Economic Growth: Thinking Past the Short-run

Automotive Communities and Work Force Adjustment
October 9, 2009

Mark Schweitzer, Senior Vice President
OUR RESEARCH ASKS:

- Why do residents of some states have higher incomes than residents of other states?
- Why have these income differences persisted for the past 75 years?
BASED ON A LONG-TERM RESEARCH PROJECT

- Paul Bauer, Scott Shane (of Case), and myself
- *State Growth Empirics* (Federal Reserve Bank of Cleveland Working Paper 06-06)
- Revising our work. The publication process has enabled us to do some out-of-sample tests.
BASIC STATE

INCOME GROWTH FACTS
Figure 1

Income Growth

Real Per Capita Income, Thousands of Dollars

Year


Highest state
90th percentile
Median state
10th percentile
Lowest state
Figure 1

Income Growth

New York
$9,703

Mississippi
$1,882
Figure 2

Income Convergence

The diagram shows the standard deviation of real per capita income (natural log) over time from 1930 to 2000. The graph indicates a downward trend, suggesting income convergence over the years.
WHAT SHOULD WE EXPECT TO SEE?
BASIC (SOLOW) MODEL

- Simple workhorse macro model that tells how much output to expect based on capital, labor, and technology
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- Simple workhorse macro model that tells how much output to expect based on capital, labor, and technology

- Strong implications for relative growth
  - Shared technology
  - Capital mobility
  - Labor mobility

Income convergence
Newer growth theory models focus on the process of acquiring new technology.

Growth could vary more permanently:
- Human capital
- Taxes and public infrastructure
- Research and development
● There are still income differences worth investigating

● There have been notable changes
LONG-TERM RESEARCH PROJECT

- Research looks for underlying patterns in relative income changes
- Need data on potentially relevant state differences
  - Human capital
    - Education
  - Taxes and infrastructure
    - Per capita state revenues and road expenditures
  - Innovation
    - Patents per capita
  - Industry structure
    - Share of income by industry
- Not exact, but the pattern is reproduced applying only state histories of these variables
- Ordering largely preserved
- Scale of total three predictions large (~70% of overall variation)
Patent data is largest explanatory variable
Education also important in explaining differences
Industry structure smaller and less reliable
PREDICTED IMPACT OF KEY FIGURES ON 2004 STATE INCOMES

Predicted relative income (percent above or below state average)

Ohio:
- +9% for patent effect
- -1% for education
- -4% for industry structure

Michigan:
- +9% for patent effect
- -2% for education
- -5% for industry structure
WHAT’S HAPPENED MORE RECENTLY?
Knowledge Effects

Source: Bureau of Economic Analysis

Knowledge Effects

Real Per Capita Personal Income, 2008
(Thousands of Dollars)
EDUCATIONAL ATTAINMENT, 2008

Percent of population (25 and older) with a HS degree or above*

Ohio: 87.6
Kentucky: 81.3
Indiana: 86.2
Michigan: 88.1
United States: 85.0

Source: Census Bureau; *Includes equivalency and GED
EDUCATIONAL ATTAINMENT, 2008

Percent of population (25 and older) with a degree

- Bachelor’s degree or above
- Advanced degree*

Source: Census Bureau, *Advanced degree includes Master’s degree, Professional school degree and Doctorate degree
EDUCATIONAL ENROLLMENT, 2008

Percent of population (aged 14-17) enrolled in public school grades 9-12

Source: Census Bureau
EDUCATIONAL ENROLLMENT, 2008

Percent of population enrolled in a degree-granting institution

- Undergraduate
- First-professional or Graduate

Source: Census Bureau
### TOP PATENT ORGANIZATIONS: MICHIGAN, 2004-2008

<table>
<thead>
<tr>
<th>Organization</th>
<th>Count</th>
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<tbody>
<tr>
<td>GENERAL MOTORS CORPORATION</td>
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<td>FORD GLOBAL TECHNOLOGIES, L.L.C.</td>
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<td>VISTEON GLOBAL TECHNOLOGIES, INC.</td>
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<td>LEAR CORPORATION</td>
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<td>DAIMLERCHRYSLER CORPORATION</td>
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<td>UNIVERSITY OF MICHIGAN</td>
<td>273</td>
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<td>FORD MOTOR COMPANY</td>
<td>193</td>
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<td>EATON CORPORATION</td>
<td>181</td>
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## TOP PATENT ORGANIZATIONS: Ohio, 2004-2008

<table>
<thead>
<tr>
<th>Organization</th>
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<tbody>
<tr>
<td>PROCTER + GAMBLE COMPANY</td>
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<tr>
<td>GENERAL ELECTRIC COMPANY</td>
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<td>GOODYEAR TIRE + RUBBER COMPANY</td>
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<td>DIEBOLD</td>
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<td>HONDA MOTOR CO., LTD.</td>
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<td>ETHICON ENDO-SURGERY, INC.</td>
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<td>LINCOLN GLOBAL, INC.</td>
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<td>ROCKWELL AUTOMATION TECHNOLOGIES</td>
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<tr>
<td>CISCO TECHNOLOGY, INC.</td>
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</table>
LESSONS FOR THE STATES

- We do not study specific policies that might be implemented and thus have no specific recommendations.

- However, it is evident that over a span of 75 years the most reliable indicators of relative income levels and growth are knowledge variables.

- Economic development efforts should not ignore either education or innovation.
ISSUES FOR THE REGION

- Economic development efforts should not ignore either education or innovation
- Education attainment lower in the Region
  - Is it due to enrollments or attraction?
- Patent activity focused on wide-range of businesses
  - Is there a greater role for universities?