Human Capital and China's Future Growth

Hongbin Li
James Liang Director of the China Program
Stanford Center on Global Poverty and Development
Senior Fellow of SIEPR
Stanford University

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

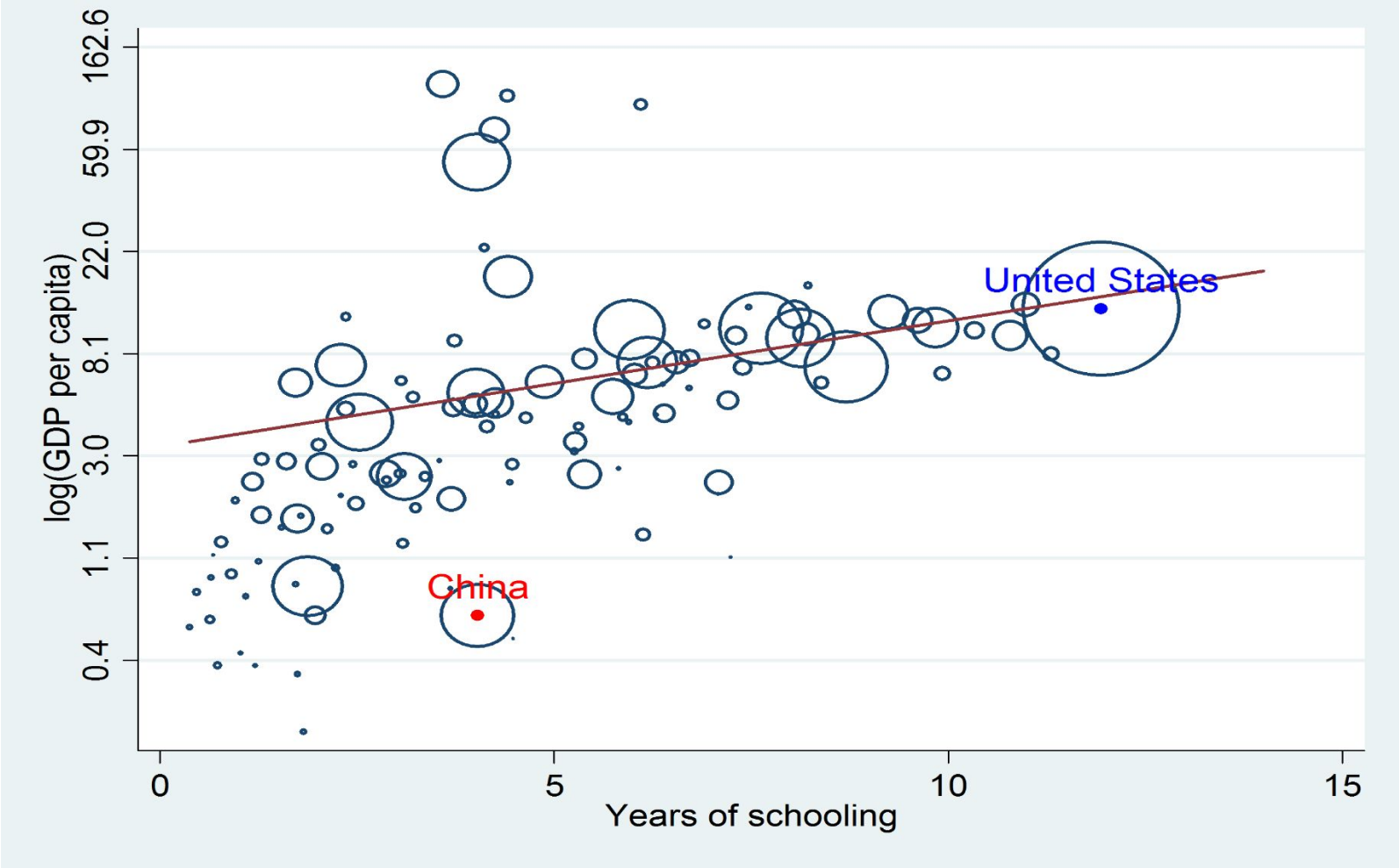
- Education
  - Years of schooling (4.3 to 9.6 years)
  - High school graduates (6% to about 30%)
  - College education (1% to 12.5%)

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)

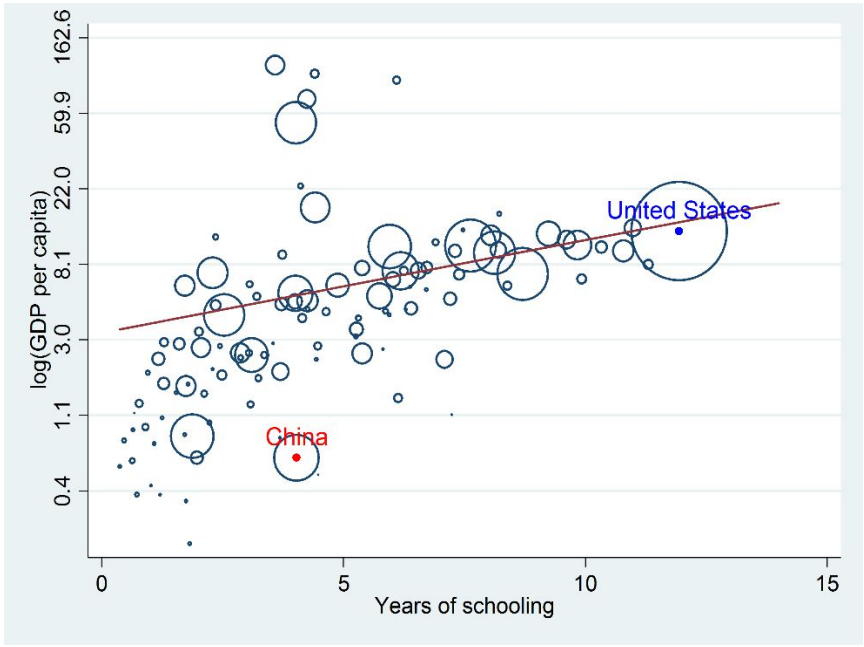
- The only possibility: ***Human Capital***

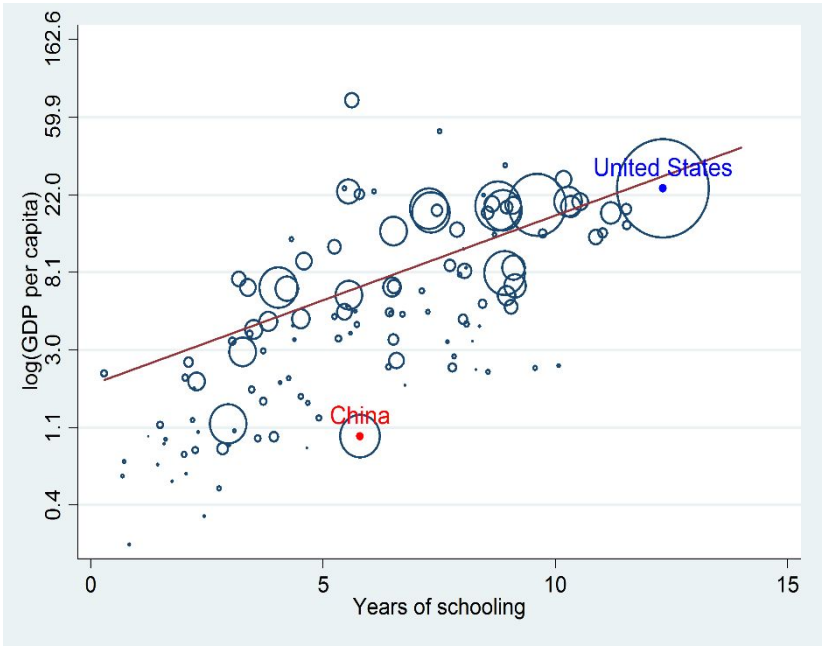
Income and education in 1980: A cross-country fit



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


log(GDP per capita)
0.4
1.1
3.0
8.1
22.0
59.9
162.6
United States
China
0
5
10
15
Years of schooling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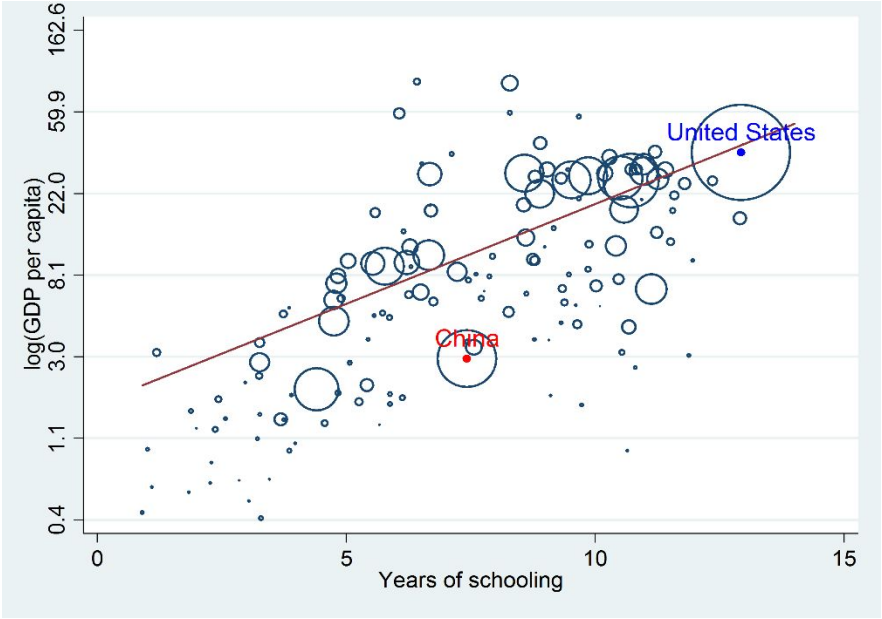
59.9
162.6
United States
China
0
5
10
15
Years of schooling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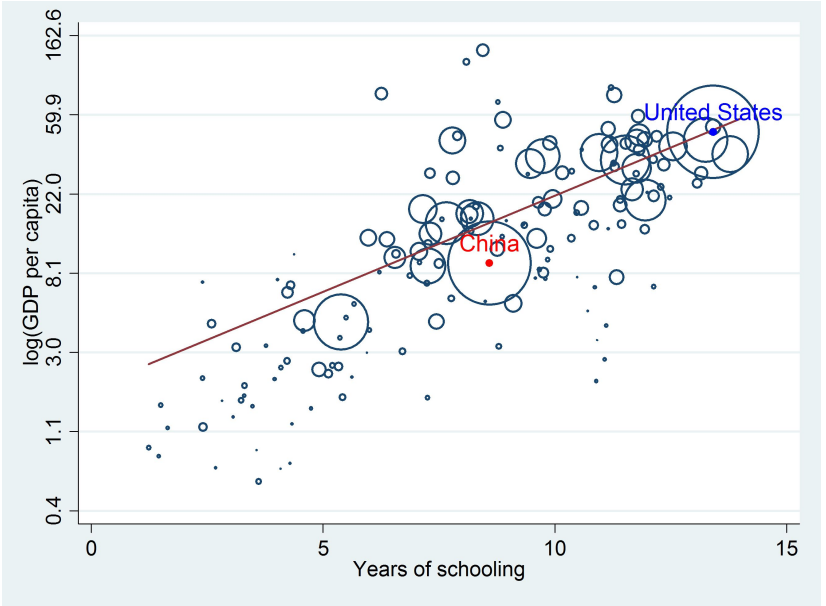
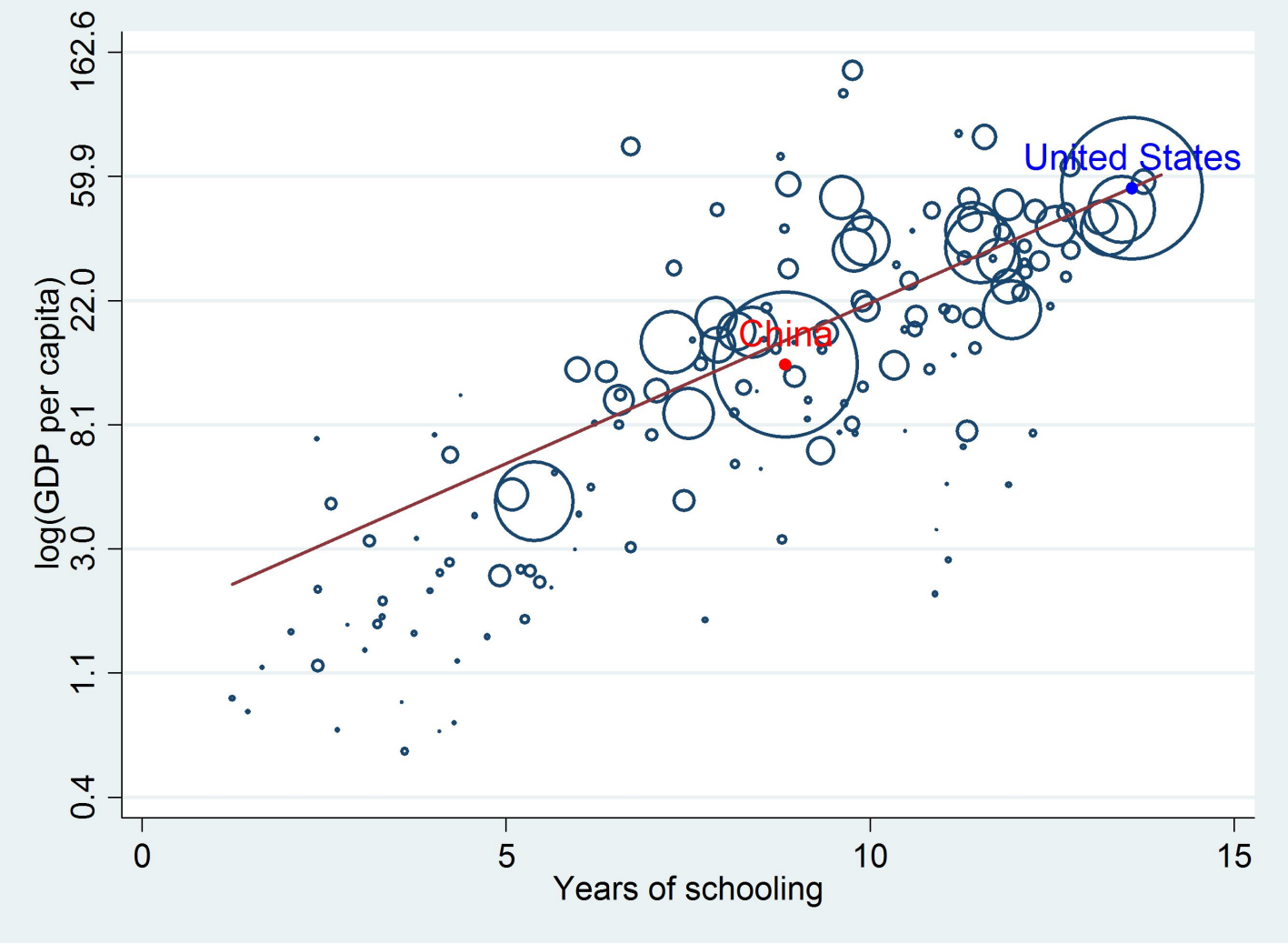
United States
China
0
5
10
15
Years of schooling


log(GDP per capita)
0.4
1.1
3.0
8.1
22.0
59.9
162.6
United States
China
0
5
10
15
Years of schooling

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



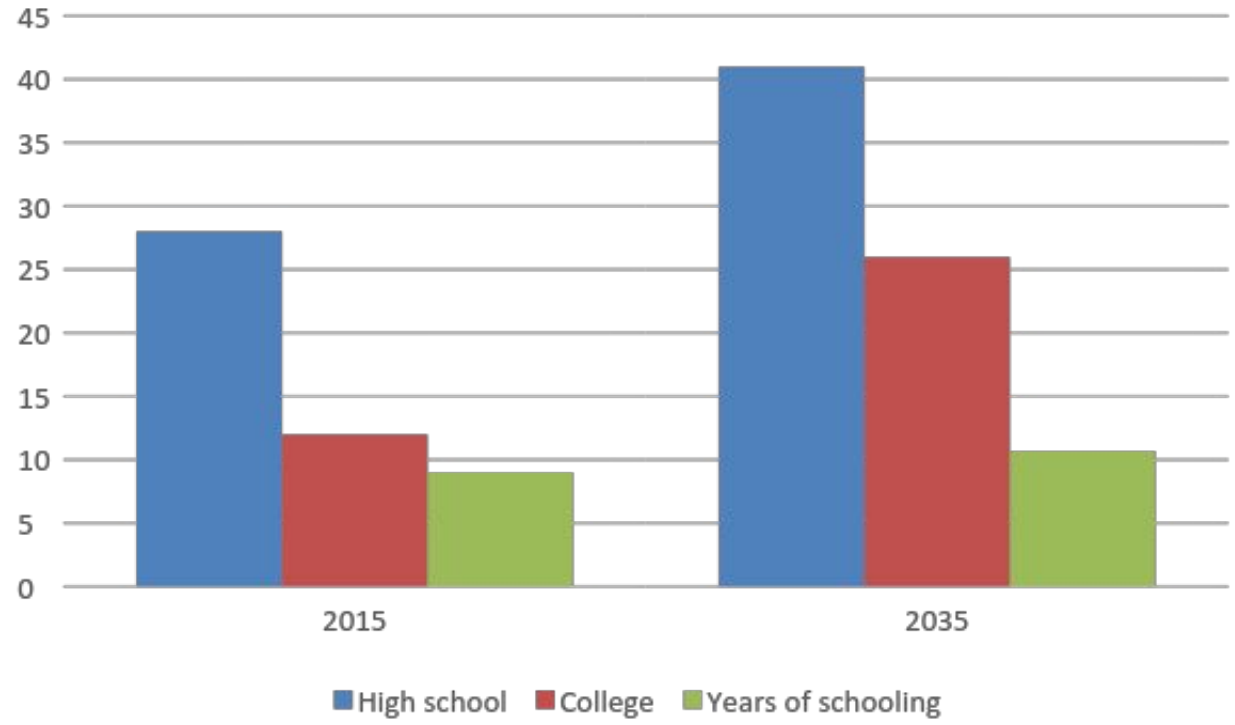
Income growth in 2015-2035

- 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

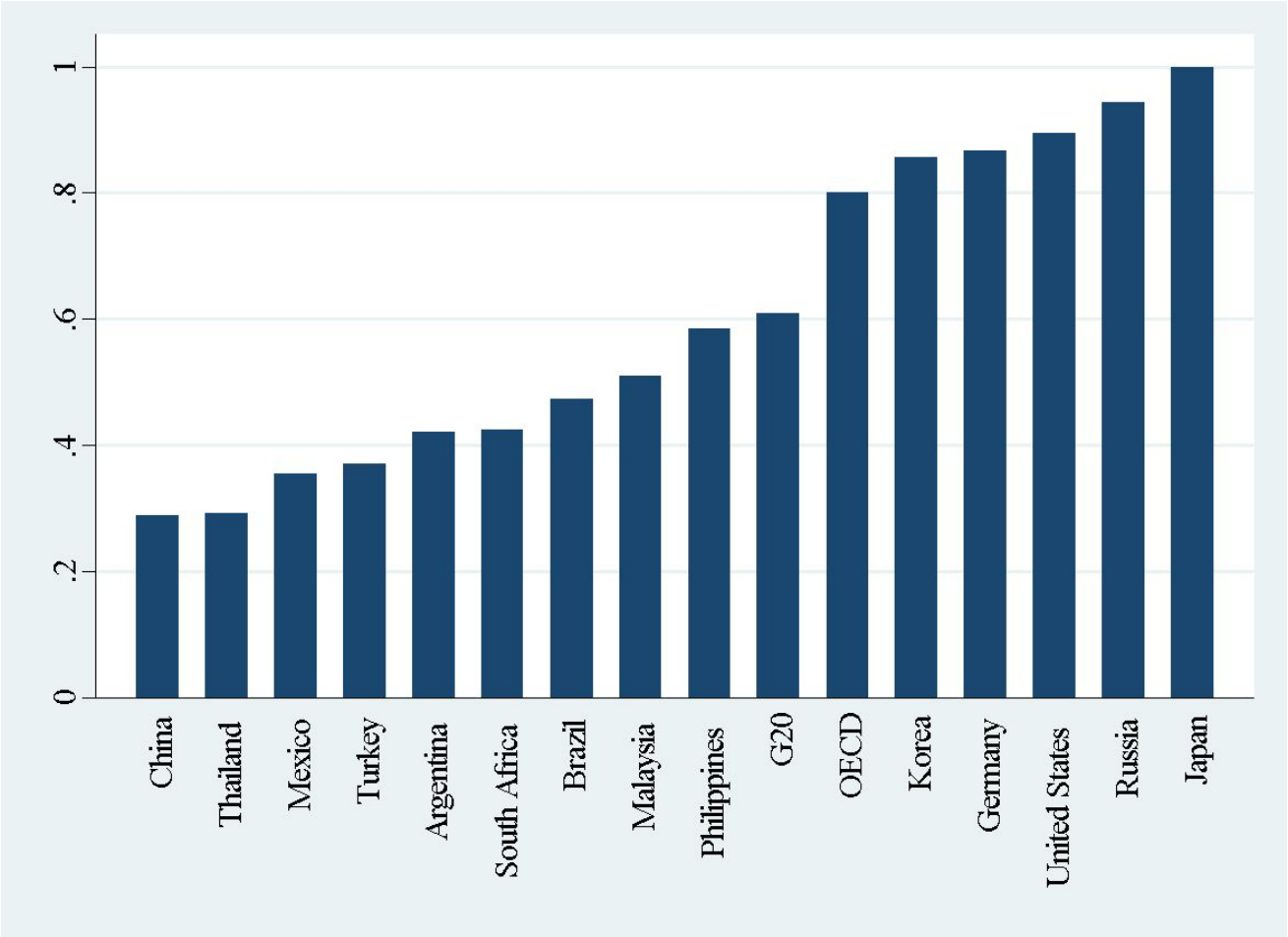
Prediction for 2015-2035

- Income can grow at ***3%*** annually
  - Because it takes time to raise the level of education of the labor force

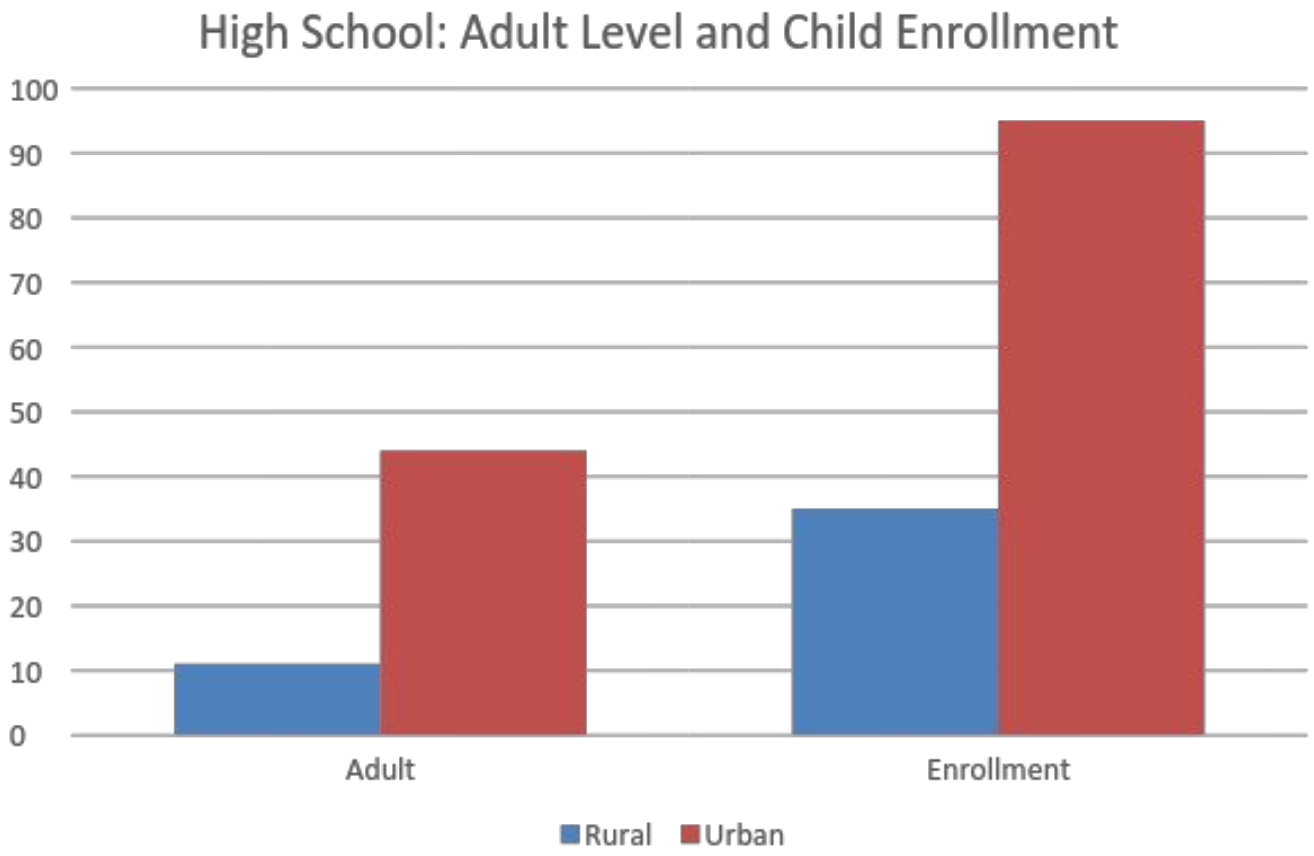
Prediction for 2015-2035

- 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



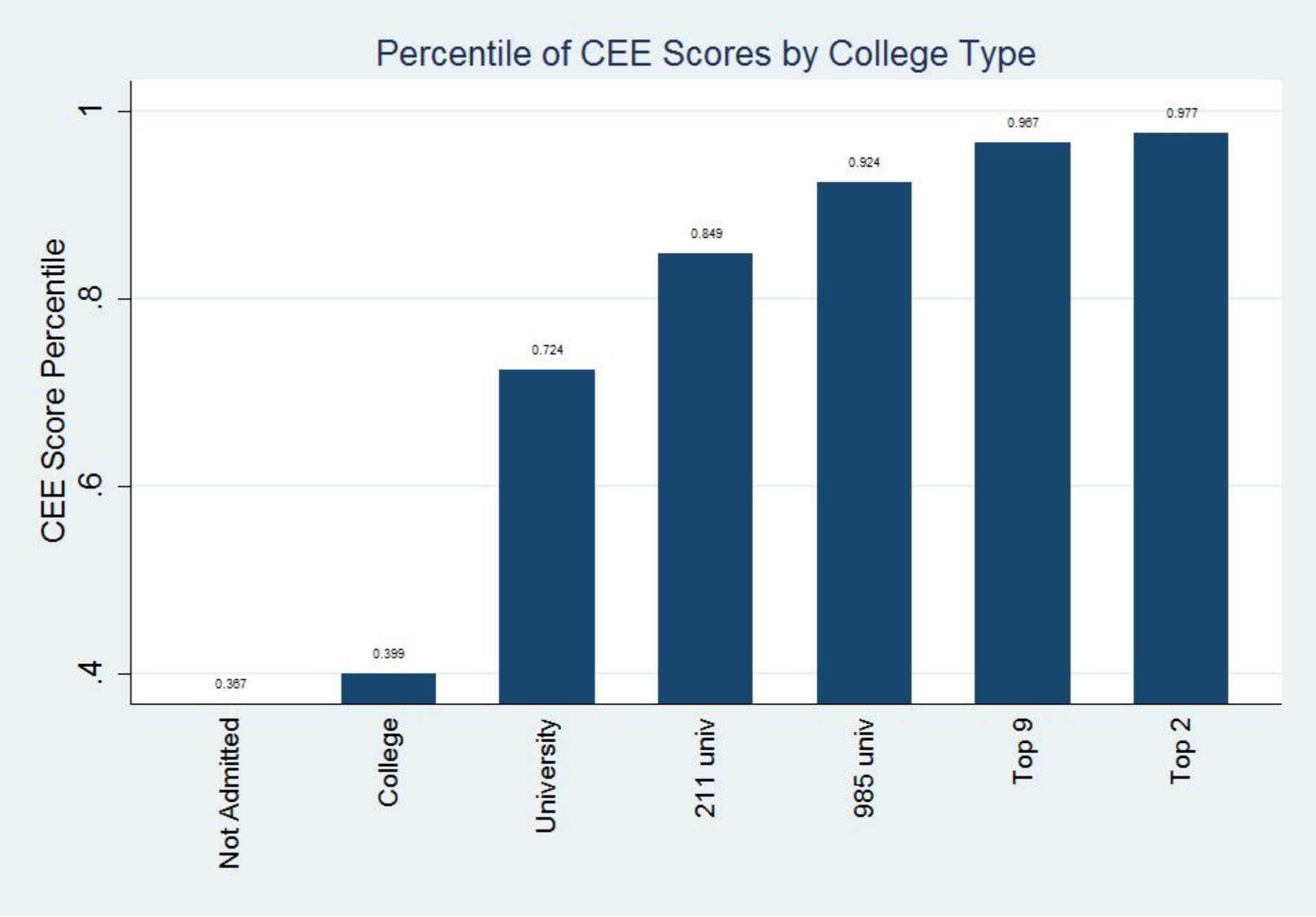
Policy: close the high school gap

- 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

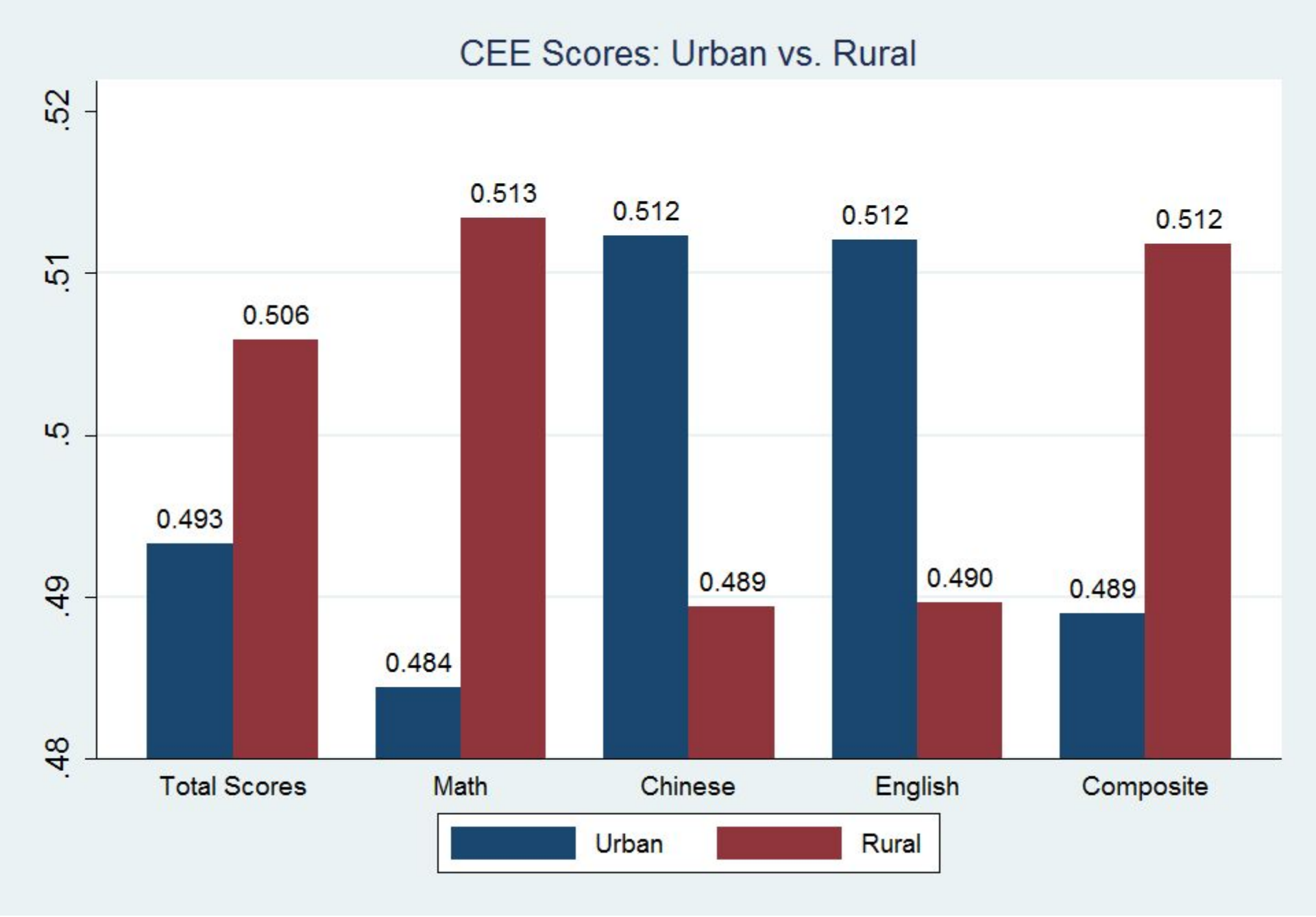

Percentile of CEE Scores by College Type
CEE Score Percentile
.4
.6
.8
1
0.367
0.399
0.724
0.849
0.924
0.967
0.977
Not Admitted
College
University
211 univ
985 univ
Top 9
Top 2

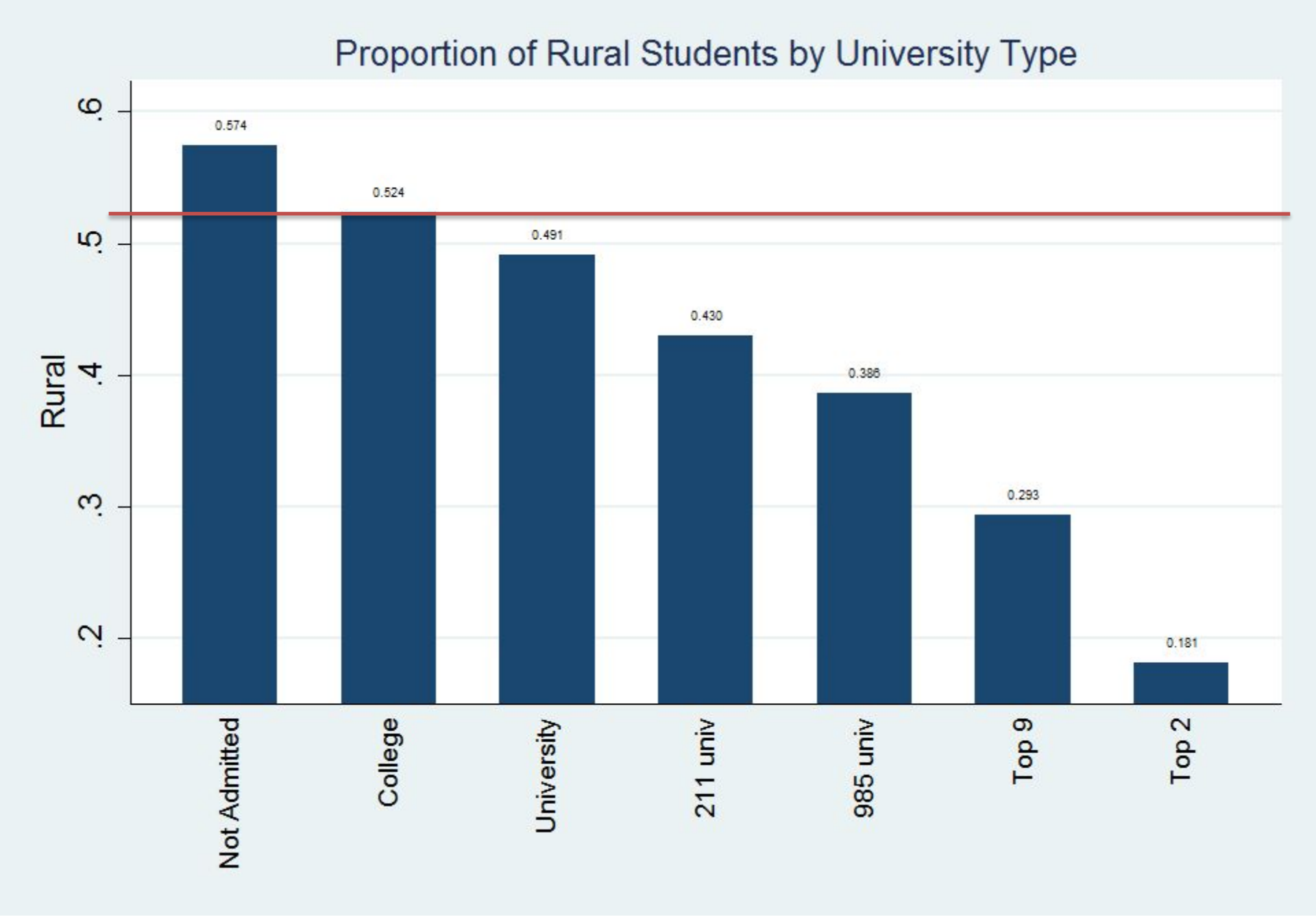
Rate of Admissions in 2003

Type	Number of colleges	Number of students	Percent of the population
Not Admitted	0	1960199	0.316
College	1123	2424147	0.391
University	602	1365827	0.220
211 Universities	76	284212	0.046
985 Universities	29	138686	0.022
Top 9 Universities	7	26672	0.004
Top 2 Universities	2	6497	0.001
Total	1839	6206240	1

Educational Inequality

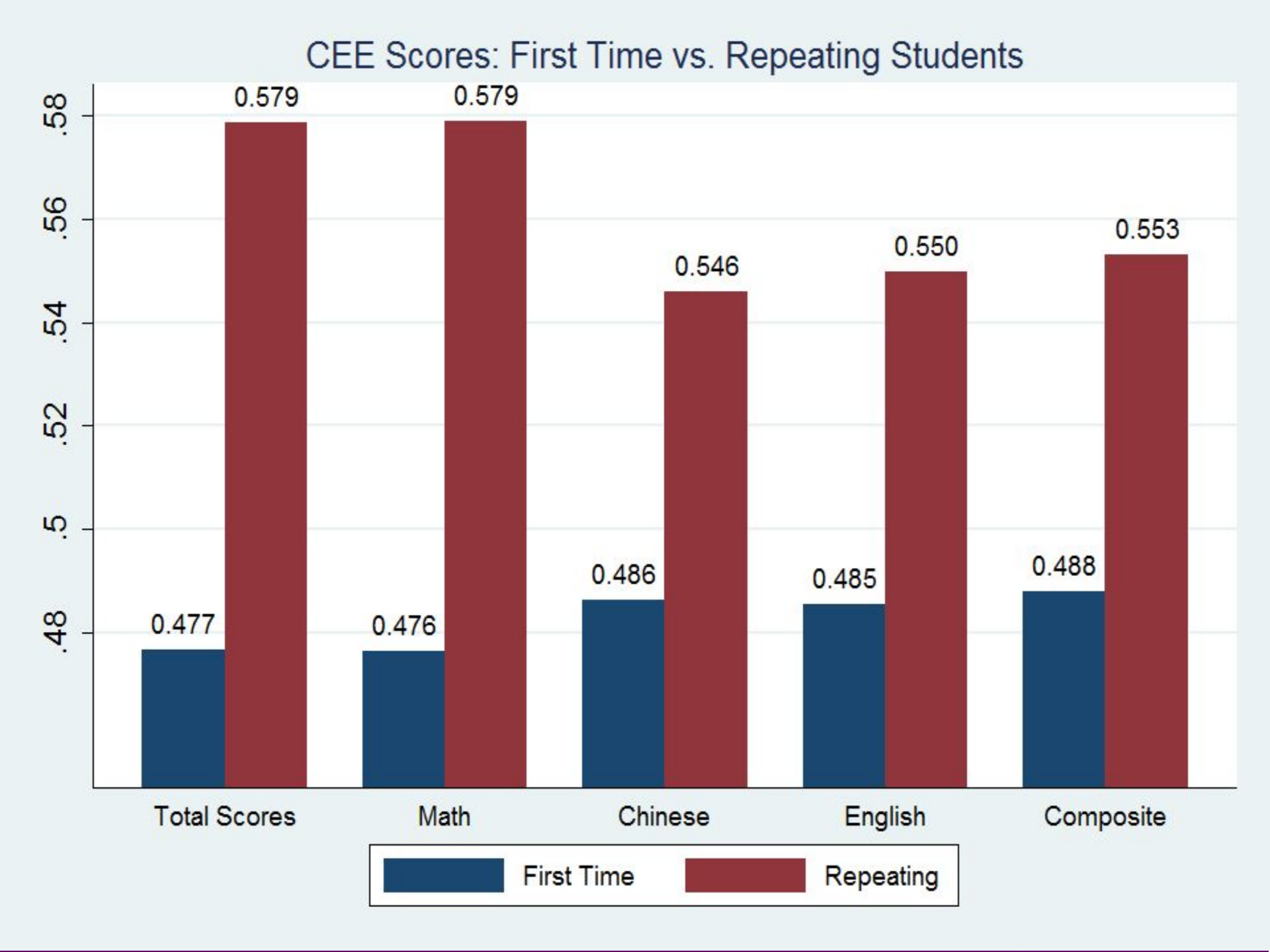
- **Urban (rural) bias**
- Repeat exam takers bias
- Home bias
- Elite high schools bias

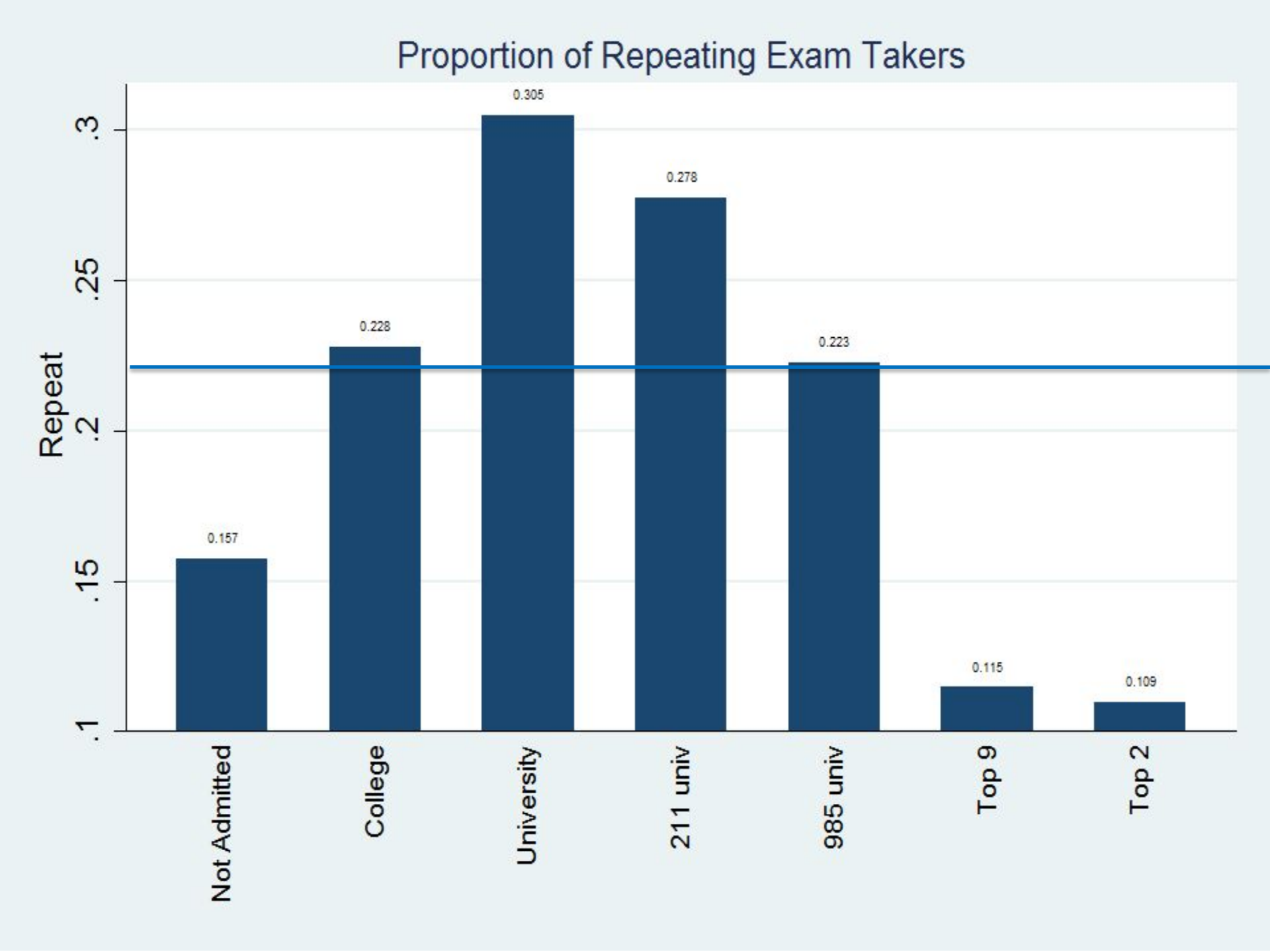

CEE Scores: Urban vs. Rural
.52
.51
.5
.49
.48
0.493
0.506
0.484
0.513
0.512
0.489
0.512
0.490
0.489
0.512
Total Scores
Math
Chinese
English
Composite
Urban
Rural


Proportion of Rural Students by University Type
Rural
.2
.3
.4
.5
.6
0.574
0.524
0.491
0.430
0.386
0.293
0.181
Not Admitted
College
University
211 univ
985 univ
Top 9
Top 2

Educational Inequality

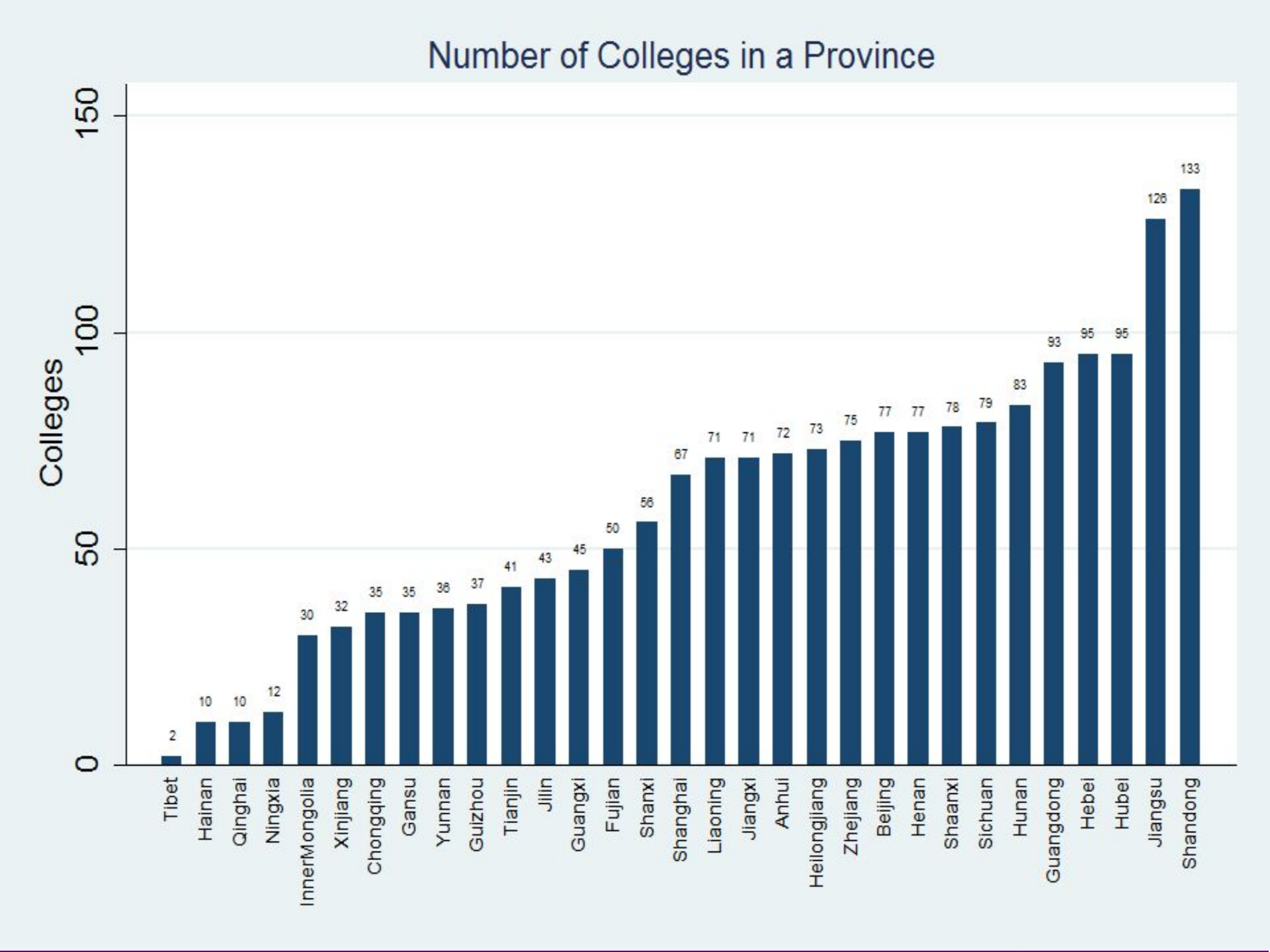
- Urban (rural) bias
- **Repeat exam takers bias**
- Home bias
- Elite high schools bias

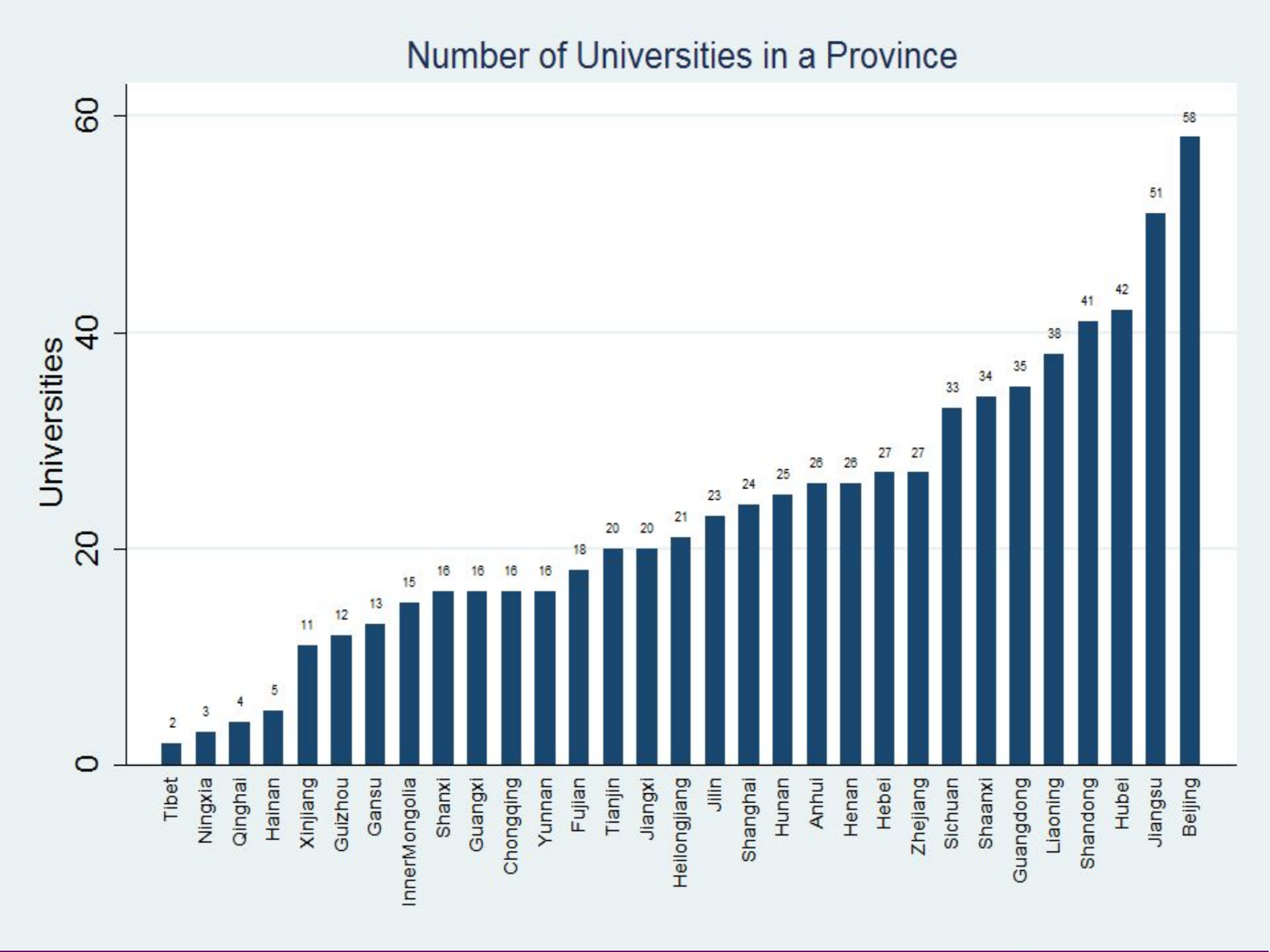

CEE Scores: First Time vs. Repeating Students
.48
.5
.52
.54
.56
.58
0.579
0.579
0.546
0.550
0.553
0.477
0.476
0.486
0.485
0.488
Total Scores
Math
Chinese
English
Composite
First Time
Repeating

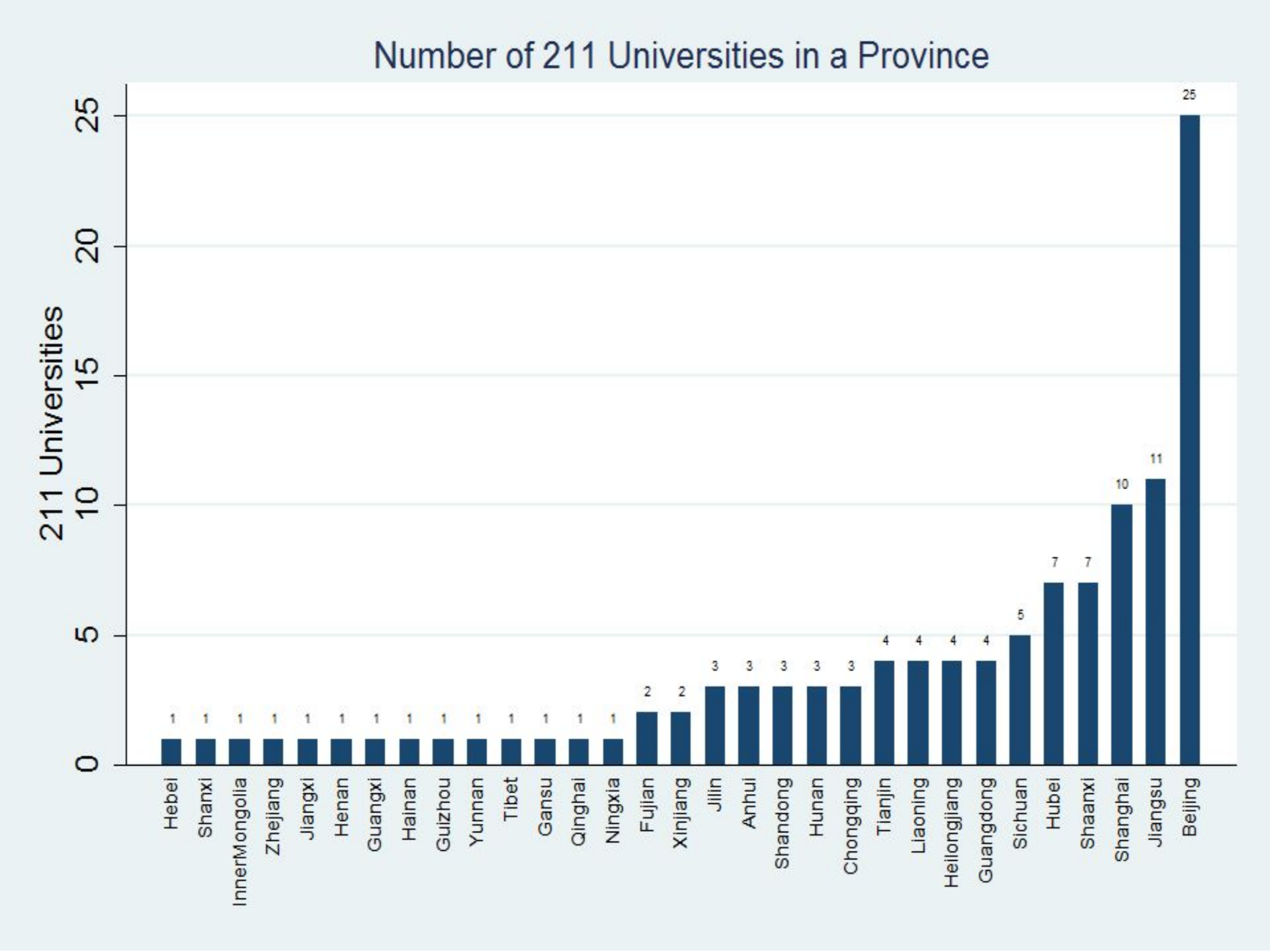

Proportion of Repeating Exam Takers
Repeat
.1
.15
.2
.25
.3
0.157
0.228
0.305
0.278
0.223
0.115
0.109
Not Admitted
College
University
211 univ
985 univ
Top 9
Top 2

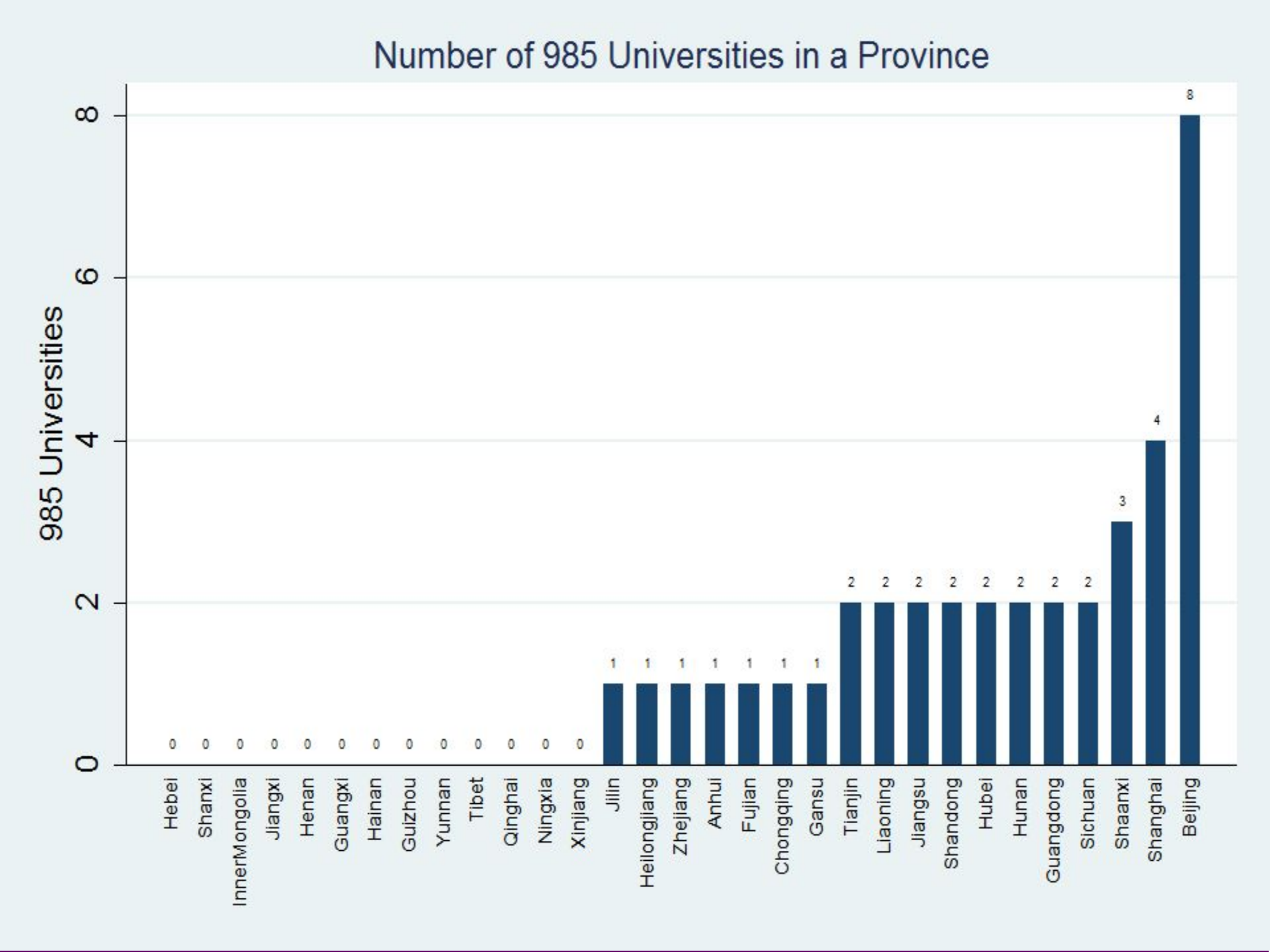
Educational Inequality

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


Number of Colleges in a Province
Colleges
0
50
100
150
2
10
10
12
30
32
35
35
36
37
41
43
45
50
56
67
71
71
72
73
75
77
77
78
79
83
93
95
95
126
133
Tibet
Hainan
Qinghai
Ningxia
InnerMongolia
Xinjiang
Chongqing
Gansu
Yunnan
Guizhou
Tianjin
Jilin
Guangxi
Fujian
Shanxi
Shanghai
Liaoning
Jiangxi
Anhui
Heilongjiang
Zhejiang
Beijing
Henan
Shaanxi
Sichuan
Hunan
Guangdong
Hebei
Hubei
Jiangsu
Shandong

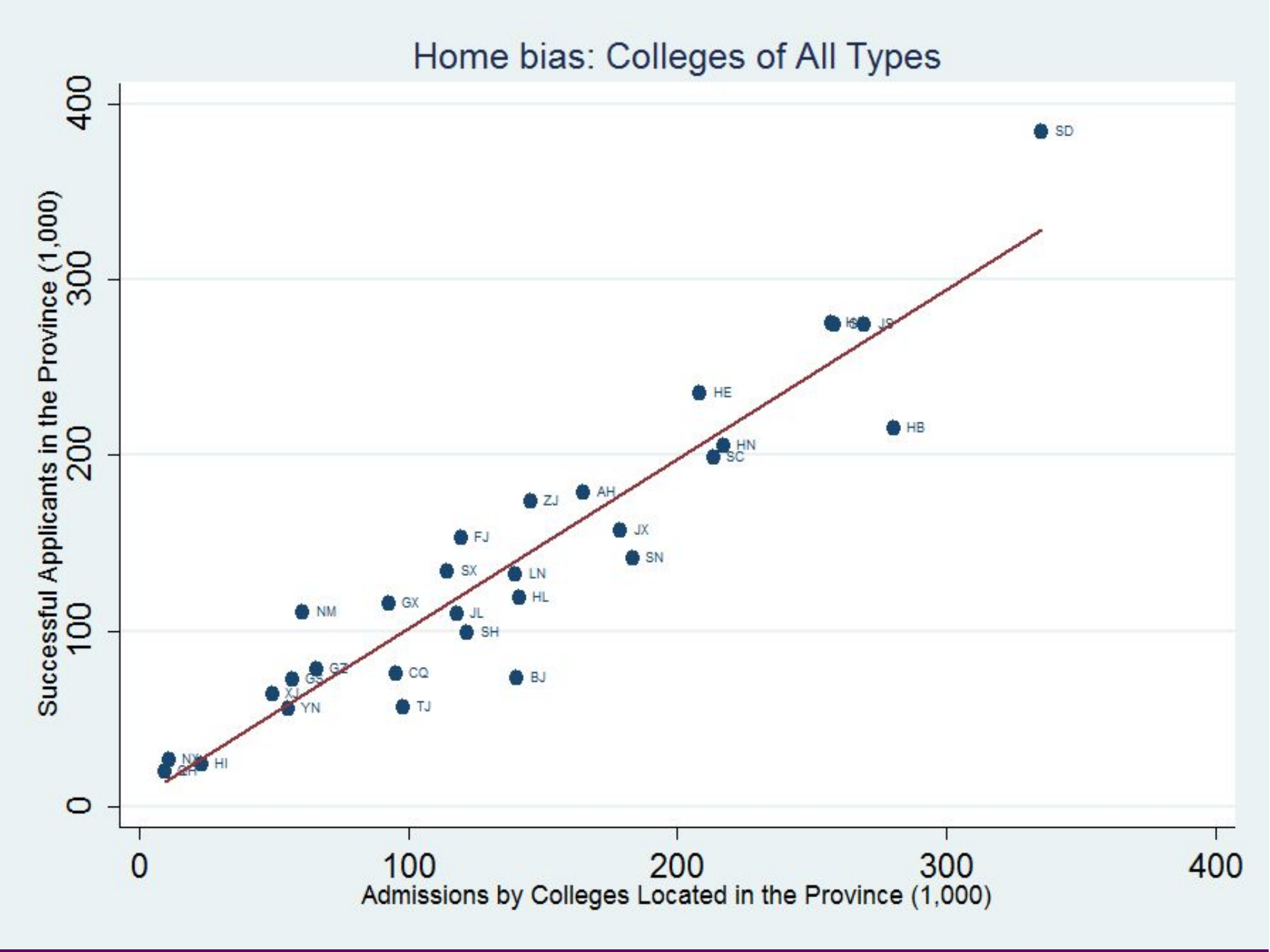

Number of Universities in a Province
Universities
0
20
40
60
Tibet 2
Ningxia 3
Qinghai 4
Hainan 5
Xinjiang 11
Guizhou 12
Gansu 13
InnerMongolia 15
Shanxi 16
Guangxi 16
Chongqing 16
Yunnan 16
Fujian 18
Tianjin 20
Jiangxi 20
Heilongjiang 21
Jilin 23
Shanghai 24
Hunan 25
Anhui 26
Henan 26
Hebei 27
Zhejiang 27
Sichuan 33
Shaanxi 34
Guangdong 35
Liaoning 38
Shandong 41
Hubei 42
Jiangsu 51
Beijing 58


Number of 211 Universities in a Province
211 Universities
0
5
10
15
20
25
1
1
1
1
1
1
1
1
1
1
1
1
1
1
2
2
3
3
3
3
3
4
4
4
4
5
7
7
10
11
25
Hebei
Shanxi
InnerMongolia
Zhejiang
Jiangxi
Henan
Guangxi
Hainan
Guizhou
Yunnan
Tibet
Gansu
Qinghai
Ningxia
Fujian
Xinjiang
Jilin
Anhui
Shandong
Hunan
Chongqing
Tianjin
Liaoning
Heilongjiang
Guangdong
Sichuan
Hubei
Shaanxi
Shanghai
Jiangsu
Beijing


Number of 985 Universities in a Province
985 Universities
0
2
4
6
8
0
0
0
0
0
0
0
0
0
0
0
0
1
1
1
1
1
1
1
2
2
2
2
2
2
2
2
3
4
8
Hebei
Shanxi
InnerMongolia
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

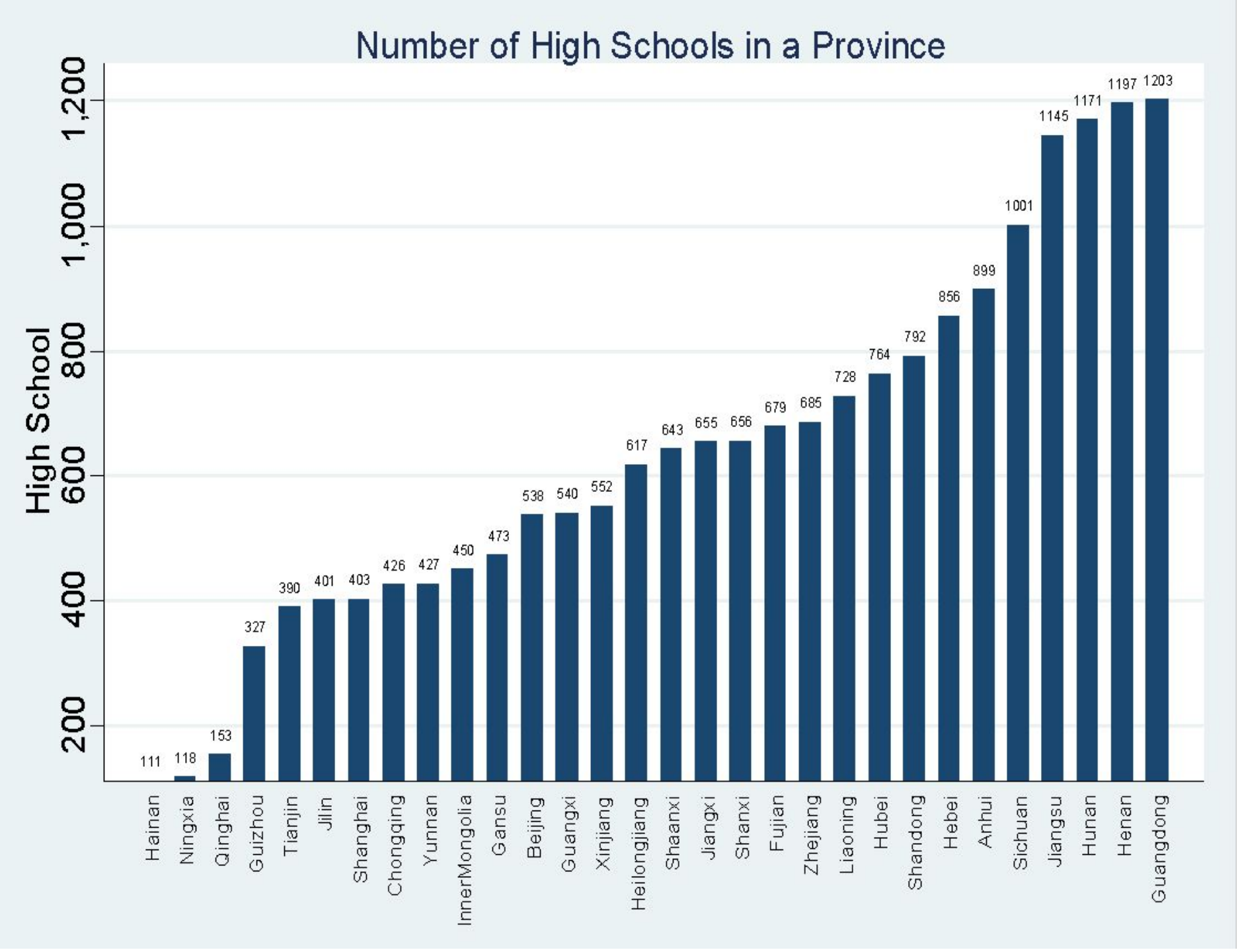
Admissions of Local Students

Type (inclusive)	Percent of local admissions
College	0.658
University	0.667
211 Universities	0.456
985 Universities	0.393
Top 9 Universities	0.388
Top 2 Universities	0.209


Home bias: Colleges of All Types
Successful Applicants in the Province (1,000)
0
100
200
300
400
Admissions by Colleges Located in the Province (1,000)
0
100
200
300
400
SD
JS
HE
HB
HN
SC
ZJ
AH
FJ
JX
SN
SX
LN
HL
NM
GX
JL
SH
GZ
CQ
BJ
GS
XJ
YN
TJ
HI

Educational Inequality

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


Number of High Schools in a Province
High School
200
400
600
800
1,000
1,200
111
118
153
327
390
401
403
426
427
450
473
538
540
552
617
643
655
656
679
685
728
764
792
856
899
1001
1145
1171
1197
1203
Hainan
Ningxia
Qinghai
Guizhou
Tianjin
Jilin
Shanghai
Chongqing
Yunnan
InnerMongolia
Gansu
Beijing
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Fujian
Zhejiang
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Hubei
Shandong
Hebei
Anhui
Sichuan
Jiangsu
Hunan
Henan
Guangdong

Gini Coefficients for High School Education

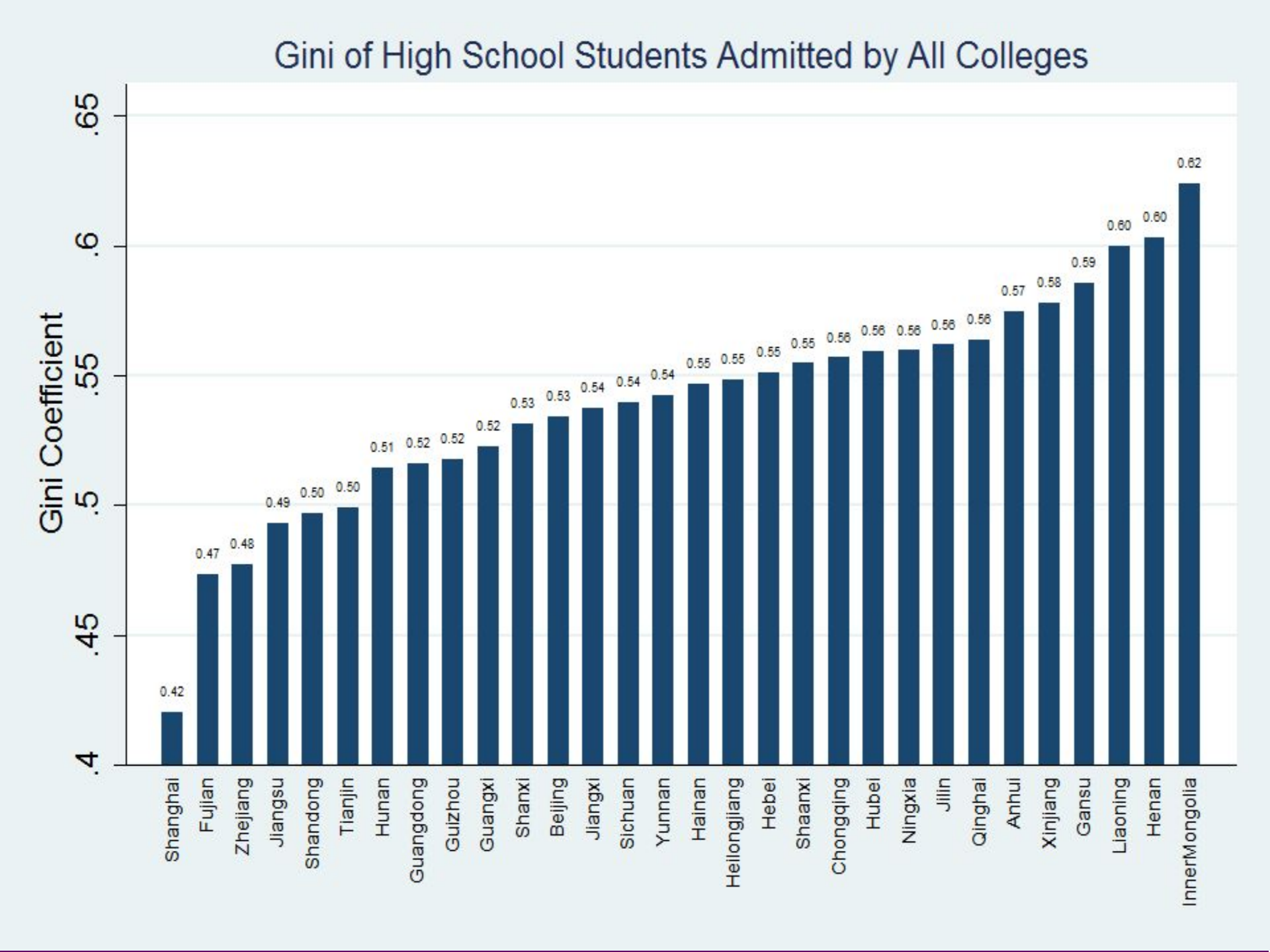
- High school Gini coefficients for different level of colleges
- Eg: High school Gini for admission to top-2 universities
  - Count the number of successful applicants of each high school
  - Calculate the Gini coefficients

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

Type	Gini
College	0.556
University	0.712
211 Universities	0.804
985 Universities	0.861
Top 9 Universities	0.929
Top 2 Universities	0.959

Admissions from Top High Schools

Type	Top 10% of high schools	Top 5% of high schools
College	0.365	0.222
University	0.510	0.318
211 Universities	0.664	0.456
985 Universities	0.764	0.565
Top 9 Universities	0.914	0.756
Top 2 Universities	1	0.858


Gini of High School Students Admitted by All Colleges
Gini Coefficient
.4
.45
.5
.55
.6
.65
0.42
0.47
0.48
0.49
0.50
0.50
0.51
0.52
0.52
0.52
0.53
0.53
0.54
0.54
0.54
0.55
0.55
0.55
0.55
0.56
0.56
0.56
0.56
0.56
0.57
0.58
0.59
0.60
0.60
0.62
Shanghai
Fujian
Zhejiang
Jiangsu
Shandong
Tianjin
Hunan
Guangdong
Guizhou
Guangxi
Shanxi
Beijing
Jiangxi
Sichuan
Yunnan
Hainan
Heilongjiang
Hebei
Shaanxi
Chongqing
Hubei
Ningxia
Jilin
Qinghai
Anhui
Xinjiang
Gansu
Liaoning
Henan
InnerMongolia

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

Year	Survey	Sample	Success	Response rate
2015	**Firms**	634	570	90%
	Workers	4,988	4,794	96%
2016	**Firms**	1,338	1,121	84%
	Workers	9,140	8,939	98%

Report to provincial leaders

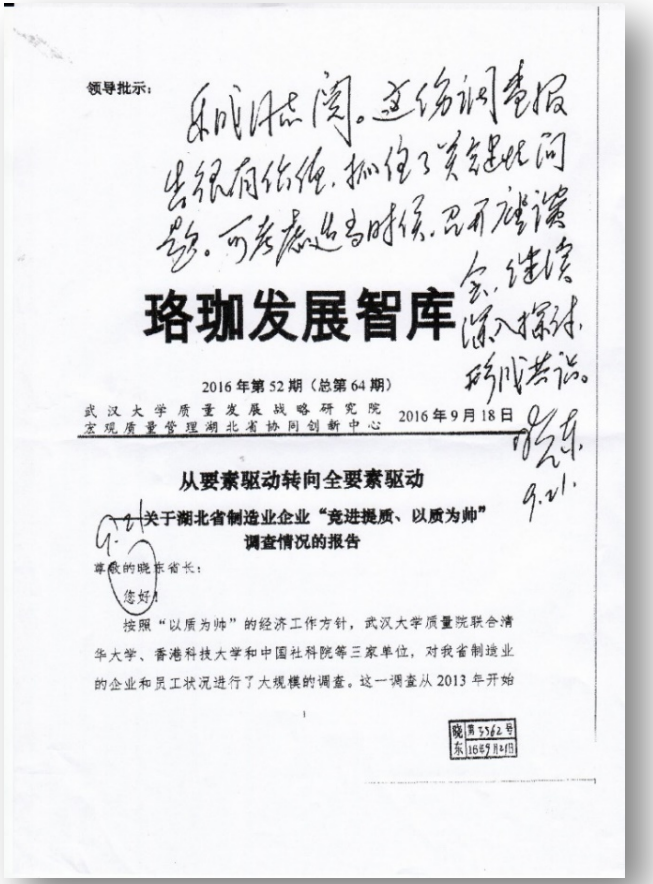
Vice governor of Guangdong,
Tong Xing

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



领导批示：

珞珈发展智库

2016年第52期（总第64期）

武汉大学质量发展战略研究院
宏观质量管理湖北省协同创新中心　2016年9月18日

从要素驱动转向全要素驱动

关于湖北省制造业企业“竞进提质、以质为帅”调查情况的报告

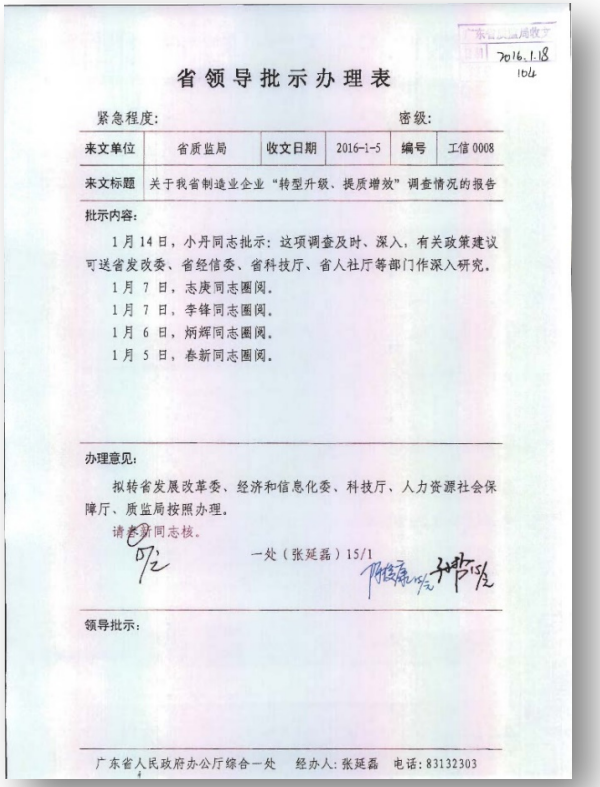
尊敬的晓东省长：

您好！

按照“以质为帅”的经济工作方针，武汉大学质量院联合清华大学、香港科技大学和中国社科院等三家单位，对我省制造业的企业和员工状况进行了大规模的调查。这一调查从2013年开始

Responses from provincial leaders

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



省领导批示办理表

紧急程度: 密级:

来文单位	省质监局	收文日期	2016-1-5	编号	工信 0008
来文标题	关于我省制造业企业“转型升级、提质增效”调查情况的报告				

批示内容:

1月14日，小丹同志批示：这项调查及时、深入，有关政策建议可送省发改委、省经信委、省科技厅、省人社厅等部门作深入研究。

1月7日，志庚同志圈阅。

1月7日，李锋同志圈阅。

1月6日，炳辉同志圈阅。

1月5日，春新同志圈阅。

办理意见:

拟转省发展改革委、经济和信息化委、科技厅、人力资源社会保障厅、质监局按照办理。

请李开同志核。

一处（张延磊）15/1

领导批示:

广东省人民政府办公厅综合一处 经办人：张延磊 电话：83132303