Analysis of Educational Inequality in Korea
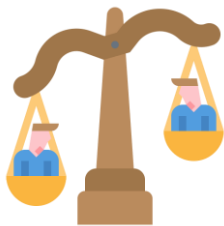
Team 9

Project Objectives

서울대 진학률 충북 '꼴찌'…교육 격차·불균형 '심각'

서울 고3 14명 서울대 진학할 때 충북 '3명'
세종 11.3명·대전 8.3명·충남 4.9명·충북 3.1명·강원 3명 순

김정원 기자 입력 2020-10-18 23:53 | 수정 2020-10-20 03:15

Entrance rate of Seoul National University, Chungbuk is the 'lowest'
Education inequality problem is 'serious'

Does exist?

How exists?

Which fator matters?

Does Educational Inequality Exist in Korea?

scores of college entrance exam(Su-neung) [1]

시도	국어		수학가		수학나	
	평균	표준편차	평균	표준편차	평균	표준편차
서울	100.9	20.3	102.9	18.7	100.7	20.8
부산	98.3	19.0	99.7	18.5	99.6	19.1
대구	100.4	18.5	100.4	17.8	100.8	19.0
인천	95.7	18.7	95.1	19.1	98.1	18.7
광주	99.2	18.6	100.7	18.0	100.4	19.1
대전	97.5	19.5	97.8	19.2	97.4	19.0
울산	96.1	19.1	101.1	18.4	99.9	18.2
경기	96.9	20.1	98.0	20.0	98.2	19.7
강원	93.6	18.8	90.4	20.0	95.8	18.2
충북	97.3	18.5	92.3	19.7	99.0	18.0
충남	95.4	19.6	92.4	20.9	96.9	18.4
전북	97.7	19.4	91.6	20.5	98.3	19.1
전남	94.7	18.9	89.4	19.7	96.4	18.3
경북	96.7	19.2	92.6	20.4	98.3	18.5
경남	94.8	19.2	93.7	19.9	98.3	18.7
제주	100.9	18.7	104.4	16.6	103.0	19.1
세종	97.1	19.3	91.6	19.7	98.3	19.7
전체	97.7	19.6	97.5	19.8	98.9	19.4

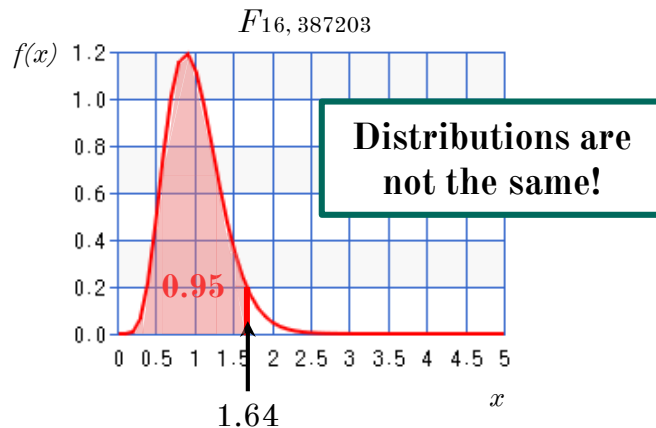+ the number of examinees in each city [1]

ANOVA 17 cities | 387,220 examinees
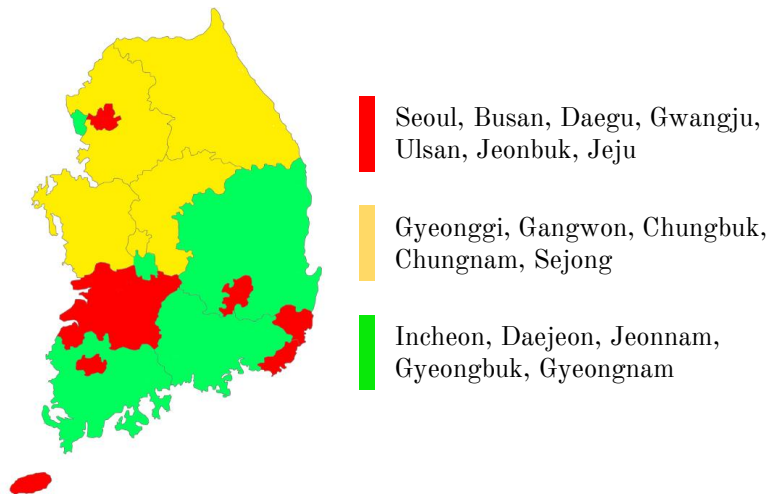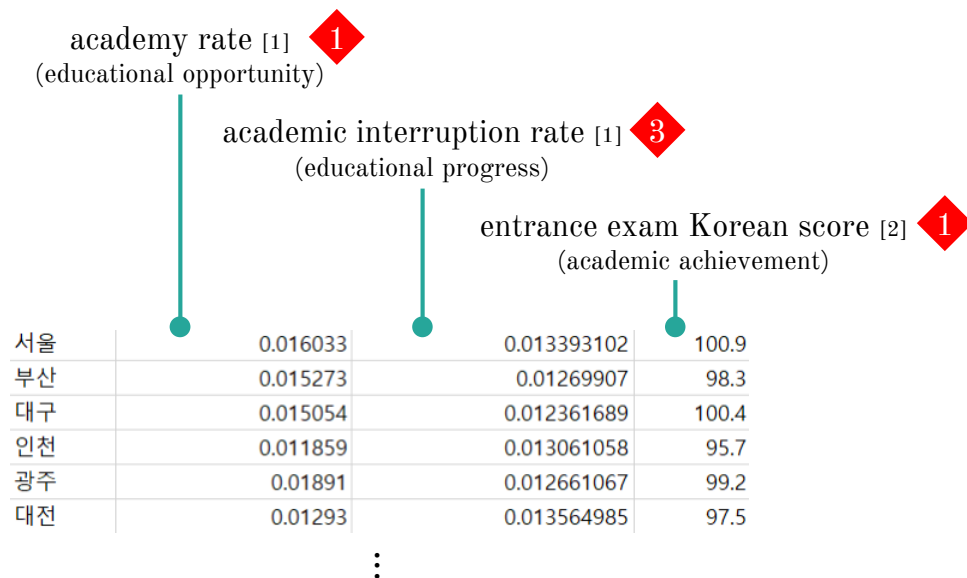
```
$anova.table
                      SS        df      MS         F
Between (A)     1753479        16  109592    287.68
Within        147505041   387203      381
Total         149258519   387219
```

$F_{16,\,387203}$

Distributions are not the same!

0.95

1.64

[1] Korean Educational Statistics Service (KESS, 교육통계서비스), We used data from 2019.

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How does Educational Inequality Exist in Korea?

Clustering 17 cities | 3 features | k-mean

academy rate [1] ◆1
(educational opportunity)

academic interruption rate [1] ◆3
(educational progress)

entrance exam Korean score [2] ◆1
(academic achievement)

서울	0.016033	0.013393102	100.9
부산	0.015273	0.01269907	98.3
대구	0.015054	0.012361689	100.4
인천	0.011859	0.013061058	95.7
광주	0.01891	0.012661067	99.2
대전	0.01293	0.013564985	97.5

⋮

▌ Seoul, Busan, Daegu, Gwangju, Ulsan, Jeonbuk, Jeju

▌ Gyeonggi, Gangwon, Chungbuk, Chungnam, Sejong

▌ Incheon, Daejeon, Jeonnam, Gyeongbuk, Gyeongnam

Seoul and Metropolis Cities have a better educational environment!

[1] Korean Educational Statistics Service (KESS, 교육통계서비스), We used data from 2019.
[2] Korea Institute for Curriculum and Evaluation (KICE, 한국교육과정평가원), We used data from 2019.

What Factors Influence Educational Inequality?

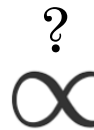public education — private education

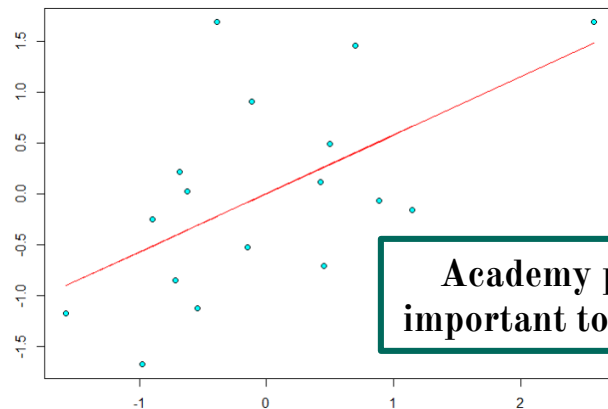classroom rate [1]   teacher rate [1]   academy rate [1]   academy pay rate [2]   entrance exam Korean score

Linear Regression

```
                  Estimate Std. Error t value Pr(>|t|)
(Intercept)      -9.179e-16  2.273e-01   0.000     1.00
classroomNumRate -2.102e-01  5.159e-01  -0.407     0.69
teacherNumRate   -2.843e-01  5.159e-01  -0.551     0.59


                  Estimate Std. Error t value Pr(>|t|)
(Intercept)      -1.083e-15  2.068e-01   0.000   1.0000
academyNumRate    1.830e-01  2.135e-01   0.857   0.4059
academyPayRate    5.646e-01  2.135e-01   2.645   0.0192
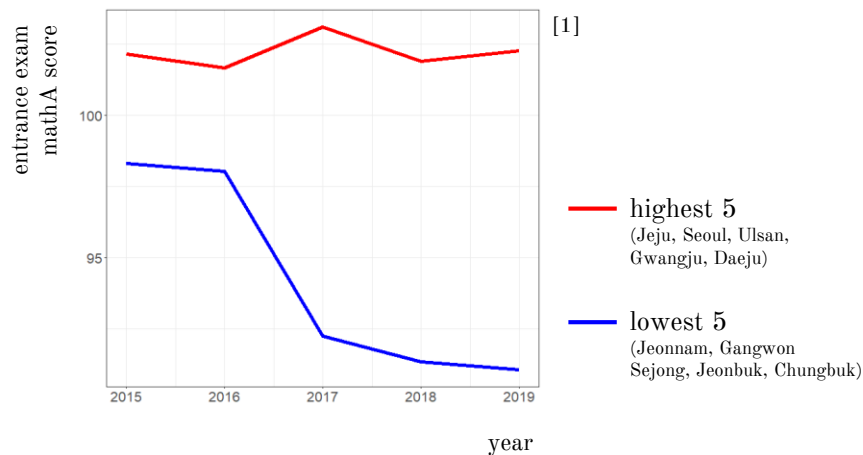```

entrance exam Korean score (scaled)

academy pay rate (scaled)
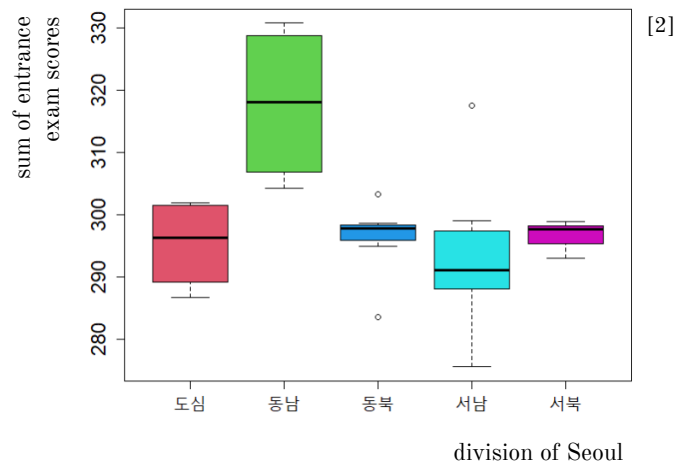
**Academy pay rate is important to exam score!**

[1] Korean Educational Statistics Service (KESS, 교육통계서비스), We used data from 2019.
[2] KOrean Statistical Information Service (KOSIS, 국가통계포털), We used data from 2019.

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# Additional Analyses



Educational inequality **gap increased**.



Educational inequality also exists **in Seoul**.

[1] Korean Educational Statistics Service (KESS, 교육통계서비스), We used data from 2015 to 2019.
[2] OhmyNews, http://www.ohmynews.com/NWS_Web/View/at_pg_w.aspx?CNTN_CD=A0002142488

# Summary

**ANOVA**

Distributions of entrance exam scores are not the same in each city.

**Clustering**

Seoul and Metropolitan Cities have the best educational environment.

**Linear Regression**

As academy pay rate increases, exam score also tends to increase.