A Statistical Analysis of Regional Economic Impacts of the Manufacturing USA Program

SPS 2020 Summer Internship Symposium
Background

Who: Max Dornfest, Mather Policy - NIST

Where: Fremont, California

What: Senior, UC Berkeley, Research Affiliate, LBNL
    Majors: Physics, Political Science
    Minor: Public Policy

Why: (should you care) Using econometrics and astrophysics tools to analyze ROI for Manufacturing USA program
Where I worked this summer

National Institute of Standards and Technology’s
Office of Advanced Manufacturing

- Major program is Manufacturing USA, a network of 15 public-private manufacturing innovation institutes funded by nine government agencies.

- Manufacturing USA institutes convene business, academia, and stakeholders to work on those hard problems that can not be solved alone.
Research Project

Zigs and Zags

- Started with rare earth metals and electronics components.
- SARS-Covid-19 helped shape the direction of my work.
- Along the way - reviewed a grant, made progress to creating industry “one-pagers” starting with healthcare.
- All of this helped me focus my data analysis efforts on NIIMBL - The National Institute for Innovation in Manufacturing Biopharmaceuticals, one of the 15 Manufacturing USA institutes
Developing paper

Data

- Collaborated with Nico Thomas and Stephen Campbell.
- Used EMSI data a labor market analytics firm.

Language

- Python 3.0 in JupyterLab GUI housed in an Anaconda framework.
- Libraries: StatsModels, Pandas, Stargazer, etc.
Developing paper

Analysis

Standard Regressions (OLS)
- easy to implement.

Regression Discontinuity
- identifies chronological effect of treatment.

Synthetic Control
- allows comparison amongst many data sets.
Expectation

Standard Regressions (OLS)

- Highly dependant on variables present in data
- Would like to tease out geographic and chronological relationship
- Each sub-institute was established at a different time
Data (Varied Variables)

Two sets of Data

Industries
North American Industry Classification System (NAICS) is the standard used by Federal statistical agencies

Occupations
Standard Occupational Classification (SOC) system is a federal standard used to classify workers into occupational categories
Industries

Important Takeaways

- Area and Industry/Occupation are “nice” *categorical variables*.

- Jobs are not integers.

- With industry dataset I have access to pay, broken down into *three* variables!
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Results

R-squared = 0.643

The Durbin-Watson stat is used to test for autocorrelation.

If the Durbin-Watson stat is between 1.5 and 2.5, it is a good sign that there is no autocorrelation.
Results

Occupation = Top regression
Industry = Bottom regression

Area [T.10] = Delaware

Delaware is the one state with stable signal across both datasets.

NIIMBL = In Delaware

This is a promising start.
Concluding Thoughts

Great learning experience

Paper still on going

Recently asked to interview for a quantitative analysis job.

Conclusion: Paper was a great serendipitous choice.
Thank you for the great summer!

Jessica Strickler, Administrative Officer

Robert Rudnitsky, Physicist, Associate Director for Policy

Lisa Fronczek, Electronics Engineer, Manufacturing USA Competition Manager

Steve Campbell, Economist, Manufacturing Extension Partnership

Nico Thomas, Performance Analyst, Manufacturing Extension Partnership

and All of SPS!