Results

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## Loading required package: Matrix
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Let's start with looking at regression coefficients for all methods including: ols, ridge, lasso, pcr, and plsr.

Table 1: Table of Regression Coefficients for All Methods

	OSL	ridege	lasso	PCR	PLSR
(Intercept)	0.000	0.000	0.000	0.000	0.000
Income	-0.598	-0.569	-0.552	-0.599	-0.599
Limit	0.958	0.719	0.925	0.671	0.676
Rating	0.382	0.593	0.368	0.671	0.666
Cards	0.053	0.044	0.045	0.040	0.041
Age	-0.023	-0.025	-0.017	-0.023	-0.023
Education	-0.007	-0.006	0.000	-0.006	-0.006
GenderFemale	-0.012	-0.011	0.000	-0.012	-0.012
StudentYes	0.278	0.273	0.267	0.276	0.277
MarriedYes	-0.009	-0.011	0.000	-0.011	-0.011
EthnicityAsian	0.016	0.016	0.000	0.017	0.019
EthnicityCaucasian	0.011	0.011	0.000	0.011	0.013

Table 1 has twelve rows (one intercept term and eleven predictors terms) and five columns (one column per regression methods: ols, ridge, lasso, pcr, and plsr).

From Table 1, the result shows that regression coefficients for ridge, lasso, pcr, and plsr are approximately closed to each other's value but a slightly different comparing to ols - our benchmark.

Not surprisingly, we have seen that some coefficients in lasso regression are zero because lasso regression allows coefficients to be zero to minimize the regression penalty.

Now let's look at another table with the test MSE values for the regression techniques: ridge, lasso, pcr, and plsr

Table 2: Table of Test MSE for All Methods

	ridge	lasso	PCR	PLSR
MSE Value	0.045	0.047	0.046	0.047

Table 2 has only one row (Test MSE value) and four columns (one column per regression methods: ridge, lasso, pcr, and plsr).

From Table 2, the result shows that the model with lowest test Mean Square Error is Ridge Regression, which means that ridge regression acttually has the best performance when we test the prediction against the true value in testing set. So ridge regression is the best model in terms of measuring the fitness by MSE.

Now let's look at a plot in which the official coefficients are compared. We plot trend lines (i.e. the profiles) of the coefficients (one line connecting the coefficients of each method).

Official Coefficients Comparison
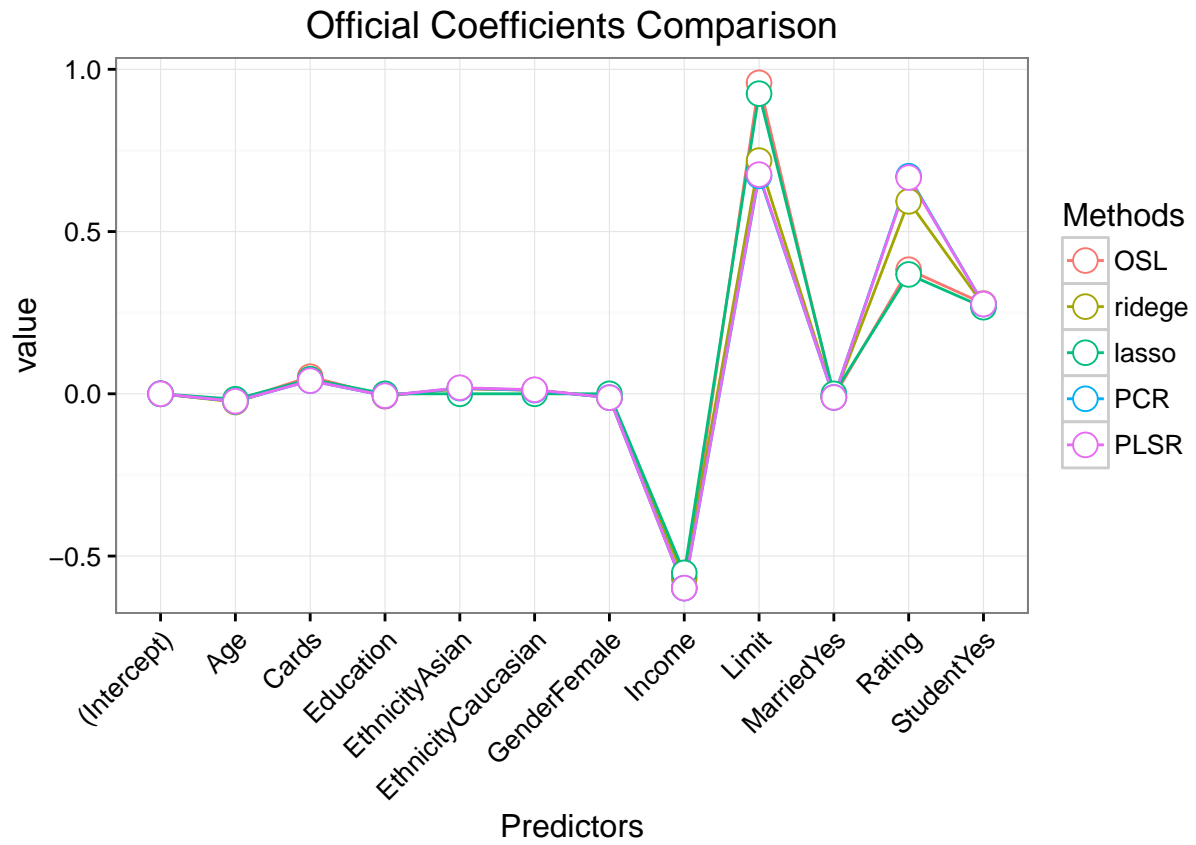
The graph displays comparison of coefficients of each predictor between different methods that we discussed earlier. In this visualization, we again confirm that there is some level of similarity between all methods.