Human Capital and Economic Activity in U.S. Metro Areas

A Focus on New York State

Jaison R. Abel

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Overview

- What is the relationship between the stock of human capital and the level of economic activity in U.S. metropolitan areas?
  - Utilize new data on metropolitan area GDP to measure economic activity
  - Develop new knowledge-based measures of human capital to complement conventional measures
  - Describe the types of human capital in New York’s metropolitan areas
Distribution of Economic Activity

Per Capita GDP, 2001-2005 Average

More than 5-fold difference exists

Source: U.S. Bureau of Economic Analysis, U.S. Census
**Education and Economic Activity**

Simple Correlation = 0.56

<table>
<thead>
<tr>
<th>College Degree (%)</th>
<th>Per Capita GDP (2001-2005 Average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York City</td>
<td>30%; $51,440</td>
</tr>
<tr>
<td>Boston</td>
<td>36%; $54,587</td>
</tr>
<tr>
<td>Elmira</td>
<td>19%; $24,670</td>
</tr>
<tr>
<td>Buffalo</td>
<td>23%; $31,347</td>
</tr>
<tr>
<td>Rochester</td>
<td>27%; $36,798</td>
</tr>
<tr>
<td>Albany</td>
<td>28%; $37,277</td>
</tr>
</tbody>
</table>
Economic Foundations

- Human capital increases the productivity of individuals
  - Skilled workers produce more goods and services
  - Skilled workers more likely to produce high value goods and services

- Human capital spillovers enhance productivity and fuel innovation
  - Workers gain knowledge and skills by learning from others
  - New ideas are created through formal and informal interactions

- Impact on economic activity may differ by type of human capital
# Measuring Human Capital

<table>
<thead>
<tr>
<th>Education</th>
<th>Occupations</th>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>College Degree</td>
<td></td>
<td>Biology</td>
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<td></td>
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<td>Law</td>
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<td></td>
<td></td>
<td>Math</td>
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<td></td>
<td></td>
<td>Engineering</td>
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<tr>
<td>High School Diploma</td>
<td></td>
<td>Economics</td>
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<td></td>
<td></td>
<td>Management</td>
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<td>Physics</td>
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<td>No High School Diploma</td>
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<td>Computers</td>
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<td>Fine Arts</td>
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<td>Sales</td>
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<td></td>
<td>Construction</td>
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<tr>
<td></td>
<td></td>
<td>English</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Security</td>
</tr>
</tbody>
</table>
## Types of Knowledge

- Administration and Management
- Biology
- Building and Construction
- Chemistry
- Clerical
- Communications and Media
- Computers and Electronics
- Customer and Personal Service
- Design
- Economics and Accounting
- Education and Training
- Engineering and Technology
- English Language
- Fine Arts
- Food Production
- Foreign Language
- Geography
- History and Archeology
- Law and Government
- Mathematics
- Mechanical
- Medicine and Dentistry
- Personnel and Human Resources
- Philosophy and Theology
- Physics
- Production and Processing
- Psychology
- Public Safety and Security
- Sales and Marketing
- Sociology and Anthropology
- Telecommunications
- Therapy and Counseling
- Transportation

Source: O*NET, U.S. Department of Labor
Measuring Knowledge

O*NET Questionnaire

14. Mathematics

Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

A. How **important** is knowledge of MATHEMATICS to the performance of your current job?


* If you marked Not Important, skip LEVEL below and go on to the next knowledge area.

B. What **level** of knowledge of MATHEMATICS is needed to perform your current job?

1. Add two numbers 2. Analyze data to determine areas with the highest sales 3. Derive a complex mathematical equation

1 2 3 4 5 6 7

Highest Level
Important Knowledge Types

- Types of knowledge associated with high levels of economic activity in metropolitan areas

- Administration and Management
- Economics and Accounting
- Mathematics
- Computers and Electronics
- Sales and Marketing
- Personnel and Human Resources
- Customer and Personal Service
- Clerical
- Telecommunications
- Law and Government
- Production and Processing
- Design
- Engineering and Technology
- English Language
Knowledge Profile for Elmira, NY

Knowledge Types

- Clerical
- English Language
- Production & Processing
- Customer & Personal Service
- Law & Government
- Computers & Electronics
- Sales & Marketing
- Telecommunications
- Administration & Management
- Personnel & Human Resources
- Mathematics
- Economics & Accounting
- Engineering & Technology
- Design
- English Language

Standardized Knowledge Index

Above Average

Below Average

Knowledge Types

FEDERAL RESERVE BANK OF NEW YORK
Knowledge Profile for Buffalo, NY

Standardized Knowledge Index

Knowledge Types
- Clerical
- English Language
- Production & Processing
- Customer & Personal Service
- Law & Government
- Computers & Electronics
- Sales & Marketing
- Administration & Management
- Personnel & Human Resources
- Mathematics
- Economics & Accounting
- Engineering & Technology
- Design
- Telecommunications

Above Average

Below Average

Standardized Knowledge Index

Above Average

Below Average

Knowledge Types
Knowledge Profile for Albany, NY

Standardized Knowledge Index

Above Average

Knowledge Types

- Administration & Management
- Economics & Accounting
- Mathematics
- Computers & Electronics
- Sales & Marketing
- Personnel & Human Resources
- Customer & Personal Service
- Clerical
- Telecommunications
- Law & Government
- Production & Processing
- Design
- Engineering & Technology
- English Language

Below Average

Standardized Index: +3 to -2

Knowledge Types

- Administration & Management
- Economics & Accounting
- Mathematics
- Computers & Electronics
- Sales & Marketing
- Personnel & Human Resources
- Customer & Personal Service
- Clerical
- Telecommunications
- Law & Government
- Production & Processing
- Design
- Engineering & Technology
- English Language
Knowledge Profile for Boston, MA

Standardized Knowledge Index

Above Average

Administration
Economics & Accounting
Mathematics
Computers & Electronics
Sales & Marketing
Personnel & Human Resources
Customer & Personal Service
Clerical
Telecommunications
Law & Government
Production & Processing

Below Average

Design
Engineering & Technology
English Language

Knowledge Types
Knowledge and Economic Activity

Simple Correlation = 0.65

Per Capita GDP (2001-2005 Average)

Aggregate Knowledge Index (Z-Score in 2000)

-4.00 -3.00 -2.00 -1.00 0.00 1.00 2.00 3.00 4.00

Boston
0.97; $54,587

New York City
0.53; $51,440

Albany
-0.04; $37,277

Elmira
-1.61; $24,670

Buffalo
-0.37; $31,347

Rochester
-0.21; $36,798
Summary and Conclusions

- Amount of human capital in a region explains much of the observed difference in the level of economic activity across U.S. metropolitan areas.

- **Type** of human capital also matters.
  - Knowledge related to the provision of producer services and information technology boosts economic activity.

- Many of New York’s metros, particularly upstate, tend to have below average amounts of the types of human capital associated with high levels of economic activity.
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