The Impact of Metropolitan Technology on the Nonmetropolitan Labor Market: Evidence from U.S. Patents

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1. Introduction

Urban Technological Effects:

- Knowledge Spillovers
- Brain Drain
- Product Market Competition

2. Research Questions

- Primary research question: The impact of metropolitan technological progress on labor markets of adjacent nonmetropolitan areas.
- Other research questions:
  - Evidence of knowledge spillovers, brain drain, and market competition
  - The impact of metropolitan technological progress on the welfare of nonmetropolitan residents.

3. Data

We

- use county data for contiguous U.S. over the period of 2005-2015. The data set contains metropolitan areas and adjacent nonmetropolitan areas.
- employ patent data from USPTO to measure technological progress.
- extract unemployment rate and education data from the U.S. Census Bureau and USDA.

4. Methodology

- We use patent to measure technological progress. We weight these patents with distance between counties to account for the localization of knowledge, mobility costs of people, market power, and transportation costs.
- We use 3 estimators, including FD, FE, and Blundell-Bond.
- For sensitivity, we test other hypotheses, including commuting to work, industry labor demand shocks, the mobility of low-skilled workers, automation and offshoring in the U.S., and rural entrepreneurship.

5. Results

Our results show:

- suggestive evidence of knowledge spillovers, technology-induced nonmetropolitan out-migration, and market competition.
- There is a negative association between metropolitan technological progress and the nonmetropolitan labor market.
- negative impact of urban technological progress on the average wage of nonmetropolitan residents.

6. Policy Implications

Potential policy implications include

- contributing to ongoing discussions among academics and policymakers about the effects of technology
- informing policymakers about unintended consequences of urban technological progress
- estimating the effects of urban technology on the rural welfare

7. Future Work and COVID-19 Implications

- Future study could include analyzing heterogeneous effects of urban technological progress and examining other welfare measurements
- During the onset of the COVID-19 pandemic, there was significant outmigration of workers (especially high-skilled workers) from megacities.
- Innovations in the U.S. have been highly concentrated in a few urban centers.
- The pandemic might alter the landscape of innovation in the United States.
- The outcomes of this process can be determined by factors, such as investment in infrastructure (such as broadband) and the "return-to-office battle" between employers and employees.

Thank You!

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