Problem Set 3 - Answer Key

MaCCS 201 - Fall 2025

2025-11-12

Tentative Due Date: November 8

Please submit markdown file named [last_name]_[first_name]_ps1.Rmd or a pdf with all code and answers.

##Part 1: Blackburn and Neumark (1992)

Let's take a look at the data from Blackburn and Neumark (QJE 1992). We would like to estimate the model:

$$\begin{aligned} \log(wage) &= \beta_o + exper \cdot \beta_1 + tenure \cdot \beta_2 + married \cdot \beta_3 + south \cdot \beta_4 + \\ & \quad urban \cdot \beta_5 + black \cdot \beta_6 + educ \cdot \beta_7 + abil \cdot \gamma + \varepsilon \end{aligned} \tag{1}$$

One of the big problems in the wage literature is that we do not observe ability. If ability is not correlated with any of the right hand side variables, we can include it in the disturbance and nothing is lost by not observing it. If, however, it is correlated with one or more of the right hand side variables, OLS is no longer unbiased or consistent. Assume that ability is correlated with education and none of the other right hand side variables.

a) Derive the bias of β_7 and show what direction the bias goes in depending on whether the correlation between ability and education is positive or negative.

The estimated coefficient on education (β_7) is given by the OVB formula. If you leave out ability, you will estimate $\beta_7 + \gamma \cdot \delta_1$. δ_1 here is the coefficient of education on ability in the "weird regression'' from class. We can sign that one. We would think that $\gamma > 0$ as we might think that higher ability (whatever that means) might lead to higher wages (all else equal). We also might think that higher ability might "go with" more years of education. Also positive. Hence the product is positive, and hece the bias is positive!

b) You showed in the first part that we can derive the sign/direction of the bias. One approach that has been take in the literature is using a "proxy" variable for the unobservable ability. We will use IQ here to proxy for ability. Estimate the model above excluding ability, record your parameter estimates, standard errors and R^2.

```
newburn <- read.csv("newburn.csv")
mod_1 <- lm(lwage  ~ exper + tenure + married + south + urban + black + educ, data=newburn)
summary(mod_1)
```

```
##
## Call:
## lm(formula = lwage ~ exper + tenure + married + south + urban +
##     black + educ, data = newburn)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
```

```
## -1.98069 -0.21996  0.00707  0.24288  1.22822
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  5.395497   0.113225  47.653  < 2e-16 ***
## exper        0.014043   0.003185   4.409 1.16e-05 ***
## tenure       0.011747   0.002453   4.789 1.95e-06 ***
## married      0.199417   0.039050   5.107 3.98e-07 ***
## south       -0.090904   0.026249  -3.463 0.000558 ***
## urban        0.183912   0.026958   6.822 1.62e-11 ***
## black       -0.188350   0.037667  -5.000 6.84e-07 ***
## educ         0.065431   0.006250  10.468  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3655 on 927 degrees of freedom
## Multiple R-squared:  0.2526, Adjusted R-squared:  0.2469
## F-statistic: 44.75 on 7 and 927 DF,  p-value: < 2.2e-16
```

c) Estimate the model including IQ as a proxy, record your parameter estimates, standard errors and R^2.

```
mod_2 <- lm(lwage  ~ exper + tenure + married + south + urban + black + educ + iq, data=newburn)
summary(mod_2)
```

```
##
## Call:
## lm(formula = lwage ~ exper + tenure + married + south + urban +
##     black + educ + iq, data = newburn)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.01203 -0.22244  0.01017  0.22951  1.27478
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  5.1764392  0.1280006  40.441  < 2e-16 ***
## exper        0.0141458  0.0031651   4.469 8.82e-06 ***
## tenure       0.0113951  0.0024394   4.671 3.44e-06 ***
## married      0.1997644  0.0388025   5.148 3.21e-07 ***
## south       -0.0801695  0.0262529  -3.054 0.002325 **
## urban        0.1819463  0.0267929   6.791 1.99e-11 ***
## black       -0.1431253  0.0394925  -3.624 0.000306 ***
## educ         0.0544106  0.0069285   7.853 1.12e-14 ***
## iq           0.0035591  0.0009918   3.589 0.000350 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3632 on 926 degrees of freedom
## Multiple R-squared:  0.2628, Adjusted R-squared:  0.2564
## F-statistic: 41.27 on 8 and 926 DF,  p-value: < 2.2e-16
```

d) What happens to returns to schooling? Does this result confirm your suspicion of how ability and schooling are expected to be correlated?

Yes! What we see is that the coefficient without including IQ is larger than when we include it. It is always so nice to see that this stuff really works!

Part 2: Card (1995)

a) Read the data into R. Plot the series make sure your data are read in correctly.

```
card <- read.csv("card.csv")
print(dfSummary(card))
```

```
## Data Frame Summary
## card
## Dimensions: 3010 x 34
## Duplicates: 0
##
## ------------------------------------------------------------------------------------------------------------
## No   Variable    Stats / Values                    Freqs (% of Valid)     Graph                  Vali
## ---- ----------- --------------------------------- ---------------------- ---------------------- ----
## 1    id          Mean (sd) : 2581.7 (1500.5)       3010 distinct values   : . . : : . .   . .    3010
##      [integer]   min < med < max:                                          : : : : : : : : : :    (100
##                  2 < 2541 < 5225                                        : : : : : : : : : :
##                  IQR (CV) : 2583.2 (0.6)                                : : : : : : : : : :
##                                                                         : : : : : : : : : :
##
## 2    nearc2      Min  : 0                         0 : 1683 (55.9%)       IIIIIIIIIII            3010
##      [integer]   Mean : 0.4                       1 : 1327 (44.1%)       IIIIIIII               (100
##                  Max  : 1
##
## 3    nearc4      Min  : 0                         0 :  957 (31.8%)       IIIIII                 3010
##      [integer]   Mean : 0.7                       1 : 2053 (68.2%)       IIIIIIIIIIII           (100
##                  Max  : 1
##
## 4    educ        Mean (sd) : 13.3 (2.7)           18 distinct values               :          3010
##      [integer]   min < med < max:                                                  :          (100
##                  1 < 13 < 18                                                    : . :
##                  IQR (CV) : 4 (0.2)                                         . : : : :
##                                                                           : : : : : :
##
## 5    age         Mean (sd) : 28.1 (3.1)           11 distinct values     :                      3010
##      [integer]   min < med < max:                                        :                      (100
##                  24 < 28 < 34                                           : .
##                  IQR (CV) : 6 (0.1)                                     : : : : . .   . . .
##                                                                         : : : : : : : : : :
##
## 6    fatheduc    Mean (sd) : 10 (3.7)             19 distinct values               :          2320
##      [integer]   min < med < max:                                                  :          (77
##                  0 < 10 < 18                                                  :   :
##                  IQR (CV) : 4 (0.4)                                         . : . :
##                                                                       . : : : : : : : .
##
## 7    motheduc    Mean (sd) : 10.3 (3.2)           19 distinct values               :          2657
##      [integer]   min < med < max:                                                  :          (88
##                  0 < 12 < 18                                                    :
##                  IQR (CV) : 4 (0.3)                                           :   :
##                                                                       . . : : : : . .
```

```
##
## 8    weight      Mean (sd) : 321185.3 (170645.8)   348 distinct values      :                    301
##      [integer]   min < med < max:                                             :                    (10
##                  75607 < 365200 < 1752340                                 : :
##                  IQR (CV) : 283226 (0.5)                                  : : :
##                                                                           : : :
##
## 9    momdad14    Min  : 0                          0 :  634 (21.1%)       IIII                 301
##      [integer]   Mean : 0.8                        1 : 2376 (78.9%)       IIIIIIIIIIIIIII      (10
##                  Max  : 1
##
## 10   sinmom14    Min  : 0                          0 : 2707 (89.9%)       IIIIIIIIIIIIIIIII    301
##      [integer]   Mean : 0.1                        1 :  303 (10.1%)       II                   (10
##                  Max  : 1
##
## 11   step14      Min  : 0                          0 : 2893 (96.1%)       IIIIIIIIIIIIIIIIII   301
##      [integer]   Mean : 0                          1 :  117 ( 3.9%)                            (10
##                  Max  : 1
##
## 12   reg661      Min  : 0                          0 : 2870 (95.3%)       IIIIIIIIIIIIIIIIII   301
##      [integer]   Mean : 0                          1 :  140 ( 4.7%)                            (10
##                  Max  : 1
##
## 13   reg662      Min  : 0                          0 : 2526 (83.9%)       IIIIIIIIIIIIIII      301
##      [integer]   Mean : 0.2                        1 :  484 (16.1%)       III                  (10
##                  Max  : 1
##
## 14   reg663      Min  : 0                          0 : 2421 (80.4%)       IIIIIIIIIIIIIII      301
##      [integer]   Mean : 0.2                        1 :  589 (19.6%)       III                  (10
##                  Max  : 1
##
## 15   reg664      Min  : 0                          0 : 2817 (93.6%)       IIIIIIIIIIIIIIIII    301
##      [integer]   Mean : 0.1                        1 :  193 ( 6.4%)       I                    (10
##                  Max  : 1
##
## 16   reg665      Min  : 0                          0 : 2383 (79.2%)       IIIIIIIIIIIIII       301
##      [integer]   Mean : 0.2                        1 :  627 (20.8%)       IIII                 (10
##                  Max  : 1
##
## 17   reg666      Min  : 0                          0 : 2721 (90.4%)       IIIIIIIIIIIIIIIII    301
##      [integer]   Mean : 0.1                        1 :  289 ( 9.6%)       I                    (10
##                  Max  : 1
##
## 18   reg667      Min  : 0                          0 : 2679 (89.0%)       IIIIIIIIIIIIIIII     301
##      [integer]   Mean : 0.1                        1 :  331 (11.0%)       II                   (10
##                  Max  : 1
##
## 19   reg668      Min  : 0                          0 : 2925 (97.2%)       IIIIIIIIIIIIIIIIII   301
##      [integer]   Mean : 0                          1 :   85 ( 2.8%)                            (10
##                  Max  : 1
##
## 20   reg669      Min  : 0                          0 : 2738 (91.0%)       IIIIIIIIIIIIIIIII    301
##      [integer]   Mean : 0.1                        1 :  272 ( 9.0%)       I                    (10
##                  Max  : 1
```

```
##
## 21   south66     Min  : 0                        0 : 1763 (58.6%)       IIIIIIIIIII           3010
##      [integer]   Mean : 0.4                      1 : 1247 (41.4%)       IIIIIIII              (100
##                  Max  : 1
##
## 22   black       Min  : 0                        0 : 2307 (76.6%)       IIIIIIIIIIIIII        3010
##      [integer]   Mean : 0.2                      1 :  703 (23.4%)       IIII                  (100
##                  Max  : 1
##
## 23   smsa        Min  : 0                        0 :  864 (28.7%)       IIIII                 3010
##      [integer]   Mean : 0.7                      1 : 2146 (71.3%)       IIIIIIIIIIIII         (100
##                  Max  : 1
##
## 24   south       Min  : 0                        0 : 1795 (59.6%)       IIIIIIIIIII           3010
##      [integer]   Mean : 0.4                      1 : 1215 (40.4%)       IIIIIIII              (100
##                  Max  : 1
##
## 25   smsa66      Min  : 0                        0 : 1055 (35.0%)       IIIIIII               3010
##      [integer]   Mean : 0.6                      1 : 1955 (65.0%)       IIIIIIIIIII           (100
##                  Max  : 1
##
## 26   wage        Mean (sd) : 577.3 (263)         755 distinct values      :                   3010
##      [integer]   min < med < max:                                         : :                 (100
##                  100 < 537.5 < 2404                                       : :
##                  IQR (CV) : 314.5 (0.5)                                 : : : .
##                                                                         : : : : .
##
## 27   enroll      Min  : 0                        0 : 2732 (90.8%)       IIIIIIIIIIIIIIIII     3010
##      [integer]   Mean : 0.1                      1 :  278 ( 9.2%)       I                     (100
##                  Max  : 1
##
## 28   KWW         Mean (sd) : 33.5 (8.6)          50 distinct values             . :          2963
##      [integer]   min < med < max:                                             : : :          (98
##                  4 < 34 < 56                                                  : : : :
##                  IQR (CV) : 12 (0.3)                                        : : : : : .
##                                                                           . : : : : : : :
##
## 29   IQ          Mean (sd) : 102.4 (15.4)        92 distinct values             :           2061
##      [integer]   min < med < max:                                             : : :          (68
##                  50 < 103 < 149                                               : : :
##                  IQR (CV) : 20 (0.2)                                        : : : : :
##                                                                           . : : : : : : .
##
## 30   married     Mean (sd) : 2.3 (2.1)           1 : 2144 (71.4%)       IIIIIIIIIIIII         3003
##      [integer]   min < med < max:                2 :   14 ( 0.5%)                             (99
##                  1 < 1 < 6                       3 :    3 ( 0.1%)
##                  IQR (CV) : 3 (0.9)              4 :  155 ( 5.2%)       I
##                                                  5 :  102 ( 3.4%)
##                                                  6 :  585 (19.5%)       III
##
## 31   libcrd14    Min  : 0                        0 :  976 (32.6%)       IIIIII                2997
##      [integer]   Mean : 0.7                      1 : 2021 (67.4%)       IIIIIIIIIIII          (99
##                  Max  : 1
##
```

```
## 32   exper       Mean (sd) : 8.9 (4.1)            24 distinct values          :                3010
##      [integer]   min < med < max:                                               :                (100
##                  0 < 8 < 23                                                  : : .
##                  IQR (CV) : 5 (0.5)                                        . : : : . :
##                                                                          . : : : : : : : .
##
## 33   lwage       Mean (sd) : 6.3 (0.4)            755 distinct values            :            3010
##      [numeric]   min < med < max:                                              : : :          (100
##                  4.6 < 6.3 < 7.8                                             . : : :
##                  IQR (CV) : 0.6 (0.1)                                        : : : :
##                                                                            : : : : : : : .
##
## 34   expersq     Mean (sd) : 95.6 (84.6)          24 distinct values     :                     3010
##      [integer]   min < med < max:                                        : .                   (100
##                  0 < 64 < 529                                        : :
##                  IQR (CV) : 85 (0.9)                                 : :
##                                                                      : : : : :
## ---------------------------------------------------------------------------------------------------
```

b) Estimate a log($wage$) regression via Least Squares with $educ$, $exper$, $exper^2$, $black$, $south$, $smsa$, $reg661$ through $reg668$ and $smsa66$ on the right hand side. Check your results against Table2, column 5.

```
mod_3 <- lm(lwage  ~  educ + exper+ exper^2 + black + south + smsa + reg661 + reg662 + reg663 + reg664 +
summary(mod_3)
```

```
##
## Call:
## lm(formula = lwage ~ educ + exper + exper^2 + black + south +
##     smsa + reg661 + reg662 + reg663 + reg664 + reg665 + reg666 +
##     reg667 + reg668 + smsa66, data = card)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.72549 -0.22918  0.01839  0.24091  1.30683
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  4.925618   0.067287  73.203  < 2e-16 ***
## educ         0.074458   0.003528  21.105  < 2e-16 ***
## exper        0.039638   0.002194  18.068  < 2e-16 ***
## black       -0.197546   0.018402 -10.735  < 2e-16 ***
## south       -0.153710   0.026189  -5.869 4.85e-09 ***
## smsa         0.140926   0.020262   6.955 4.30e-12 ***
## reg661      -0.119396   0.039160  -3.049 0.002317 **
## reg662      -0.025996   0.028493  -0.912 0.361641
## reg663       0.022845   0.027594   0.828 0.407794
## reg664      -0.063640   0.035984  -1.769 0.077066 .
## reg665       0.008056   0.036424   0.221 0.824975
## reg666       0.017514   0.040435   0.433 0.664940
## reg667       0.003354   0.039710   0.084 0.932686
## reg668      -0.172533   0.046732  -3.692 0.000227 ***
## smsa66       0.024335   0.019611   1.241 0.214754
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
```

```
## Residual standard error: 0.3754 on 2995 degrees of freedom
## Multiple R-squared:  0.2876, Adjusted R-squared:  0.2843
## F-statistic: 86.38 on 14 and 2995 DF,  p-value: < 2.2e-16
```

c) Estimate a reduced form equation for *educ* containing all of the explanatory variables and the dummy variable *nearc4*. Is the partial correlation between *nearc4* and *educ* statistically significant?

```
mod_4 <- lm(educ  ~  exper+ exper^2 + black + south + smsa + reg661 + reg662 + reg663 + reg664 + reg665
summary(mod_4)
```

```
##
## Call:
## lm(formula = educ ~ exper + exper^2 + black + south + smsa +
##     reg661 + reg662 + reg663 + reg664 + reg665 + reg666 + reg667 +
##     reg668 + smsa66 + nearc4, data = card)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -7.5165 -1.3757 -0.0982  1.2867  6.2210
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 16.779396   0.165267 101.529  < 2e-16 ***
## exper       -0.395405   0.008743 -45.224  < 2e-16 ***
## black       -0.936158   0.093716  -9.989  < 2e-16 ***
## south       -0.049436   0.135349  -0.365 0.714953
## smsa         0.400515   0.104751   3.824 0.000134 ***
## reg661      -0.209961   0.202432  -1.037 0.299728
## reg662      -0.287477   0.147297  -1.952 0.051069 .
## reg663      -0.237056   0.142602  -1.662 0.096544 .
## reg664      -0.093045   0.185960  -0.500 0.616864
## reg665      -0.482419   0.188162  -2.564 0.010400 *
## reg666      -0.511497   0.209588  -2.440 0.014725 *
## reg667      -0.428663   0.205574  -2.085 0.037136 *
## reg668       0.312685   0.241638   1.294 0.195757
## smsa66       0.026284   0.105745   0.249 0.803716
## nearc4       0.319703   0.087852   3.639 0.000278 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.94 on 2995 degrees of freedom
## Multiple R-squared:  0.4771, Adjusted R-squared:  0.4746
## F-statistic: 195.2 on 14 and 2995 DF,  p-value: < 2.2e-16
```

d) Estimate the log(*wage*) equation by instrumental variables, using *nearc4* as an instrument for *educ*. Compare the 95% confidence interval for the return to education to that obtained from the Least Squares regression above.

```
mod_5 <- iv_robust(lwage  ~  educ + exper+ exper^2 + black + south + smsa + reg661 + reg662 + reg663 + r
summary(mod_5)
```

```
##
## Call:
## iv_robust(formula = lwage ~ educ + exper + exper^2 + black +
##     south + smsa + reg661 + reg662 + reg663 + reg664 + reg665 +
##     reg666 + reg667 + reg668 + smsa66 | exper + exper^2 + black +
```

```
##     south + smsa + reg661 + reg662 + reg663 + reg664 + reg665 +
##     reg666 + reg667 + reg668 + smsa66 + nearc4, data = card,
##
## Standard error type:  classical
##
## Coefficients:
##             Estimate Std. Error t value  Pr(>|t|) CI Lower CI Upper   DF
## (Intercept)  3.93214    0.94124  4.1776 3.030e-05  2.08659  5.77768 2995
## educ         0.13315    0.05558  2.3959 1.664e-02  0.02418  0.24212 2995
## exper        0.06288    0.02208  2.8482 4.426e-03  0.01959  0.10616 2995
## black       -0.14354    0.05453 -2.6325 8.520e-03 -0.25046 -0.03663 2995
## south       -0.15044    0.02755 -5.4616 5.106e-08 -0.20445 -0.09643 2995
## smsa         0.11563    0.03193  3.6213 2.980e-04  0.05302  0.17824 2995
## reg661      -0.10830    0.04225 -2.5633 1.042e-02 -0.19114 -0.02546 2995
## reg662      -0.01042    0.03322 -0.3136 7.538e-01 -0.07555  0.05472 2995
## reg663       0.03773    0.03209  1.1759 2.397e-01 -0.02518  0.10065 2995
## reg664      -0.05788    0.03800 -1.5231 1.278e-01 -0.13239  0.01663 2995
## reg665       0.03799    0.04743  0.8011 4.231e-01 -0.05500  0.13098 2995
## reg666       0.05166    0.05317  0.9717 3.313e-01 -0.05259  0.15591 2995
## reg667       0.03170    0.04939  0.6417 5.211e-01 -0.06515  0.12854 2995
## reg668      -0.18889    0.05123 -3.6871 2.309e-04 -0.28935 -0.08844 2995
## smsa66       0.01633    0.02185  0.7472 4.550e-01 -0.02651  0.05917 2995
##
## Multiple R-squared:  0.2218 ,    Adjusted R-squared:  0.2182
## F-statistic: 50.36 on 14 and 2995 DF,  p-value: < 2.2e-16
```

The CI is [0.02418; 0.24212], which includes the point estimate from before (0.074).

e) (Bonus) Now use multiple instruments. Use *nearc2* and *nearc4* as instruments for *educ*. Comment on the significance of the partial correlations of both instruments in the reduced form.

```
mod_6 <- lm(educ  ~  exper+ exper^2 + black + south + smsa + reg661 + reg662 + reg663 + reg664 + reg665
summary(mod_6)
```

```
##
## Call:
## lm(formula = educ ~ exper + exper^2 + black + south + smsa +
##     reg661 + reg662 + reg663 + reg664 + reg665 + reg666 + reg667 +
##     reg668 + smsa66 + nearc4 + nearc2, data = card)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -7.5573 -1.3897 -0.0904  1.2736  6.2761
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept) 16.7053892  0.1716330  97.332  < 2e-16 ***
## exper       -0.3955715  0.0087416 -45.252  < 2e-16 ***
## black       -0.9458118  0.0938876 -10.074  < 2e-16 ***
## south       -0.0397620  0.1354504  -0.294 0.769119
## smsa         0.3997409  0.1047249   3.817 0.000138 ***
## reg661      -0.1683746  0.2040566  -0.825 0.409360
## reg662      -0.2675837  0.1477874  -1.811 0.070303 .
## reg663      -0.1889623  0.1457270  -1.297 0.194839
## reg664      -0.0375312  0.1891509  -0.198 0.842730
```

```
## reg665      -0.4365643  0.1903039  -2.294 0.021857 *
## reg666      -0.5006480  0.2096451  -2.388 0.016999 *
## reg667      -0.3789416  0.2078784  -1.823 0.068418 .
## reg668       0.3812661  0.2453828   1.554 0.120347
## smsa66       0.0007981  0.1069222   0.007 0.994045
## nearc4       0.3203922  0.0878309   3.648 0.000269 ***
## nearc2       0.1233125  0.0774137   1.593 0.111288
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.94 on 2994 degrees of freedom
## Multiple R-squared:  0.4775, Adjusted R-squared:  0.4749
## F-statistic: 182.4 on 15 and 2994 DF,  p-value: < 2.2e-16
```

```
mod_7 <- iv_robust(lwage  ~  educ + exper+ exper^2 + black + south + smsa + reg661 + reg662 + reg663 + r
summary(mod_7)
```

```
##
## Call:
## iv_robust(formula = lwage ~ educ + exper + exper^2 + black +
##     south + smsa + reg661 + reg662 + reg663 + reg664 + reg665 +
##     reg666 + reg667 + reg668 + smsa66 | exper + exper^2 + black +
##     south + smsa + reg661 + reg662 + reg663 + reg664 + reg665 +
##     reg666 + reg667 + reg668 + smsa66 + nearc4 + nearc2, data = card,
##
## Standard error type:  classical
##
## Coefficients:
##              Estimate Std. Error t value  Pr(>|t|) CI Lower CI Upper   DF
## (Intercept)  3.521945    0.89800  3.9220 8.978e-05  1.76120  5.28269 2995
## educ         0.157386    0.05302  2.9687 3.015e-03  0.05344  0.26134 2995
## exper        0.072474    0.02107  3.4393 5.913e-04  0.03116  0.11379 2995
## black       -0.121243    0.05261 -2.3044 2.127e-02 -0.22440 -0.01808 2995
## south       -0.149092    0.02865 -5.2032 2.090e-07 -0.20528 -0.09291 2995
## smsa         0.105187    0.03171  3.3171 9.204e-04  0.04301  0.16736 2995
## reg661      -0.103720    0.04378 -2.3693 1.788e-02 -0.18955 -0.01789 2995
## reg662      -0.003987    0.03404 -0.1171 9.068e-01 -0.07073  0.06275 2995
## reg663       0.043880    0.03289  1.3341 1.823e-01 -0.02061  0.10837 2995
## reg664      -0.055503    0.03950 -1.4050 1.601e-01 -0.13296  0.02196 2995
## reg665       0.050353    0.04795  1.0502 2.937e-01 -0.04366  0.14436 2995
## reg666       0.065760    0.05369  1.2247 2.208e-01 -0.03952  0.17104 2995
## reg667       0.043397    0.05020  0.8645 3.874e-01 -0.05503  0.14182 2995
## reg668      -0.195648    0.05295 -3.6947 2.240e-04 -0.29948 -0.09182 2995
## smsa66       0.013020    0.02253  0.5779 5.634e-01 -0.03116  0.05720 2995
##
## Multiple R-squared:  0.1562 ,    Adjusted R-squared:  0.1523
## F-statistic: 46.69 on 14 and 2995 DF,  p-value: < 2.2e-16
```