

Figure: Categories of knowledge flows

Research Question

- How do the nature of knowledge flows in a region affect the quality of inventions generated in the region?

Summary of Preliminary Findings

- Localized knowledge flows do not seem to improve invention quality
- Geographical diversification is seen to improve invention quality
- Much additional research required to distill any stylized facts on the impact of geography and firm boundaries on invention quality

On the Nature of Knowledge Spillovers

- Rent Spillovers vs. Pure Spillovers (Griliches, 1979)
- Knowledge as a private good and a public good (Arrow, 1962)
- Knowledge flows are invisible (Krugman, 1991)
- Knowledge flows sometimes leave a paper trail in the form of patent citations (Jaffe et al., 1993)

On the Localization of Knowledge Spillovers

- Rent Spillovers vs. Pure Spillovers (Griliches, 1979)

On Knowledge Flows across Countries

- Knowledge flows sometimes leave a paper trail in the form of patent citations (Jaffe et al., 1993)

Hypotheses

Create four slides and on each put up in pictures the various mechanisms and effects that literature suggests

Geographic Mapping

San Jose

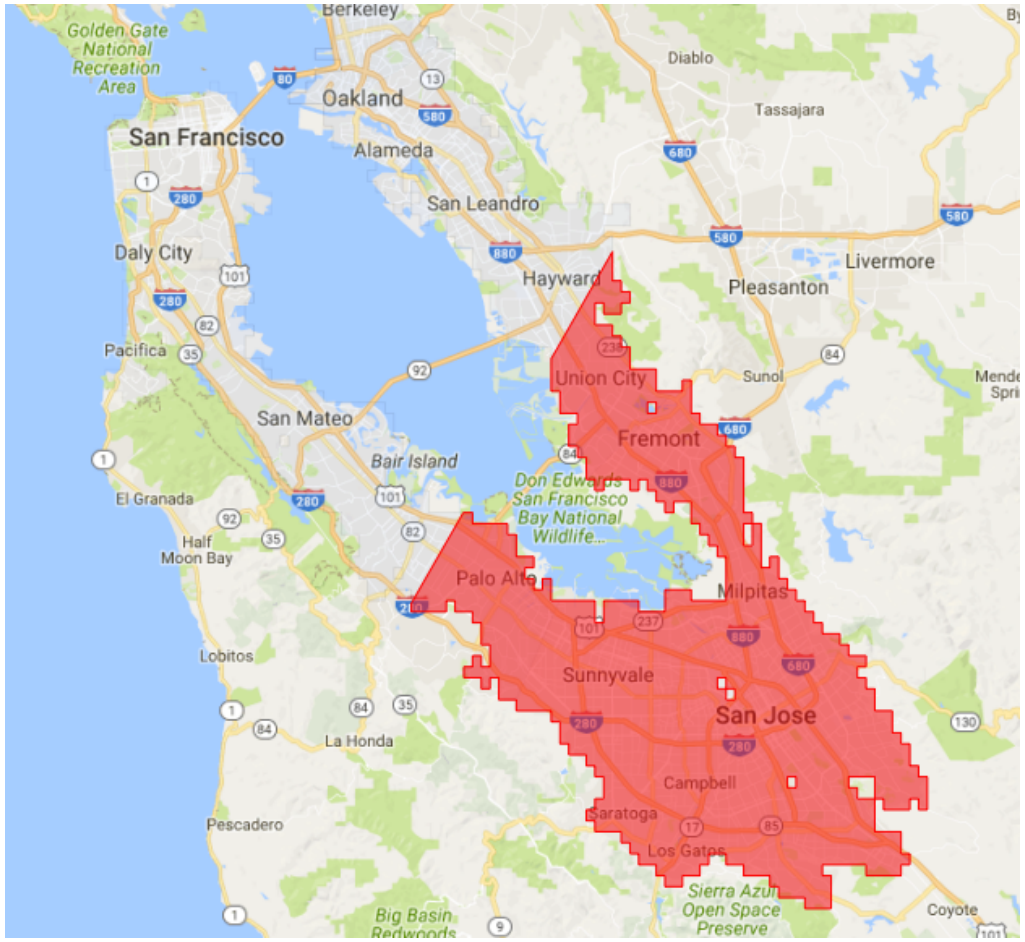

Figure: Geographic Definition of San Jose, CA

Methodology

- Data Source: Patents from USPTO, source: patentsview.org
- Data Source: Regions using Remote Sensing Data, source: naturalearthdata.com
- Unit of Analysis: Region-Year
- Dependent Variables: Total Citations Received, Non-Self Citations Received
- Independent Variables: Share of citations made within/outside region, within/outside assignee
- Control Variables: Technology subcategories (Hall, Jaffe, & Trajtenberg, 2001), Region fixed effects, Year effects
- Estimation Method: Negative Binomial

Addressing Potential Issues

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Results

Limitations and Future Work

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Feldman, M. P. 1994. **The geography of innovation**. Boston: Kluwer Academic Publishers.

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