

RIETI Policy Symposium

Frontier of Inter-firm Network Analysis: Power of network and geographical friction

Handout



Lorenzo CALIENDO

Associate Professor of Economics, Yale University

March 8, 2016

Research Institute of Economy, Trade and Industry (RIETI)
<http://www.rieti.go.jp/en/index.html>

Trade, Sectoral Linkages, and Labor Market Dynamics: Quantitative Implications

Lorenzo Caliendo
Yale University, NBER

RIETI Symposium

Introduction

- Fluctuations in aggregate economic activity are the result of a wide variety of disaggregated changes
 - ▶ **Sectoral**: process or product innovations, industrial/commercial policies
 - ▶ **Regional**: natural disasters or changes in local regulations
 - ▶ **Sectoral and regional**: large corporate bankruptcy or bailout

Introduction

- What are the mechanisms through which disaggregated changes affect the aggregate economy?
 - ▶ Sectoral Linkages
 - ▶ Geographic factors
 - ▶ Inter-regional trade
 - ▶ Labor Market Dynamics - Migration
- What are the quantitative implications of different disaggregated changes?
 - ▶ I'll present different examples

What are the mechanisms?

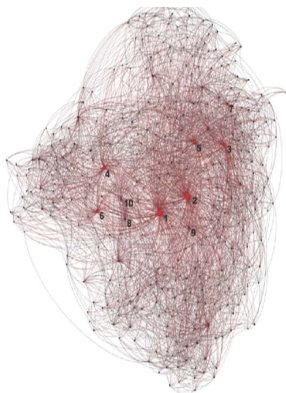
Sectoral Linkages

- Firms purchase goods from each other and this forms sectoral linkages

- Data for United States 2002

Sectors

- 1: Wholesale trade
- 2: Real State
- 3: Electric Power
- 4: Management of Companies and Enterprises
- 5: Iron and Steel
- 6: Depository Credit Intermediation
- 7: Petroleum Refineries
- 8: Nondepository Credit interm.



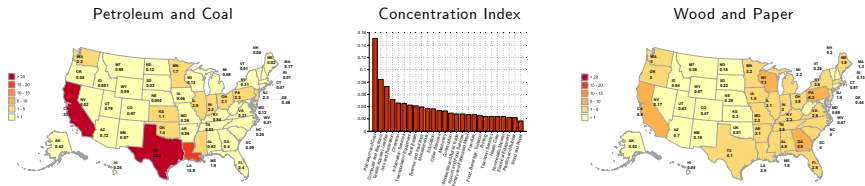
Source: Data from BEA, Carvalho 2014

What are the mechanisms?

Geographic factors

- Research on this area has largely abstracted from accounting for the regional concentration of sectoral activity
 - ▶ Does it matter? Yes!
 - ★ Because the distribution of sectors across regions is far from uniform

Concentration across regions (2007)



What are the mechanisms?

Inter-regional trade

- Physical production takes places at different geographical locations
 - ▶ Shipping goods across space is costly
- Regional trade much more important than international trade!

U.S. trade as a share of GDP (% , 2007)

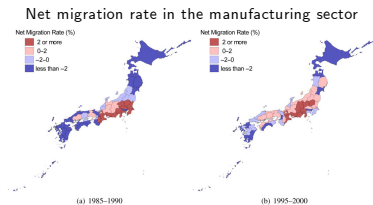
	Exports	Imports	Total
International trade	11.9	17.0	28.9
Inter-regional trade	33.4	33.4	66.8

Source: World Development indicators and CFS

What are the mechanisms?

Labor Market Dynamics - Migration

- Some factors of production are fixed to a location
 - ▶ for example: land and infrastructures
- Labor moves and adjusts after a change in local circumstances
 - ▶ More than 6% (approx 10 million) of the labor force in the U.S. change sectors and/or states in any given quarter!
- Interregional migration is also important in Japan



Source: Kondo, Okubo (2012)

Quantifying the economic effects of disaggregated shocks

How to quantify the economic effects of different shocks?

- Use new developments on the international trade literature to quantify/identify the effects
 - ▶ Building on Eaton and Kortum (2002), Caliendo and Parro (2015)
- These new methodologies account for:
 - ▶ Sectoral Linkages
 - ▶ Inter-regional trade
 - ▶ Labor Market Dynamics - Migration
- Equally important, these methods also take into account the regional composition of sectoral activity

Quantitative implications

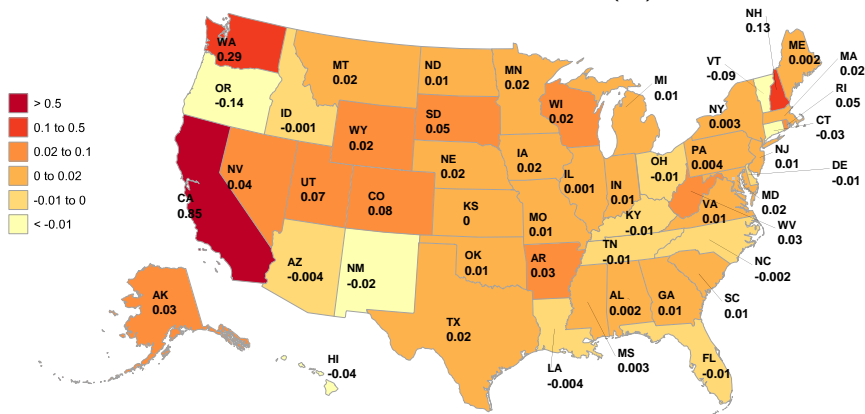
- I'll present results of studies that quantify the effects of a variety sectoral/regional changes
 - ① Productivity boom in Computers and Electronics in California
 - ② Reduction of internal regional distortions in the U.S.
 - ③ Aggregate effects to the Japanese economy from:
 - ★ Commercial policy (NAFTA, Preferential Trade Agreements)
 - ★ China's productivity boom (2000-2007)
- List of collaborators:
 - ▶ Parro, Dvorkin, Feenstra, Romalis, Rossi-Hansberg, Sarte, Taylor

1) Productivity Boom in Computers and Electronics

- California, home of prominent information and technology firms
 - ▶ Apple, Cisco Systems, Hewlett-Packard, Intel and others
 - ▶ In 2007, California had 24% of all employment in Comp. & Elec.
 - ★ Texas 8%, Massachusetts 6%, other states (37) less than 2%
- From 2002-07 California experienced a boom in Comp. & Elec.
 - ▶ An average of 14.6% annual productivity increase in that sector
 - ▶ The largest across all states and regions in the U.S. during that period
- We evaluate how the productivity boom in that sector and state propagated to all other sectors and states of the U.S. economy

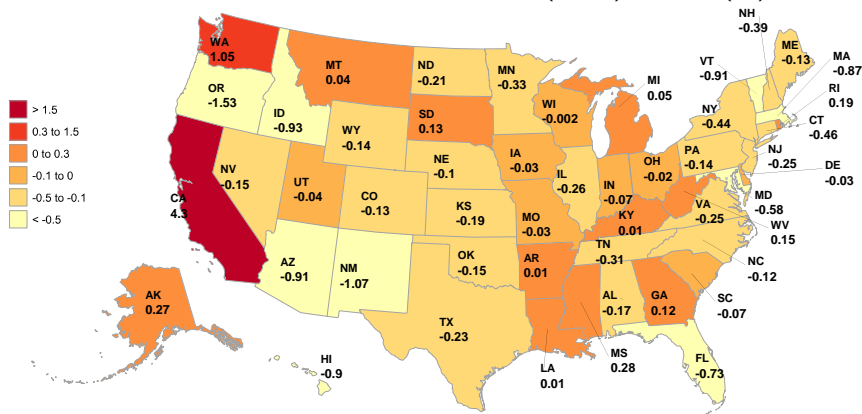
1) Productivity Boom in Comp. & Elec. in California

Regional Productivity effects (%)



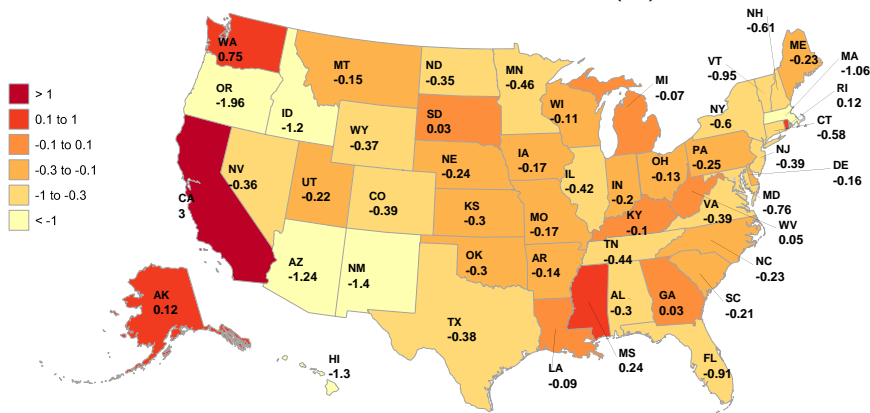
1) Productivity Boom in Comp. & Elec. in California

Regional Gross Domestic Product (GDP) effects (%)



1) Productivity Boom in Comp. & Elec. in California

Regional Employment effects (%)



1) Productivity Boom in Comp. & Elec. in California

- We find that the boom in the Computers and Electronics industry in California increased U.S. welfare by 0.2%
 - ▶ *Twice* the gains that the U.S. had from signing the North American Free Trade Agreement (NAFTA)!
- **TAKEAWAY:** Local shocks can have considerable aggregate effects!

2) Reduction of inter-regional trade distortions in the U.S.

- Distortions impede an efficient allocation of resources across firms

Eliminating distortions across U.S. states	
Aggregate Productivity gains	3.62%
Aggregate GDP gains	10.54%
Aggregate Welfare gains	10.10%

- **TAKEAWAY:** Reducing inter-regional trade distortions can have considerable aggregate effects!

3) Aggregate effects to the Japanese economy

Commercial policy

- How did NAFTA affected the Japanese economy?
 - ▶ Example of how a change in commercial policy can affect other economies
 - ▶ We find that Japan's real income decreased by -0.007%
 - ★ Main reason: trade diversion
- Did Japan gained from reducing tariffs?
 - ▶ Example of the effect of Japan's commercial policy
 - ★ All Preferential Trade Agreements (PTA) from 1995 to 2010
 - ▶ We find that Japan's real income increased by 4%

3) Aggregate effects to the Japanese economy

Effect of China's productivity boom (2000-2007)

- How did China's growth affected the Japanese economy?
 - ▶ We find that Japan's real income increased by 0.035%
 - ▶ Main reason: access to cheaper intermediate goods from China
 - ★ Taniguchi (2015) also finds a positive effect on manufacturing employment growth at the prefecture level in Japan

Conclusions

- Accounting for **Sectoral Linkages, Geographic factors, Inter-regional trade, and Labor Market Dynamics** is quantitatively and economically meaningful
 - ▶ We show this in a series of studies that quantify the effects of a variety of shocks with and without these channels active
- Main findings:
 - ▶ **Local shocks can have considerable aggregate effects!**
 - ▶ **Reducing inter-regional trade distortions can have considerable aggregate effects!**
- For the case of Japan
 - ▶ Gains from signing PTA's
 - ▶ Gains from China's productivity boom
- More to be done in this area... our only limitation is access to data

どうもありがとうございます