Human Capital Formation and Economic Prosperity

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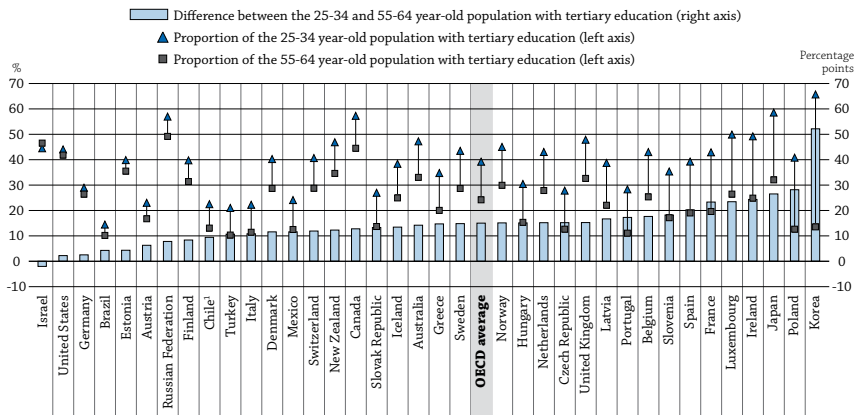
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Human Capital in the USA

1. Human capital stocks in the USA are not growing at the same rate as in other developed countries.

Tertiary Education in OECD Countries

Chart A1.3. **Percentage of younger and older tertiary-educated adults (2012)**

25-34 and 55-64 year-olds, and percentage-point difference between these two groups

1. Year of reference 2011.
Countries are ranked in ascending order of the percentage-point difference between the 25-34 and 55-64 year-old population with tertiary education.
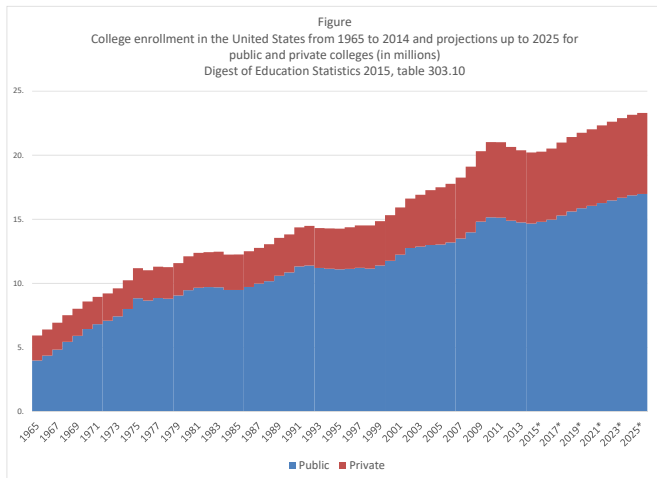**Source:** OECD. Table A1.3a. See Annex 3 for notes (*www.oecd.org/edu/eag.htm*).
StatLink http://dx.doi.org/10.1787/888933114989

Human Capital in the USA

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College Enrollment: NCES Dataset

Figure
College enrollment in the United States from 1965 to 2014 and projections up to 2025 for
public and private colleges (in millions)
Digest of Education Statistics 2015, table 303.10

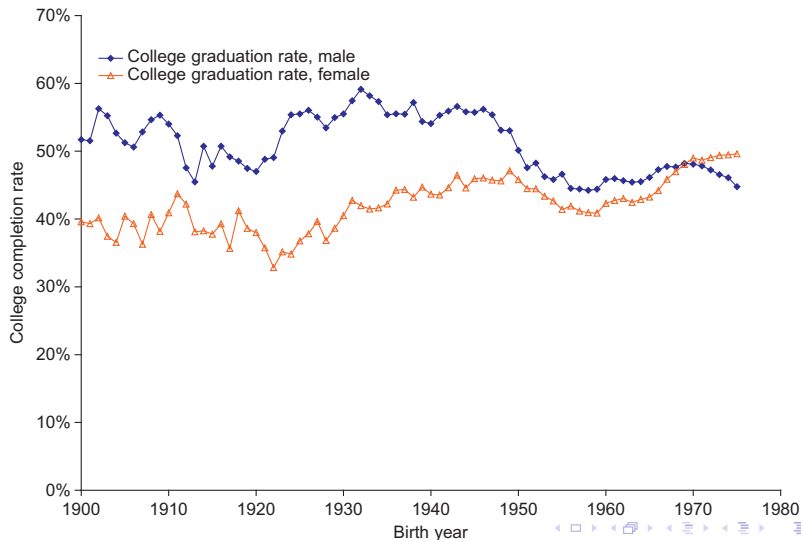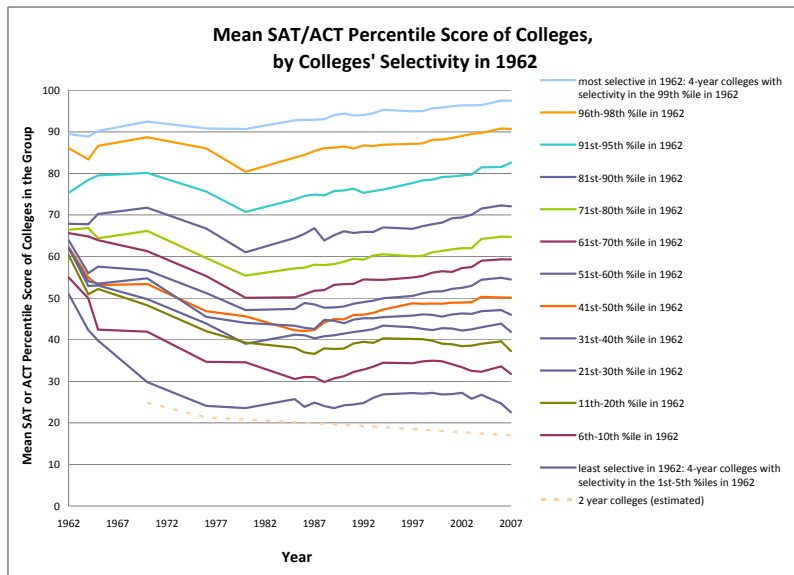# College Graduation Conditional on Enrollment: Goldin and Katz (2007)
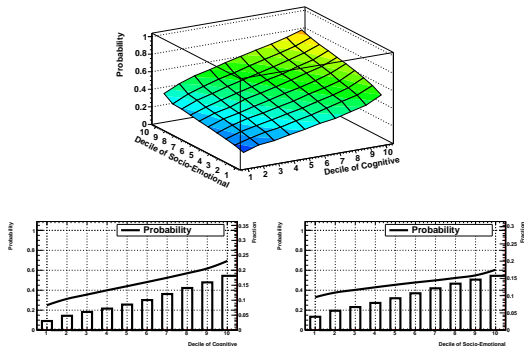
Fostering Human Capital in the USA

1. Human capital stocks in the USA are not growing at the same rate as in other developed countries.

2. College enrollment has increased but graduation rates have stayed constant.

3. Most of the growth in enrollment takes place in "nonselective institutions" which are accepting individuals who are not "college ready."

Changing Selectivity: Hoxby (2009)

Mean SAT/ACT Percentile Score of Colleges, by Colleges' Selectivity in 1962

Y-axis: Mean SAT or ACT Percentile Score of Colleges in the Group

X-axis: Year

Legend:
- most selective in 1962: 4-year colleges with selectivity in the 99th %ile in 1962
- 96th-98th %ile in 1962
- 91st-95th %ile in 1962
- 81st-90th %ile in 1962
- 71st-80th %ile in 1962
- 61st-70th %ile in 1962
- 51st-60th %ile in 1962
- 41st-50th %ile in 1962
- 31st-40th %ile in 1962
- 21st-30th %ile in 1962
- 11th-20th %ile in 1962
- 6th-10th %ile in 1962
- least selective in 1962: 4-year colleges with selectivity in the 1st-5th %iles in 1962
- 2 year colleges (estimated)

# College Graduation Conditional on Enrollment: Heckman et al (2006)

Figure 3: The Probability of Educational Decisions, by Endowment Levels, **Some College** vs. **4-year college degree**
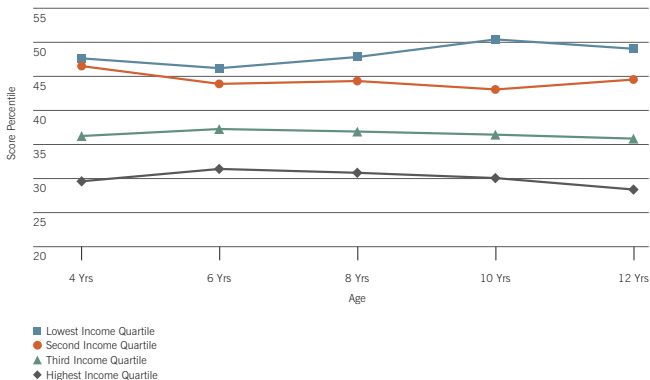
Human Capital in the USA

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4. College readiness is a process that starts in childhood and continues during adolescence and early adulthood

Evolution of Inequality in Cognitive Skills
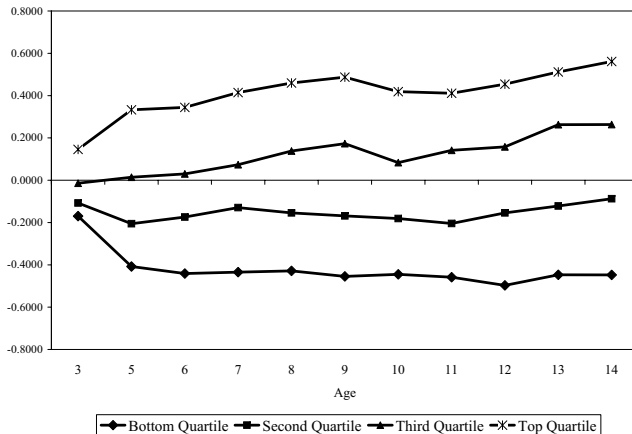
Evolution of Inequality in Noncognitive Skills

Average percentile rank on anti-social behavior score, by income quartile

■ Lowest Income Quartile
● Second Income Quartile
▲ Third Income Quartile
◆ Highest Income Quartile

Human Capital in the USA

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2. College enrollment has increased but graduation rates have stayed constant.
3. Most of the growth in enrollment takes place in "nonselective institutions" which are accepting individuals who are not "college ready."
4. College readiness is a process that starts in childhood and continues during adolescence and early adulthood.
5. To increase college readiness in the USA, it is necessary to:
   1. Improve targeting of early childhood programs.
   2. Implement programs that promote the development of non-cognitive skills.

Technology of Skill Formation

- In joint work with James Heckman and Susanne Schennach, we have shown that the production function of human capital is roughly approximated by:

$$H_1 = A \left\{ (1 - \gamma_L) \left[\gamma_E \left(H_0 \right)^{\phi_E} + (1 - \gamma_E) \left(I_E \right)^{\phi_E} \right]^{\frac{\phi_L}{\phi_E}} + \gamma_L \left(I_L \right)^{\phi_L} \right\}^{\frac{1}{\phi_L}}$$

- Our estimates are such that we cannot reject that
$1 > \phi_E > 0 > \phi_L >> -\infty$.

Technology of Skill Formation

- Note:

$$H_1 = A \left\{ (1 - \gamma_L) \left[\gamma_E \left(H_0 \right)^{\phi_E} + (1 - \gamma_E) \left(I_E \right)^{\phi_E} \right]^{\frac{\phi_L}{\phi_E}} + \gamma_L \left(I_L \right)^{\phi_L} \right\}^{\frac{1}{\phi_L}}$$

- Our findings imply that:
  - Early substitutability: The returns to early investments are higher for children who have low levels of H_0.
  - Dynamic complementarity: The returns to late investments are higher for children who have high levels of
    $\left[\gamma_E \left(H_0 \right)^{\phi_E} + (1 - \gamma_E) \left(I_E \right)^{\phi_E} \right]$.

Technology of Skill Formation

- Note:

$$H_1 = A \left\{ (1 - \gamma_L) \left[\gamma_E \left(H_0 \right)^{\phi_E} + (1 - \gamma_E) \left(I_E \right)^{\phi_E} \right]^{\frac{\phi_L}{\phi_E}} + \gamma_L \left(I_L \right)^{\phi_L} \right\}^{\frac{1}{\phi_L}}$$

- Our findings do not imply:
  - Early childhood "determinism".
  - Interventions at later stages cannot improve stocks of human capital at adulthood.
  - "Either early or late". In fact, dynamic complementarity means that returns to early investments will be higher the higher the quality of schools and universities.

Example 1: Better Targeting of Early Intervention Programs

- We need to identify families who are at risk for investing too little in their children.
- In different studies in Philadelphia and Houston, our team is working to develop ways that we can easily separate at risk from not at risk families.

LENA Natural Language Processing Device

Figure 2
Pilot LENA Pro System Study in the HIPPY Program - HISD
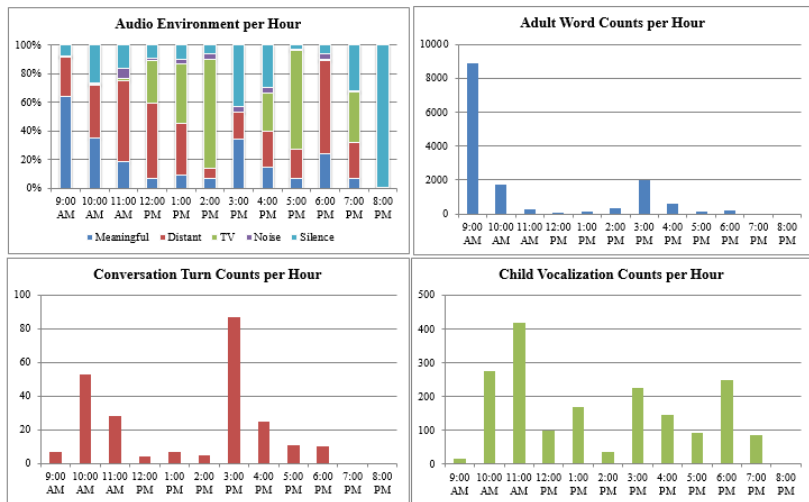
How large are differences in language environments?

- Preliminary results in Philadelphia indicate that:
  - High-SES families spend more meaningful time, have higher AWC and CTC counts than low SES ones.
  - Back of the envelope calculation: 350,000 more words per year and 8,000 more turns per year.
  - Comparing mean low-SES family with low-SES family who is one standard deviation above: pretty much same difference.
  - In other words, there are many low-SES families that invest as if they were high-SES families.
- Why? Our research indicates that this is due to differences in expectations about the returns to investments.

Example 2: Noncognitive Skills in Schools

- Nagaoka et al (2012) survey the literature on noncognitive skills and academic performance. According to the literature, there is strong and positive correlation between academic performance (including college graduation) and noncognitive factors such as:
  - Academic behaviors
  - Academic perseverance
  - Learning strategies

Example 2: Noncognitive Skills in Schools

- Kautz and Zanoni (2014) provide an evaluation of noncognitive skill formation program implemented in the Chicago Public Schools.
- Program designed to do a few things:
  - Information on how to apply for college.
  - Training and practice of how to build noncognitive skills.
- Analysis by Kautz and Zanoni (2014) suggests that program improves college persistence and college performance.

Fostering Human Capital in the USA

1. The skills an individual acquires through a college education are important for economic prosperity and inequality.
2. So far, policy has attempted to increase access to college even for those students who are not college-ready.
3. This has led to increase in enrollment, but not in graduation.
4. To change this reality, it is necessary to promote college-readiness.
5. Among other things, this will require better targeting of early investments and a portfolio of interventions that foster all dimensions of human capital.