Discussion of
“The Birth of American Ingenuity:
Innovation and Inventors of the
Golden Age”

Ben Jones, Northwestern & NBER
NBER Economic Growth Meeting
July 15, 2016

Overview

• Data
  – Integrates U.S. Census and U.S. patent records, 1980-1940 (and beyond)

• Analysis
  – Part I: Patenting and Economic Growth
  – Part II: Regional Characteristics that Predict Patenting
  – Part III: Inventor and Family Characteristics that Predict Patenting
  – Part IV: Individual Income of Inventors
  – Part V: Regional Inequality and Inventiveness
Data & Matching

• Complete count census data for 1880-1940
• Match to patents granted (decennial years)
  – Last name, first name, state; then refine using county, middle initial
• Find match for 46% of U.S. patentees
  – 1880: 62%, 1920: 34% (why?)
• Does decennial matching select on especially prolific inventors?
  – People with patents every year more likely to be found. May bias up inventor income measures.

Part I: Patenting and Economic Growth

• 100% ↑ in patenting predicts 15% ↑ in Y/L
Comment 1: What does Correlation Between Y/L and Patenting Tell Us?

- At state level, is it a test of (a) how innovation affects growth, or (b) degree of spillovers?
- If spillovers were complete, then would see zero correlation at state level, even if patenting drove all national growth
- Regression mixes (at least) these two forces. It doesn’t tell us overall effect of innovation on growth but rather local gains that aren’t dissipated to other states.

Aggregate
\[ \Delta \ln(y) = \Delta \ln(patents) \]

State
\[ \Delta \ln(y) = \frac{1}{7} \Delta \ln(patents) \]

- Theory suggests \( \Delta \ln(y) = \Delta \ln(A) \). If we take patent counts seriously, then can reconcile above via large spillovers, which seems natural.
Part I: Patenting and Economic Growth – It is Causative?

- Instrument: WW2 Office of Scientific Research & Development (OSRD) contracts

Comment 2: Is It Causative?

- OSRD funding is not randomly assigned
- Can it be treated as exogenous?
- Not obvious...
  - Paper tells us that 50% of contracts went to three states: NY (30%), MA (13%), PA (11%)
  - MIT got the most contracts and most money
- One imagines OSRD picked places with high innovative capacity, esp. given wartime needs
Comment 2: Is It Causative?

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>1947-87 GDP Growth Rate</th>
<th>Contracts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Patent 1935-1940</td>
<td>0.115 (0.189)</td>
<td>0.008 (0.161)</td>
</tr>
<tr>
<td>1935-1940 GDP Growth</td>
<td>0.006 (0.005)</td>
<td></td>
</tr>
<tr>
<td>1935-1940 GDP DHS Growth</td>
<td>2.107 (3.856)</td>
<td></td>
</tr>
<tr>
<td>1940 GDP per Capita</td>
<td>0.009 (0.038)</td>
<td>3.129*** (3.129***</td>
</tr>
<tr>
<td>Population Density</td>
<td>0.002 (1.002)</td>
<td>12.587** (12.587**</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>12.587** (12.587**</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>48</td>
<td></td>
</tr>
</tbody>
</table>

- Placebo tests could use more normal periods (1935-1940 is during Great Depression)
- Can storytelling identify plausibly exogenous shock, perhaps as one OSRD component? Or link today’s specific patent classes to OSRD local technology target?

Parts II-V

- Many interesting and striking facts
- Example: Tertiary education predictive of inventors (not uneducated “tinkerers”) even in 1880-1940.
Part II: Regional Characteristics

• Population density

Similarly, upward slope today... consistent with Marshallian agglomeration advantages
Is invention advantage as strong in 1880-1940?

Part III: Characteristics of Inventors

• High income parents
• Striking durability of this fact

1880-1940 is extremely similar!
Part V: Inventiveness and Inequality

- Historical lens on a hot topic
- Negative correlation then, mostly

- But here 1880-1940 does look different...

Part V: Inventiveness and Inequality

- Theory:
  - Aghion et al. (2015): innovation raises inequality (sustains markups / escapes imitators)
  - Jones and Kim (2015): innovation reduces inequality (creative destruction / new entry undercuts leaders)
- Why are 1980-2010 and 1880-1940 different?
Part V: Inventiveness and Inequality

Possibilities include:

- **Scale Effects**
  - e.g., digitization & globalization
  - 1 big tournament, huge share to winners

- **Patent Institutions**
  - Strengthening property rights
  - New strategies: Increasingly used to foreclose entry as opposed to reward innovation?
  - Allow larger markups and corporate income?

- **More evidence to sort out, advance theory**

Concluding comments

- Great new dataset
- Very interesting facts emerging
- More intersection with theory/literature and existing facts
  - Are facts contrary or consistent?
  - Do facts support/reject theories?
- The “historical test” is great agenda
- May require narrower paper(s)
Thank You