

# Project Code and Result

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## R Markdown

```
library(foreign)
library(readxl)
library(dummies)

## dummies-1.5.6 provided by Decision Patterns
library(devtools)
library(broom)
library(readxl)
library(car)

## Loading required package: carData
library(het.test)

## Loading required package: vars
## Loading required package: MASS
## Loading required package: strucchange
## Loading required package: zoo
##
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':
##       as.Date, as.Date.numeric

## Loading required package: sandwich
## Loading required package: urca
## Loading required package: lmtest
data <- read_excel("data.xlsx")
summary (data$edu)

##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
##      0.000  0.000  2.000  1.768  3.000  5.000

data$edummy <- as.factor(data$edu)
data$edummy <- relevel(data$edummy, ref = '0')

lm1 <- lm(lgexp~ edummy, data = data)
summary (lm1)

##
## Call:
## lm(formula = lgexp ~ edummy, data = data)
```

```

## 
## Residuals:
##   Min     1Q Median     3Q    Max
## -3.2990 -0.4586  0.0039  0.4504  3.8641
## 
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)    
## (Intercept) 8.64520  0.01478 585.114 < 2e-16 ***
## edummy1     0.12187  0.02324  5.245  1.6e-07 ***
## edummy2     0.17980  0.02175  8.266 < 2e-16 ***
## edummy3     0.26465  0.02215 11.950 < 2e-16 ***
## edummy4     0.44331  0.02808 15.788 < 2e-16 ***
## edummy5     0.93748  0.05540 16.923 < 2e-16 ***
## ---      
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 
## Residual standard error: 0.7436 on 9612 degrees of freedom
## Multiple R-squared:  0.05021, Adjusted R-squared:  0.04971 
## F-statistic: 101.6 on 5 and 9612 DF, p-value: < 2.2e-16

lm2 <- lm(lgexp ~ edummy + lgincome, data = data)
summary (lm2)

```

```

## 
## Call:
## lm(formula = lgexp ~ edummy + lgincome, data = data)
## 
## Residuals:
##   Min     1Q Median     3Q    Max
## -3.0344 -0.4383 -0.0055  0.4268  3.7207
## 
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)    
## (Intercept) 7.318710  0.049781 147.019 < 2e-16 ***
## edummy1     0.094248  0.022379  4.211 2.56e-05 ***
## edummy2     0.114826  0.021057  5.453 5.08e-08 *** 
## edummy3     0.150005  0.021702  6.912 5.08e-12 *** 
## edummy4     0.253261  0.027865  9.089 < 2e-16 *** 
## edummy5     0.616704  0.054531 11.309 < 2e-16 *** 
## lgincome    0.159652  0.005742 27.805 < 2e-16 *** 
## ---      
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 
## Residual standard error: 0.7154 on 9611 degrees of freedom
## Multiple R-squared:  0.1209, Adjusted R-squared:  0.1204 
## F-statistic: 220.3 on 6 and 9611 DF, p-value: < 2.2e-16

lm3 <- lm(lgexp ~ edummy + lgincome + lgwealth, data = data)
summary (lm3)

```

```

## 
## Call:
## lm(formula = lgexp ~ edummy + lgincome + lgwealth, data = data)
## 
## Residuals:

```

```

##      Min     1Q   Median     3Q    Max
## -3.1081 -0.4336 -0.0067  0.4228  3.6388
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 6.468764  0.067679 95.580 < 2e-16 ***
## edummy1     0.085183  0.022011  3.870  0.00011 ***
## edummy2     0.093744  0.020738  4.520 6.25e-06 ***
## edummy3     0.110488  0.021449  5.151 2.64e-07 ***
## edummy4     0.194047  0.027592  7.033 2.16e-12 ***
## edummy5     0.481279  0.054134  8.891 < 2e-16 ***
## lgincome    0.127264  0.005920 21.497 < 2e-16 ***
## lgwealth    0.109971  0.006047 18.185 < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7035 on 9610 degrees of freedom
## Multiple R-squared:  0.1502, Adjusted R-squared:  0.1495
## F-statistic: 242.6 on 7 and 9610 DF, p-value: < 2.2e-16
lm4 <- lm(lgexp ~ edummy + lgincome + lgwealth + age, data = data)
summary (lm4)

##
## Call:
## lm(formula = lgexp ~ edummy + lgincome + lgwealth + age, data = data)
##
## Residuals:
##      Min     1Q   Median     3Q    Max
## -3.0234 -0.4357 -0.0043  0.4221  3.6367
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 6.707584  0.093219 71.955 < 2e-16 ***
## edummy1     0.077033  0.022105  3.485 0.000494 ***
## edummy2     0.084063  0.020886  4.025 5.75e-05 ***
## edummy3     0.088502  0.022234  3.981 6.93e-05 ***
## edummy4     0.173045  0.028145  6.148 8.14e-10 ***
## edummy5     0.468367  0.054209  8.640 < 2e-16 ***
## lgincome    0.127744  0.005918 21.587 < 2e-16 ***
## lgwealth    0.107359  0.006084 17.646 < 2e-16 ***
## age        -0.003131  0.000841 -3.723 0.000198 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.703 on 9609 degrees of freedom
## Multiple R-squared:  0.1514, Adjusted R-squared:  0.1507
## F-statistic: 214.3 on 8 and 9609 DF, p-value: < 2.2e-16
lm5 <- lm(lgexp ~ edummy + lgincome + lgwealth + age + hukou, data = data)
summary (lm5)

##
## Call:
## lm(formula = lgexp ~ edummy + lgincome + lgwealth + age + hukou,

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```

##      data = data)
##
## Residuals:
##      Min     1Q Median     3Q    Max
## -2.9926 -0.4366 -0.0054  0.4231  3.6646
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 6.9113805  0.0969639 71.278 < 2e-16 ***
## edummy1     0.0704754  0.0220610  3.195 0.001405 **
## edummy2     0.0702553  0.0209120  3.360 0.000784 ***
## edummy3     0.0569221  0.0225800  2.521 0.011721 *
## edummy4     0.1098966  0.0293386  3.746 0.000181 ***
## edummy5     0.3591356  0.0560419  6.408 1.54e-10 ***
## lgincome    0.1170421  0.0060762 19.262 < 2e-16 ***
## lgwealth   0.1032467  0.0060925 16.947 < 2e-16 ***
## age        -0.0043336  0.0008543 -5.072 4.00e-07 ***
## hukou       0.1537082  0.0207973  7.391 1.58e-13 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7011 on 9608 degrees of freedom
## Multiple R-squared:  0.1562, Adjusted R-squared:  0.1554
## F-statistic: 197.6 on 9 and 9608 DF,  p-value: < 2.2e-16
lm6 <- lm(lgexp ~ edummy + lgincome + lgwealth + age + hukou + mar, data = data)
summary (lm6)

```

```

##
## Call:
## lm(formula = lgexp ~ edummy + lgincome + lgwealth + age + hukou +
##      mar, data = data)
##
## Residuals:
##      Min     1Q Median     3Q    Max
## -3.0474 -0.4359 -0.0065  0.4209  3.6726
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 7.0373707  0.1034332 68.038 < 2e-16 ***
## edummy1     0.0747060  0.0220816  3.383 0.000719 ***
## edummy2     0.0748217  0.0209409  3.573 0.000355 ***
## edummy3     0.0616494  0.0226077  2.727 0.006404 **
## edummy4     0.1151846  0.0293609  3.923 8.80e-05 ***
## edummy5     0.3646451  0.0560317  6.508 8.01e-11 ***
## lgincome    0.1178156  0.0060767 19.388 < 2e-16 ***
## lgwealth   0.1021534  0.0060970 16.755 < 2e-16 ***
## age        -0.0050787  0.0008802 -5.770 8.18e-09 ***
## hukou       0.1529113  0.0207865  7.356 2.05e-13 ***
## mar        -0.0846943  0.0243056 -3.485 0.000495 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7006 on 9607 degrees of freedom
## Multiple R-squared:  0.1572, Adjusted R-squared:  0.1564

```

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## F-statistic: 179.3 on 10 and 9607 DF, p-value: < 2.2e-16
lm7 <- lm(lgexp ~ edummy + lgincome + lgwealth + age + hukou + mar + com, data = data)
summary (lm7)

##
## Call:
## lm(formula = lgexp ~ edummy + lgincome + lgwealth + age + hukou +
##      mar + com, data = data)
##
## Residuals:
##    Min     1Q   Median     3Q    Max 
## -3.0308 -0.4344 -0.0070  0.4235  3.6801 
## 
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)    
## (Intercept) 7.0839511  0.1039873 68.123 < 2e-16 ***
## edummy1     0.0706412  0.0220867  3.198  0.00139 **  
## edummy2     0.0689052  0.0209750  3.285  0.00102 **  
## edummy3     0.0514113  0.0227303  2.262  0.02373 *   
## edummy4     0.0950251  0.0297560  3.193  0.00141 **  
## edummy5     0.3193814  0.0570898  5.594  2.28e-08 *** 
## lgincome    0.1171832  0.0060739 19.293 < 2e-16 *** 
## lgwealth    0.1016803  0.0060933 16.687 < 2e-16 *** 
## age        -0.0056143  0.0008894 -6.313 2.87e-10 *** 
## hukou       0.1478211  0.0208078  7.104 1.30e-12 *** 
## mar        -0.0885701  0.0243049 -3.644  0.00027 ***  
## com         0.0984588  0.0242931  4.053 5.10e-05 *** 
## ---      
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 
## Residual standard error: 0.7001 on 9606 degrees of freedom
## Multiple R-squared:  0.1587, Adjusted R-squared:  0.1577 
## F-statistic: 164.7 on 11 and 9606 DF, p-value: < 2.2e-16

lm8 <- lm(lgexp ~ edummy + lgincome + lgwealth + age + hukou + mar + com + gender, data = data)
summary (lm8)

##
## Call:
## lm(formula = lgexp ~ edummy + lgincome + lgwealth + age + hukou +
##      mar + com + gender, data = data)
##
## Residuals:
##    Min     1Q   Median     3Q    Max 
## -3.0304 -0.4345 -0.0072  0.4234  3.6797 
## 
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)    
## (Intercept) 7.0841119  0.1040715 68.070 < 2e-16 ***
## edummy1     0.0704623  0.0225426  3.126  0.001779 **  
## edummy2     0.0686534  0.0219129  3.133  0.001735 **  
## edummy3     0.0511168  0.0239103  2.138  0.032554 *   
## edummy4     0.0947036  0.0308390  3.071  0.002140 **  
## edummy5     0.3190358  0.0577522  5.524  3.40e-08 ***

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## lgincome      0.1171975  0.0060848 19.261 < 2e-16 ***
## lgwealth     0.1016872  0.0060961 16.681 < 2e-16 ***
## age          -0.0056205  0.0009029 -6.225 5.02e-10 ***
## hukou         0.1478873  0.0208756  7.084 1.50e-12 ***
## mar          -0.0886467  0.0243824 -3.636 0.000279 ***
## com           0.0982951  0.0246418  3.989 6.69e-05 ***
## gender        0.0006262  0.0157674  0.040 0.968323
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7001 on 9605 degrees of freedom
## Multiple R-squared:  0.1587, Adjusted R-squared:  0.1576
## F-statistic:   151 on 12 and 9605 DF, p-value: < 2.2e-16
lm01 <- lm.engel~ edummy, data = data)
summary (lm01)

##
## Call:
## lm(formula = engel ~ edummy, data = data)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -59.508 -16.104   2.546  17.959  45.095
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)    
## (Intercept) 60.2508    0.4459 135.128 < 2e-16 ***
## edummy1     -0.4562    0.7013 -0.651  0.51534    
## edummy2     -1.8570    0.6564 -2.829  0.00468 **  
## edummy3     -4.1309    0.6683 -6.181 6.62e-10 ***
## edummy4     -6.7842    0.8473 -8.007 1.32e-15 ***
## edummy5     -11.3273   1.6717 -6.776 1.31e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 22.44 on 9612 degrees of freedom
## Multiple R-squared:  0.01261, Adjusted R-squared:  0.01209
## F-statistic: 24.54 on 5 and 9612 DF, p-value: < 2.2e-16
lm02 <- lm.engel~ edummy + lgincome, data = data)
summary (lm02)

##
## Call:
## lm(formula = engel ~ edummy + lgincome, data = data)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -61.500 -15.939   2.552  17.797  45.142
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)    
## (Intercept) 72.7117    1.5559 46.734 < 2e-16 ***
## edummy1     -0.1967    0.6994 -0.281  0.7785

```

```

## edummy2      -1.2466    0.6581  -1.894   0.0582 .
## edummy3     -3.0540    0.6783  -4.503  6.79e-06 ***
## edummy4     -4.9989    0.8709  -5.740  9.76e-09 ***
## edummy5     -8.3140    1.7043  -4.878  1.09e-06 ***
## lgincome    -1.4997    0.1795  -8.357  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 22.36 on 9611 degrees of freedom
## Multiple R-squared:  0.01973, Adjusted R-squared:  0.01912
## F-statistic: 32.24 on 6 and 9611 DF, p-value: < 2.2e-16
lm03 <- lm.engel ~ edummy + lgincome + lgwealth, data = data)
summary (lm03)

```

```

##
## Call:
## lm(formula = engel ~ edummy + lgincome + lgwealth, data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -62.167  -15.950   2.503  17.609  46.509
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)    
## (Intercept) 82.2662    2.1467  38.322 < 2e-16 ***
## edummy1     -0.0948    0.6982  -0.136 0.891993  
## edummy2     -1.0096    0.6578  -1.535 0.124836  
## edummy3     -2.6098    0.6804  -3.836 0.000126 ***
## edummy4     -4.3333    0.8752  -4.951 7.50e-07 ***
## edummy5     -6.7917    1.7171  -3.955 7.70e-05 ***
## lgincome    -1.1357    0.1878  -6.048 1.52e-09 ***
## lgwealth    -1.2362    0.1918  -6.445 1.21e-10 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 22.31 on 9610 degrees of freedom
## Multiple R-squared:  0.02395, Adjusted R-squared:  0.02324
## F-statistic: 33.68 on 7 and 9610 DF, p-value: < 2.2e-16
lm04 <- lm.engel ~ edummy + lgincome + lgwealth + age, data = data)
summary (lm04)

```

```

##
## Call:
## lm(formula = engel ~ edummy + lgincome + lgwealth + age, data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -60.99  -15.99   2.54  17.62  48.03
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)    
## (Intercept) 92.20260   2.95530  31.199 < 2e-16 ***
## edummy1     -0.43392   0.70077  -0.619   0.5358

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## edummy2      -1.41243   0.66215  -2.133   0.0329 *
## edummy3     -3.52450   0.70487  -5.000  5.83e-07 ***
## edummy4     -5.20710   0.89227  -5.836  5.53e-09 ***
## edummy5     -7.32889   1.71855  -4.265  2.02e-05 ***
## lgincome    -1.11573   0.18760  -5.947  2.82e-09 ***
## lgwealth    -1.34490   0.19288  -6.973  3.31e-12 ***
## age         -0.13027   0.02666  -4.886  1.05e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 22.29 on 9609 degrees of freedom
## Multiple R-squared:  0.02637, Adjusted R-squared:  0.02556
## F-statistic: 32.53 on 8 and 9609 DF, p-value: < 2.2e-16
lm05 <- lm.engel ~ edummy + lgincome + lgwealth + age + hukou, data = data)
summary (lm05)

##
## Call:
## lm(formula = engel ~ edummy + lgincome + lgwealth + age + hukou,
##      data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -60.826 -15.990   2.512  17.622  47.704
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 86.67160   3.07634 28.174 < 2e-16 ***
## edummy1     -0.25595   0.69992 -0.366 0.714604
## edummy2     -1.03769   0.66347 -1.564 0.117840
## edummy3     -2.66742   0.71639 -3.723 0.000198 ***
## edummy4     -3.49326   0.93081 -3.753 0.000176 ***
## edummy5     -4.36436   1.77802 -2.455 0.014121 *
## lgincome    -0.82530   0.19278 -4.281 1.88e-05 ***
## lgwealth    -1.23330   0.19329 -6.380 1.85e-10 ***
## age        -0.09763   0.02711 -3.602 0.000318 ***
## hukou       -4.17161   0.65983 -6.322 2.69e-10 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 22.24 on 9608 degrees of freedom
## Multiple R-squared:  0.0304, Adjusted R-squared:  0.02949
## F-statistic: 33.47 on 9 and 9608 DF, p-value: < 2.2e-16
lm06 <- lm.engel ~ edummy + lgincome + lgwealth + age + hukou + mar, data = data)
summary (lm06)

##
## Call:
## lm(formula = engel ~ edummy + lgincome + lgwealth + age + hukou +
##      mar, data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max

```

```

## -60.619 -15.959  2.531 17.599 47.840
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 87.75394   3.28351 26.726 < 2e-16 ***
## edummy1     -0.21961   0.70099 -0.313 0.754069
## edummy2     -0.99846   0.66477 -1.502 0.133140
## edummy3     -2.62681   0.71768 -3.660 0.000253 ***
## edummy4     -3.44783   0.93207 -3.699 0.000218 ***
## edummy5     -4.31703   1.77874 -2.427 0.015242 *
## lgincome    -0.81865   0.19291 -4.244 2.22e-05 ***
## lgwealth   -1.24269   0.19355 -6.420 1.42e-10 ***
## age        -0.10403   0.02794 -3.723 0.000198 ***
## hukou       -4.17845   0.65987 -6.332 2.52e-10 ***
## mar         -0.72758   0.77159 -0.943 0.345721
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 22.24 on 9607 degrees of freedom
## Multiple R-squared: 0.03049, Adjusted R-squared: 0.02948
## F-statistic: 30.21 on 10 and 9607 DF, p-value: < 2.2e-16
lm07 <- lm.engel ~ edummy + lgincome + lgwealth + age + hukou + mar + com, data = data)
summary(lm07)

```

```

##
## Call:
## lm(formula = engel ~ edummy + lgincome + lgwealth + age + hukou +
##      mar + com, data = data)
##
## Residuals:
##      Min      1Q Median      3Q      Max
## -60.608 -15.968   2.532  17.605  47.902
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 87.80144   3.30392 26.575 < 2e-16 ***
## edummy1     -0.22376   0.70175 -0.319 0.749843
## edummy2     -1.00450   0.66642 -1.507 0.131768
## edummy3     -2.63725   0.72219 -3.652 0.000262 ***
## edummy4     -3.46839   0.94542 -3.669 0.000245 ***
## edummy5     -4.36319   1.81388 -2.405 0.016171 *
## lgincome    -0.81930   0.19298 -4.246 2.20e-05 ***
## lgwealth   -1.24317   0.19360 -6.421 1.41e-10 ***
## age        -0.10458   0.02826 -3.701 0.000216 ***
## hukou       -4.18364   0.66111 -6.328 2.59e-10 ***
## mar         -0.73153   0.77222 -0.947 0.343506
## com          0.10040   0.77185  0.130 0.896507
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 22.24 on 9606 degrees of freedom
## Multiple R-squared: 0.03049, Adjusted R-squared: 0.02938
## F-statistic: 27.46 on 11 and 9606 DF, p-value: < 2.2e-16

```

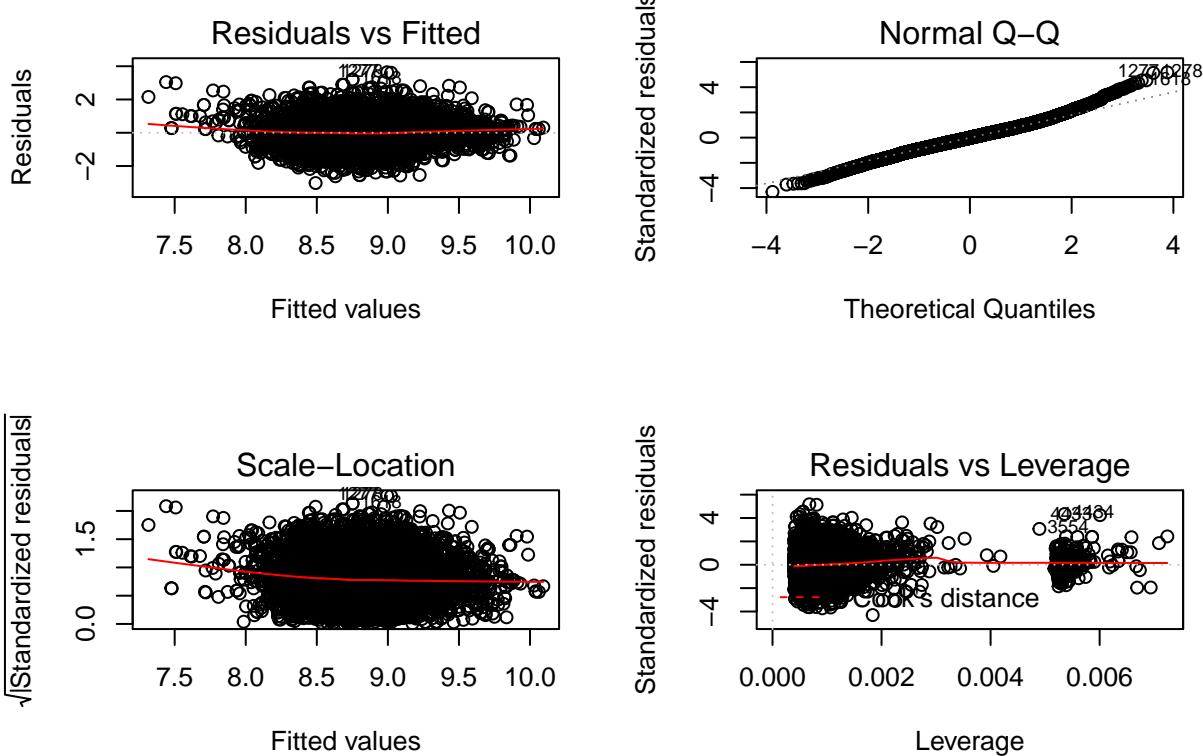
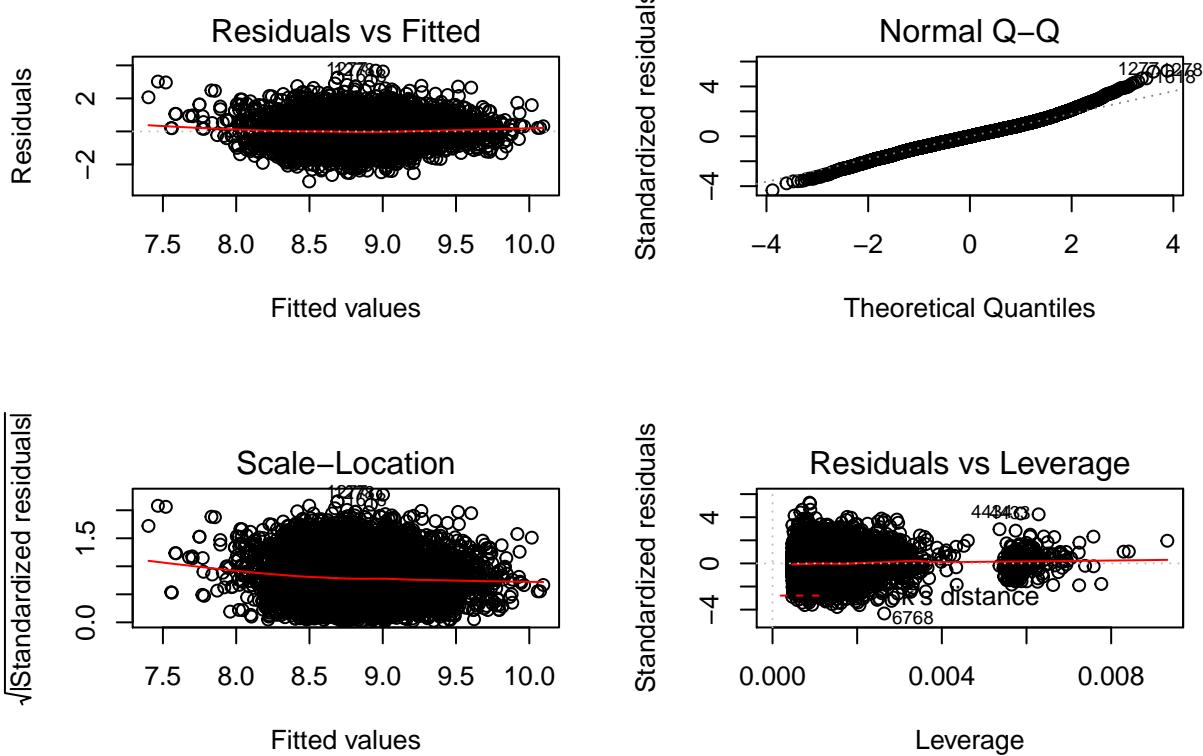
```

lm08 <- lm.engel ~ edummy + lgincome + lgwealth + age + hukou + mar + com + gender, data = data)
summary (lm08)

##
## Call:
## lm(formula = engel ~ edummy + lgincome + lgwealth + age + hukou +
##     mar + com + gender, data = data)
##
## Residuals:
##       Min     1Q   Median     3Q    Max 
## -61.704 -15.940    2.454  17.655  47.221 
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)    
## (Intercept) 88.29138   3.30409  26.722 < 2e-16 ***
## edummy1     -0.76901   0.71569 -1.075 0.282623    
## edummy2     -1.77168   0.69570 -2.547 0.010892 *  
## edummy3     -3.53467   0.75911 -4.656 3.26e-06 ***
## edummy4     -4.44815   0.97909 -4.543 5.61e-06 *** 
## edummy5     -5.41643   1.83354 -2.954 0.003144 ** 
## lgincome    -0.77588   0.19318 -4.016 5.96e-05 *** 
## lgwealth    -1.22189   0.19354 -6.313 2.85e-10 *** 
## age         -0.12338   0.02867 -4.304 1.69e-05 *** 
## hukou        -3.98175   0.66277 -6.008 1.95e-09 *** 
## mar          -0.96472   0.77410 -1.246 0.212702    
## com          -0.39867   0.78234 -0.510 0.610350    
## gender       1.90829   0.50059  3.812 0.000139 *** 
## ---        
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 22.23 on 9605 degrees of freedom
## Multiple R-squared:  0.03196,   Adjusted R-squared:  0.03075 
## F-statistic: 26.42 on 12 and 9605 DF,  p-value: < 2.2e-16

par(mfrow=c(2,2))
plot(lm08)

```



```

vif(lm8)

##          GVIF Df GVIF^(1/(2*Df))
## edummy     1.764293 5      1.058418
## lgincome   1.308325 1      1.143820
## lgwealth   1.218664 1      1.103931
## age        1.306428 1      1.142991
## hukou       1.384815 1      1.176782
## mar         1.100167 1      1.048889
## com         1.149032 1      1.071929
## gender      1.219239 1      1.104191

bptest(lm8)

##
## studentized Breusch-Pagan test
##
## data: lm8
## BP = 80.281, df = 12, p-value = 3.648e-12
covmtx <- hcmm(lm8)
coeftest(lm8, vcov = covmtx)

##
## t test of coefficients:
##
##           Estimate Std. Error t value Pr(>|t|)
## (Intercept) 7.08411189 0.10890236 65.0501 < 2.2e-16 ***
## edummy1     0.07046232 0.02305434  3.0564 0.0022466 **
## edummy2     0.06865343 0.02216397  3.0975 0.0019571 **
## edummy3     0.05111683 0.02379249  2.1484 0.0317034 *
## edummy4     0.09470356 0.02998201  3.1587 0.0015898 **
## edummy5     0.31903575 0.05057384  6.3083 2.945e-10 ***
## lgincome    0.11719748 0.00750862 15.6084 < 2.2e-16 ***
## lgwealth    0.10168724 0.00646965 15.7176 < 2.2e-16 ***
## age        -0.00562051 0.00091283 -6.1572 7.699e-10 ***
## hukou       0.14788731 0.02016436  7.3341 2.413e-13 ***
## mar        -0.08864667 0.02666407 -3.3246 0.0008889 ***
## com         0.09829507 0.02495465  3.9389 8.242e-05 ***
## gender      0.00062617 0.01579529  0.0396 0.9683785
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

vif(lm4)

##          GVIF Df GVIF^(1/(2*Df))
## edummy     1.255089 5      1.022981
## lgincome   1.227291 1      1.107832
## lgwealth   1.203856 1      1.097204
## age        1.124246 1      1.060305

bptest(lm4)

##
## studentized Breusch-Pagan test
##
## data: lm4

```

```

## BP = 60.521, df = 8, p-value = 3.684e-10
covmtx <- hccm(lm4)
coeftest(lm4, vcov = covmtx)

##
## t test of coefficients:
##
##           Estimate Std. Error t value Pr(>|t|)
## (Intercept) 6.70758370 0.09744425 68.8351 < 2.2e-16 ***
## edummy1     0.07703280 0.02265726  3.3999 0.0006768 ***
## edummy2     0.08406278 0.02123177  3.9593 7.571e-05 ***
## edummy3     0.08850234 0.02205930  4.0120 6.066e-05 ***
## edummy4     0.17304535 0.02748446  6.2961 3.185e-10 ***
## edummy5     0.46836752 0.04646722 10.0795 < 2.2e-16 ***
## lgincome    0.12774345 0.00735989 17.3567 < 2.2e-16 ***
## lgwealth    0.10735864 0.00649069 16.5404 < 2.2e-16 ***
## age        -0.00313094 0.00084902 -3.6877 0.0002275 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```