Human Capital and China’s Future Growth

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China’s growth in last 40 years: 
A labor market perspective

A simple model

• GDP growth = labor growth + labor productivity growth

Li et al. (2017) Journal of Economic Perspectives
China’s growth in last 40 years: A labor market perspective

**Quantity**

- Labor force rose significantly (From 600 million to 1 billion; 60% of the population to 75%)
China’s growth in last 40 years: A labor market perspective

**Labor Market**

- Mobility and an emerging labor market
  - From rural to urban (share of labor in agriculture down from 70% to about 30%)
  - From the state to private sector (0 rose to 83%)
China’s growth in last 40 years:
A labor market perspective

Human Capital

• Education
  – Years of schooling (4.3 to 9.6 years)
  – High school graduates (6% to about 30%)
  – College education (1% to 12.5%)
The prospect looks different now

• **Quantity**: the labor force is declining
• **Labor market** is already there
  – Migration is slowing down
  – The labor market is quite efficient (State sector employs 17% of workers now)

• The only possibility: *Human Capital*
Income and education in 1980: A cross-country fit
Income and Education at the National Level

• National income per capita rises by 25% with each year of additional schooling
• This relationship is very stable over time
Income growth in the past from the perspective of human capital

• Growth toward the line: 65% of past growth
  – Better technology, more machinery
  – More efficient use of human capital
  – Higher quality of human capital

• Growth along the line: 40% of past growth
  – More human capital
Income and education in 2014: A cross-country fit
Income growth in 2015-2035

• Little growth toward the line, as China is already on the line (about 1% a year)
• Only growth along the line: by improving the level of education: how much a year?
Enrollment growth in 2015-2035

• How fast can the level of human capital improve?

• High school: optimistic assumptions
  – Urban enrollment: 100% by 2017
  – Rural enrollment: 100% by 2020 (yearly increase 13%)

• College enrollment: expands 5% a year
How fast can education improve?
Prediction for China 2015-2035

• Years of schooling for adults: rises by 1.7 years in 20 years to 10.7 years
• Use 10.7 to predict income in 2035, which is about USD 25,000
• Current income level: USD 14,000
Prediction for 2015-2035

• Income can grow at 3% annually
  – Because it takes time to raise the level of education of the labor force
Prediction for 2015-2035

• The growth rate of 7% a year is unlikely
  – If 7%, China’s income will reach US$ 55,000 (the level of US income now)

• Education level of the US labor force
  – High school 89%
  – College 44%
The high school gap 2015—% of high school in labor force
The high school gap 2015

High School: Adult Level and Child Enrollment

- Adult
- Enrollment

Rural | Urban
Policy: close the high school gap

• Rural governments
  – No resources (especially poor areas)
  – No incentives: no high school graduates return

• Urban schools
  – Don’t want to enroll migrant children

• Solution: central government
  – Centralize funding
  – funding follows enrollment
Education Inequality in China
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
Percentile of CEE Scores by College Type

- Not Admitted: 0.367
- College: 0.399
- University: 0.724
- 211 Univ: 0.849
- 985 Univ: 0.924
- Top 9: 0.957
- Top 2: 0.977
## Rate of Admissions 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>
Educational Inequality

- Urban (rural) bias
- Repeat exam takers bias
- Home bias
- Elite high schools bias
Educational Inequality

• Urban (rural) bias
• Repeat exam takers bias
• Home bias
• Elite high schools bias
CEE Scores: First Time vs. Repeating Students

<table>
<thead>
<tr>
<th>Subject</th>
<th>First Time</th>
<th>Repeating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Scores</td>
<td>0.477</td>
<td>0.579</td>
</tr>
<tr>
<td>Math</td>
<td>0.476</td>
<td>0.579</td>
</tr>
<tr>
<td>Chinese</td>
<td>0.486</td>
<td>0.546</td>
</tr>
<tr>
<td>English</td>
<td>0.485</td>
<td>0.550</td>
</tr>
<tr>
<td>Composite</td>
<td>0.488</td>
<td>0.553</td>
</tr>
</tbody>
</table>
Proportion of Repeating Exam Takers

- Not Admitted: 0.157
- College: 0.228
- University: 0.305
- 211 univ: 0.278
- 985 univ: 0.223
- Top 9: 0.115
- Top 2: 0.109
Educational Inequality

• Urban (rural) bias
• Repeat exam takers bias
• **Home bias**
• Elite high schools bias
Number of Colleges in a Province

0 50 100 150
College Count

Tibet 2
Hainan 10
Qinghai 10
Ningxia 12
Inner Mongolia 30
Xinjiang 32
Chongqing 35
Gansu 35
Yunnan 36
Guizhou 37
Tianjin 41
Jilin 43
Hebei 45
Fujian 50
Shanxi 56
Shanghai 67
Liaoning 71
Anhui 71
Jiangsu 72
Heilongjiang 73
Zhejiang 75
Beijing 77
Henan 77
Shaanxi 78
Hunan 79
Sichuan 83
Guangdong 93
Hebei 95
Shandong 95
Jiangsu 126
Shanghai 133
Number of 985 Universities in a Province

- Beijing: 8
- Shanghai: 4
- Sichuan, Guangdong, Shandong, Henan, Anhui, Heilongjiang, Zhejiang, Fujian, Chongqing, Gansu, Tianjin, Liaoning, Jiangsu, Shandong, Guizhou, Hubei, Hunan, Guangdong, Sichuan, Shaanxi, Henan: 2
- Hebei, Shanxi, Jiangxi, Heilongjiang, Zhejiang, Fujian, Chongqing, Gansu, Tianjin, Liaoning, Jiangsu, Shandong, Guizhou, Hubei, Hunan, Guangdong, Sichuan, Shaanxi, Henan: 1
- Other provinces: 0
## Admissions of Local Students

<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>
Educational Inequality

• Urban (rural) bias
• Repeat exam takers bias
• Home bias
• Elite high schools bias
Number of High Schools in a Province

- High School
  - Hainan
  - Ningxia
  - Qinghai
  - Guizhou
  - Tianjin
  - Jilin
  - Shanghai
  - Chongqing
  - Yunnan
  - Inner Mongolia
  - Gansu
  - Beijing
  - Guangxi
  - Xinjiang
  - Heilongjiang
  - Shaanxi
  - Jiangxi
  - Shanxi
  - Fujian
  - Zhejiang
  - Liaoning
  - Hubei
  - Shandong
  - Hebei
  - Anhui
  - Sichuan
  - Jiangsu
  - Hunan
  - Henan
  - Guangdong
Gini Coefficients for High School Education

- 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
## Gini Coefficients for High School (based on number of admissions)

<table>
<thead>
<tr>
<th>Type</th>
<th>Gini</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>
Summary

• Who has better chances to go to universities?
  – Students from urban area, rich families, elite high school and advantageous provinces

• The college entrance exam is not necessarily a pro-poor college admission mechanism
Policies

• Reform the college admission mechanism: the current admission mechanism far from equal, economically inefficient
China Employment Employee Survey (CEES)

• A general survey of matched firm-worker survey conducted in China for
  – Academic research in social sciences and business

• A platform for firm and worker survey and data
  – For researchers in China and around the world

• A think-tank
  – Policy research for better understanding and tracking China’s economy
CEES so far

• 2015 pilot in Guangdong province
  – 570 Firms; 4,794 Workers

• 2016 pilot in Guangdong and Hubei province
  – 1,121 Firms; 8,939 Workers
  – The Guangdong sample is a 2-year panel

• 2018 formal survey in 5 provinces
  – 3,000 Firms; 50,000 workers
CEES Founders

• Hong Cheng (IQDS, Wuhan University)
• Yang Du (Chinese Academy of Social Sciences)
• Hongbin Li (Tsinghua/Stanford)
• Albert Park (HKU of Science and Technology)
CEES Advisory Committee

- David Abowd (Cornell/US Census Bureau)
- David Autor (MIT)
- Nick Bloom (Stanford)
- Loren Brandt (Toronto)
- Hanming Fang (UPenn)
- Gordon Hanson (UCSD)
- Chris Pissarides (LSE)
- Mark Rosenzweig (Yale)
- Shangjin Wei (Columbia)
- Colin Xu (World Bank)
- And the 4 founders
Firm survey form

• Basic information
• Accounts (balance sheet, cash flow, asset/liability)
• External environment (tax, subsidy, finance, land etc.)
• CEO (human capital, political capital, family)
• Production (output, input, energy, machinery)
• Sales (domestic, export)
• Management (Nick Bloom’s management questions)
• Technology and innovation (R&D, patent, design)
• Product quality control (method, innovation)
• Personnel (human capital, compensation, turnover, contract, social security, labor protection)
Worker survey form

• Basic information
• Human capital (education, migration history)
• Family (spouse, children, parents)
• Health
• Current job (time, position, task, training, skills required, detailed compensations, promotion, family connections within firm, control right)
• Job history (previous job, first job)
• Welfare (social security, insurance, housing...)
• Management (Nick Bloom’s questions)
• Personality test
Report to the vice premier

Report to Wang Yang, the vice premium of China
# Response rates

<table>
<thead>
<tr>
<th>Year</th>
<th>Survey</th>
<th>Sample</th>
<th>Success</th>
<th>Response rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>Firms</td>
<td>634</td>
<td>570</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>4,988</td>
<td>4,794</td>
<td>96%</td>
</tr>
<tr>
<td>2016</td>
<td>Firms</td>
<td>1,338</td>
<td>1,121</td>
<td>84%</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>9,140</td>
<td>8,939</td>
<td>98%</td>
</tr>
</tbody>
</table>
Report to provincial leaders

Vice governor of Guangdong, Tong Xing
Report to provincial leaders

Vice governor of Hubei, Xu Kezheng
Responses from provincial leaders

• Signed by Hubei Governor, Wang Xiaodong

• This is a very valuable report, examining a critical issue.

• We should have special meetings to discuss these issues, reaching some policy conclusions.
Responses from provincial leaders

• Reports read and signed by Guangdong governor, Zhu Xiaodong
  – 4 vice governors
  – All important departments