EDUC 643 Assignment 02 Key

1. Do schools that educate a larger proportion of students with financial need spend more per student on their education?

1.1. Review the variables you have at your disposal and select a set of substantively sensible continuous covariates that might explain schools’ per-pupil expenditure and help clarify the relationship between *ppe* and *frpl*. Note: make sure to exclude the identifiers and the locale and level variables. (1 point)

We

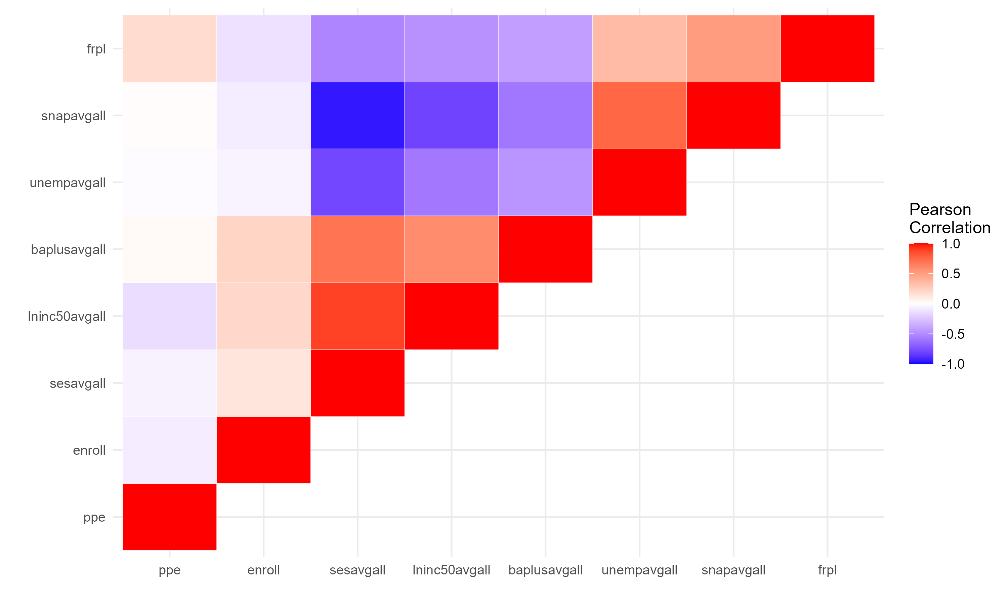
1.2. Construct a correlation matrix and/or correlation heatmap to assess for potential multicollinearity issues in your selection of covariates and use it to decide which covariates you will select for your postulated model. (2 points)

**Table 1**

|  | ppe | enroll | sesavgall | lninc50avgall | baplusavgall | unempavgall | snapavgall | frpl |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ppe | 1 | . | . | . | . | . | . | . |
| enroll | -.078 | 1 | . | . | . | . | . | . |
| sesavgall | -.053 | .137 | 1 | . | . | . | . | . |
| lninc50avgall | -.146 | .202 | .887 | 1 | . | . | . | . |
| baplusavgall | .025 | .222 | .694 | .588 | 1 | . | . | . |
| unempavgall | -.016 | -.050 | -.793 | -.586 | -.457 | 1 | . | . |
| snapavgall | .017 | -.081 | -.957 | -.804 | -.587 | .754 | 1 | . |
| frpl | .184 | -.129 | -.529 | -.474 | -.419 | .352 | .515 | 1 |

**Figure 1**

*Relationship between school-level per-pupil expenditure in U.S. dollars and the proportion of students receiving free- or reduced-price lunch for Oregon public schools 2018-19.*

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1.3. Write a formal linear model that describes the relationship between school-level per-pupil expenditure and the school-level average receipt of free- or reduced-price lunch, adjusting for the covariates you have selected (at least one required). Interpret each of the terms in this model. (1 point)

1.4. State your null hypothesis about the relationship between per-pupil expenditure and the proportion of students receiving free- or reduced-price lunch, accounting for the covariates in your model. (1 point)

This

1.5. Formally test your hypothesis using an Ordinary Least Squares estimation strategy. Report a set of results in a formatted table in which you compare the bivariate relationship between *ppe* and *frpl* with the multivariate relationship you have just estimated. (2 points)

**Table 2**

|  | (1) | (2) | (3) | (4) |
| --- | --- | --- | --- | --- |
| (Intercept) | 12,226.90\*\*\* | 12,592.77\*\*\* | 82,729.69\*\* | 102,327.73\*\*\* |
|  | (271.68) | (392.08) | (25,293.20) | (18,563.75) |
| Receiving FRPL (0-1) | 2,634.33\*\*\* | 2,533.13\*\*\* | 3,233.37\*\*\* | 3,285.95\*\*\* |
|  | (427.86) | (437.35) | (525.40) | (524.57) |
| Total enrollment |  | -0.66+ | -0.44 | -0.42 |
|  |  | (0.37) | (0.36) | (0.36) |
| Median income (log) |  |  | -5,917.33\* | -8,045.17\*\*\* |
|  |  |  | (2,423.86) | (1,616.15) |
| BA+ holders (0-1) |  |  | 7,258.26\*\*\* | 5,633.75\*\*\* |
|  |  |  | (1,593.85) | (1,042.93) |
| Unemployment rate (0-1) |  |  | -26,442.88 | -7,324.17 |
|  |  |  | (20,440.74) | (13,929.48) |
| SNAP receipt rate (0-1) |  |  | -42,052.18\*\*\* | -26,672.34\*\*\* |
|  |  |  | (12,535.77) | (7,907.01) |
| SES composite |  |  | -2,598.84 |  |
|  |  |  | (1,916.37) |  |
| Num.Obs. | 1193 | 1193 | 1193 | 1193 |
| R2 | 0.034 | 0.037 | 0.102 | 0.100 |
| F-statistic | 41.85 (*df*=1191) | 22.81 (*df*=1190) | 19.20 (*df*=1185) | 21.94 (*df*=1186) |
| *Notes:* + p < 0.1, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001. Cells report coefficients and heteroscedastic-robust standard errors in parentheses. Each observation is one school. | | | | |

Generally, we find our OLS assumptions to be roughly—though not perfectly—met in this context. We can

1.6. Interpret the results of your test in 1-2 sentences. (2 points)

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1.7. Assess the quality of your model fit and make appropriate inferences about your overall model, using relevant statistics. (1 point)

Generally, we find our OLS assumptions to be roughly—though not perfectly—met in this context. We can

1.7. Imagine you are writing a piece for The Oregonian detailing whether schools with greater levels of student financial need receive more money. Create a plot that illustrates the multivariate-adjusted relationship between the proportion of free- and reduced-price lunch recipients and per-pupil expenditure and prototypical values of the other variables in your model. Present the plot and a short paragraph reporting the results of your analysis to your readers **(2 point)**

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