

# Case Solution Group 5

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## Step 1: Specification, hypotheses, and descriptive statistics

```
##          WAGE EDUC AGE RACE SMSA MARRIED REGION QOB REGION1 REGION2 REGION3
## 1 580.1000   9  45    0    0     1     9   3     0     0     0
## 2 642.2115  17  47    0    0     1     3   4     0     0     1
## 3 577.0192  12  42    0    0     1     7   2     0     0     0
## 4 999.1346  10  43    0    0     1     3   2     0     0     1
## 5 307.7885  12  41    0    0     1     6   3     0     0     0
## 6 280.1000  12  40    1    0     1     5   2     0     0     0
##          REGION4 REGION5 REGION6 REGION7 REGION8 REGION9 QOB1 QOB2 QOB3 QOB4
## 1          0      0      0      0      0     1   0   0   1   0
## 2          0      0      0      0      0     0   0   0   0   1
## 3          0      0      0      1      0     0   0   1   0   0
## 4          0      0      0      0      0     0   0   1   0   0
## 5          0      0      1      0      0     0   0   0   1   0
## 6          0      1      0      0      0     0   0   0   1   0
##          WAGE          EDUC          AGE          RACE
## Min. : 0.096  Min. : 0.00  Min. :40.00  Min. :0.0000
## 1st Qu.: 278.558 1st Qu.:12.00 1st Qu.:42.00 1st Qu.:0.0000
## Median : 384.712 Median :12.00 Median :45.00 Median :0.0000
## Mean   : 436.524 Mean  :12.71 Mean  :44.68 Mean  :0.0832
## 3rd Qu.: 520.100 3rd Qu.:15.00 3rd Qu.:47.00 3rd Qu.:0.0000
## Max.   :10167.500 Max.  :20.00 Max.  :50.00 Max.  :1.0000
##          SMSA          MARRIED          REGION          QOB
## Min. :0.0000  Min. :0.0000  Min. :1.000  Min. :1.000
## 1st Qu.:0.0000 1st Qu.:1.0000 1st Qu.:3.000 1st Qu.:1.000
## Median :0.0000  Median :1.0000  Median :5.000  Median :3.000
## Mean   :0.1813  Mean  :0.8609  Mean  :4.767  Mean  :2.502
## 3rd Qu.:0.0000 3rd Qu.:1.0000 3rd Qu.:7.000 3rd Qu.:3.000
## Max.   :1.0000  Max.  :1.0000  Max.  :9.000  Max.  :4.000
##          REGION1          REGION2          REGION3          REGION4
## Min. :0.0000  Min. :0.0000  Min. :0.0000  Min. :0.0000
## 1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.0000
## Median :0.0000  Median :0.0000  Median :0.0000  Median :0.0000
## Mean   :0.0549  Mean  :0.1584  Mean  :0.1949  Mean  :0.0732
## 3rd Qu.:0.0000 3rd Qu.:0.0000 3rd Qu.:0.0000 3rd Qu.:0.0000
## Max.   :1.0000  Max.  :1.0000  Max.  :1.0000  Max.  :1.0000
##          REGION5          REGION6          REGION7          REGION8
## Min. :0.0000  Min. :0.000  Min. :0.0000  Min. :0.0000
## 1st Qu.:0.0000 1st Qu.:0.000 1st Qu.:0.0000 1st Qu.:0.0000
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## Median :0.0000  Median :0.000  Median :0.0000  Median :0.0000
## Mean   :0.1773  Mean   :0.064  Mean   :0.0995  Mean   :0.0494
## 3rd Qu.:0.0000 3rd Qu.:0.000 3rd Qu.:0.0000 3rd Qu.:0.0000
## Max.   :1.0000  Max.   :1.000  Max.   :1.0000  Max.   :1.0000
##      REGION9          QOB1          QOB2          QOB3
## Min.   :0.0000  Min.   :0.0000  Min.   :0.0000  Min.   :0.0000
## 1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.0000
## Median :0.0000  Median :0.0000  Median :0.0000  Median :0.0000
## Mean   :0.1284  Mean   :0.2533  Mean   :0.2354  Mean   :0.2674
## 3rd Qu.:0.0000 3rd Qu.:1.0000 3rd Qu.:0.0000 3rd Qu.:1.0000
## Max.   :1.0000  Max.   :1.0000  Max.   :1.0000  Max.   :1.0000
##      QOB4
## Min.   :0.0000
## 1st Qu.:0.0000
## Median :0.0000
## Mean   :0.2439
## 3rd Qu.:0.0000
## Max.   :1.0000

##      vars     n   mean     sd median trimmed    mad   min    max range
## WAGE      1 10000 436.52 295.37 384.71  401.88 173.27  0.1 10167.5 10167.4
## EDUC      2 10000 12.71   3.28  12.00   12.72   2.97  0.0   20.0   20.0
## AGE       3 10000 44.68   2.93  45.00   44.67   4.45  40.0   50.0   10.0
## RACE      4 10000  0.08   0.28   0.00    0.00   0.00  0.0    1.0    1.0
## SMSA      5 10000  0.18   0.39   0.00    0.10   0.00  0.0    1.0    1.0
## MARRIED   6 10000  0.86   0.35   1.00    0.95   0.00  0.0    1.0    1.0
## REGION    7 10000  4.77   2.46   5.00    4.65   2.97  1.0    9.0    8.0
## QOB       8 10000  2.50   1.12   3.00    2.50   1.48  1.0    4.0    3.0
## REGION1   9 10000  0.05   0.23   0.00    0.00   0.00  0.0    1.0    1.0
## REGION2  10 10000  0.16   0.37   0.00    0.07   0.00  0.0    1.0    1.0
## REGION3  11 10000  0.19   0.40   0.00    0.12   0.00  0.0    1.0    1.0
## REGION4  12 10000  0.07   0.26   0.00    0.00   0.00  0.0    1.0    1.0
## REGION5  13 10000  0.18   0.38   0.00    0.10   0.00  0.0    1.0    1.0
## REGION6  14 10000  0.06   0.24   0.00    0.00   0.00  0.0    1.0    1.0
## REGION7  15 10000  0.10   0.30   0.00    0.00   0.00  0.0    1.0    1.0
## REGION8  16 10000  0.05   0.22   0.00    0.00   0.00  0.0    1.0    1.0
## REGION9  17 10000  0.13   0.33   0.00    0.04   0.00  0.0    1.0    1.0
## QOB1     18 10000  0.25   0.43   0.00    0.19   0.00  0.0    1.0    1.0
## QOB2     19 10000  0.24   0.42   0.00    0.17   0.00  0.0    1.0    1.0
## QOB3     20 10000  0.27   0.44   0.00    0.21   0.00  0.0    1.0    1.0
## QOB4     21 10000  0.24   0.43   0.00    0.18   0.00  0.0    1.0    1.0

##      skew kurtosis   se
## WAGE    7.39  170.46 2.95
## EDUC   -0.07   0.55 0.03
## AGE     0.05  -1.18 0.03
## RACE    3.02   7.11 0.00
## SMSA    1.65   0.74 0.00
## MARRIED -2.09   2.35 0.00
## REGION   0.35  -1.06 0.02
## QOB    -0.03  -1.35 0.01
## REGION1  3.91  13.27 0.00
## REGION2  1.87   1.50 0.00
## REGION3  1.54   0.37 0.00
## REGION4  3.28   8.74 0.00

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## REGION5 1.69      0.85 0.00
## REGION6 3.56      10.69 0.00
## REGION7 2.68      5.16 0.00
## REGION8 4.16      15.29 0.00
## REGION9 2.22      2.93 0.00
## QOB1     1.13      -0.71 0.00
## QOB2     1.25      -0.44 0.00
## QOB3     1.05      -0.90 0.00
## QOB4     1.19      -0.58 0.00

##          WAGE    EDUC    AGE     RACE    SMSA MARRIED REGION REGION1 REGION2
## WAGE    87241.084 315.768 5.257 -10.490 -14.858 10.178 8.855 -0.854 3.820
## EDUC     315.768 10.742 -0.668 -0.138 -0.188 0.022 0.274 0.016 0.043
## AGE      5.257 -0.668 8.592 -0.004 -0.024 0.021 -0.125 0.016 0.009
## RACE    -10.490 -0.138 -0.004 0.076 -0.004 -0.011 0.001 -0.003 0.001
## SMSA    -14.858 -0.188 -0.024 -0.004 0.148 0.005 0.033 -0.002 -0.015
## MARRIED 10.178 0.022 0.021 -0.011 0.005 0.120 -0.022 -0.001 0.000
## REGION   8.855 0.274 -0.125 0.001 0.033 -0.022 6.064 -0.207 -0.438
## REGION1 -0.854 0.016 0.016 -0.003 -0.002 -0.001 -0.207 0.052 -0.009
## REGION2  3.820 0.043 0.009 0.001 -0.015 0.000 -0.438 -0.009 0.133
## REGION3  3.379 -0.040 0.006 -0.003 -0.004 0.002 -0.344 -0.011 -0.031
## REGION4 -1.138 0.000 -0.011 -0.004 0.012 0.002 -0.056 -0.004 -0.012
## REGION5 -6.815 -0.054 -0.014 0.010 0.003 0.001 0.041 -0.010 -0.028
## REGION6 -3.960 -0.068 0.006 0.003 0.011 0.002 0.079 -0.004 -0.010
## REGION7 -1.995 -0.032 0.003 0.001 -0.001 0.001 0.222 -0.005 -0.016
## REGION8 -0.217 0.020 -0.017 -0.003 0.006 0.002 0.160 -0.003 -0.008
## REGION9  7.781 0.115 0.001 -0.003 -0.010 -0.007 0.544 -0.007 -0.020

##          REGION3 REGION4 REGION5 REGION6 REGION7 REGION8 REGION9
## WAGE     3.379 -1.138 -6.815 -3.960 -1.995 -0.217 7.781
## EDUC    -0.040 0.000 -0.054 -0.068 -0.032 0.020 0.115
## AGE      0.006 -0.011 -0.014 0.006 0.003 -0.017 0.001
## RACE    -0.003 -0.004 0.010 0.003 0.001 -0.003 -0.003
## SMSA    -0.004 0.012 0.003 0.011 -0.001 0.006 -0.010
## MARRIED 0.002 0.002 0.001 0.002 0.001 0.002 -0.007
## REGION  -0.344 -0.056 0.041 0.079 0.222 0.160 0.544
## REGION1 -0.011 -0.004 -0.010 -0.004 -0.005 -0.003 -0.007
## REGION2 -0.031 -0.012 -0.028 -0.010 -0.016 -0.008 -0.020
## REGION3  0.157 -0.014 -0.035 -0.012 -0.019 -0.010 -0.025
## REGION4 -0.014 0.068 -0.013 -0.005 -0.007 -0.004 -0.009
## REGION5 -0.035 -0.013 0.146 -0.011 -0.018 -0.009 -0.023
## REGION6 -0.012 -0.005 -0.011 0.060 -0.006 -0.003 -0.008
## REGION7 -0.019 -0.007 -0.018 -0.006 0.090 -0.005 -0.013
## REGION8 -0.010 -0.004 -0.009 -0.003 -0.005 0.047 -0.006
## REGION9 -0.025 -0.009 -0.023 -0.008 -0.013 -0.006 0.112

##          WAGE    EDUC    AGE     RACE    SMSA MARRIED REGION REGION1 REGION2
## WAGE     1.000 0.326 0.006 -0.129 -0.131 0.100 0.012 -0.013 0.035
## EDUC      0.326 1.000 -0.070 -0.152 -0.149 0.019 0.034 0.022 0.036
## AGE      0.006 -0.070 1.000 -0.005 -0.021 0.021 -0.017 0.024 0.008
## RACE    -0.129 -0.152 -0.005 1.000 -0.036 -0.113 0.002 -0.046 0.014
## SMSA    -0.131 -0.149 -0.021 -0.036 1.000 0.041 0.034 -0.020 -0.104
## MARRIED 0.100 0.019 0.021 -0.113 0.041 1.000 -0.026 -0.008 -0.004
## REGION   0.012 0.034 -0.017 0.002 0.034 -0.026 1.000 -0.369 -0.487
## REGION1 -0.013 0.022 0.024 -0.046 -0.020 -0.008 -0.369 1.000 -0.105

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## REGION2 0.035 0.036 0.008 0.014 -0.104 -0.004 -0.487 -0.105 1.000
## REGION3 0.029 -0.031 0.005 -0.024 -0.024 0.014 -0.353 -0.119 -0.213
## REGION4 -0.015 -0.001 -0.015 -0.050 0.118 0.021 -0.088 -0.068 -0.122
## REGION5 -0.060 -0.043 -0.012 0.091 0.019 0.004 0.044 -0.112 -0.201
## REGION6 -0.055 -0.084 0.008 0.040 0.113 0.018 0.131 -0.063 -0.113
## REGION7 -0.023 -0.033 0.003 0.009 -0.011 0.007 0.301 -0.080 -0.144
## REGION8 -0.003 0.028 -0.026 -0.044 0.071 0.021 0.299 -0.055 -0.099
## REGION9 0.079 0.105 0.001 -0.030 -0.077 -0.061 0.660 -0.093 -0.167
##          REGION3 REGION4 REGION5 REGION6 REGION7 REGION8 REGION9
## WAGE      0.029 -0.015 -0.060 -0.055 -0.023 -0.003 0.079
## EDUC     -0.031 -0.001 -0.043 -0.084 -0.033 0.028 0.105
## AGE       0.005 -0.015 -0.012 0.008 0.003 -0.026 0.001
## RACE     -0.024 -0.050 0.091 0.040 0.009 -0.044 -0.030
## SMSA     -0.024 0.118 0.019 0.113 -0.011 0.071 -0.077
## MARRIED   0.014 0.021 0.004 0.018 0.007 0.021 -0.061
## REGION   -0.353 -0.088 0.044 0.131 0.301 0.299 0.660
## REGION1  -0.119 -0.068 -0.112 -0.063 -0.080 -0.055 -0.093
## REGION2  -0.213 -0.122 -0.201 -0.113 -0.144 -0.099 -0.167
## REGION3   1.000 -0.138 -0.228 -0.129 -0.164 -0.112 -0.189
## REGION4  -0.138  1.000 -0.130 -0.073 -0.093 -0.064 -0.108
## REGION5  -0.228 -0.130  1.000 -0.121 -0.154 -0.106 -0.178
## REGION6  -0.129 -0.073 -0.121  1.000 -0.087 -0.060 -0.100
## REGION7  -0.164 -0.093 -0.154 -0.087  1.000 -0.076 -0.128
## REGION8  -0.112 -0.064 -0.106 -0.060 -0.076  1.000 -0.087
## REGION9  -0.189 -0.108 -0.178 -0.100 -0.128 -0.087  1.000

## # A tibble: 9 x 11
##   REGION mean_wage mean_educ mean_age sd_wage sd_educ sd_age var_wage var_educ
##   <int>     <dbl>     <dbl>     <dbl>    <dbl>    <dbl>    <dbl>    <dbl>    <dbl>
## 1     1      421.      13.0      45.0    244.     3.10     2.93   59622.     9.62
## 2     2      461.      13.0      44.7    355.     3.17     2.96  126021.    10.0
## 3     3      454.      12.5      44.7    264.     3.07     2.89   69754.     9.40
## 4     4      421.      12.7      44.5    263.     3.15     2.94   69295.     9.90
## 5     5      398.      12.4      44.6    261.     3.48     2.99   68143.    12.1
## 6     6      375.      11.7      44.8    330.     3.74     2.77  108586.    14.0
## 7     7      416.      12.4      44.7    266.     3.57     2.98   70638.    12.7
## 8     8      432.      13.1      44.3    236.     2.95     2.95   55764.     8.73
## 9     9      497.      13.6      44.7    346.     2.92     2.89  119854.     8.54
## # i 2 more variables: var_age <dbl>, count <int>

##
## Descriptive statistics by group
## REGION: 1
##   vars   n   mean      sd median trimmed     mad     min     max   range skew
## REGION    1 549  1.00    0.00  1.00    1.00    0.00  1.00    1.0    0.00  NaN
## WAGE      2 549 420.98 244.18 384.71  389.65 171.07  3.94 1562.5 1558.56 1.74
## EDUC      3 549 13.01   3.10 12.00   12.91   2.97  5.00  20.0   15.00 0.33
## AGE       4 549 44.97   2.93 45.00   45.02   4.45 40.00  50.0   10.00 -0.05
## RACE      5 549  0.03   0.17  0.00    0.00    0.00  0.00    1.0   1.00  5.40
## SMSA      6 549  0.15   0.36  0.00    0.06    0.00  0.00    1.0   1.00  1.96
## MARRIED   7 549  0.85   0.36  1.00    0.93    0.00  0.00    1.0   1.00 -1.94
##   kurtosis   se
## REGION     NaN 0.00
## WAGE      4.51 10.42

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## EDUC      -0.16  0.13
## AGE       -1.22  0.13
## RACE      27.22  0.01
## SMSA      1.85  0.02
## MARRIED   1.78  0.02
##
## REGION: 2
##          vars   n   mean      sd median trimmed     mad   min   max range
## REGION    1 1584  2.00  0.00  2.00  2.00  0.00  2.0  2.0  0.0
## WAGE      2 1584 460.64 354.99 403.94 422.27 171.07 2.4 10167.5 10165.1
## EDUC      3 1584 12.98  3.17 12.00 12.90  2.97  0.0 20.0 20.0
## AGE       4 1584 44.74  2.96 45.00 44.73  4.45 40.0 50.0 10.0
## RACE      5 1584  0.09  0.29  0.00  0.00  0.00  0.0  1.0  1.0
## SMSA      6 1584  0.09  0.28  0.00  0.00  0.00  0.0  1.0  1.0
## MARRIED   7 1584  0.86  0.35  1.00  0.95  0.00  0.0  1.0  1.0
##          skew kurtosis   se
## REGION    NaN      NaN 0.00
## WAGE      13.60   352.35 8.92
## EDUC      0.18    0.42 0.08
## AGE       0.04    -1.22 0.07
## RACE      2.82    5.94 0.01
## SMSA      2.88    6.32 0.01
## MARRIED   -2.05   2.20 0.01
##
## REGION: 3
##          vars   n   mean      sd median trimmed     mad   min   max range
## REGION    1 1949  3.00  0.00  3.00  3.00  0.00  3.00 3.00 0.00
## WAGE      2 1949 453.86 264.11 409.2 425.41 164.62 0.15 4634.17 4634.02
## EDUC      3 1949 12.51  3.07 12.00 12.43  1.48  0.00 20.00 20.00
## AGE       4 1949 44.71  2.89 45.00 44.70  2.97 40.00 50.00 10.00
## RACE      5 1949  0.07  0.25  0.00  0.00  0.00  0.00  1.00  1.00
## SMSA      6 1949  0.16  0.37  0.00  0.08  0.00  0.00  1.00  1.00
## MARRIED   7 1949  0.87  0.34  1.00  0.96  0.00  0.00  1.00  1.00
##          skew kurtosis   se
## REGION    NaN      NaN 0.00
## WAGE      4.11    43.18 5.98
## EDUC      0.22    0.56 0.07
## AGE       0.05    -1.12 0.07
## RACE      3.37    9.39 0.01
## SMSA      1.83    1.36 0.01
## MARRIED   -2.21   2.88 0.01
##
## REGION: 4
##          vars   n   mean      sd median trimmed     mad   min   max range skew
## REGION    1 732   4.00  0.00  4.00  4.00  0.00  4.00 4.00  0  NaN
## WAGE      2 732 420.98 263.24 384.71 390.86 146.34 10.25 4076.25 4066 4.76
## EDUC      3 732 12.71  3.15 12.00 12.63  1.48  0.00 20.00 20  0.16
## AGE       4 732 44.52  2.94 44.00 44.48  4.45 40.00 50.00 10  0.11
## RACE      5 732   0.03  0.18  0.00  0.00  0.00  0.00  1.00  1  5.12
## SMSA      6 732   0.34  0.48  0.00  0.30  0.00  0.00  1.00  1  0.66
## MARRIED   7 732   0.89  0.32  1.00  0.98  0.00  0.00  1.00  1 -2.43
##          kurtosis   se
## REGION    NaN 0.00
## WAGE      52.28 9.73

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## EDUC      0.58 0.12
## AGE       -1.19 0.11
## RACE      24.24 0.01
## SMSA     -1.57 0.02
## MARRIED    3.93 0.01
##
## REGION: 5
##          vars   n   mean      sd median trimmed     mad   min   max range
## REGION    1 1773  5.00  0.00    5.00    5.00  0.00  5.0  5.00  0.00
## WAGE      2 1773 398.09 261.04 346.25  362.95 189.49  0.1 2501.25 2501.15
## EDUC      3 1773 12.41  3.48  12.00  12.46  2.97  0.0  20.00 20.00
## AGE       4 1773 44.60  2.99  45.00  44.59  4.45  40.0 50.00 10.00
## RACE      5 1773  0.14  0.34  0.00   0.05  0.00  0.0  1.00  1.00
## SMSA      6 1773  0.20  0.40  0.00   0.12  0.00  0.0  1.00  1.00
## MARRIED    7 1773  0.86  0.34  1.00   0.95  0.00  0.0  1.00  1.00
##          skew kurtosis   se
## REGION    NaN      NaN 0.00
## WAGE      2.23     8.76 6.20
## EDUC     -0.19     0.27 0.08
## AGE       0.06    -1.22 0.07
## RACE      2.10     2.42 0.01
## SMSA      1.52     0.31 0.01
## MARRIED   -2.12    2.51 0.01
##
## REGION: 6
##          vars   n   mean      sd median trimmed     mad   min   max range skew
## REGION    1 640   6.00  0.00    6.00    6.00  0.00  6.00  6  0.00  NaN
## WAGE      2 640 374.65 329.52 334.13  335.99 181.61  1.98 6005 6003.02 8.62
## EDUC      3 640  11.66  3.74  12.00  11.65  2.97  0.00  20 20.00 -0.03
## AGE       4 640  44.77  2.77  45.00  44.74  2.97  40.00 50 10.00  0.06
## RACE      5 640   0.12  0.33  0.00   0.03  0.00  0.00  1  1.00  2.26
## SMSA      6 640   0.35  0.48  0.00   0.31  0.00  0.00  1  1.00  0.63
## MARRIED   7 640   0.88  0.32  1.00   0.98  0.00  0.00  1  1.00 -2.40
##          kurtosis   se
## REGION    NaN  0.00
## WAGE      133.54 13.03
## EDUC      0.08  0.15
## AGE      -1.08  0.11
## RACE      3.12  0.01
## SMSA     -1.60  0.02
## MARRIED   3.76  0.01
##
## REGION: 7
##          vars   n   mean      sd median trimmed     mad   min   max range
## REGION    1 995   7.00  0.00    7.00    7.00  0.00  7.00  7.00  0.00
## WAGE      2 995 416.47 265.78 373.17  381.59 191.03  4.69 2501.25 2496.56
## EDUC      3 995  12.39  3.57  12.00  12.56  2.97  0.00  20.00 20.00
## AGE       4 995  44.71  2.98  45.00  44.71  4.45  40.00 50.00 10.00
## RACE      5 995   0.09  0.29  0.00   0.00  0.00  0.00  1.00  1.00
## SMSA      6 995   0.17  0.37  0.00   0.09  0.00  0.00  1.00  1.00
## MARRIED   7 995   0.87  0.34  1.00   0.96  0.00  0.00  1.00  1.00
##          skew kurtosis   se
## REGION    NaN  0.00
## WAGE      2.01  7.02 8.43

```

```

## EDUC    -0.47    0.56 0.11
## AGE     0.02    -1.19 0.09
## RACE    2.85    6.14 0.01
## SMSA    1.77    1.12 0.01
## MARRIED -2.18    2.74 0.01
##
## REGION: 8
##          vars   n   mean      sd median trimmed     mad   min   max range
## REGION    1 494  8.00  0.00    8.00    8.00  0.00  8.00  8.00  0.00
## WAGE      2 494 432.13 236.14 384.71  401.01 145.41  1.06 1469.49 1468.43
## EDUC      3 494 13.12  2.95   12.00   13.09  2.97  1.00  20.00 19.00
## AGE       4 494 44.34  2.95   44.00   44.27  2.97 40.00  50.00 10.00
## RACE      5 494  0.03  0.17   0.00    0.00  0.00  0.00  1.00  1.00
## SMSA      6 494  0.30  0.46   0.00    0.25  0.00  0.00  1.00  1.00
## MARRIED   7 494  0.89  0.31   1.00    0.99  0.00  0.00  1.00  1.00
##          skew kurtosis   se
## REGION    NaN      NaN  0.00
## WAGE      1.84    4.94 10.62
## EDUC      0.06    0.95  0.13
## AGE       0.17   -1.16  0.13
## RACE      5.46   27.84  0.01
## SMSA      0.86   -1.26  0.02
## MARRIED   -2.53   4.41  0.01
##
## REGION: 9
##          vars   n   mean      sd median trimmed     mad   min   max range skew
## REGION    1 1284  9.00  0.00    9.00    9.00  0.00  9.0   9   0.0  0.0  NaN
## WAGE      2 1284 497.11 346.20 440.48  454.64 196.73  7.1 7335 7327.9 7.21
## EDUC      3 1284 13.61  2.92   13.00   13.56  1.48  0.0   20  20.0 0.01
## AGE       4 1284 44.69  2.89   45.00   44.68  2.97 40.0   50  10.0 0.03
## RACE      5 1284  0.06  0.24   0.00    0.00  0.00  0.0    1   1.0 3.65
## SMSA      6 1284  0.10  0.30   0.00    0.00  0.00  0.0    1   1.0 2.60
## MARRIED   7 1284  0.81  0.40   1.00    0.88  0.00  0.0    1   1.0 -1.55
##          kurtosis   se
## REGION    NaN  0.00
## WAGE      121.20 9.66
## EDUC      0.85  0.08
## AGE       -1.18 0.08
## RACE      11.30 0.01
## SMSA      4.76  0.01
## MARRIED   0.39  0.01

##
## Descriptive statistics by group
## AGE_GROUP: 1
##          vars   n   mean      sd median trimmed     mad   min   max range
## WAGE      1 1835 439.82 340.56 384.71  401.20 171.07  1.06 7335 7333.94
## EDUC      2 1835 12.98  3.11   12.00   12.93  2.97  0.00  20  20.00
## AGE       3 1835 40.56  0.50   41.00   40.58  0.00 40.00  41  1.00
## RACE      4 1835  0.09  0.28   0.00    0.00  0.00  0.00  1   1.00
## SMSA      5 1835  0.18  0.39   0.00    0.10  0.00  0.00  1   1.00
## MARRIED   6 1835  0.85  0.36   1.00    0.94  0.00  0.00  1   1.00
## AGE_GROUP 7 1835  1.00  0.00   1.00    1.00  0.00  1.00  1   0.00
##          skew kurtosis   se

```

```

## WAGE      8.61   139.95 7.95
## EDUC      0.07    0.54 0.07
## AGE      -0.25   -1.94 0.01
## RACE      2.95    6.70 0.01
## SMSA      1.65    0.71 0.01
## MARRIED   -1.95   1.82 0.01
## AGE_GROUP  NaN     NaN 0.00
##
## -----
## AGE_GROUP: 2
##      vars   n   mean      sd median trimmed    mad   min   max range
## WAGE      1 2029 433.85 281.52 384.71 397.82 178.77  2.4 4634.17 4631.76
## EDUC      2 2029 12.90   3.22 12.00 12.90   2.97  0.0 20.00 20.00
## AGE       3 2029 42.50   0.50 43.00 42.50   0.00 42.0 43.00 1.00
## RACE      4 2029  0.08   0.27  0.00  0.00   0.00 0.0 1.00 1.00
## SMSA      5 2029  0.19   0.39  0.00  0.12   0.00 0.0 1.00 1.00
## MARRIED   6 2029  0.86   0.35  1.00  0.94   0.00 0.0 1.00 1.00
## AGE_GROUP 7 2029  2.00   0.00  2.00  2.00   0.00 2.0 2.00 0.00
##      skew kurtosis   se
## WAGE      3.45   30.53 6.25
## EDUC      -0.05   0.55 0.07
## AGE       -0.01   -2.00 0.01
## RACE      3.07    7.45 0.01
## SMSA      1.55    0.41 0.01
## MARRIED   -2.02   2.07 0.01
## AGE_GROUP  NaN     NaN 0.00
##
## -----
## AGE_GROUP: 3
##      vars   n   mean      sd median trimmed    mad   min   max range
## WAGE      1 2035 426.73 245.77 384.71 398.04 171.07  1.98 2884.62 2882.64
## EDUC      2 2035 12.75   3.26 12.00 12.75   2.97  0.00 20.00 20.00
## AGE       3 2035 44.48   0.50 44.00 44.47   0.00 44.00 45.00 1.00
## RACE      4 2035  0.08   0.28  0.00  0.00   0.00 0.0 1.00 1.00
## SMSA      5 2035  0.19   0.40  0.00  0.12   0.00 0.00 1.00 1.00
## MARRIED   6 2035  0.87   0.34  1.00  0.96   0.00 0.00 1.00 1.00
## AGE_GROUP 7 2035  3.00   0.00  3.00  3.00   0.00 3.00 3.00 0.00
##      skew kurtosis   se
## WAGE      2.12    9.53 5.45
## EDUC      -0.01   0.38 0.07
## AGE       0.09   -1.99 0.01
## RACE      3.03    7.19 0.01
## SMSA      1.55    0.39 0.01
## MARRIED   -2.16   2.66 0.01
## AGE_GROUP  NaN     NaN 0.00
##
## -----
## AGE_GROUP: 4
##      vars   n   mean      sd median trimmed    mad   min   max range
## WAGE      1 1876 444.74 341.11 391.25 408.69 191.22  0.15 10167.5 10167.35
## EDUC      2 1876 12.62   3.38 12.00 12.61   2.97  0.00 20.0 20.00
## AGE       3 1876 46.51   0.50 47.00 46.52   0.00 46.00 47.0 1.00
## RACE      4 1876  0.09   0.28  0.00  0.00   0.00 0.00 1.0 1.00
## SMSA      5 1876  0.17   0.38  0.00  0.09   0.00 0.00 1.0 1.00
## MARRIED   6 1876  0.86   0.35  1.00  0.95   0.00 0.00 1.0 1.00
## AGE_GROUP 7 1876  4.00   0.00  4.00  4.00   0.00 4.00 4.0 0.00
##      skew kurtosis   se

```

```

## WAGE      13.04   351.30 7.88
## EDUC     -0.06    0.47  0.08
## AGE      -0.05   -2.00  0.01
## RACE      2.96    6.74  0.01
## SMSA      1.74    1.03  0.01
## MARRIED   -2.05   2.19  0.01
## AGE_GROUP  NaN     NaN  0.00
##
## -----
## AGE_GROUP: 5
##          vars   n   mean      sd median trimmed    mad   min   max range
## WAGE      1 2225 438.28 266.11 384.71  404.37 173.64  0.1 2667.5 2667.4
## EDUC      2 2225 12.37   3.37  12.00   12.40   2.97  0.0  20.0  20.0
## AGE       3 2225 48.69   0.67  49.00   48.62   1.48  48.0  50.0  2.0
## RACE      4 2225  0.08   0.27  0.00    0.00   0.00  0.0   1.0  1.0
## SMSA      5 2225  0.17   0.37  0.00    0.08   0.00  0.0   1.0  1.0
## MARRIED   6 2225  0.87   0.33  1.00   0.97   0.00  0.0   1.0  1.0
## AGE_GROUP 7 2225  5.00   0.00  5.00    5.00   0.00  5.0   5.0  0.0
##          skew kurtosis   se
## WAGE      2.05    7.54 5.64
## EDUC     -0.18    0.63 0.07
## AGE       0.45   -0.79 0.01
## RACE      3.06    7.37 0.01
## SMSA      1.79    1.21 0.01
## MARRIED   -2.24   3.00 0.01
## AGE_GROUP  NaN     NaN 0.00

```

[[1]]

Table 1: REGION 1

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	59622.389	326.291	19.889	-4.301	-19.309	8.220
EDUC	326.291	9.617	-0.350	-0.024	-0.152	-0.054
AGE	19.889	-0.350	8.596	0.001	-0.054	0.074
RACE	-4.301	-0.024	0.001	0.030	-0.005	-0.004
SMSA	-19.309	-0.152	-0.054	-0.005	0.127	-0.005
MARRIED	8.220	-0.054	0.074	-0.004	-0.005	0.129

[[2]]

Table 2: REGION 2

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	126020.884	335.536	29.869	-13.086	-6.225	16.273
EDUC	335.536	10.031	-0.673	-0.158	-0.088	0.091
AGE	29.869	-0.673	8.753	-0.016	0.009	-0.012
RACE	-13.086	-0.158	-0.016	0.084	-0.007	-0.014
SMSA	-6.225	-0.088	0.009	-0.007	0.081	0.001
MARRIED	16.273	0.091	-0.012	-0.014	0.001	0.122

[[3]]

Table 3: REGION 3

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	69754.484	247.163	-9.152	-6.535	-13.792	10.302
EDUC	247.163	9.398	-0.690	-0.083	-0.106	-0.007
AGE	-9.152	-0.690	8.344	-0.021	-0.035	-0.018
RACE	-6.535	-0.083	-0.021	0.065	-0.011	-0.006
SMSA	-13.792	-0.106	-0.035	-0.011	0.136	0.006
MARRIED	10.302	-0.007	-0.018	-0.006	0.006	0.113

[[4]]

Table 4: REGION 4

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	69294.730	276.252	-25.048	-4.650	-20.462	12.774
EDUC	276.252	9.903	-0.788	-0.043	-0.246	0.082
AGE	-25.048	-0.788	8.668	0.008	0.015	0.020
RACE	-4.650	-0.043	0.008	0.033	-0.005	-0.004
SMSA	-20.462	-0.246	0.015	-0.005	0.226	0.005
MARRIED	12.774	0.082	0.020	-0.004	0.005	0.101

[[5]]

Table 5: REGION 5

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	68142.878	359.308	-13.139	-15.912	-13.042	10.883
EDUC	359.308	12.144	-0.823	-0.232	-0.257	0.040
AGE	-13.139	-0.823	8.956	0.017	-0.038	0.053
RACE	-15.912	-0.232	0.017	0.119	0.001	-0.019
SMSA	-13.042	-0.257	-0.038	0.001	0.159	0.003
MARRIED	10.883	0.040	0.053	-0.019	0.003	0.118

[[6]]

Table 6: REGION 6

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	108586.360	289.292	-38.510	-10.947	-20.349	3.987
EDUC	289.292	14.004	-1.028	-0.234	-0.204	0.117
AGE	-38.510	-1.028	7.682	0.018	0.036	-0.011
RACE	-10.947	-0.234	0.018	0.110	0.006	-0.022
SMSA	-20.349	-0.204	0.036	0.006	0.227	0.011
MARRIED	3.987	0.117	-0.011	-0.022	0.011	0.102

[[7]]

Table 7: REGION 7

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	70637.866	357.447	26.277	-11.392	-12.199	11.726
EDUC	357.447	12.717	-0.614	-0.183	-0.219	0.008
AGE	26.277	-0.614	8.851	0.008	-0.026	0.055
RACE	-11.392	-0.183	0.008	0.082	0.004	-0.010
SMSA	-12.199	-0.219	-0.026	0.004	0.140	0.004
MARRIED	11.726	0.008	0.055	-0.010	0.004	0.114

[[8]]

Table 8: REGION 8

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	55763.738	204.967	8.289	-5.134	-19.118	0.818
EDUC	204.967	8.725	-0.586	-0.044	-0.214	0.034
AGE	8.289	-0.586	8.700	-0.033	-0.049	0.027
RACE	-5.134	-0.044	-0.033	0.030	-0.005	-0.001
SMSA	-19.118	-0.214	-0.049	-0.005	0.211	0.008
MARRIED	0.818	0.034	0.027	-0.001	0.008	0.096

[[9]]

Table 9: REGION 9

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	119854.165	270.881	33.568	-8.149	-7.110	10.765
EDUC	270.881	8.544	-0.359	-0.046	-0.113	-0.022
AGE	33.568	-0.359	8.370	-0.012	-0.016	0.051
RACE	-8.149	-0.046	-0.012	0.058	-0.005	-0.009
SMSA	-7.110	-0.113	-0.016	-0.005	0.093	0.005
MARRIED	10.765	-0.022	0.051	-0.009	0.005	0.156

[[1]]

Table 10: REGION 1

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	1.000	0.431	0.028	-0.102	-0.222	0.094
EDUC	0.431	1.000	-0.038	-0.045	-0.137	-0.049
AGE	0.028	-0.038	1.000	0.002	-0.052	0.071
RACE	-0.102	-0.045	0.002	1.000	-0.075	-0.071
SMSA	-0.222	-0.137	-0.052	-0.075	1.000	-0.037
MARRIED	0.094	-0.049	0.071	-0.071	-0.037	1.000

[[2]]

Table 11: REGION 2

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	1.000	0.298	0.028	-0.127	-0.062	0.131
EDUC	0.298	1.000	-0.072	-0.173	-0.098	0.082
AGE	0.028	-0.072	1.000	-0.019	0.011	-0.011
RACE	-0.127	-0.173	-0.019	1.000	-0.084	-0.139
SMSA	-0.062	-0.098	0.011	-0.084	1.000	0.007
MARRIED	0.131	0.082	-0.011	-0.139	0.007	1.000

[[3]]

Table 12: REGION 3

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	1.000	0.305	-0.012	-0.097	-0.142	0.116
EDUC	0.305	1.000	-0.078	-0.107	-0.093	-0.007
AGE	-0.012	-0.078	1.000	-0.029	-0.033	-0.019
RACE	-0.097	-0.107	-0.029	1.000	-0.115	-0.075
SMSA	-0.142	-0.093	-0.033	-0.115	1.000	0.049
MARRIED	0.116	-0.007	-0.019	-0.075	0.049	1.000

[[4]]

Table 13: REGION 4

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	1.000	0.333	-0.032	-0.097	-0.164	0.153
EDUC	0.333	1.000	-0.085	-0.076	-0.164	0.082
AGE	-0.032	-0.085	1.000	0.015	0.010	0.021
RACE	-0.097	-0.076	0.015	1.000	-0.057	-0.075
SMSA	-0.164	-0.164	0.010	-0.057	1.000	0.031
MARRIED	0.153	0.082	0.021	-0.075	0.031	1.000

[[5]]

Table 14: REGION 5

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	1.000	0.395	-0.017	-0.177	-0.125	0.122
EDUC	0.395	1.000	-0.079	-0.193	-0.185	0.034
AGE	-0.017	-0.079	1.000	0.017	-0.032	0.052
RACE	-0.177	-0.193	0.017	1.000	0.008	-0.157
SMSA	-0.125	-0.185	-0.032	0.008	1.000	0.023
MARRIED	0.122	0.034	0.052	-0.157	0.023	1.000

[[6]]

Table 15: REGION 6

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	1.000	0.235	-0.042	-0.100	-0.130	0.038
EDUC	0.235	1.000	-0.099	-0.189	-0.114	0.097
AGE	-0.042	-0.099	1.000	0.019	0.027	-0.012
RACE	-0.100	-0.189	0.019	1.000	0.041	-0.203
SMSA	-0.130	-0.114	0.027	0.041	1.000	0.070
MARRIED	0.038	0.097	-0.012	-0.203	0.070	1.000

[[7]]

Table 16: REGION 7

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	1.000	0.377	0.033	-0.149	-0.122	0.130
EDUC	0.377	1.000	-0.058	-0.179	-0.164	0.007
AGE	0.033	-0.058	1.000	0.010	-0.023	0.055
RACE	-0.149	-0.179	0.010	1.000	0.036	-0.105
SMSA	-0.122	-0.164	-0.023	0.036	1.000	0.033
MARRIED	0.130	0.007	0.055	-0.105	0.033	1.000

[[8]]

Table 17: REGION 8

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	1.000	0.294	0.012	-0.127	-0.176	0.011
EDUC	0.294	1.000	-0.067	-0.087	-0.158	0.037
AGE	0.012	-0.067	1.000	-0.065	-0.036	0.029
RACE	-0.127	-0.087	-0.065	1.000	-0.065	-0.015
SMSA	-0.176	-0.158	-0.036	-0.065	1.000	0.057
MARRIED	0.011	0.037	0.029	-0.015	0.057	1.000

[[9]]

Table 18: REGION 9

	WAGE	EDUC	AGE	RACE	SMSA	MARRIED
WAGE	1.000	0.268	0.034	-0.098	-0.067	0.079
EDUC	0.268	1.000	-0.042	-0.066	-0.127	-0.019
AGE	0.034	-0.042	1.000	-0.017	-0.018	0.044
RACE	-0.098	-0.066	-0.017	1.000	-0.066	-0.096
SMSA	-0.067	-0.127	-0.018	-0.066	1.000	0.044
MARRIED	0.079	-0.019	0.044	-0.096	0.044	1.000

```
## Warning: Use of 'df$EDUC' is discouraged.
## i Use 'EDUC' instead.
```

```
## Warning: Use of 'df$WAGE' is discouraged.
## i Use 'WAGE' instead.
```



## Step 2: OLS estimation and testing

```
##
## -----
##                               Dependent variable:
## -----
##                               WAGE
## -----
##   ## EDUC          26.696***  

##                   (0.869)  

##                   t = 30.724  

##                   p = 0.000  

##   ## AGE           2.244**  

##                   (0.942)  

##                   t = 2.382  

##                   p = 0.018  

##   ## RACE         -77.632***  

##                   (10.225)  

##                   t = -7.592  

##                   p = 0.000  

##   ## SMSA         -63.756***
```

```

##                               (7.393)
##                               t = -8.624
##                               p = 0.000
## MARRIED                      78.001***  

##                               (8.026)
##                               t = 9.719
##                               p = 0.000
## REGION2                      41.193***  

##                               (13.644)
##                               t = 3.019
##                               p = 0.003
## REGION3                      49.088***  

##                               (13.305)
##                               t = 3.690
##                               p = 0.0003
## REGION4                      18.845  

##                               (15.600)
##                               t = 1.208
##                               p = 0.228
## REGION5                      4.205  

##                               (13.492)
##                               t = 0.312
##                               p = 0.756
## REGION6                      7.604  

##                               (16.123)
##                               t = 0.472
##                               p = 0.638
## REGION7                      17.081  

##                               (14.646)
##                               t = 1.166
##                               p = 0.244
## REGION8                      15.897  

##                               (17.106)
##                               t = 0.929
##                               p = 0.353
## REGION9                      63.710***  

##                               (14.046)
##                               t = 4.536
##                               p = 0.00001
## Constant                      -81.669*
##                               (46.614)
##                               t = -1.752
##                               p = 0.080
## -----
## Observations                  10,000
## R2                            0.134
## Adjusted R2                   0.133
## Residual Std. Error          275.029 (df = 9986)
## F Statistic                   118.953*** (df = 13; 9986) (p = 0.000)
## =====
## Note:                         *p<0.1; **p<0.05; ***p<0.01

## 
## Linear hypothesis test:

```

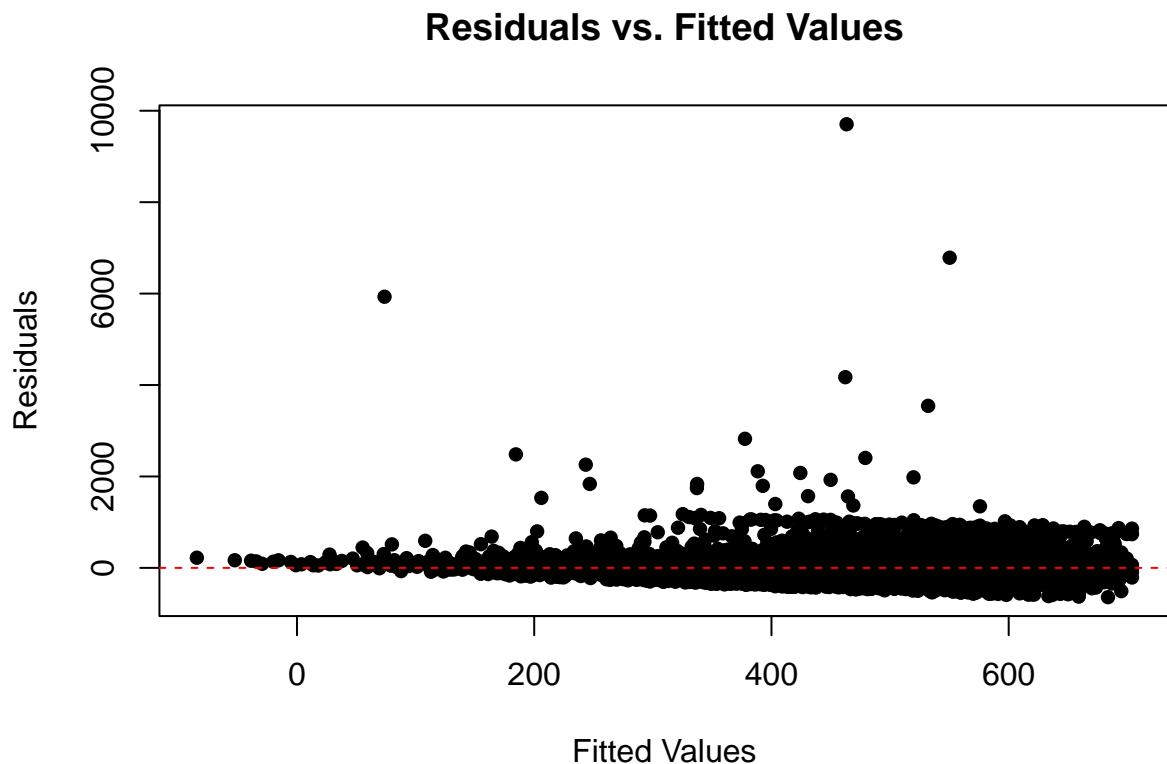
```

## AGE = 0
## RACE = 0
## MARRIED = 0
## SMSA = 0
##
## Model 1: restricted model
## Model 2: WAGE ~ EDUC + AGE + RACE + SMSA + MARRIED + REGION2 + REGION3 +
##           REGION4 + REGION5 + REGION6 + REGION7 + REGION8 + REGION9
##
##   Res.Df      RSS Df Sum of Sq      F    Pr(>F)
## 1  9990 773577022
## 2  9986 755352847  4  18224175 60.232 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

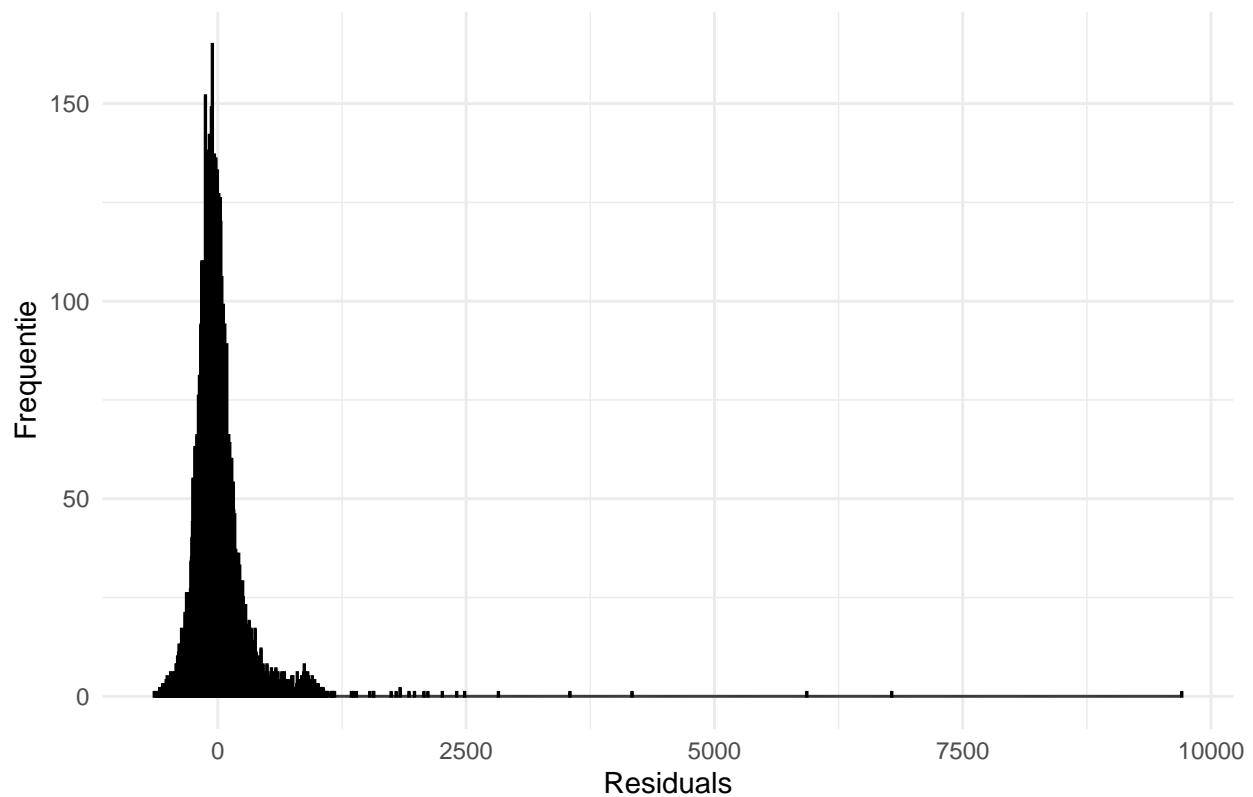
##
## Linear hypothesis test:
## REGION2 = 0
## REGION3 = 0
## REGION4 = 0
## REGION5 = 0
## REGION6 = 0
## REGION7 = 0
## REGION8 = 0
## REGION9 = 0
##
## Model 1: restricted model
## Model 2: WAGE ~ EDUC + AGE + RACE + SMSA + MARRIED + REGION2 + REGION3 +
##           REGION4 + REGION5 + REGION6 + REGION7 + REGION8 + REGION9
##
##   Res.Df      RSS Df Sum of Sq      F    Pr(>F)
## 1  9994 759957235
## 2  9986 755352847  8  4604388 7.6089 3.389e-10 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

### Step 3: Checking GM assumptions and individual remedies



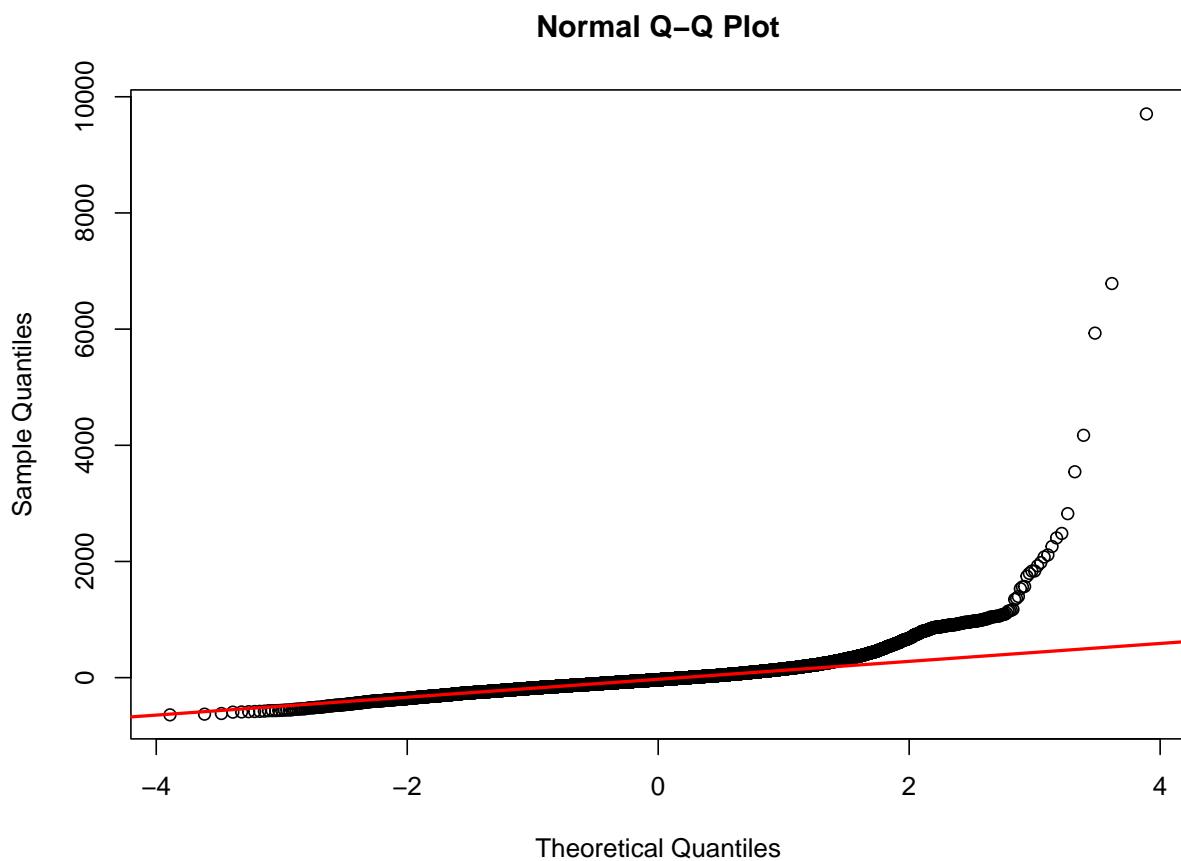
## Histogram Residuals



```
[1] -4.605628e-16
```

```
One Sample t-test
```

```
data: residuals t = -1.6757e-16, df = 9999, p-value = 1 alternative hypothesis: true mean is not equal to 0  
95 percent confidence interval: -5.387624 5.387624 sample estimates: mean of x -4.605628e-16
```



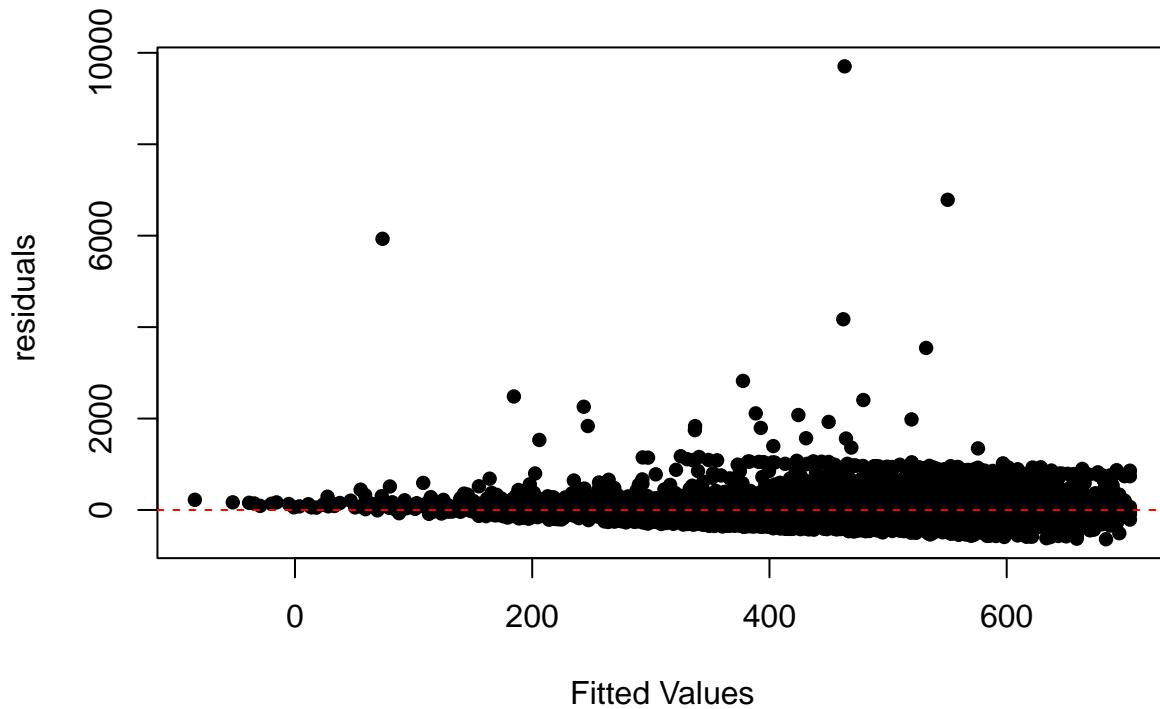
Jarque Bera Test

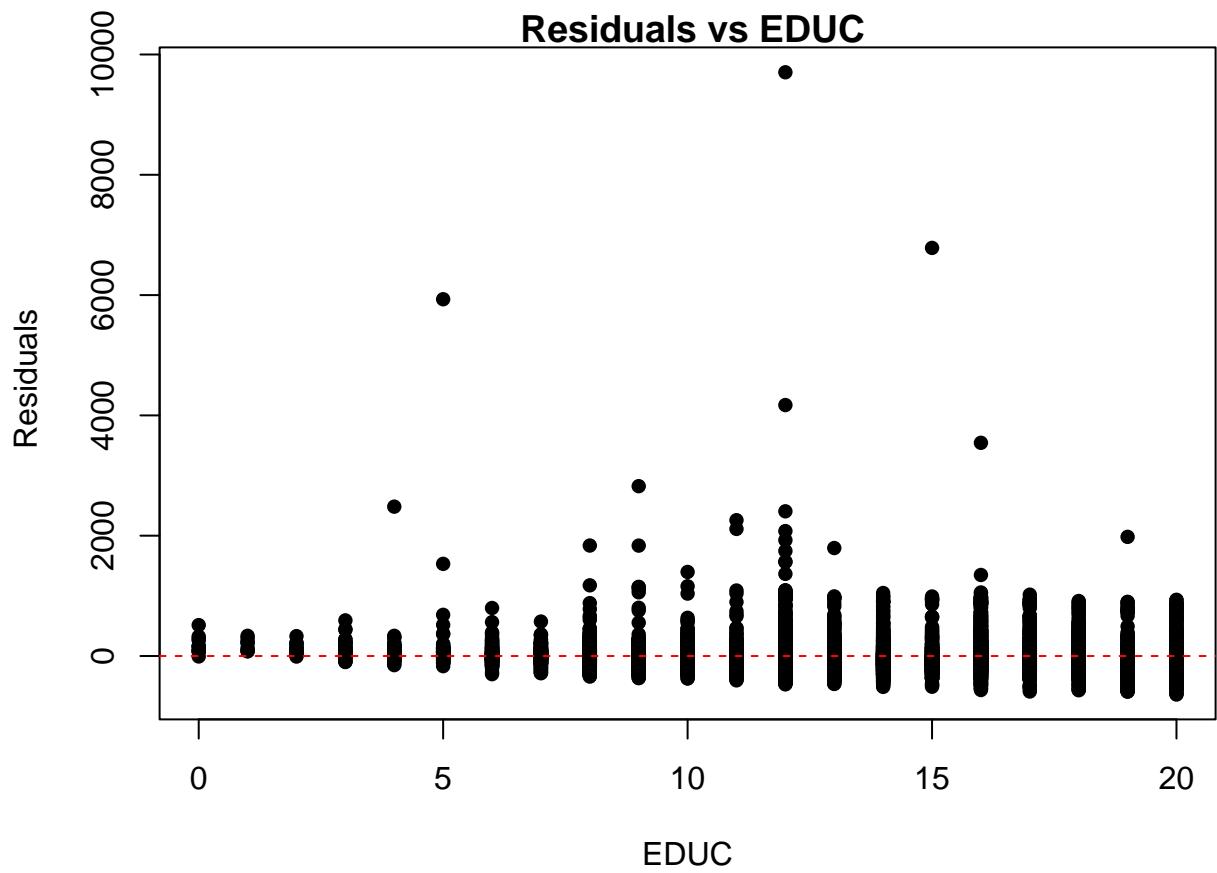
data: residuals X-squared = 21722226, df = 2, p-value < 2.2e-16

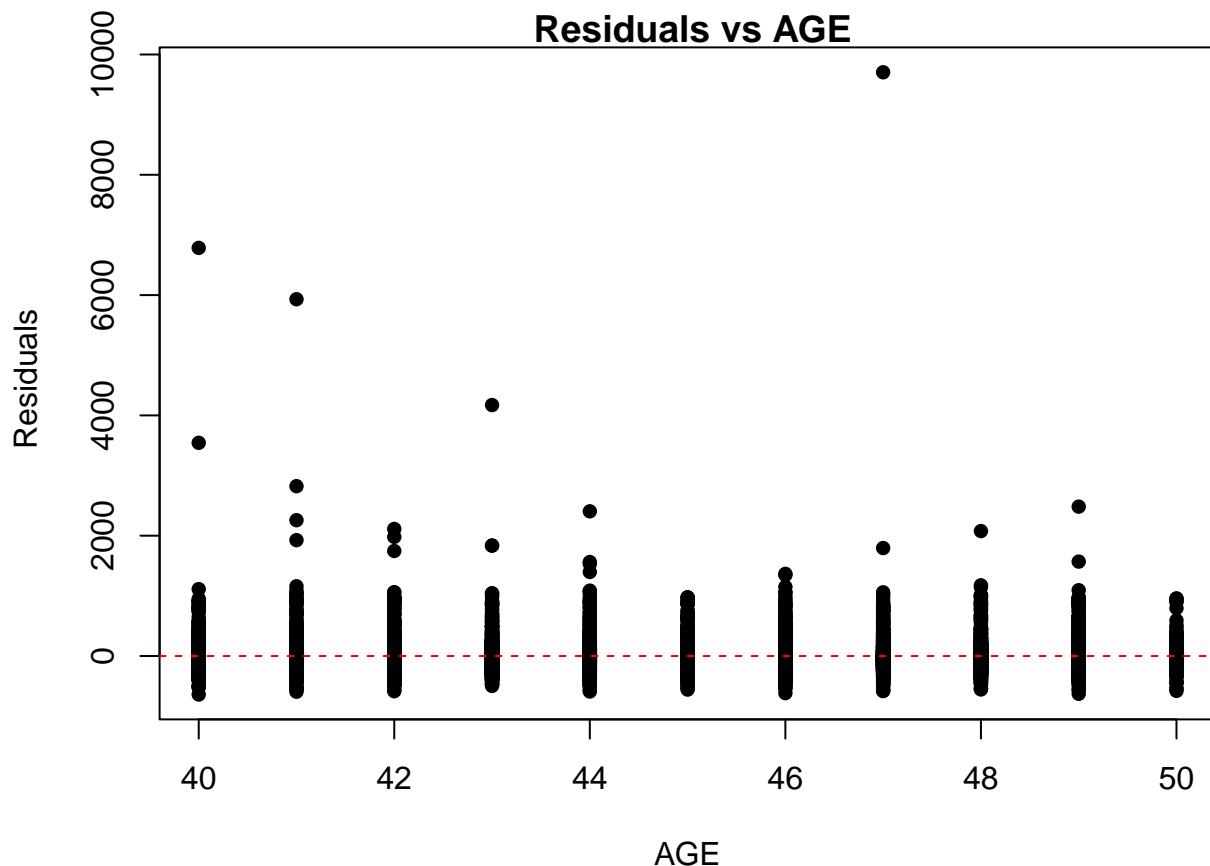
Table 19:

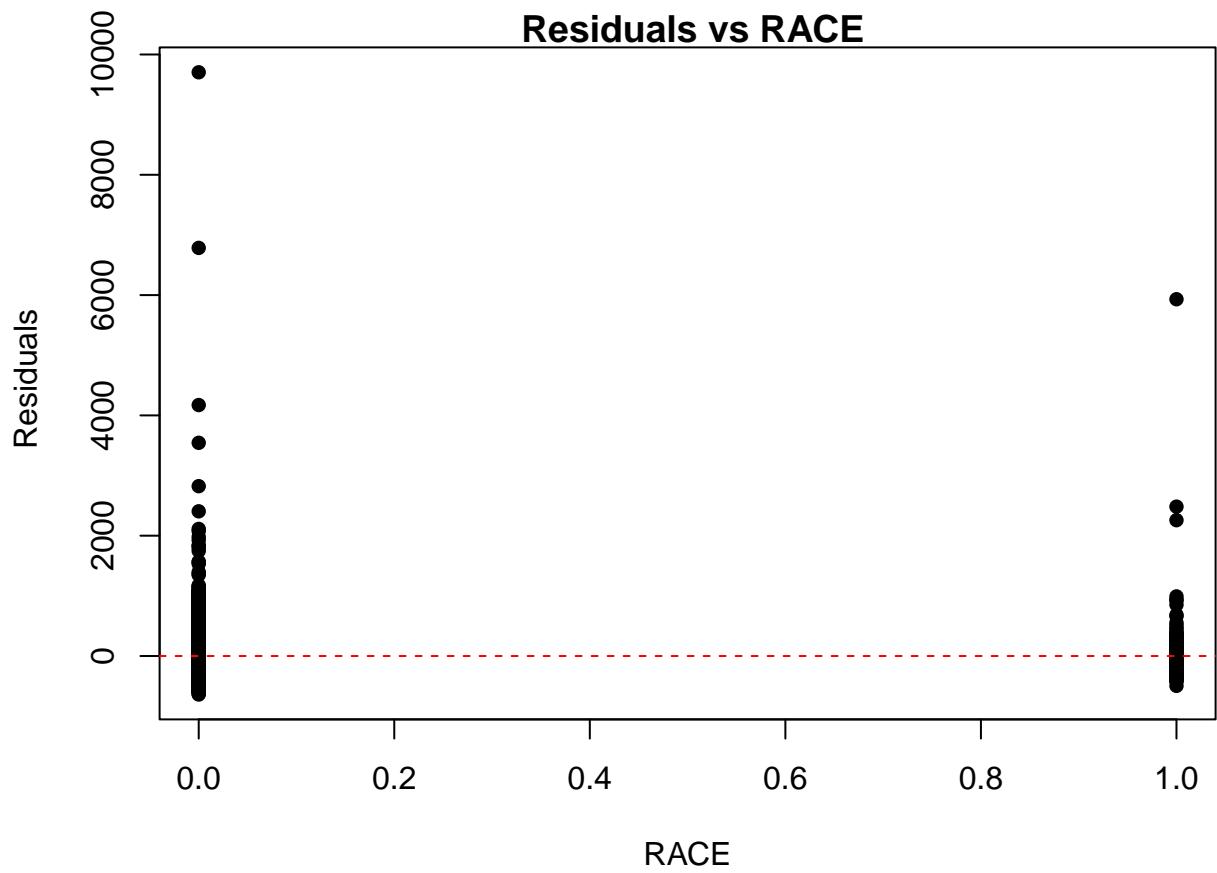
	Variable	VIF
EDUC	EDUC	1.072
AGE	AGE	1.008
RACE	RACE	1.054
SMSA	SMSA	1.073
MARRIED	MARRIED	1.020
REGION2	REGION2	3.281
REGION3	REGION3	3.672
REGION4	REGION4	2.183
REGION5	REGION5	3.510
REGION6	REGION6	2.059
REGION7	REGION7	2.541
REGION8	REGION8	1.817
REGION9	REGION9	2.919

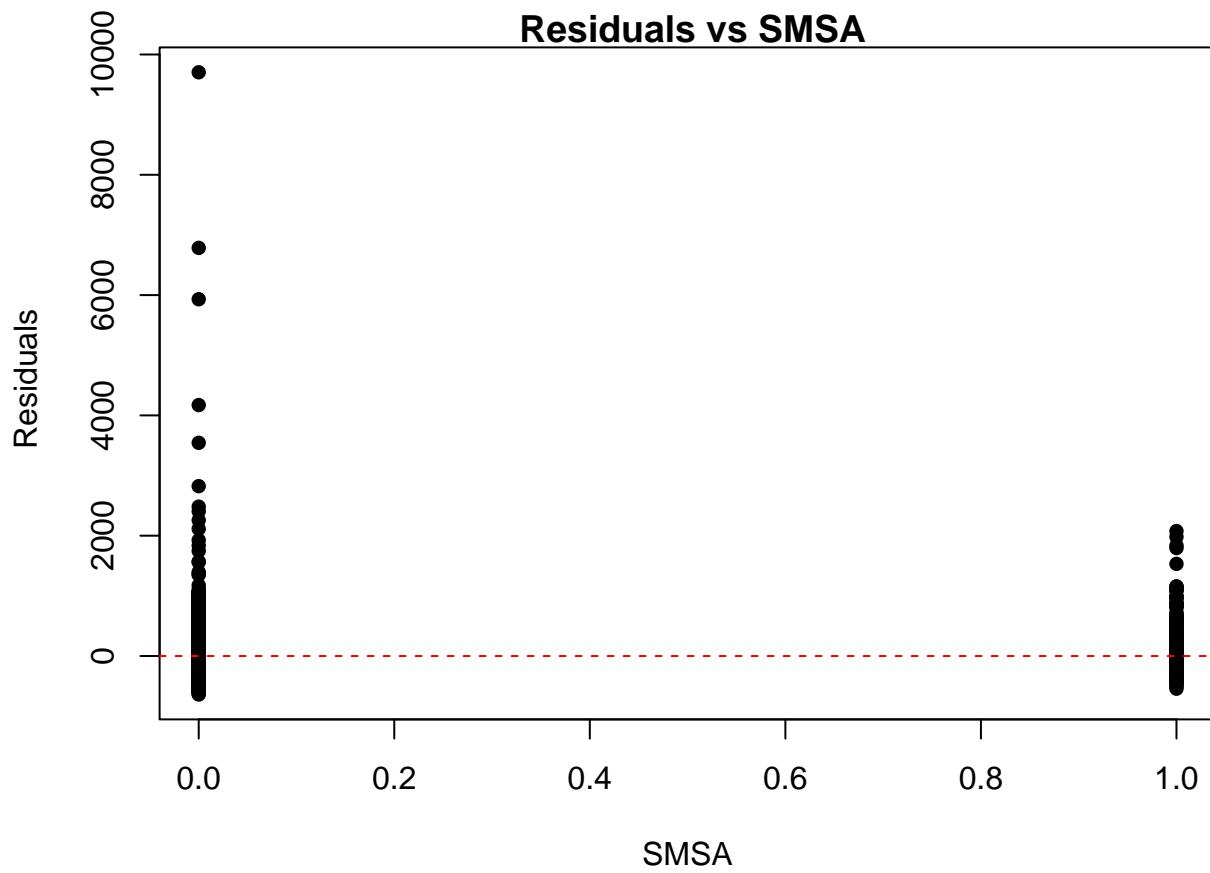
### residuals vs. Fitted Values

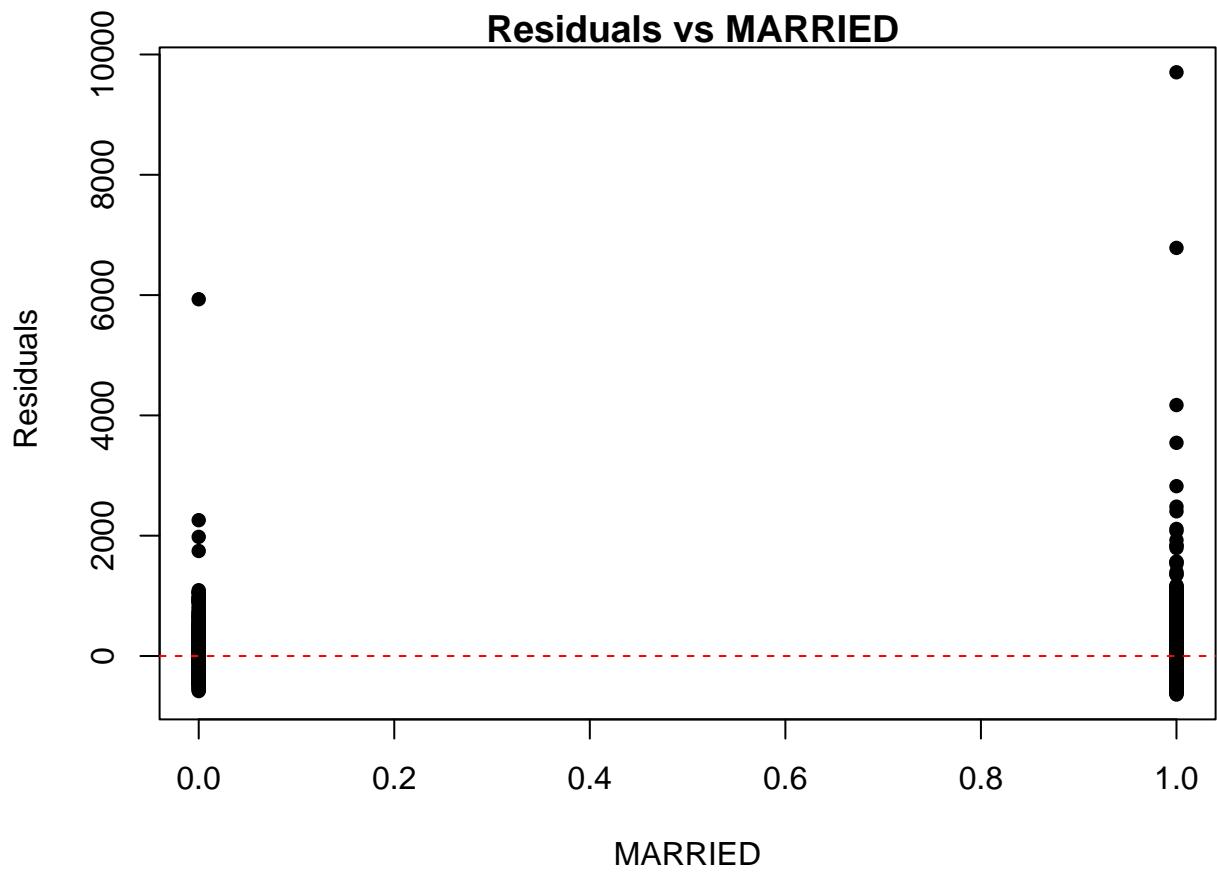


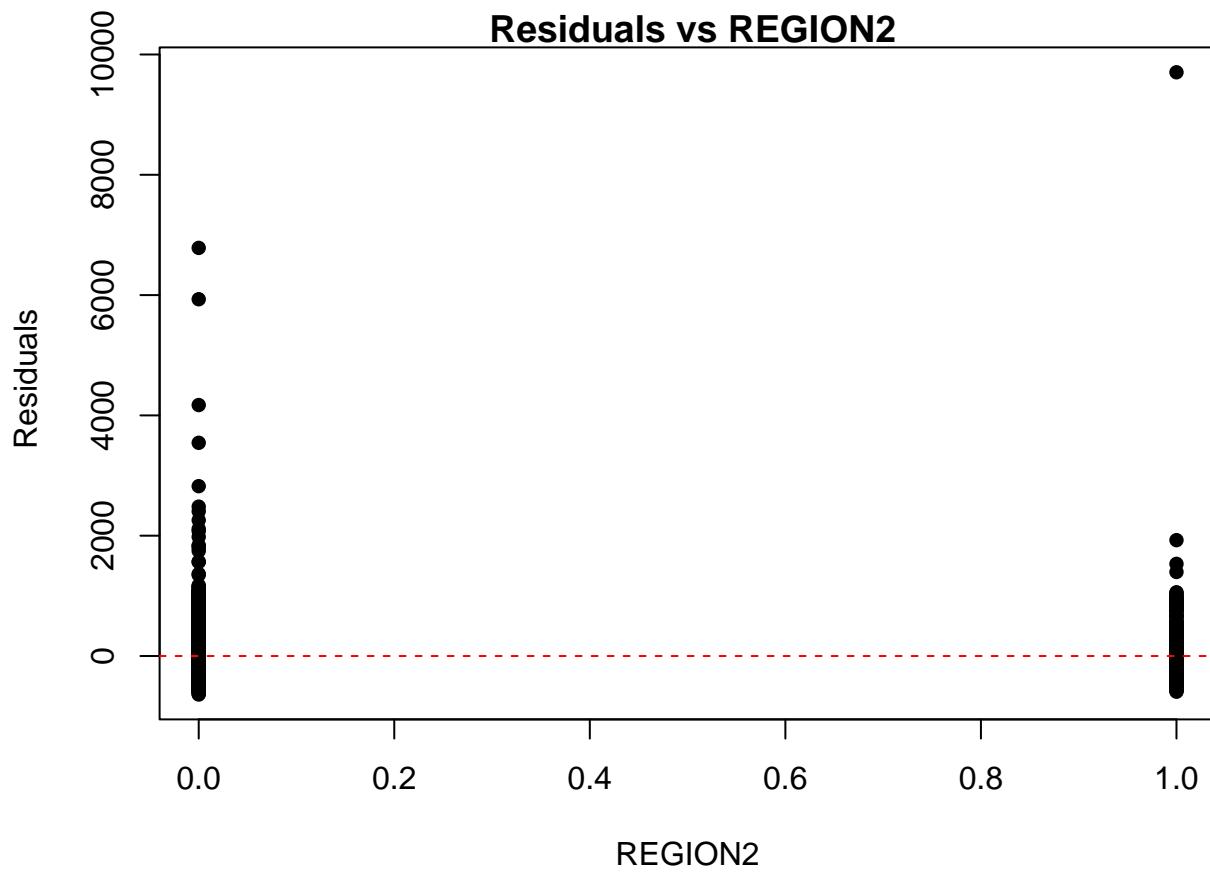


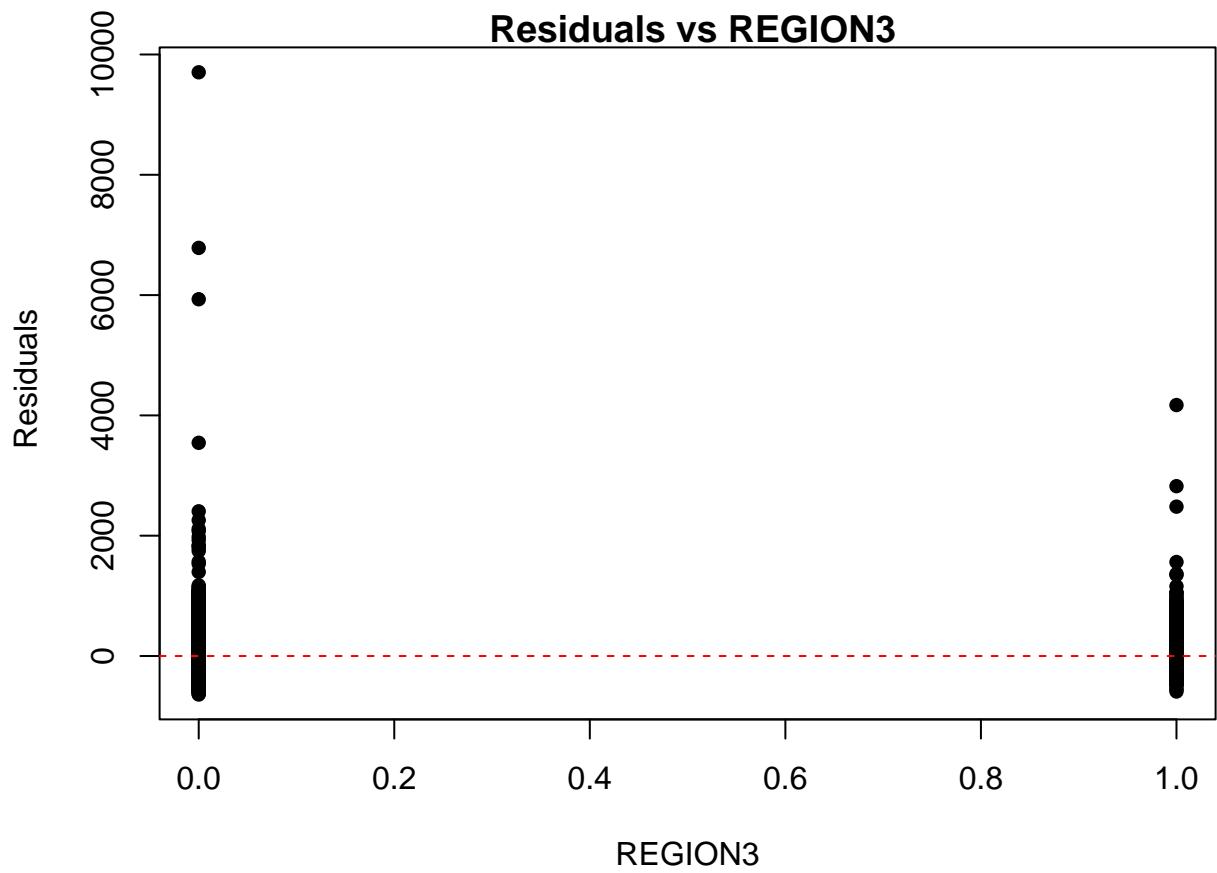


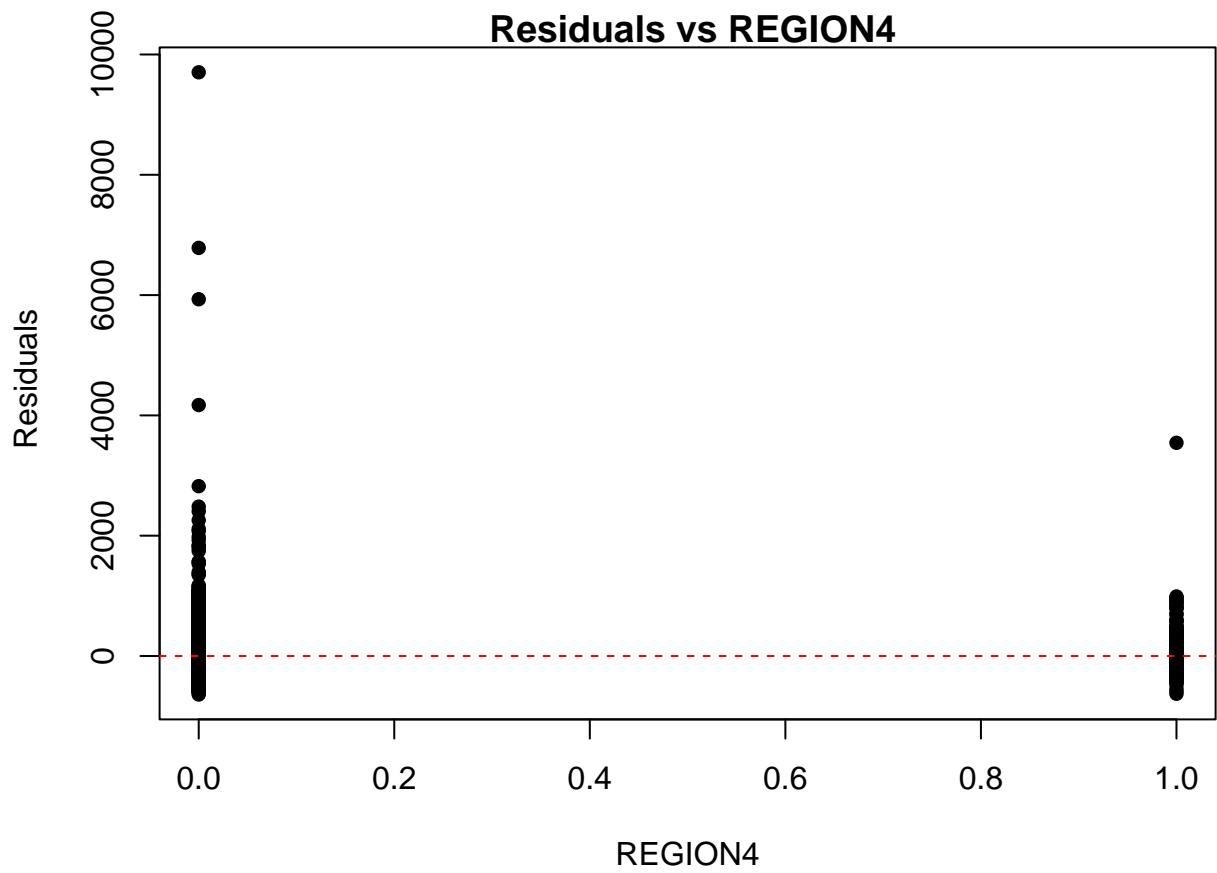


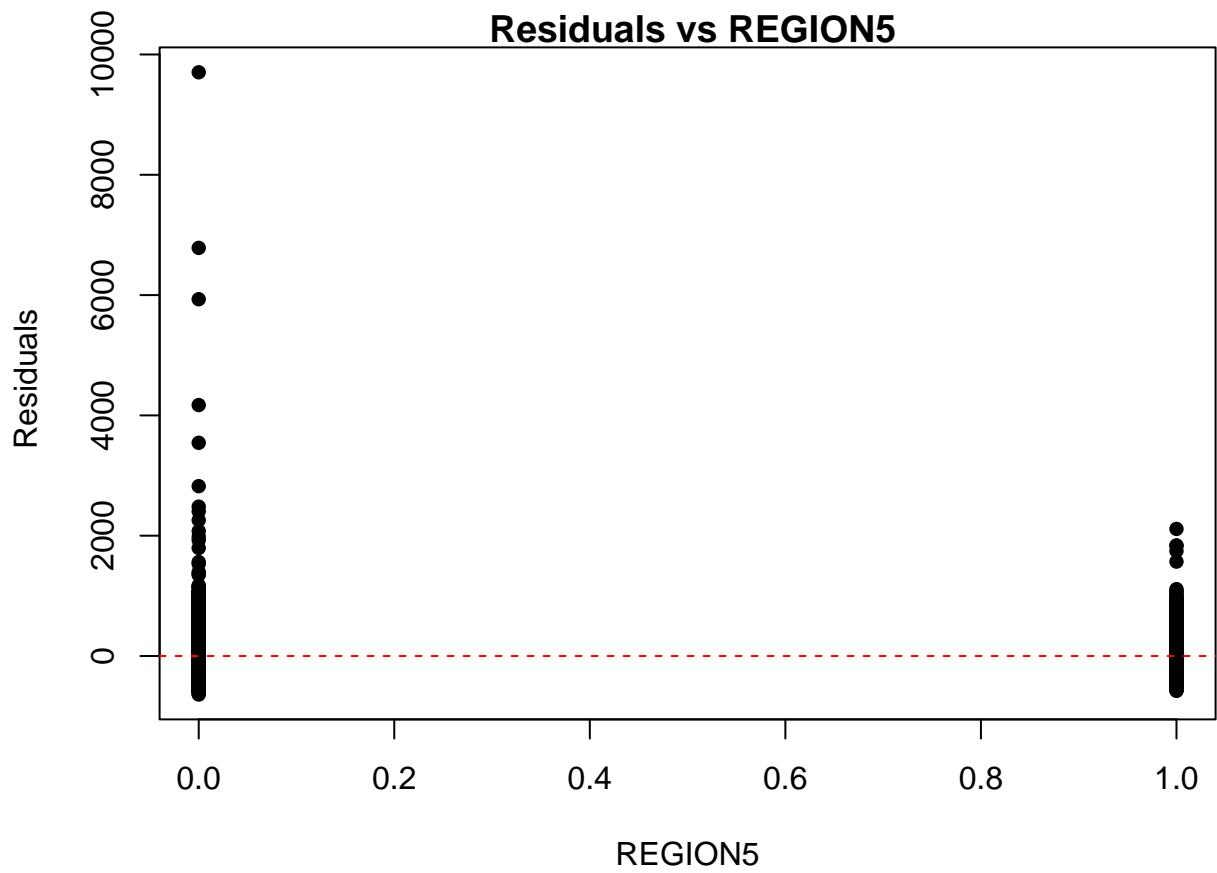


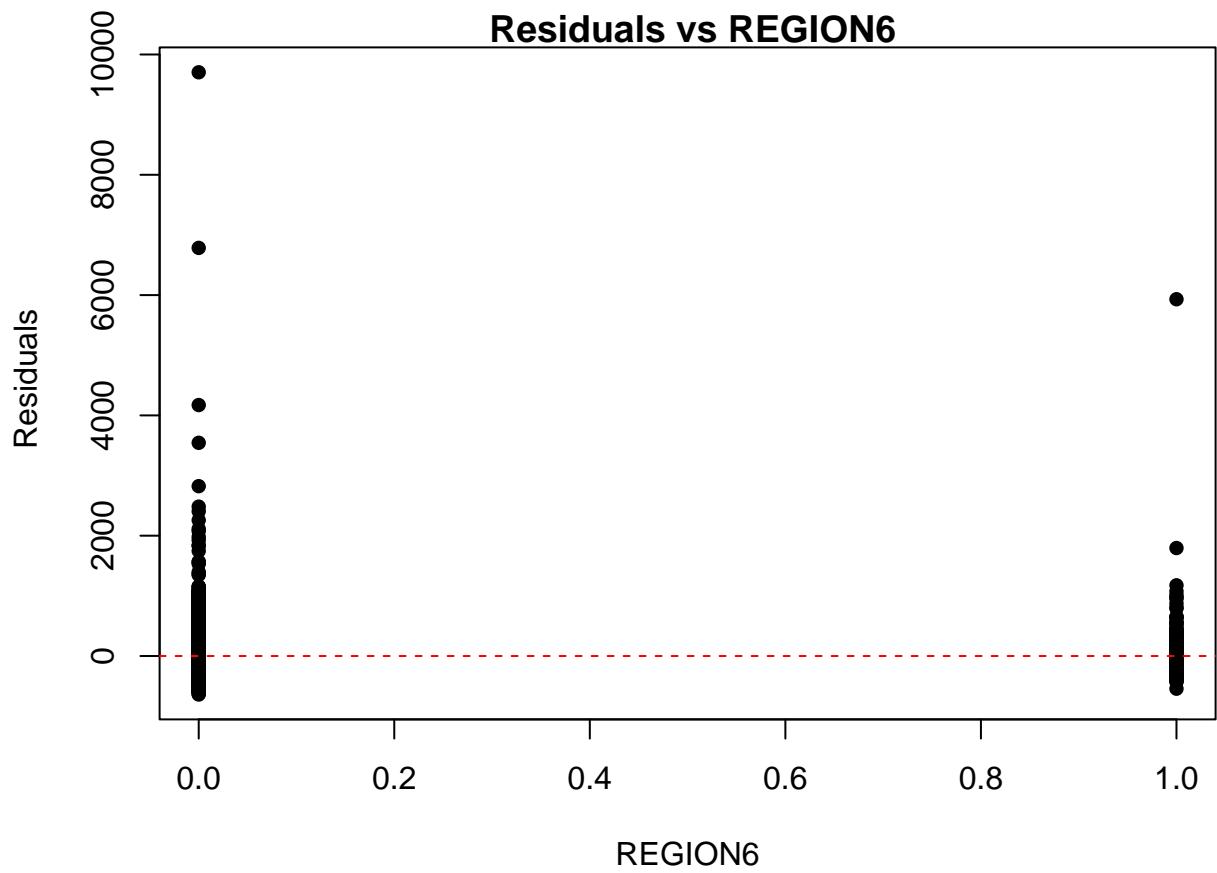


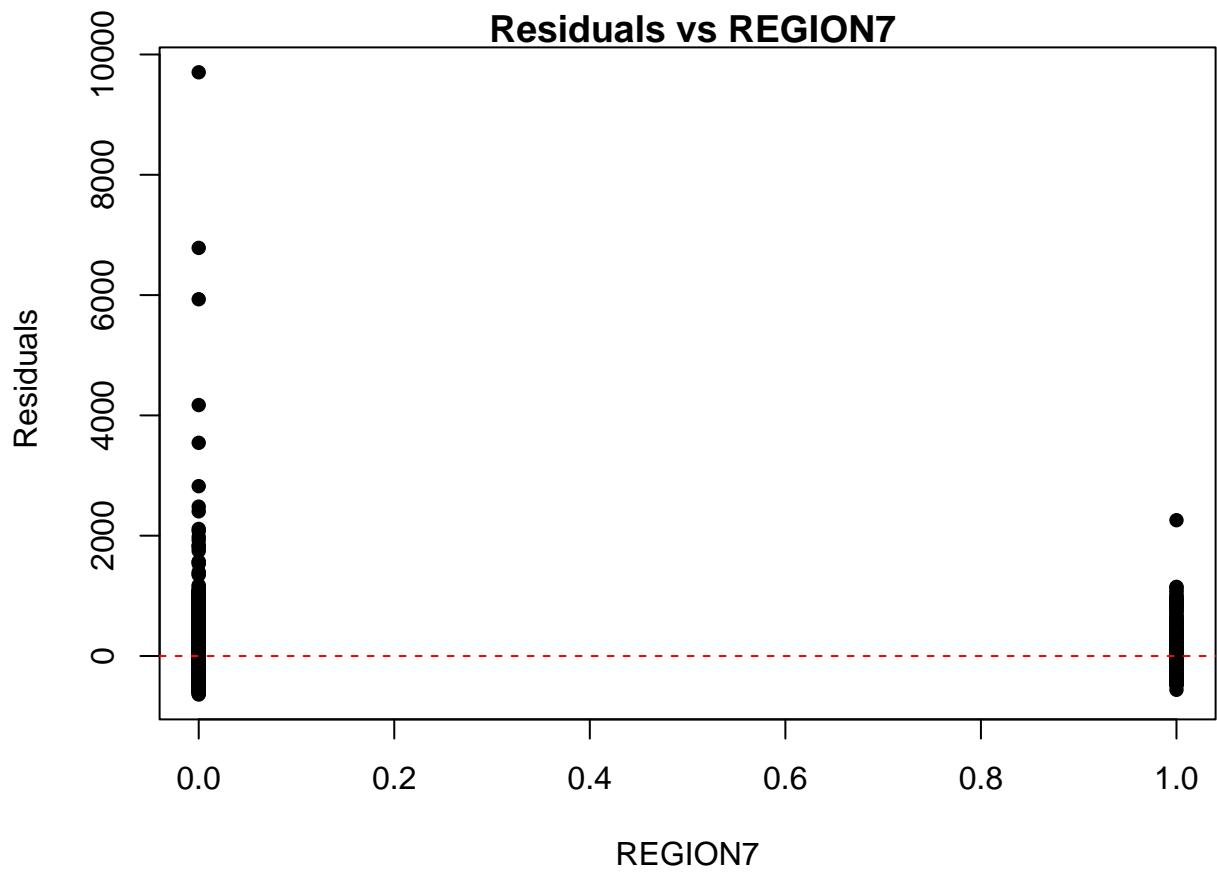


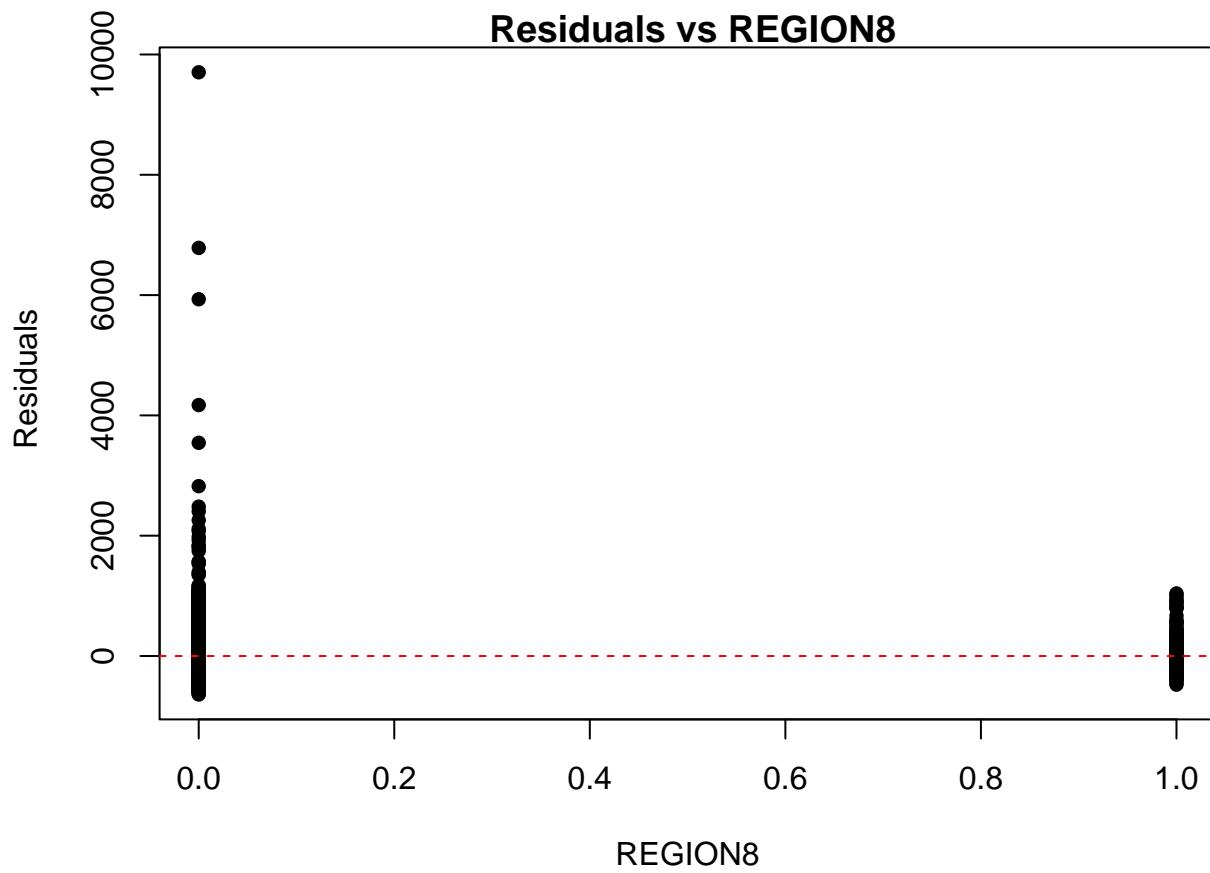


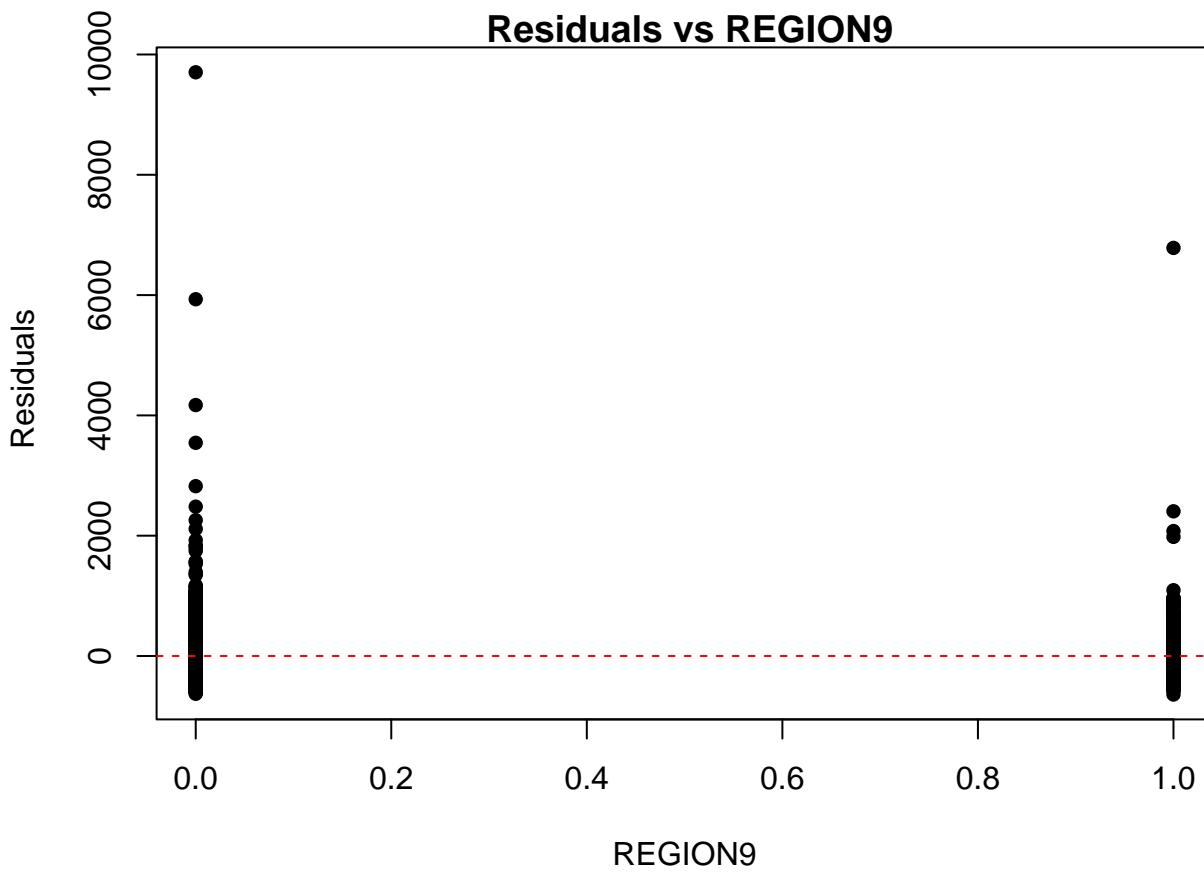












```
##
## studentized Breusch-Pagan test
##
## data: linear_model1
## BP = 7.0287, df = 2, p-value = 0.02977

##
## studentized Breusch-Pagan test
##
## data: linear_model_trimmed
## BP = 361.55, df = 2, p-value < 2.2e-16
```

```
gqtest_result <- gqtest(linear_model1, order.by =df$EDUC ,fraction = 1000)
print(gqtest_result)
```

```
##
## Goldfeld-Quandt test
##
## data: linear_model1
## GQ = 1.8257, df1 = 4486, df2 = 4486, p-value < 2.2e-16
## alternative hypothesis: variance increases from segment 1 to 2
```

% Table created by stargazer v.5.2.3 by Marek Hlavac, Social Policy Institute. E-mail: marek.hlavac at gmail.com % Date and time: wo, mei 28, 2025 - 0:10:29

Table 20: OLS Regression with Robust Standard Errors

<i>Dependent variable:</i>	
	Weekly Wage
Education	26.6959*** (0.9189)
Age	2.2442** (0.9897)
Race	-77.6318*** (9.3927)
SMSA	-63.7562*** (6.2889)
Married	78.0013*** (7.9321)
Region 2	41.1931*** (12.5732)
Region 3	49.0879*** (10.7566)
Region 4	18.8453 (12.9527)
Region 5	4.2049 (10.8923)
Region 6	7.6044 (15.3882)
Region 7	17.0805 (12.0005)
Region 8	15.8968 (13.7257)
Region 9	63.7105*** (13.0328)
Constant	-81.6693 (49.8318)
Observations	10,000
R <sup>2</sup>	0.1341
Adjusted R <sup>2</sup>	0.1330
Residual Std. Error	275.0294 (df = 9986)
F Statistic	118.9531*** (df = 13; 9986)

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01  
Heteroskedasticity-consistent standard errors in parentheses

Table 21: EGLS Estimation Results

<i>Dependent variable:</i>	
	Transformed WAGE
Intercept	435.7491*** (51.0221)
EDUC	17.9831*** (0.7695)
AGE	-6.5454*** (1.0558)
RACE	-69.0106*** (7.8876)
SMSA	-78.0229*** (5.5790)
MARRIED	53.2469*** (5.7072)
REGION2	37.1832* (19.6988)
REGION3	60.2545*** (19.3016)
REGION4	25.2715 (18.7175)
REGION5	9.2088 (18.0923)
REGION6	12.2196 (18.5587)
REGION7	37.1148* (19.4049)
REGION8	40.5698* (24.2491)
REGION9	65.6674*** (21.2749)
Observations	10,000
R <sup>2</sup>	0.6063
Adjusted R <sup>2</sup>	0.6058
Residual Std. Error	1.0188 (df = 9986)
F Statistic	1,098.5050*** (df = 14; 9986)

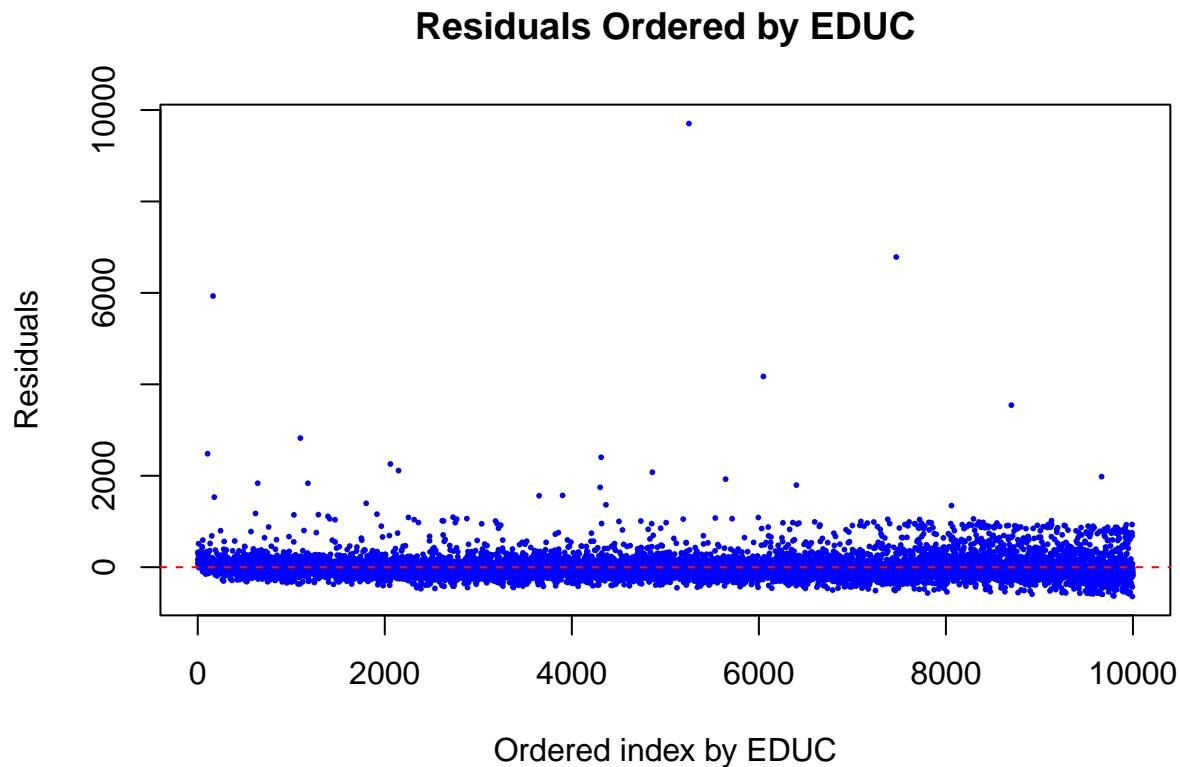
Note:

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

Variables transformed by dividing by y hat)

	Baseline (White SEs)	EGLS
(Intercept)	-81.669 (49.832)	435.749*** (51.022)
EDUC	26.696*** (0.919)	17.983*** (0.769)
AGE	2.244* (0.990)	-6.545*** (1.056)
RACE	-77.632*** (9.393)	-69.011*** (7.888)
SMSA	-63.756*** (6.289)	-78.023*** (5.579)
MARRIED	78.001*** (7.932)	53.247*** (5.707)
REGION2	41.193** (12.573)	
REGION3	49.088*** (10.757)	
REGION4	18.845 (12.953)	
REGION5	4.205 (10.892)	
REGION6	7.604 (15.388)	
REGION7	17.081 (12.001)	
REGION8	15.897 (13.726)	
REGION9	63.710*** (13.033)	
X_starREGION2		37.183+ (19.699)
X_starREGION3		60.255** (19.302)
X_starREGION4		25.272 (18.718)
X_starREGION5		9.209 (18.092)
X_starREGION6		12.220 (18.559)
X_starREGION7		37.115+ (19.405)
X_starREGION8		40.570+ (24.249)
X_starREGION9		65.667** (21.275)

% Table created by stargazer v.5.2.3 by Marek Hlavac, Social Policy Institute. E-mail: marek.hlavac at gmail.com % Date and time: wo, mei 28, 2025 - 0:10:29



```
##  
## Runs Test  
##  
## data: residuals_ordered  
## statistic = -2.6201, runs = 4870, n1 = 5000, n2 = 5000, n = 10000,  
## p-value = 0.00879  
## alternative hypothesis: nonrandomness  
  
##  
## Durbin-Watson test  
##  
## data: linear_model_ordered  
## DW = 1.9568, p-value = 0.01502  
## alternative hypothesis: true autocorrelation is greater than 0  
  
##  
## Breusch-Godfrey test for serial correlation of order up to 6  
##  
## data: linear_model_ordered  
## LM test = 13.468, df = 6, p-value = 0.03617  
  
##
```

```

## =====
##                               Dependent variable:
## -----
##                               WAGE
## -----
##   ## EDUC             -23.274**
##   ##                   (9.053)
##   ##                   t = -2.571
##   ##                   p = 0.011
##   ## AGE              -2.364*
##   ##                   (1.220)
##   ##                   t = -1.937
##   ##                   p = 0.053
##   ## RACE              44.302
##   ##                   (27.709)
##   ##                   t = 1.599
##   ##                   p = 0.110
##   ## SMSA              48.280**
##   ##                   (23.258)
##   ##                   t = 2.076
##   ##                   p = 0.038
##   ## MARRIED           -60.243**
##   ##                   (27.647)
##   ##                   t = -2.179
##   ##                   p = 0.030
##   ## I(Yfit2)          0.003***  

##   ##                   (0.001)
##   ##                   t = 3.419
##   ##                   p = 0.001
##   ## I(Yfit3)          -0.00000*
##   ##                   (0.00000)
##   ##                   t = -1.742
##   ##                   p = 0.082
##   ## REGION2            -38.952**
##   ##                   (19.736)
##   ##                   t = -1.974
##   ##                   p = 0.049
##   ## REGION3            -43.479**
##   ##                   (21.499)
##   ##                   t = -2.022
##   ##                   p = 0.044
##   ## REGION4            -17.440
##   ##                   (16.867)
##   ##                   t = -1.034
##   ##                   p = 0.302
##   ## REGION5            -9.229
##   ##                   (13.555)
##   ##                   t = -0.681
##   ##                   p = 0.496
##   ## REGION6            -16.522
##   ##                   (16.341)
##   ##                   t = -1.011
##   ##                   p = 0.313
##   ## REGION7            -20.320

```

```

##                               (15.930)
##                               t = -1.276
##                               p = 0.203
## REGION8                      -13.612
##                               (17.950)
##                               t = -0.758
##                               p = 0.449
## REGION9                      -61.727**
##                               (26.282)
##                               t = -2.349
##                               p = 0.019
## Constant                     410.901***
##                               (82.840)
##                               t = 4.960
##                               p = 0.00000
## -----
## Observations                  10,000
## R2                           0.143
## Adjusted R2                  0.142
## Residual Std. Error          273.622 (df = 9984)
## F Statistic                  111.158*** (df = 15; 9984) (p = 0.000)
## -----
## Note:                         *p<0.1; **p<0.05; ***p<0.01

## -----
## Test-statistic P-value
## -----
## 52.514                      0
## -----


## RESET test
##
## data: linear_model1
## RESET = 52.514, df1 = 2, df2 = 9984, p-value < 2.2e-16

## -----
##                               Dependent variable:
##                               -----
##                               res
## -----
## EDUC                          -78.358***
##                               (12.150)
##                               t = -6.449
##                               p = 0.000
## I(EDUC2)                     5.689***
##                               (1.086)
##                               t = 5.237
##                               p = 0.00000
## I(EDUC3)                     -0.127***
##                               (0.030)

```

```

##          t = -4.160
##          p = 0.00004
## AGE          -293.290
##                      (795.744)
##          t = -0.369
##          p = 0.713
##          6.035
##          (17.811)
##          t = 0.339
##          p = 0.735
##          -0.041
##          (0.133)
##          t = -0.309
##          p = 0.758
##          -3.948
##          (10.202)
##          t = -0.387
##          p = 0.699
##          0.600
##          (7.374)
##          t = 0.081
##          p = 0.936
## MARRIED          2.297
##          (8.001)
##          t = 0.287
##          p = 0.775
##          -0.676
##          (13.595)
##          t = -0.050
##          p = 0.961
##          0.602
##          (13.257)
##          t = 0.045
##          p = 0.964
##          -0.770
##          (15.544)
##          t = -0.050
##          p = 0.961
##          -3.922
##          (13.451)
##          t = -0.292
##          p = 0.771
## REGION6          -5.673
##                      (16.087)
##          t = -0.353
##          p = 0.725
## REGION7          -6.282
##                      (14.614)
##          t = -0.430
##          p = 0.668
## REGION8          -1.142
##                      (17.051)
##          t = -0.067
##          p = 0.947

```

```

## REGION9          -1.657
##                           (14.006)
##                           t = -0.118
##                           p = 0.906
## Constant          5,038.892
##                           (11,824.640)
##                           t = 0.426
##                           p = 0.671
## -----
## Observations      10,000
## R2                0.008
## Adjusted R2       0.006
## Residual Std. Error   274.028 (df = 9982)
## F Statistic      4.538*** (df = 17; 9982) (p = 0.000)
## -----
## Note:           *p<0.1; **p<0.05; ***p<0.01

##
## -----
## Test-statistic P-value
## -----
## 76.692          0
## -----


##
## =====
##             Dependent variable:
## -----
##                   res
## -----
## EDUC            -78.409*** 
##                           (12.149)
##                           t = -6.454
##                           p = 0.000
## I(EDUC2)        5.689*** 
##                           (1.086)
##                           t = 5.238
##                           p = 0.00000
## I(EDUC3)        -0.127*** 
##                           (0.030)
##                           t = -4.159
##                           p = 0.00004
## AGE              -0.268
##                           (0.939)
##                           t = -0.285
##                           p = 0.776
## RACE             -4.121
##                           (10.201)
##                           t = -0.404
##                           p = 0.687
## SMSA             0.401
##                           (7.373)
##                           t = 0.054
##                           p = 0.957

```

```

## MARRIED           2.277
##                           (8.001)
##                           t = 0.285
##                           p = 0.776
## REGION2           -0.610
##                           (13.595)
##                           t = -0.045
##                           p = 0.965
## REGION3           0.461
##                           (13.256)
##                           t = 0.035
##                           p = 0.973
## REGION4           -0.674
##                           (15.544)
##                           t = -0.043
##                           p = 0.966
## REGION5           -3.686
##                           (13.450)
##                           t = -0.274
##                           p = 0.785
## REGION6           -6.174
##                           (16.084)
##                           t = -0.384
##                           p = 0.702
## REGION7           -6.134
##                           (14.613)
##                           t = -0.420
##                           p = 0.675
## REGION8           -0.951
##                           (17.050)
##                           t = -0.056
##                           p = 0.956
## REGION9           -1.756
##                           (14.005)
##                           t = -0.125
##                           p = 0.901
## Constant          339.975*** (63.486)
##                           t = 5.355
##                           p = 0.00000
## -----
## Observations       10,000
## R2                 0.007
## Adjusted R2        0.006
## Residual Std. Error 274.032 (df = 9984)
## F Statistic        4.988*** (df = 15; 9984) (p = 0.000)
## -----
## Note:             *p<0.1; **p<0.05; ***p<0.01

## -----
## Test-statistic P-value
## -----
## 74.385            0

```

```

## -----
## =====
##             Dependent variable:
## -----
##             res
## -----
## EDUC          0.017
##                 (0.869)
## t = 0.019
## p = 0.985
## I(AGE2)      5.338
##                 (17.875)
## t = 0.299
## p = 0.766
## I(AGE3)      -0.036
##                 (0.133)
## t = -0.268
## p = 0.789
## AGE          -262.949
##                 (798.583)
## t = -0.329
## p = 0.742
## RACE          0.182
##                 (10.226)
## t = 0.018
## p = 0.986
## SMSA          0.201
##                 (7.394)
## t = 0.027
## p = 0.979
## MARRIED       0.026
##                 (8.026)
## t = 0.003
## p = 0.998
## REGION2      -0.069
##                 (13.644)
## t = -0.005
## p = 0.996
## REGION3      0.149
##                 (13.305)
## t = 0.011
## p = 0.992
## REGION4      -0.096
##                 (15.600)
## t = -0.006
## p = 0.996
## REGION5      -0.243
##                 (13.493)
## t = -0.018
## p = 0.986
## REGION6      0.510
##                 (16.126)

```

```

##          t = 0.032
##          p = 0.975
## REGION7          -0.154
##                      (14.646)
##          t = -0.010
##          p = 0.992
## REGION8          -0.190
##                      (17.107)
##          t = -0.011
##          p = 0.992
## REGION9          0.110
##                      (14.046)
##          t = 0.008
##          p = 0.994
## Constant        4,267.804
##                      (11,866.400)
##          t = 0.360
##          p = 0.720
## -----
## Observations      10,000
## R2              0.0002
## Adjusted R2     -0.001
## Residual Std. Error   275.023 (df = 9984)
## F Statistic      0.165 (df = 15; 9984) (p = 1.000)
## -----
## Note:           *p<0.1; **p<0.05; ***p<0.01

## -----
## Test-statistic P-value
## -----
## 2.479          0.290
## -----


## 
## Baseline vs Log-Linear Model with Robust SEs
## -----
##                               Dependent variable:
## -----
##          WAGE      log(WAGE)
##          Level    Log-Level
##          (1)       (2)
## -----
## EDUC          26.696***   0.061***
##          (0.920)   (0.002)
## AGE           2.244**    0.005**
##          (0.990)   (0.002)
## RACE          -77.632***  -0.270***
##          (9.399)   (0.027)
## SMSA          -63.756***  -0.182***
##          (6.293)   (0.018)
## MARRIED       78.001***   0.259***
##          (7.938)   (0.021)
## REGION2      41.193***   0.102**

```

```

##                               (12.582)      (0.031)
## REGION3                  49.088***    0.139***
##                               (10.764)      (0.031)
## REGION4                  18.845       0.066*
##                               (12.962)      (0.035)
## REGION5                  4.205        -0.016
##                               (10.900)      (0.032)
## REGION6                  7.604        -0.037
##                               (15.399)      (0.038)
## REGION7                  17.081       0.021
##                               (12.009)      (0.034)
## REGION8                  15.897       0.072*
##                               (13.735)      (0.038)
## REGION9                  63.710***   0.147***  

##                               (13.042)      (0.032)
## Constant                 -81.669      4.657***  

##                               (49.867)      (0.108)
## -----
## Observations              10,000      10,000
## R2                        0.134        0.166
## Adjusted R2               0.133        0.165
## Residual Std. Error (df = 9986) 275.029      0.622
## F Statistic (df = 13; 9986) 118.953***  152.546***  

## =====
## Note:                      *p<0.1; **p<0.05; ***p<0.01
##
## Baseline vs Log-Linear Model with Robust SEs
## ====
## TRUE
## ----

##           df      AIC
## linear_model1 15 140732.32
## log_model     15 18897.87

##           df      BIC
## linear_model1 15 140840.48
## log_model     15 19006.02

## Linear model r-squared:
## [1] 0.134091

## Log model r-squared:
## [1] 0.1656844

##
## RESET test
##
## data: log_model
## RESET = 3.482, df1 = 2, df2 = 9984, p-value = 0.03078

```

```

## Analysis of Variance Table
##
## Model 1: WAGE ~ EDUC + AGE + RACE + SMSA + MARRIED + REGION2 + REGION3 +
##           REGION4 + REGION5 + REGION6 + REGION7 + REGION8 + REGION9
## Model 2: WAGE ~ EDUC + AGE + RACE + MARRIED + SMSA + REGION2 + REGION3 +
##           REGION4 + REGION5 + REGION6 + REGION7 + REGION8 + REGION9 +
##           I(EDUC^2)
##   Res.Df      RSS Df Sum of Sq      F    Pr(>F)
## 1 9986 755352847
## 2 9985 751033088  1   4319759 57.431 3.811e-14 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ',' 1

##
## =====
##             Dependent variable:
## -----
##                   WAGE
## -----
## EDUC          -4.259
##                 (4.176)
## 
## AGE          1.966**
##                 (0.940)
## 
## RACE         -81.460***
##                 (10.209)
## 
## MARRIED       79.888***
##                 (8.007)
## 
## SMSA          -64.560***
##                 (7.373)
## 
## REGION2       40.801***
##                 (13.606)
## 
## REGION3       49.505***
##                 (13.267)
## 
## REGION4        18.609
##                 (15.556)
## 
## REGION5        1.490
##                 (13.459)
## 
## REGION6        1.554
##                 (16.097)
## 
## REGION7        13.477
##                 (14.612)
## 
## REGION8        16.740
##                 (17.058)

```

```

## 
## REGION9          64.151*** 
##                           (14.007)
## 
## I(EDUC2)         1.222*** 
##                           (0.161)
## 
## Constant        113.617** 
##                           (53.148)
## 
## -----
## Observations     10,000
## R2              0.139
## Adjusted R2      0.138
## Residual Std. Error   274.256 (df = 9985)
## F Statistic      115.183*** (df = 14; 9985)
## -----
## Note:           *p<0.1; **p<0.05; ***p<0.01

## Analysis of Variance Table
## 
## Model 1: WAGE ~ EDUC + AGE + RACE + MARRIED + SMSA + REGION2 + REGION3 +
##             REGION4 + REGION5 + REGION6 + REGION7 + REGION8 + REGION9 +
##             I(EDUC^2)
## Model 2: WAGE ~ EDUC + AGE + RACE + MARRIED + SMSA + REGION2 + REGION3 +
##             REGION4 + REGION5 + REGION6 + REGION7 + REGION8 + REGION9 +
##             I(EDUC^2) + I(EDUC^3)
##   Res.Df   RSS Df Sum of Sq      F   Pr(>F)
## 1    9985 751033088
## 2    9984 749734167  1    1298920 17.297 3.223e-05 ***
## --- 
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

## Analysis of Variance Table
## 
## Model 1: WAGE ~ EDUC + AGE + RACE + SMSA + MARRIED + REGION2 + REGION3 +
##             REGION4 + REGION5 + REGION6 + REGION7 + REGION8 + REGION9
## Model 2: WAGE ~ EDUC + AGE + RACE + MARRIED + SMSA + REGION2 + REGION3 +
##             REGION4 + REGION5 + REGION6 + REGION7 + REGION8 + REGION9 +
##             I(AGE^2)
##   Res.Df   RSS Df Sum of Sq      F   Pr(>F)
## 1    9986 755352847
## 2    9985 755171041  1    181806 2.4039 0.1211

## Analysis of Variance Table
## 
## Model 1: WAGE ~ EDUC + AGE + RACE + SMSA + MARRIED + REGION2 + REGION3 +
##             REGION4 + REGION5 + REGION6 + REGION7 + REGION8 + REGION9
## Model 2: WAGE ~ EDUC + AGE + RACE + MARRIED + SMSA + REGION2 + REGION3 +
##             REGION4 + REGION5 + REGION6 + REGION7 + REGION8 + REGION9 +
##             I(AGE * EDUC)
##   Res.Df   RSS Df Sum of Sq      F   Pr(>F)
## 1    9986 755352847
## 2    9985 755352738  1    109.36 0.0014 0.9697

```

```

## Analysis of Variance Table

## Model 1: WAGE ~ EDUC + AGE + RACE + SMSA + MARRIED + REGION2 + REGION3 +
##          REGION4 + REGION5 + REGION6 + REGION7 + REGION8 + REGION9
## Model 2: WAGE ~ EDUC + AGE + RACE + MARRIED + SMSA + REGION2 + REGION3 +
##          REGION4 + REGION5 + REGION6 + REGION7 + REGION8 + REGION9 +
##          I(RACE * EDUC)
##   Res.Df      RSS Df Sum of Sq      F    Pr(>F)
## 1  9986 755352847
## 2  9985 752115125  1  3237722 42.984 5.793e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ',' 1

## -----
## Test-statistic P-value
## -----
## 864.620      0.999
## -----


## RESET test
## data: best_mod
## RESET = 2.445, df1 = 2, df2 = 9981, p-value = 0.08678

## Warning: package 'AER' was built under R version 4.4.3

## Loading required package: survival

## Call:
## ivreg(formula = WAGE ~ EDUC + AGE + RACE + MARRIED + SMSA + factor(REGION) |
##        factor(QOB) + AGE + RACE + MARRIED + SMSA + factor(REGION),
##        data = df)
## 

## Residuals:
##       Min     1Q   Median     3Q    Max 
## -513.39 -146.84  -46.46   84.07 9675.05 
## 

## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)    
## (Intercept) 365.66451  435.98983  0.839 0.401658  
## EDUC         0.05619   25.81727  0.002 0.998263  
## AGE          0.07230   2.32297  0.031 0.975170  
## RACE        -124.25131  46.40167 -2.678 0.007424 ** 
## MARRIED      82.00629   9.24773  8.868 < 2e-16 ***  
## SMSA        -96.62067  32.75603 -2.950 0.003188 ** 
## factor(REGION)2 40.70416  14.27976  2.850 0.004374 ** 
## factor(REGION)3 37.19148  18.06742  2.058 0.039570 *  
## factor(REGION)4 16.05045  16.54083  0.970 0.331894  
## factor(REGION)5 -6.18516  17.33281 -0.357 0.721214  
## factor(REGION)6 -18.23311  30.17656 -0.604 0.545715 

```

```

## factor(REGION)7    3.22484   20.36608   0.158 0.874189
## factor(REGION)8    22.22860   18.91487   1.175 0.239946
## factor(REGION)9    79.00354   20.86277   3.787 0.000153 ***
##
## Diagnostic tests:
##                   df1  df2 statistic p-value
## Weak instruments     3 9984      4.130 0.00618 **
## Wu-Hausman          1 9985      1.166 0.28017
## Sargan              2    NA      0.484 0.78508
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 287.7 on 9986 degrees of freedom
## Multiple R-Squared: 0.05258, Adjusted R-squared: 0.05135
## Wald test: 42.36 on 13 and 9986 DF, p-value: < 2.2e-16

##
## Call:
## lm(formula = EDUC ~ AGE + RACE + MARRIED + SMSA + factor(REGION) +
##     factor(QOB), data = df)
##
## Residuals:
##       Min     1Q Median     3Q     Max
## -13.9346 -1.5650 -0.4542  2.1027  9.4079
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 16.59752   0.52615 31.545 < 2e-16 ***
## AGE         -0.07907   0.01094 -7.226 5.34e-13 ***
## RACE        -1.74777   0.11643 -15.011 < 2e-16 ***
## MARRIED      0.15402   0.09239  1.667 0.09555 .
## SMSA        -1.23427   0.08421 -14.657 < 2e-16 ***
## factor(REGION)2 -0.01927   0.15706 -0.123 0.90237
## factor(REGION)3 -0.44465   0.15310 -2.904 0.00369 **
## factor(REGION)4 -0.09355   0.17961 -0.521 0.60249
## factor(REGION)5 -0.38840   0.15528 -2.501 0.01239 *
## factor(REGION)6 -0.96504   0.18536 -5.206 1.96e-07 ***
## factor(REGION)7 -0.51186   0.16856 -3.037 0.00240 **
## factor(REGION)8  0.23877   0.19692  1.212 0.22535
## factor(REGION)9  0.57912   0.16159  3.584 0.00034 ***
## factor(QOB)2     0.11171   0.09141  1.222 0.22170
## factor(QOB)3     -0.03431   0.08853 -0.388 0.69837
## factor(QOB)4     0.25101   0.09056  2.772 0.00559 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.166 on 9984 degrees of freedom
## Multiple R-squared:  0.06836, Adjusted R-squared:  0.06696
## F-statistic: 48.84 on 15 and 9984 DF, p-value: < 2.2e-16

##
## Call:
## lm(formula = WAGE ~ EDUC + AGE + RACE + MARRIED + SMSA + REGION2 +
##     REGION3 + REGION4 + REGION5 + REGION6 + REGION7 + REGION8 +

```

```

##      REGION9 + first_stage_residuals, data = df)
##
## Residuals:
##   Min     1Q Median     3Q    Max
## -636.0 -131.9 -35.5  76.3 9702.1
##
## Coefficients:
##                               Estimate Std. Error t value Pr(>|t|)
## (Intercept)            365.66451  416.81028  0.877  0.38035
## EDUC                  0.05619   24.68154  0.002  0.99818
## AGE                   0.07230   2.22078  0.033  0.97403
## RACE                 -124.25131  44.36042 -2.801  0.00511 **
## MARRIED                82.00629   8.84092  9.276 < 2e-16 ***
## SMSA                  -96.62067  31.31506 -3.085  0.00204 **
## REGION2               40.70416  13.65158  2.982  0.00287 **
## REGION3               37.19148  17.27261  2.153  0.03133 *
## REGION4               16.05045  15.81318  1.015  0.31013
## REGION5               -6.18516  16.57033 -0.373  0.70896
## REGION6               -18.23311  28.84907 -0.632  0.52739
## REGION7                3.22484  19.47016  0.166  0.86845
## REGION8               22.22860  18.08279  1.229  0.21900
## REGION9               79.00354  19.94500  3.961 7.51e-05 ***
## first_stage_residuals 26.67275  24.69685  1.080  0.28017
##
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 275 on 9985 degrees of freedom
## Multiple R-squared:  0.1342, Adjusted R-squared:  0.133
## F-statistic: 110.5 on 14 and 9985 DF,  p-value: < 2.2e-16

```

## Step 4: General remedies and conclusions

```

##
## -----
##                               Dependent variable:
## -----
##                               log(WAGE)
## -----
## EDUC                  -0.0856***  

##                           (0.0252)  

## t = -3.3950  

## p = 0.0007  

## I(EDUC2)                0.0136***  

##                           (0.0022)  

## t = 6.1686  

## p = 0.0000  

## I(EDUC3)                -0.0004***  

##                           (0.0001)  

## t = -6.2296  

## p = 0.0000  

## AGE                   0.0058***  

##                           (0.0019)  

## t = 3.1592

```

```

##          p = 0.0016
## RACE      -0.1717**
##           (0.0751)
##          t = -2.2877
##          p = 0.0222
##           -0.0064
##           (0.0063)
##          t = -1.0203
##          p = 0.3076
##           -0.1647*** 
##           (0.0148)
##          t = -11.1338
##          p = 0.0000
##           0.2386*** 
##           (0.0161)
##          t = 14.7939
##          p = 0.0000
##           0.0781*** 
##           (0.0268)
##          t = 2.9161
##          p = 0.0036
##           0.1250*** 
##           (0.0261)
##          t = 4.7823
##          p = 0.000002
##           0.0417
##           (0.0307)
##          t = 1.3599
##          p = 0.1739
##           -0.0302
##           (0.0266)
##          t = -1.1334
##          p = 0.2571
##           -0.0645** 
##           (0.0321)
##          t = -2.0105
##          p = 0.0444
##           -0.0045
##           (0.0289)
##          t = -0.1563
##          p = 0.8759
##           0.0541
##           (0.0335)
##          t = 1.6151
##          p = 0.1063
##           0.1062*** 
##           (0.0275)
##          t = 3.8550
##          p = 0.0002
##           5.1219*** 
##           (0.1305)
##          t = 39.2526
##          p = 0.0000
## -----

```

```
## Observations           9,900
## Log Likelihood       -7,968.5440
## Akaike Inf. Crit.    15,975.0900
## Bayesian Inf. Crit. 16,111.8600
## -----
## Note:                 *p<0.1; **p<0.05; ***p<0.01
```