Famille, capital humain et inégalité
90ème anniversaire de l’IRES

Pierre-André Chiappori

Columbia University

IRES, Mai 2018
Inequality: the ‘other 99%’

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  - ... but a key role is played by \textit{Human Capital}
Quick picture of inequality and its evolution over the last decades
This talk

- Quick picture of inequality and its evolution over the last decades
- Crucial role of Human Capital (HC)

Main issue:
Human Capital is endogenous!
how is it generated?
Emphasize the link with demography, and in particular marital patterns

Basic argument:
Increasing role of HC, which becomes prominent
First consequence: spectacular increase in HC investment
Second consequence: change in matching patterns (more assortative matching)
Final (and crucial) consequence: 'inequality spiral'

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Inequality and Human Capital
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Part 1
Inequality and Human Capital over five decades

Part 2
The determinants of Human Capital investment
Inequality: some facts

- Fact 1: divergent evolutions since the mid-70s
- Fact 2: the crucial role of HC in current inequality
- Fact 3: the crucial role of HC in the evolution of inequality
- Fact 4: the ‘demand for skills’ story (Autor 2014)
- Fact 5: links between inequality, HC and social mobility
Fact 1: divergent evolutions since the mid-70s
Income Gains Widely Shared in Early Postwar Decades — But Not Since Then (Source: CBPP 2018)

Real family income between 1947 and 2016, as a percentage of 1973 level

Note: In 2014 Census split its sample of survey respondents into two groups to test a set of redesigned income questions. In 2015 (reporting on 2014 income using the new questions), Census released two estimates of 2013 incomes, one based on the old questions and one on the new. The chart uses the estimate based on the old questions, based on CBPP's judgment that, due in part to sample size, it is likely more accurate for 2013.

Source: CBPP calculations based on U.S. Census Bureau Data
experienced losses in lifetime income over this time period while women experienced large gains, there has been a narrowing of the lifetime earnings gap.

Comparing the median income of males and females from Figure 1, we see that the difference between the median male and female lifetime earnings has narrowed over time, from the 1957 cohort in which the median female’s earnings were 37% of the earnings of the median male, to the 1983 cohort in which the median female’s earnings were almost 60% of the earnings of the median male. We see similar trends comparing other points of the gender-specific distributions over these cohorts. These comparisons can be seen in Figure 3. However, given that women started from such low levels of lifetime income (for example, almost 95% of females in the 1957 cohort earned less in lifetime income than the median male), gains in female lifetime income across cohorts largely serve to shore up the bottom of the distribution.

Using the CPI rather than the PCE to convert nominal incomes to 2013 dollars paints an even bleaker picture of lifetime income growth for the population as a whole. Figure 4 displays median lifetime income for each cohort using the two deflators. Whereas deflating with the PCE results in median lifetime income rising until around the 1967 cohort and remaining flat thereafter, deflating with the CPI results in median lifetime income being
Fig. S1: Changes in the 90/10 Ratio of Full-Time Male Earnings Across Twelve OECD Countries, 1980-2011 (Source: Autor 2014)

Notes: The bars show changes in the ratio of the earnings of full-time male workers at the 90th and 10th percentiles of the earnings distribution. The number accompanying each bar reports the earnings ratio as of 1980. For most countries, we compute the difference in the 90/10 ratio between 1980 and 2011 using data downloaded from OECD Stat Extracts. For New Zealand, the earliest data available are from 1984, so we compute this difference between 1984 and 2011 and multiply it by 31/27 to approximate the change over 1980-2011. For Denmark, France, Germany, and the Netherlands we use data from Machin and Van Reenen (61), scaling in similar fashion to approximate changes over 1980-2011.
Fact 2: the crucial role of HC in current inequality
Cross-national differences in wage returns to skills, 2011–2013

Percentage increase for a one standard deviation increase in skill

- Sweden
- Czech R.
- Norway
- Italy
- Denmark
- Cyprus
- Finland
- Belgium
- France
- Estonia
- Slovak R.
- Austria
- Netherlands
- Japan
- Poland
- Canada
- Korea
- U.K.
- Spain
- Germany
- Ireland
- U.S.

Earnings gain
95% confidence interval
Fact 3: the crucial role of HC in the evolution of inequality
Earnings Premium Over Time

Skeptics of the value of a college education often argue erroneously that the payoff is declining. Comparisons over time involve all of the complexities cited above, plus questions about the appropriate time periods to examine and about how to interpret year-to-year changes.

As figure 4 illustrates, median 2012 earnings of men and women ages 25 to 34 with a bachelor’s degree or higher working full time were, respectively, 70 and 82 percent higher than median earnings of their high school graduate counterparts. Twenty years earlier, the earnings differentials were just under 60 percent for both genders.

The growth in the earnings premium between 1992 and 2012 occurred while the percentage of adults in this age range with no education beyond high school fell from 57 percent to 43 percent, and the percentage of those with at least a bachelor’s degree increased from 21 percent to 31 percent (US Census Bureau 2013a). All else equal, the increase in the supply of college graduates relative to high school graduates should have caused the gap between college and high school earnings to narrow. Its increase indicates that that increasing demand for college-educated workers outstripped the increase in their supply (Goldin and Katz 2008).

Focusing on the most recent decade sheds light on how people can tell different stories with the same data because, as Figure 5 indicates, the earnings premium has been fluctuating. Among men, the gap increased from 66 percent in 2002 to 70 percent in 2012, but the smallest gap was 61 percent in 2010 and the largest was 74 percent in 2008. Among women, the gap increased from 71 percent in 2002 to a high of 82 percent in 2012, but the smallest gap was 67 percent in 2004.

The data on earnings differentials over time are complicated. Choosing a different start date can make the story look different. The earnings premium has risen more for all men and all women than for those working full time. Despite these complicating factors, the data are consistent in showing that the earnings benefits of college graduates are secure.

Figure 4. Median Earnings of Full-Time Year-Round Workers Ages 25–34 with at Least a Bachelor’s Degree Relative to High School Graduates, 1972–2012, Selected Years

<table>
<thead>
<tr>
<th>Gender</th>
<th>Year</th>
<th>Median Earnings Relative to High School Graduates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>1972</td>
<td>1.22</td>
</tr>
<tr>
<td></td>
<td>1982</td>
<td>1.25</td>
</tr>
<tr>
<td></td>
<td>1992</td>
<td>1.57</td>
</tr>
<tr>
<td></td>
<td>2002</td>
<td>1.66</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>1.70</td>
</tr>
<tr>
<td>Women</td>
<td>1972</td>
<td>1.42</td>
</tr>
<tr>
<td></td>
<td>1982</td>
<td>1.41</td>
</tr>
<tr>
<td></td>
<td>1992</td>
<td>1.59</td>
</tr>
<tr>
<td></td>
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Fact 4: the ‘demand for skills’ story (Autor 2014)
The supply of college graduates and the U.S. college/high school premium, 1963–2012

A. College share of hours worked (%), 1963–2012: All working-age adults

B. College versus high school wage gap (%)

- Measured Gap
- Predicted by Supply-Demand Model
The supply of college graduates and the U.S. college/high school premium, 1963–2012

College share of hours worked (%). 1963–2012:
All working-age adults

A

50 percent

College versus high school wage gap (%)

B

105 percent

100 percent

95 percent

90 percent

85 percent

80 percent

75 percent

70 percent

65 percent

60 percent

55 percent

50 percent

45 percent

40 percent

35 percent

30 percent

25 percent

20 percent

15 percent


Measured Gap

Predicted by Supply-Demand Model
Fact 5: links between inequality, HC and social mobility
Earnings inequality and economic mobility: cross-national relationships

Generational earnings elasticity (higher values imply lower mobility)

A

B

Income inequality (more inequality →)

College earnings premium (men 25 to 34)
Earnings inequality and economic mobility: cross-national relationships

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Part 2
The determinants of Human Capital investment
Human Capital is endogenous

- Back to the supply/demand story:
  - Increase in demand for HC, due to various factors:
    - technical progress
    - international trade
    - etc.
  - What about supply?
  - Demand for higher education: gender-specific patterns
  - In the US...
  - ... and worldwide
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Demand for college education: worldwide

- Remarkable increase in female education, labor supply, incomes worldwide during the last decades.

Source: Becker-Hubbard-Murphy 2009
The ‘Gender Puzzle’

Figure 13: Completed Education by Sex, Age 30-40, US 1968-2005

→ how can we explain these striking differences?
Why do individuals invest in HC?

- Standard answer: investment in HC generates benefits received on the labor market (‘college premium’)

  - More recent answer (CIW AER 2009): additional benefits received on the marriage market

  - Additional benefits from more education: changes in marriage probability and their allocation between spouses

  - Marriage-market benefits (the ‘marital college premium’): have been largely neglected and their evolution markedly differs across genders, which may influence investment behavior.
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Economic Models of the Household

Two components

1. Model of household behavior: economic gains to marriage

Marriage generates a 'gain' (or a 'surplus') that can be shared between spouses. Two main sources of this surplus, both linked to 'domestic production' (Becker):

- Specialization (chores, etc.)
- Fertility
- Investment in children's Human Capital

... and a few others (risk sharing, savings, etc.) - plus non-economic aspects!

2. Model of household formation: who marries whom and why?

Basic insights:

- The gains are couple-specific
- Therefore, their nature impacts matching ('Who marries whom?')...
- ...but also how the surplus is allocated...
- ...which in turn influences investment in HC
Two components

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  - Marriage generates a ‘gain’ (or a ‘surplus’) that can be shared between spouses

- Model of household formation: who marries whom and why?
  - Gains are couple-specific
  - Impacts matching ('Who marries whom?')
  - Allocated surplus influences investment in human capital
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Inequality and Human Capital

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As a result, the structure of household production has drastically changed

- ‘Traditional’ patterns (chores and specialization) less important (‘engines of liberation’, Greenwood et al 2005)
- Human capital production more and more crucial, particularly at the top of the distribution
A possible story (CSW 2016)

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Significant impact on motivations for marriage:

- Additional incentives for assortative matching (especially at the top)
- ... which impacts the Marital College Premium in gender-specific ways.
Predictions of the model (CSW, AER 2016)

- Regarding time use:
  - Total time spent on chores decreases ...
    - particularly for women (may increase for men)
  - Time spent on children increases for both parents ...
    - but especially for the father
- Regarding matching patterns:
  - Increased tendency towards assortative matching...
    - especially at the top of the distribution
- Regarding incentives to invest:
  - The 'marital college premium' increases for women, but may decrease for men which may explain the observed asymmetries between genders!
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Results

1. Time use
2. Matching patterns
3. Marital college premium
### Table 1: Time use (Source: Browning, Chiappori and Weiss 2015)

<table>
<thead>
<tr>
<th></th>
<th>USA</th>
<th>Canada</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic chores</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married men, child 5-17</td>
<td>1.18</td>
<td>1.52</td>
<td>1.56</td>
</tr>
<tr>
<td>Married women, child 5-17</td>
<td>3.63</td>
<td>2.83</td>
<td>4.55</td>
</tr>
<tr>
<td>Married men, child &lt; 5</td>
<td>1.10</td>
<td>1.38</td>
<td>1.83</td>
</tr>
<tr>
<td>Married women, child &lt; 5</td>
<td>3.67</td>
<td>2.64</td>
<td>4.79</td>
</tr>
<tr>
<td>Child care</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>0.57</td>
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<tr>
<td>Married men, child &lt; 5</td>
<td>0.40</td>
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#### 6.2 Testing the models

Next, we come to the core of our contribution; that is, we test and estimate the matching models described above.

##### 6.2.1 Tests of the benchmark model

We start with the benchmark model, tested on the white population. Recall our prediction that each of 16 $T$-dimensional vectors $d_{I,K,L}^{J,K,L} = (d_{I,K,L}^{J,K,L}, c = 1, ..., T)$ be constant. These requirements can readily be checked on the data. Here we take reference categories to be $K = L = 3$ and we plot the $d_{I,33}^{J,K,L}$ demeaned over cohorts. Figure 13 shows the graphs corresponding to the “diagonal” elements $d_{I,33}^{J,K,L}, I = 1, 2, 4, 5$ of assortatively matched white couples. Under the null, the blue curve (and the dashed smoothed blue curve) should be identically 0; the dotted curves give the 95% confidence band. The property is clearly violated for college and college-plus educated pairs, for which the trend is clearly ascending. This suggests an increase in assortativeness, at least for the more educated fraction of the population.

Altogether, the graphs suggest that the benchmark model is rejected by the data. The formal test described in section 5.1 has 432 degrees of freedom, and gives a $\chi^2$ statistic of 1579.5, way above the 5% critical value of 481.5 (the $p$-value is $3e^{-130}$).

We also estimate and test the version allowing for age differences. The conclusions are similar: when we average errors over age differences as discussed above, the $\chi^2$ statistic has value 1526.5 with 405 degrees of freedom, while the 5% critical value is 452.9, leading to a $p$-value that the computer cannot distinguish from 0.

Our findings are totally different for black couples. Given the much smaller sample size, especially for higher education, we only use four education cate-
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Source: Browning, Chiappori, and Weiss (2014).

Figure 14. Average Minutes Spent Daily in Developmental Child Care, United States

Source: Altintas (2016).
Basic issue: ‘Increase in assortativeness’ (educated people are more likely to marry their own now than in the past)

- Not easy to establish
Matching patterns

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- A structural model is needed ...
- ... but its conclusions are unambiguous: spectacular increase in preferences for assortativeness, particularly at the top of the distribution
Figure 2: Comparing partners in white couples
on the probability of getting married for women, but not for men. This gender difference has largely disappeared in recent cohorts: college-plus women now marry as much as college graduates, and much more than high school-educated women.

Figures 4 and 5 describe marital patterns by education. They show that college-educated men are now much less likely to “marry down” (about 25 percent, against 50 percent for men born in the early 1940s). The pattern for women
Figure 4: Marriage patterns of white men who marry
Figure 5: Marriage patterns of white women who marry
Figure 18: Excess premia of white women
Conclusion: the ‘inequality spiral’

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Unlike the labor market college premium, the evolution of this 'marital college premium' differs across genders - which can explain differences in investment.

‘Inequality spiral’: high HC people intermarry and invest a lot on children’s HC, even more heterogeneity in HC for the next generation. Therefore: (even) less intergenerational mobility of opportunities.

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