Household Conditions by Geographic School District

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Week 5

Last Week's Challenges

- Workshop research question
- Join new data sets
- Making sense of the new data
- Github Pages

New Research Question

One of the only measures being used to predict graduation rates are GPA, tests, disciplinary issues, attendance etc. using a tracking system called EWS (early warning system).

However, we know that household conditions significantly impact these indicators. This leads us to the question:

What household conditions are the biggest indicators for graduation rates across school districts?

How does this differ across:

- Racial and ethnic groups?
- Regions?
- Household income groups?

Graduation Rates Data

R package from Urban Institute includes **Adjusted Cohort Graduation Rate (ACGR)** for school districts in US

- Originally each observation was a "cohort number" (# of members in a cohort)
- 10-12 cohorts in a district
- Weighted average of the Graduation Rates by the size of each cohort
- Weighted average by how many students were counted that year
- Joined by LEAID (state FIPS code and school district ID)

Table 4. Formula for Calculating the Four-Year Adjusted-Cohort Graduation Rate

$$\frac{\text{Number of cohort members who earned a regular high school diploma by the end of SY 2017-18}}{\text{Number of first-time 9th graders in fall 2014 (starting cohort) plus students who transferred in, minus students who transferred out, emigrated, or died during SY 2014-15, 2015-16, 2016-17, and 2017-18}}$$

A Quick Look

Histogram of grad_race_HH$grad_rate_midpt
Frequency
0
500
1000
1500
2000
2500
3000
0
20
40
60
80
100
grad_race_HH$grad_rate_midpt

```
Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
3.23   82.25   87.84   86.07   91.68   97.93    3113
```

Interesting Outliers

Shannon County School District 65-1 (South Dakota)

- Graduation Rate: **3.23%**
- Children: **3856**
- % HH in poverty: **52%**
- % Single Parent HH: **69%**
- % without comp/internet: **49%**

- **90.7%** Native American

(On an Indian Reservation)

Hermosa Beach City Elementary School District

- Graduation Rate: **15.35%**
- Faulty data?
- How did they manage to report graduation rates if there aren't any high schools to graduate from within this district?

Correlations by region

1. The whole US

2. The Bible Belt : Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Utah

3. States with the best and worst school systems:

- Based on metrics like safety, dropout rates, pupil-to-teacher ratio, bullying-incidence rate and testing scores in subjects like math and reading

➢ Ranked 1-5 ("best"): Massachusetts, Connecticut, New Jersey, Virginia, New Hampshire

➢ Ranked 46-50 ("worst") : Alabama, Alaska, Arizona, Louisiana, New Mexico

Correlations between Grad Rates, HH conditions, and Race in **the US**

	children	grad_rate_midpt	pct_pov	pct_SP	pct_HHVJ	pct_CC	pct_NCI	pct_CD	pct_CLI	pct_hisp_latino	pct_white	pct_black	pct_native	pct_asian
children	1.00	-0.07	0.02	0.08	0.13	0.11	-0.04	-0.04	0.22	0.20	-0.25	0.15	-0.04	0.18
grad_rate_midpt	-0.07	1.00	-0.36	-0.36	-0.12	-0.24	-0.25	-0.13	-0.09	-0.09	0.30	-0.20	-0.31	0.11
pct_pov	0.02	-0.36	1.00	0.63	0.15	0.35	0.62	0.28	0.17	0.21	-0.45	0.44	0.21	-0.23
pct_SP	0.08	-0.36	0.63	1.00	0.26	0.22	0.37	0.27	0.10	0.14	-0.48	0.52	0.22	-0.14
pct_HHVJ	0.13	-0.12	0.15	0.26	1.00	0.03	0.00	0.12	0.08	0.12	-0.16	0.11	-0.03	0.00
pct_CC	0.11	-0.24	0.35	0.22	0.03	1.00	0.36	-0.03	0.47	0.53	-0.55	0.01	0.40	0.07
pct_NCI	-0.04	-0.25	0.62	0.37		0.36	1.00	0.13	0.18	0.15	-0.30	0.24	0.28	-0.23
pct_CD	-0.04	-0.13	0.28	0.27	0.12	-0.03	0.13	1.00	-0.07	-0.05		0.09	0.02	-0.15
pct_CLI	0.22	-0.09	0.17	0.10	0.08	0.47	0.18	-0.07	1.00	0.65	-0.51	0.04	-0.05	0.19
pct_hisp_latino	0.20	-0.09	0.21	0.14	0.12	0.53	0.15	-0.05	0.65	1.00	-0.70	-0.03	-0.06	0.08
pct_white	-0.25	0.30	-0.45	-0.48	-0.16	-0.55	-0.30		-0.51	-0.70	1.00	-0.53	-0.29	-0.24
pct_black	0.15	-0.20	0.44	0.52	0.11	0.01	0.24	0.09	0.04	-0.03	-0.53	1.00	-0.08	
pct_native	-0.04	-0.31	0.21	0.22	-0.03	0.40	0.28	0.02	-0.05	-0.06	-0.29	-0.08	1.00	-0.06
pct_asian	0.18	0.11	-0.23	-0.14		0.07	-0.23	-0.15	0.19	0.08	-0.24		-0.06	1.00

Correlations between Grad Rates, HH conditions, and Race in the **Bible Belt**

	children	grad_rate_midpt	pct_pov	pct_SP	pct_HHVJ	pct_CC	pct_NCI	pct_CD	pct_CLI	pct_hisp_latino	pct_white	pct_black	pct_native	pct_asian
children	1.00	-0.06	-0.12	0.02	0.16	0.03	-0.15	-0.10	0.20	0.12	-0.19	0.11	-0.11	0.33
grad_rate_midpt	-0.06	1.00	-0.28	-0.30	-0.03	-0.01	-0.21	-0.05	0.05	0.14	0.28	-0.33	-0.28	0.11
pct_pov	-0.12	-0.28	1.00	0.64	0.02	0.21	0.51	0.19	0.10	0.05	-0.42	0.48	0.04	-0.24
pct_SP	0.02	-0.30	0.64	1.00	0.12	0.05	0.37	0.13	0.01	-0.04	-0.51	0.65	0.03	-0.12
pct_HHVJ	0.16	-0.03	0.02	0.12	1.00	0.02	-0.10	0.02	0.08	0.04	-0.08	0.04	-0.04	0.08
pct_CC	0.03	-0.01	0.21	0.05	0.02	1.00	0.21	0.02	0.50	0.63	-0.43	-0.12	0.03	-0.03
pct_NCI	-0.15	-0.21	0.51	0.37	-0.10	0.21	1.00	0.09	0.10	0.07	-0.30	0.27	0.12	-0.22
pct_CD	-0.10	-0.05	0.19	0.13	0.02	0.02	0.09	1.00	-0.06	-0.07	0.05	0.02	0.03	-0.10
pct_CLI	0.20	0.05	0.10	0.01	0.08	0.50	0.10	-0.06	1.00	0.59	-0.40	-0.07	-0.14	0.10
pct_hisp_latino	0.12	0.14	0.05	-0.04	0.04	0.63	0.07	-0.07	0.59	1.00	-0.56	-0.26	-0.16	0.03
pct_white	-0.19	0.28	-0.42	-0.51	-0.08	-0.43	-0.30	0.05	-0.40	-0.56	1.00	-0.55	-0.06	-0.09
pct_black	0.11	-0.33	0.48	0.65	0.04	-0.12	0.27	0.02	-0.07	-0.26	-0.55	1.00	-0.19	0.02
pct_native	-0.11	-0.28	-0.04	-0.03	-0.04	0.03	0.12	0.03	-0.14	-0.16	-0.06	-0.19	1.00	-0.07
pct_asian	0.33	0.11	-0.24	-0.12	0.08	-0.03	-0.22	-0.10	0.10	0.03	-0.09	0.02	-0.07	1.00

Correlations in states with the "worst public-school systems"

	children	grad_rate_midpt	pct_pov	pct_SP	pct_HHVJ	pct_CC	pct_NCI	pct_CD	pct_CLI	pct_hisp_latino	pct_white	pct_black	pct_native	pct_asian
children	1.00	0.01	-0.18	-0.05	0.17	-0.09	-0.17	-0.03	0.11	0.12	[illegible]	0.05	-0.16	0.12
grad_rate_midpt	0.01	1.00	-0.27	-0.28	0.05	-0.48	-0.33	0.06	-0.05	-0.12	0.53	0.13	-0.53	0.03
pct_pov	-0.18	-0.27	1.00	0.69	-0.07	0.29	0.65	0.16	0.06	-0.11	-0.49	0.41	0.30	-0.34
pct_SP	-0.05	-0.28	0.69	1.00	0.05	0.23	0.55	0.14	[illegible]	-0.18	-0.57	0.49	0.33	-0.21
pct_HHVJ	0.17	0.05	-0.07	0.05	1.00	-0.25	-0.18	0.17	0.12	0.15	0.13	0.02	-0.28	-0.04
pct_CC	-0.09	-0.48	0.29	0.23	-0.25	1.00	0.35	-0.20	0.03	-0.06	-0.44	-0.25	0.74	-0.03
pct_NCI	-0.17	-0.33	0.65	0.55	-0.18	0.35	1.00	[illegible]	0.12	-0.07	-0.49	0.15	0.48	-0.26
pct_CD	-0.03	0.06	0.16	0.14	0.17	-0.20	[illegible]	1.00	-0.10	-0.12	0.14	0.21	-0.22	-0.02
pct_CLI	0.11	-0.05	0.06	[illegible]	0.12	0.03	0.12	-0.10	1.00	0.48	-0.24	-0.17	-0.04	0.04
pct_hisp_latino	0.12	-0.12	-0.11	-0.18	0.15	-0.06	-0.07	-0.12	0.48	1.00	-0.33	-0.44	-0.19	-0.06
pct_white	[illegible]	0.53	-0.49	-0.57	0.13	-0.44	-0.49	0.14	-0.24	-0.33	1.00	-0.17	-0.53	0.05
pct_black	0.05	0.13	0.41	0.49	0.02	-0.25	0.15	0.21	-0.17	-0.44	-0.17	1.00	-0.31	-0.12
pct_native	-0.16	-0.53	0.30	0.33	-0.28	0.74	0.48	-0.22	-0.04	-0.19	-0.53	-0.31	1.00	-0.03
pct_asian	0.12	0.03	-0.34	-0.21	-0.04	-0.03	-0.26	-0.02	0.04	-0.06	0.05	-0.12	-0.03	1.00

Correlations in states with the "best public-school systems"

	children	grad_rate_midpt	pct_pov	pct_SP	pct_HHVJ	pct_CC	pct_NCI	pct_CD	pct_CLI	pct_hisp_latino	pct_white	pct_black	pct_native	pct_asian
children	1.00	-0.18	0.12	0.11	-0.01	0.22	0.08	-0.01	0.20	0.19	-0.28	0.19		0.12
grad_rate_midpt	-0.18	1.00	-0.73	-0.72	-0.42	-0.40	-0.59	-0.44	-0.36	-0.40	0.44	-0.41	-0.05	0.27
pct_pov	0.12	-0.73	1.00	0.80	0.49	0.49	0.76	0.45	0.41	0.48	-0.58	0.57	0.08	-0.23
pct_SP	0.11	-0.72	0.80	1.00	0.48	0.42	0.61	0.44	0.37	0.46	-0.55	0.56	0.07	-0.30
pct_HHVJ	0.01	-0.42	0.49	0.48	1.00	0.28	0.32	0.32	0.28	0.31	-0.21	0.12	0.09	-0.20
pct_CC	0.22	-0.40	0.49	0.42	0.28	1.00	0.41	0.07	0.70	0.71	-0.63	0.24		0.10
pct_NCI	0.08	-0.59	0.76	0.61	0.32	0.41	1.00	0.35	0.26	0.30	-0.38	0.44	0.11	-0.25
pct_CD	0.01	-0.44	0.45	0.44	0.32	0.07	0.35	1.00	-0.01	0.07	-0.09	0.21	0.03	-0.28
pct_CLI	0.20	-0.36	0.41	0.37	0.28	0.70	0.26	-0.01	1.00	0.75	-0.64	0.18	-0.02	0.19
pct_hisp_latino	0.19	-0.40	0.48	0.46	0.31	0.71	0.30	0.07	0.75	1.00	-0.75	0.17	-0.03	0.05
pct_white	-0.28	0.44	-0.58	-0.55	-0.21	-0.63	-0.38	-0.09	-0.64	-0.75	1.00	-0.68	-0.06	-0.28
pct_black	0.19	-0.41	0.57	0.56	0.12	0.24	0.44	0.21	0.18	0.17	-0.68	1.00	0.07	-0.10
pct_native		-0.05	0.08	0.07	0.09		0.11	0.03	-0.02	-0.03	-0.06	0.07	1.00	0.06
pct_asian	0.12	0.27	-0.23	-0.30	-0.20	0.10	-0.25	-0.28	0.19	0.05	-0.28	-0.10	0.06	1.00

Github Pages

View on GitHub

Household Conditions by Geographic School District

A Data & Society Capstone Project by Jon Geiger, Noel Goodwin, and Abigail Joppa

Analyses

- Preliminary Analysis
- Margin of Error Analysis
- Race-Households Join
- Graduation Rates Join

Household Conditions by Geographic School District maintained by jonmgeiger

Published with GitHub Pages

Difficulties & Next Steps

- Build regression model to predict graduation rates using HH conditions
- Choropleth Maps of graduations rates
- Household Income Data?
- Meaningful Visualizations