What Are Unique about China’s Inequality?

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Contexts

• High growth rate: 10% a year for 30+ years
• A large country with differences in many dimensions
• We are not in equilibrium yet: people are still moving around
Contexts

• Economic transition: from plan to market
  – From equality to inequality when human capital and efforts are rewarded (Heckman and Li, 2005; Zhang et al., 2005)
  – How much of the gap is due to productivity gap?
Rising returns to education

- Left: Returns to years of schooling
- Right: Returns to college education (versus high school)
Contexts

• Economic transition: from plan to market
  – There are many shocks (reforms)
Why do we care about shocks?

- Luck plays an important role
- Example: housing reforms since 1998, then house price started to shoot up
- So, when you are born is important in China!

Research questions:
- How much of the inequality is due to cohort income gap?
- What are the inter-generational implications?
- Inequality of labor vs. non-labor income?
Contexts

• Economic transition: from plan to market
  – Reforms unfinished yet
Unfinished reforms

• The state and state-owned enterprises (SOEs) are still powerful, monopoly many resources in China

• Inequality in access to public goods, or markets (health, education, finance, employment...)

• Implications: some people earn rents that shouldn’t exist in a market economy
Policy wise

• Productivity difference: rewards should be encouraged
  – Policies should target on reducing inequality in human capital (how to measure it?)
• Luck: should be taxed, but how?
• Rents: should be removed... can privatization help?
Contexts

• Economic development
  – industrialization with lagging urbanization due to the unique *hukou* policy
Industrialization and inequality

• Should industrialization increase or reduce inequality?
• Industries have higher wages than agriculture, suppose we move one labor from agriculture to industries, how should Gini change?
Industrialization and inequality: ambiguous

**Figure 5.5** Crossing Lorenz Curves in the Modern-Sector Enlargement Growth Typology
Short-run vs long-run

• Myopic laborers
  – Short-run: high demand for low human capital workers, they enter the labor market too soon, and have low-level of education (inequality comes down)
  – Long-run: technology improves (Li et al. 2012 JEP), return to human capital increases (inequality goes up)

• Left-behind children due to hukou policy
  – Children are parentless: what are the implications? Inter-generational inequality will rise?

• Policy: pay the opportunity cost of staying in school
Contexts

• Economic development
  – Lower level of protection for workers (union, pension, insurance ...)

China’s Educational Inequality: Evidence from College Entrance Exams Scores and Admissions

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Tsinghua University
Education Inequality

- Related to Income, wealth, consumption
- Has inter-generational implications
  - Parental income affects child education
  - Parental education affects child achievement
College Entrance Exams (CEE)

To get into college, most students need to take the College Entrance Exams (CEE) on June 7-9

- Math
- Chinese
- English
- Composite (one of the two)
  - Sciences
  - arts/social sciences

Fate-determining exams for Chinese
Applications and Admissions

- Before/after the exams (before/after scores known), students need to fill in their
  - college preferences in order
  - Major preferences in order
- Scores are known
- Each college sends an admission team to every province (where it has admission quotas)
- The quotas and distribution are ultimately set by the Ministry of Education, but colleges have some freedom
Data: CEE Takers in 2003

- The population of all CEE takers
  - 6.2 million students in 2003
- Information
  - Exam takers: high school name, location, hukou, birth date, gender, ethnicity, health status, repeating taker, science, scores of College Entrance Exams (CEE)...
  - Admissions: university name, major
- Could get access more years potentially
Two categories of higher education
- Colleges (2-3 years)
- Universities (4 years)

Universities
- 985 universities (in May 1998, President Jiang’s speech: build world-class universities)
- 211 universities (21st century: invest in 100 universities)
- Other universities
985 Program

- Tier 1: to become top universities in the world
  - 2: Tsinghua University; Peking University
  - Funding: all from central government

- Tier 2: to become top universities in China, well known in the world
  - 10 universities
  - Funding: ½ from central, ½ from local

- Tier 3: to become well known universities in China and the world
  - 27 universities
  - Funding: ½ from central, ½ from local
# Rate of Admission in 2003

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of colleges</th>
<th>Number of students</th>
<th>Percent of the population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Admitted</td>
<td>0</td>
<td>1960199</td>
<td>0.316</td>
</tr>
<tr>
<td>College</td>
<td>1123</td>
<td>2424147</td>
<td>0.391</td>
</tr>
<tr>
<td>University</td>
<td>602</td>
<td>1365827</td>
<td>0.220</td>
</tr>
<tr>
<td>211 Universities</td>
<td>76</td>
<td>284212</td>
<td>0.046</td>
</tr>
<tr>
<td>985 Universities</td>
<td>29</td>
<td>138686</td>
<td>0.022</td>
</tr>
<tr>
<td>Top 9 Universities</td>
<td>7</td>
<td>26672</td>
<td>0.004</td>
</tr>
<tr>
<td>Top 2 Universities</td>
<td>2</td>
<td>6497</td>
<td>0.001</td>
</tr>
<tr>
<td>Total</td>
<td>1839</td>
<td>6206240</td>
<td>1</td>
</tr>
</tbody>
</table>
Major Allocation

Percentage for Each Major

- Engineering: 37%
- Art & Social Science: 19%
- Management: 18%
- Law: 4%
- Economics: 5%
- Medical: 7%
- Agriculture: 2%
- Education: 2%
- Mathematics: 2%
- Natural Science: 2%
- Economics: 5%
- Law: 4%
- Management: 18%
- Art & Social Science: 19%
- Education: 4%
- Agriculture: 2%
- Mathematics: 2%
- Natural Science: 2%
Percentile of CEE Scores by College Type

- Not Admitted: 0.387
- College: 0.399
- University: 0.724
- 211 univ: 0.849
- 985 univ: 0.924
- Top 9: 0.957
- Top 2: 0.977
Percentile of CEE Scores of Top 9 Universities

- Education: 0.756
- Art&SS: 0.903
- Law: 0.930
- Agriculture: 0.950
- Management: 0.963
- Medical: 0.973
- Engineer: 0.980
- Economics: 0.984
- Science: 0.984
- Maths: 0.985
Educational Inequality

- Gender bias
- Urban (rural) bias
- Income bias
- Home bias
性别差异——高考成绩

性别

Total Grade Math Chinese English

Percentile of CEE Scores: Female vs. Male

男

女

0.497  0.504  0.507  0.532  0.553

0.491  0.476  0.460  0.500  0.500

5.00  5.20  5.40  5.60

5.00  5.20  5.40  5.60
Gender Bias

- % of females among students in top 10%
- % of females among students in top 5%
- % of females among students in top 1%
Proportion of Females by University Type

- Not Admitted: 0.384
- College: 0.489
- University: 0.453
- 211 univ: 0.410
- 985 univ: 0.337
- Top 9: 0.335
- Top 2: 0.381

Gender Bias

Not Admitted: College University 211 univ 985 univ Top 9 Top 2
Gender Bias

- % of females among students in top 10%
- % of females among students in top 5%
- % of females among students in top 1%

Proportion of Females by Major

<table>
<thead>
<tr>
<th>Major</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineer</td>
<td>0.289</td>
</tr>
<tr>
<td>Science</td>
<td>0.426</td>
</tr>
<tr>
<td>Agriculture</td>
<td>0.432</td>
</tr>
<tr>
<td>Maths</td>
<td>0.483</td>
</tr>
<tr>
<td>Law</td>
<td>0.501</td>
</tr>
<tr>
<td>Management</td>
<td>0.514</td>
</tr>
<tr>
<td>Economics</td>
<td>0.525</td>
</tr>
<tr>
<td>Education</td>
<td>0.533</td>
</tr>
<tr>
<td>Medical</td>
<td>0.611</td>
</tr>
<tr>
<td>Art&amp;SS</td>
<td>0.671</td>
</tr>
</tbody>
</table>
Educational Inequality

- Gender bias
- Urban (rural) bias
- Income bias
- Home bias
**Hukou Bias (CEE Scores)**

<table>
<thead>
<tr>
<th></th>
<th>Rural</th>
<th>Urban</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Scores</td>
<td>0.493</td>
<td>0.506</td>
</tr>
<tr>
<td>Math</td>
<td>0.484</td>
<td>0.513</td>
</tr>
<tr>
<td>Chinese</td>
<td>0.489</td>
<td>0.512</td>
</tr>
<tr>
<td>English</td>
<td>0.490</td>
<td>0.512</td>
</tr>
<tr>
<td>Composite</td>
<td>0.489</td>
<td>0.512</td>
</tr>
</tbody>
</table>

**Percentile of CEE Scores: Rural vs. Urban**

- Urban: 0.512
- Rural: 0.512
Proportion of Rural among Top Students

- Top 1%:
  - Science: 0.362
  - Art & SS: 0.387

- Top 5%:
  - Science: 0.442
  - Art & SS: 0.453

- Top 10%:
  - Science: 0.479
  - Art & SS: 0.483
Proportion of Rural Students by University Type

- Not Admitted: 0.574
- College: 0.524
- University: 0.491
- 211 univ: 0.430
- 985 univ: 0.385
- Top 9: 0.293
- Top 2: 0.181

Hukou (urban) Bias

Rates of Rural Students
Educational Inequality

- Gender bias
- Urban (rural) bias
- Income bias
- Home bias
Income Bias

- Children from rich families
  - Repeat exam takers (only once a year)
  - Go to elite high schools
CEE Scores: First Time vs. Repeating Students

- **Total Scores**
  - First Time: 0.477
  - Repeating: 0.579

- **Math**
  - First Time: 0.476
  - Repeating: 0.579

- **Chinese**
  - First Time: 0.486
  - Repeating: 0.546

- **English**
  - First Time: 0.485
  - Repeating: 0.550

- **Composite**
  - First Time: 0.488
  - Repeating: 0.553
Income Bias

- Children from rich families
- Repeat exam takers (only once a year)
- Go to elite high schools
Number of High Schools in a Province

<table>
<thead>
<tr>
<th>Province</th>
<th>Number of High Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hainan</td>
<td>111</td>
</tr>
<tr>
<td>Ningxia</td>
<td>118</td>
</tr>
<tr>
<td>Qinghai</td>
<td>153</td>
</tr>
<tr>
<td>Guizhou</td>
<td>327</td>
</tr>
<tr>
<td>Tianjin</td>
<td>390</td>
</tr>
<tr>
<td>Jilin</td>
<td>141</td>
</tr>
<tr>
<td>Shanghai</td>
<td>401</td>
</tr>
<tr>
<td>Chongqing</td>
<td>403</td>
</tr>
<tr>
<td>Yunnan</td>
<td>426</td>
</tr>
<tr>
<td>Inner Mongolia</td>
<td>450</td>
</tr>
<tr>
<td>Gansu</td>
<td>473</td>
</tr>
<tr>
<td>Beijing</td>
<td>538</td>
</tr>
<tr>
<td>Guangxi</td>
<td>540</td>
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<tr>
<td>Xinjiang</td>
<td>552</td>
</tr>
<tr>
<td>Heilongjiang</td>
<td>617</td>
</tr>
<tr>
<td>Shaanxi</td>
<td>643</td>
</tr>
<tr>
<td>Jiangxi</td>
<td>645</td>
</tr>
<tr>
<td>Shanxi</td>
<td>655</td>
</tr>
<tr>
<td>Fujian</td>
<td>656</td>
</tr>
<tr>
<td>Zhejiang</td>
<td>679</td>
</tr>
<tr>
<td>Liaoning</td>
<td>685</td>
</tr>
<tr>
<td>Hubei</td>
<td>728</td>
</tr>
<tr>
<td>Shandong</td>
<td>764</td>
</tr>
<tr>
<td>Hebei</td>
<td>792</td>
</tr>
<tr>
<td>Anhui</td>
<td>856</td>
</tr>
<tr>
<td>Sichuan</td>
<td>899</td>
</tr>
<tr>
<td>Jiangsu</td>
<td>1001</td>
</tr>
<tr>
<td>Hunan</td>
<td>1145</td>
</tr>
<tr>
<td>Henan</td>
<td>1171</td>
</tr>
<tr>
<td>Guangdong</td>
<td>1197</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1203</strong></td>
</tr>
</tbody>
</table>
High School Gini

- High school Gini coefficients for different level of colleges
- Eg: High school Gini for admission to Top-2 universities
  - Count the number of successful applicants of each high school
  - Calculate the Gini coefficients
## High School Gini: # Admitted

<table>
<thead>
<tr>
<th>Type (inclusive)</th>
<th>Gini Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>College</td>
<td>0.556</td>
</tr>
<tr>
<td>University</td>
<td>0.712</td>
</tr>
<tr>
<td>211 Universities</td>
<td>0.804</td>
</tr>
<tr>
<td>985 Universities</td>
<td>0.861</td>
</tr>
<tr>
<td>Top 9 Universities</td>
<td>0.929</td>
</tr>
<tr>
<td>Top 2 Universities</td>
<td>0.959</td>
</tr>
</tbody>
</table>
## Admissions from Top High Schools

<table>
<thead>
<tr>
<th>Type</th>
<th>Top 10% of high schools</th>
<th>Top 5% of high schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>College</td>
<td>0.365</td>
<td>0.222</td>
</tr>
<tr>
<td>University</td>
<td>0.510</td>
<td>0.318</td>
</tr>
<tr>
<td>211 Universities</td>
<td>0.664</td>
<td>0.456</td>
</tr>
<tr>
<td>985 Universities</td>
<td>0.764</td>
<td>0.565</td>
</tr>
<tr>
<td>Top 9 Universities</td>
<td>0.914</td>
<td>0.756</td>
</tr>
<tr>
<td>Top 2 Universities</td>
<td>1</td>
<td>0.858</td>
</tr>
</tbody>
</table>
Gini of High School Students Admitted by Universities

- Zhejiang: 0.71
- Yunnan: 0.69
- Guizhou: 0.69
- Shandong: 0.68
- Shanghai: 0.68
- Xinjiang: 0.68
- Ningxia: 0.68
- Beijing: 0.68
- Shaanxi: 0.68
- Jilin: 0.68
- Jiangsu: 0.67
- Fujian: 0.67
- Heilongjiang: 0.67
- Hainan: 0.66
- Gansu: 0.66
- Liaoning: 0.66
- Shanxi: 0.66
- Jiangxi: 0.66
- Tianjin: 0.66
- Qinghai: 0.66
- Sichuan: 0.66
- Hubei: 0.66
- Chongqing: 0.65
- Guangdong: 0.65
- Inner Mongolia: 0.65
- Shanxi: 0.7
- Guangxi: 0.7
- Hebei: 0.7
- Anhui: 0.7
- Henan: 0.76
Educational Inequality

- Gender bias
- Urban (rural) bias
- Income bias
- Home bias
Number of 985 Universities in a Province

985 Universities

Hebei, Shanxi, Inner Mongolia, Jiangxi, Henan, Guangxi, Hainan, Guizhou, Yunnan, Tibet, Qinghai, Ningxia, Xinjiang, Jilin, Heilongjiang, Zhejiang, Anhui, Fujian, Chongqing, Gansu, Tianjin, Liaoning, Jiangsu, Shandong, Hubei, Hunan, Guangdong, Sichuan, Shaanxi, Shanghai, Beijing.
# Local Admissions of Each Type

<table>
<thead>
<tr>
<th>Type (inclusive)</th>
<th>Percent of local admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>College</td>
<td>0.658</td>
</tr>
<tr>
<td>University</td>
<td>0.667</td>
</tr>
<tr>
<td>211 Universities</td>
<td>0.456</td>
</tr>
<tr>
<td>985 Universities</td>
<td>0.393</td>
</tr>
<tr>
<td>Top 9 Universities</td>
<td>0.388</td>
</tr>
<tr>
<td>Top 2 Universities</td>
<td>0.209</td>
</tr>
</tbody>
</table>
Home bias: Colleges of All Types

Successful Applicants in the Province (1,000)

Admissions by Colleges Located in the Province (1,000)
Summary

- Who have the largest chance to enter an (elite) college?
- They are
  - rich urban boys from elite high schools located in “good” provinces
- So, the College Entrance Exams may be fair, but admissions are not