The Skills Problem and Inequality

James Heckman
University of Chicago
University College Dublin

Inequality and the Challenge of Employment (Axica, Forum)
INET in Berlin: Rethinking Economics and Politics
Axica Conference Center & Federal Foreign Office, Berlin
April 14, 2012
Cumulative Growth in Average After-Tax Income, by Income Group

(Percentage change in income since 1979, adjusted for inflation)

Source: Congressional Budget Office.

Income — Average real after-tax household income.
Trends in Wage Dispersion (D9/D1), OECD (G7) countries, 1980-2008

Source: OECD Earnings Database; Note: Wage dispersion: D9/D1 ratios of full-time earnings calculated as the ratio of the upper bound value of the 9th decile to the upper bound value of the 1st decile.
Real, Composition-Adjusted Log Weekly Wages for Full-Time Full-Year Workers: U.S. Males

Source: Recreated from Acemoglu and Autor, 2011

James Heckman

The Skills Problem and Inequality
The Decline of the American Blue-Collar Middle Class

The Skills Problem and Inequality

% in Category

Graduate High School

Graduate College

Year of Birth


0 10% 20% 30% 40% 50% 60% 70% 80% 90%
The Decline of the American Blue-Collar Middle Class

James Heckman

The Skills Problem and Inequality
The Decline of the American Blue-Collar Middle Class

The Skills Problem and Inequality
The Decline of the American Blue-Collar Middle Class

The Skills Problem and Inequality

- Graduate High School
- Graduate College
Share of youth not in education, employment or training (NEET)
Ages 15-24, EU, 2007

Source: European Comission. LFS anonymised microdata set. DG EMPL calculations.
Share of NEET Youth, OECD Countries 2007
As a percentage of population in the age group

Youths aged between 20 and 24
Youths aged between 15 and 19

James Heckman
The Skills Problem and Inequality
Share of youth in education, employment or inactivity by age 2006

Share of youth in education, employment or inactivity by age 2006

UK

Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone after averaging out the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability after integrating out the cognitive ability.

Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone after averaging out the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability after integrating out the cognitive ability.

Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone after averaging out the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability after integrating out the cognitive ability.

Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone after averaging out the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability after integrating out the cognitive ability.

Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone after averaging out the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability after integrating out the cognitive ability.

Participated in 2006 Election

Dropping from Secondary School vs. Graduating

Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone after averaging out the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability after integrating out the cognitive ability.

Cognitive Ability by Educational Status

Males: Distribution of Cognitive Skills

- Uncertified Dropouts
- GEDs
- Secondary School Graduates
Post-Secondary Educational Attainment Across Education Groups Through Age 40 (NLSY79) — Males

The Skills Problem and Inequality
Distribution of Noncognitive Skill

Males: Distribution of Noncognitive Skills

- Uncertified Dropouts
- GEDs
- Secondary School Graduates

Frequency

James Heckman
The Skills Problem and Inequality
### Differences in College Entry Proportions Between Minorities and Whites, Mid-1990s

<table>
<thead>
<tr>
<th></th>
<th>Black-White</th>
<th>Hispanic-White</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual</td>
<td>-0.12</td>
<td>-0.14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Black-White</th>
<th>Hispanic-White</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual</td>
<td>-0.12</td>
<td>-0.14</td>
</tr>
<tr>
<td>Adjusted</td>
<td>0.16</td>
<td>0.15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Actual</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>-25%</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>-15%</td>
<td></td>
</tr>
</tbody>
</table>

*Denotes not statistically significant from zero, that is, the adjusted gap is likely to arise from chance. Source: Author’s calculations from the National Longitudinal Survey of Youth. For details, see the Web appendix at http://jenni.uchicago.edu/understanding_b-w_gap/. The wages are adjusted for age.*
**Shortfalls in Hourly Wages for Blacks and Hispanics in the Last Twenty Years: Actual Disparity and Disparity Adjusted for Ability**

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual</td>
<td>Adjusted</td>
</tr>
<tr>
<td>Black</td>
<td>-25%</td>
<td>-6%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-15%</td>
<td>3%*</td>
</tr>
</tbody>
</table>

* Denotes not statistically significant from zero, that is, the adjusted gap is likely to arise from chance. Source: Author’s calculations from the National Longitudinal Survey of Youth. For details, see the Web appendix at [http://jenni.uchicago.edu/understanding_b-w_gap/](http://jenni.uchicago.edu/understanding_b-w_gap/). The wages are adjusted for age.
<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual</td>
<td>Adjusted</td>
</tr>
<tr>
<td>Black</td>
<td>-25%</td>
<td>-6%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-15%</td>
<td>3%*</td>
</tr>
</tbody>
</table>

*Denotes not statistically significant from zero, that is, the adjusted gap is likely to arise from chance. Source: Author’s calculations from the National Longitudinal Survey of Youth. For details, see the Web appendix at http://jenni.uchicago.edu/understanding_b-w_gap/. The wages are adjusted for age.
Shortfalls in Hourly Wages for Blacks and Hispanics in the Last Twenty Years: Actual Disparity and Disparity Adjusted for Ability

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th></th>
<th>Females</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual</td>
<td>Adjusted</td>
<td>Actual</td>
<td>Adjusted</td>
</tr>
<tr>
<td>Black</td>
<td>-25%</td>
<td>-6%</td>
<td>-17%</td>
<td>12%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-15%</td>
<td>3%*</td>
<td>-7%</td>
<td>17%</td>
</tr>
</tbody>
</table>

*Denotes not statistically significant from zero, that is, the adjusted gap is likely to arise from chance. Source: Author’s calculations from the National Longitudinal Survey of Youth. For details, see the Web appendix at [http://jenni.uchicago.edu/understanding_b-w_gap/](http://jenni.uchicago.edu/understanding_b-w_gap/). The wages are adjusted for age.
Trend in mean by age for cognitive score by maternal education

Each score standardized within observed sample. Using all observations and assuming data missing at random. Source: Brooks-Gunn et al. (2006).
Each score standardized within observed sample. Using all observations and assuming data missing at random. Source: Brooks-Gunn et al. (2006).
Each score standardized within observed sample. Using all observations and assuming data missing at random. Source: Brooks-Gunn et al. (2006).
Each score standardized within observed sample. Using all observations and assuming data missing at random. Source: Brooks-Gunn et al. (2006).
Children Under 18 Living in Single Parent Households by Marital Status of Parent

Source: March CPS 1976-2010; Note: Source: March CPS 1976-2010. Note: Parents are defined as the head of the household. Children are defined as individuals under 18, living in the household, and the child of the head of household. Children who have been married or are not living with their parents are excluded from the calculation. Separated parents are included in “Married, Spouse Absent” Category.
Percent of births to unmarried women: United States

Source: Center for Disease Control and Prevention; Note: For the period 1940-1950 on 1940 and 1950 birth rates are presented; Age of mother 15-44
Proportion of Births out of Wedlock in Selected OECD Countries 1970 and 2008*

Note: * Data refers to 2007 for Japan, Italy, Ireland, Australia, the United States, Belgium and New Zealand; 2006 for Korea; 2005 for Canada.
The proportion of births out of wedlock is calculated as the percentage of all children born to parents who are not married (nor living in a legal partnership), occurring during that year.
The Proportion of Sole-Parent Families in all Households with Children, latest year*

Source: OECD Family Database; Note: * Data concern 1999 for France; 2000: Estonia, Finland, Korea, Latvia, Switzerland, Turkey, and the United States; 2006-7: Austria, Belgium, Bulgaria, Cyprus, Czech republic, Denmark, Greece, Hungary, Italy, Lithuania, Luxembourg, the Netherlands, Norway, Portugal, Slovak republic, Spain, and the United Kingdom; 2002: Ireland, Poland, Romania, Slovenia, and Sweden; 2005: Iceland, Mexico,
Mothers' Speech and Child Vocabulary

Source: Huttenlocher et al. (1991)
Mothers' Speech and Child Vocabulary

Source: Huttenlocher et al. (1991)
Mothers' Speech and Child Vocabulary

Source: Huttenlocher et al. (1991)
Children enter school with "meaningful differences" in vocabulary knowledge.

1. Cumulative Vocabulary Experiences

<table>
<thead>
<tr>
<th>Family Status</th>
<th>Words heard per hour</th>
<th>Words heard in a 100-hour week</th>
<th>Words heard in a 5,200 hour year</th>
<th>Word heard in 4 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welfare</td>
<td>616</td>
<td>62,000</td>
<td>3 million</td>
<td>13 million</td>
</tr>
<tr>
<td>Working Class</td>
<td>1,251</td>
<td>125,000</td>
<td>6 million</td>
<td>26 million</td>
</tr>
<tr>
<td>Professional</td>
<td>2,153</td>
<td>215,000</td>
<td>11 million</td>
<td>45 million</td>
</tr>
</tbody>
</table>
Children enter school with "meaningful differences" in vocabulary knowledge.

1. **Cumulative Vocabulary Experiences**

<table>
<thead>
<tr>
<th>Family Status</th>
<th>Words heard per hour</th>
<th>Words heard in a 100-hour week</th>
<th>Words heard in a 5,200 hour year</th>
<th>Word heard in 4 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welfare</td>
<td>616</td>
<td>62,000</td>
<td>3 million</td>
<td>13 million</td>
</tr>
<tr>
<td>Working Class</td>
<td>1,251</td>
<td>125,000</td>
<td>6 million</td>
<td>26 million</td>
</tr>
<tr>
<td>Professional</td>
<td>2,153</td>
<td>215,000</td>
<td>11 million</td>
<td>45 million</td>
</tr>
</tbody>
</table>

2. **Cumulative Vocabulary at Age 3**

<table>
<thead>
<tr>
<th>Cumulative Vocabulary at Age 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children from welfare families:</td>
</tr>
<tr>
<td>Children from working class families:</td>
</tr>
<tr>
<td>Children from professional families:</td>
</tr>
</tbody>
</table>
Perry preschool program: IQ, by age and treatment group

Source: Perry Preschool Program. IQ measured on the Stanford Binet Intelligence Scale (Terman & Merrill, 1960). Test was administered at program entry and each of the ages indicated.
Perry preschool program: IQ, by age and treatment group

Source: Perry Preschool Program. IQ measured on the Stanford Binet Intelligence Scale (Terman & Merrill, 1960). Test was administered at program entry and each of the ages indicated.
Decompositions of Treatment Effects on Outcomes

Notes: The total treatment effect is normalized to 100%. One-sided p-values are shown above each component in each outcome. "(+)" and "(-)" denote positive and negative total treatment effects. "CAT total" denotes California Achievement Test total score.
Skills Enhance Each Other: Technology of Skill Formation

<table>
<thead>
<tr>
<th>Personality and Social Skills</th>
<th>Cognitive Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>(sit still; pay attention; engage in learning; open to experience)</td>
<td></td>
</tr>
</tbody>
</table>

James Heckman

The Skills Problem and Inequality
Skills Enhance Each Other: Technology of Skill Formation

<table>
<thead>
<tr>
<th>Personality and Social Skills</th>
<th>Cognitive Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(sit still; pay attention; engage in learning; open to experience)</em></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Health</th>
<th>Cognitive Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(fewer lost school days; ability to concentrate)</em></td>
<td></td>
</tr>
</tbody>
</table>
## Skills Enhance Each Other: Technology of Skill Formation

### Personality and Social Skills
- (sit still; pay attention; engage in learning; open to experience)

### Health
- (fewer lost school days; ability to concentrate)

### Cognitive Skills
- Produce better health practices; produce more motivation; greater perception of rewards.
  - (child better understands and controls its environment)

### Outcomes
- increase productivity, higher income
- better health, more family investment
- upward mobility, reduced social costs

---

**James Heckman**

**The Skills Problem and Inequality**
Disparities by Education (Post-compulsory Education)

Note: Conti and Heckman (2010). Author’s calculations using BCS70.
Disparities by Education (Post-compulsory Education)

Note: Conti and Heckman (2010). Author’s calculations using BCS70.
Returns to a Unit Euro Invested


Programs targeted towards the earliest years
Returns to a Unit Euro Invested

Returns to a Unit Euro Invested

Returns to a Unit Euro Invested


Programs targeted towards the earliest years

Preschool programs

Schooling

Job training

Rate of return to investment in human capital

0 0-3 4-5 School Post-school
Predistribution
Not
Redistribution