

Labor Market Analysis

Exploratory Data Analysis

Marjorie Blanco, Joe Thomson, Haodi Tu

Data

We used data from the 2016 ACS for Puerto Rico to examine wage gaps between individuals with different education levels. Our research questions are: 1) How do earnings vary by education level? 2) How does the premium for education vary by gender? The 2016 ACS is a nationally representative sample of 5194. The household survey includes questions pertaining to each household member's demographic characteristics and labor market activity.

We restrict our sample to these three racial groups: White, Black and Other. In addition, given our goal of examining earning differences by gender and marital status and the reporting of earnings in the ACS on an annual basis (wages, salary, commissions, bonuses, tips, and self-employment income during the past 12 months), we restrict our sample to full-time year-round (FTYR) workers. We define FTYR workers as individuals who report positive earnings over the past year, who worked at least 40 of the past 52 weeks, and who worked at least 35 hours per week in a usual work week over this period.

EDA Insights:

For our exploratory analysis we looked at population breakdowns by education, age, marital status, gender, race, earnings, and work hours. We applied filters on education (HS diploma or above), age (18-64), and work hours (>35/week).

An earnings histogram identified a default maximum amount of earnings (189k) which we also filtered out of the data. The earning distribution is progressive above the median, but drops off sharply below the median, likely indicating the presence of a minimum wage. The correlation between age and earnings is very weak (.23). Likewise, earnings is very weakly correlated with hours worked among those who work more than 35 hours per week. However, white individuals appear to have an earnings premium over other races, and both married and divorced individuals appear to have an earnings premium over those who have never been married. Given that the correlation between age and earnings was weak, this may be due to other qualitative factors possessed by those who get married. Married was recategorized to married, divorced and never married. Men also appear to earn a small premium over women.

The age distribution of full time workers is skewed towards older adults, possibly indicating that younger workers have trouble finding full-time work, wait to enter the workforce, or are leaving the territory.

Preliminary Econometric Estimates

First Model

$$\text{Earning} = \beta_0 + \text{Divorced} * \beta_1 + \text{NeverMarried} * \beta_2 + \text{Female} * \beta_3 + \text{RaceBlack} * \beta_4 + \text{RaceOther} * \beta_5 + \text{SomeCollege} * \beta_6 + \text{Associate} * \beta_7 + \text{Bachelor} * \beta_8 + \text{Master} * \beta_9 + \text{Professional} * \beta_{10} + \text{Doctoral} * \beta_{11} + \text{Age} * \beta_{12}$$

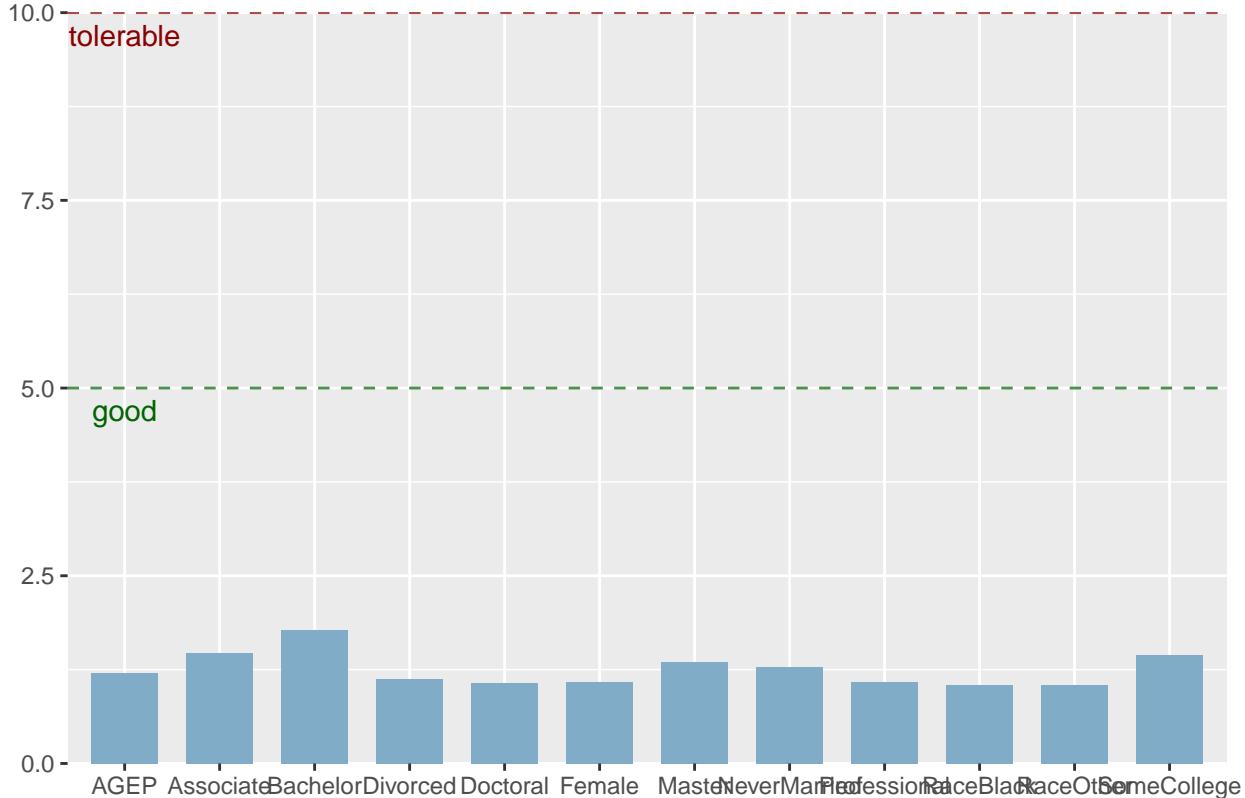
```
##  
## Call:  
## lm(formula = PERNP ~ Divorced + NeverMarried + Female + RaceBlack +  
##     RaceOther + SomeCollege + Associate + Bachelor + Master +  
##     Professional + Doctoral + AGEP, data = ss16ppr)  
##
```

```

## Residuals:
##      Min    1Q Median     3Q    Max
## -43715 -9218 -2930   5352  98732
##
## Coefficients:
##              Estimate Std. Error t value      Pr(>|t|)
## (Intercept) 12561.11   1109.02  11.326 < 0.0000000000000002 ***
## Divorced    -1185.01   548.34  -2.161      0.030735 *
## NeverMarried -2990.72   519.43  -5.758      0.00000000902 ***
## Female      -4846.95   431.25 -11.239 < 0.0000000000000002 ***
## RaceBlack    -1176.12   591.26  -1.989      0.046733 *
## RaceOther    -2133.58   579.76  -3.680      0.000236 ***
## SomeCollege  4232.33   694.53   6.094      0.00000000118 ***
## Associate    4151.64   688.15   6.033      0.00000000172 ***
## Bachelor     12333.05   586.55  21.027 < 0.0000000000000002 ***
## Master       17780.48   812.08  21.895 < 0.0000000000000002 ***
## Professional 28122.73  1475.26  19.063 < 0.0000000000000002 ***
## Doctoral     35651.82  1615.88  22.063 < 0.0000000000000002 ***
## AGEP         286.21    21.04   13.604 < 0.0000000000000002 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 14920 on 5181 degrees of freedom
## Multiple R-squared:  0.2465, Adjusted R-squared:  0.2448
## F-statistic: 141.3 on 12 and 5181 DF,  p-value: < 0.0000000000000002
##
## [[1]]

```

Variance Inflation Factors (multicollinearity)

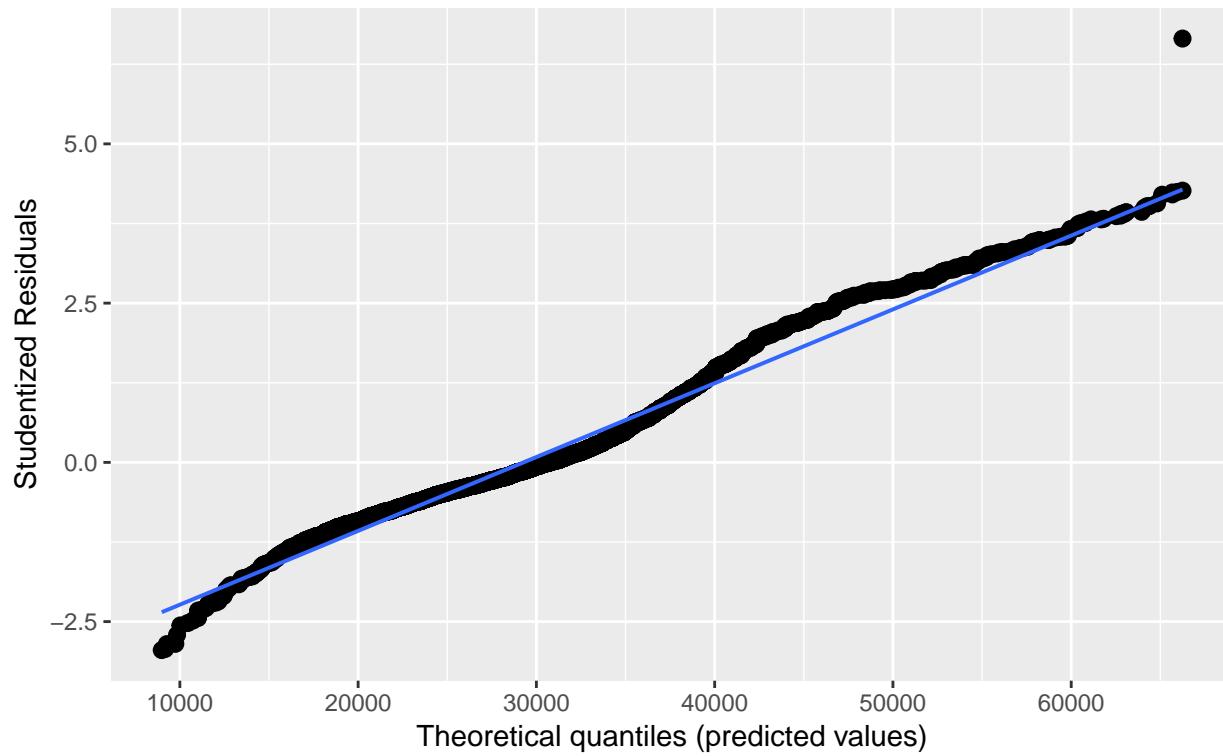


```
##
```

```
## [[2]]
```

Non-normality of residuals and outliers

Dots should be plotted along the line

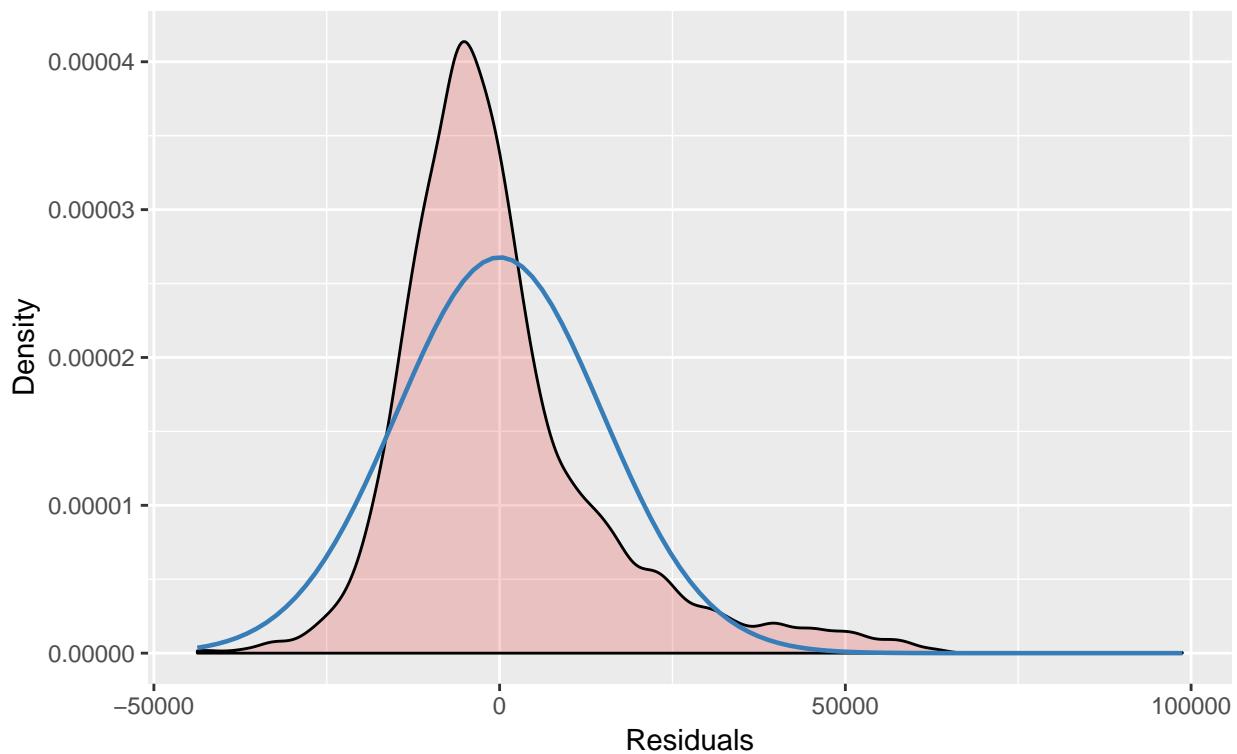


```
##
```

```
## [[3]]
```

Non-normality of residuals

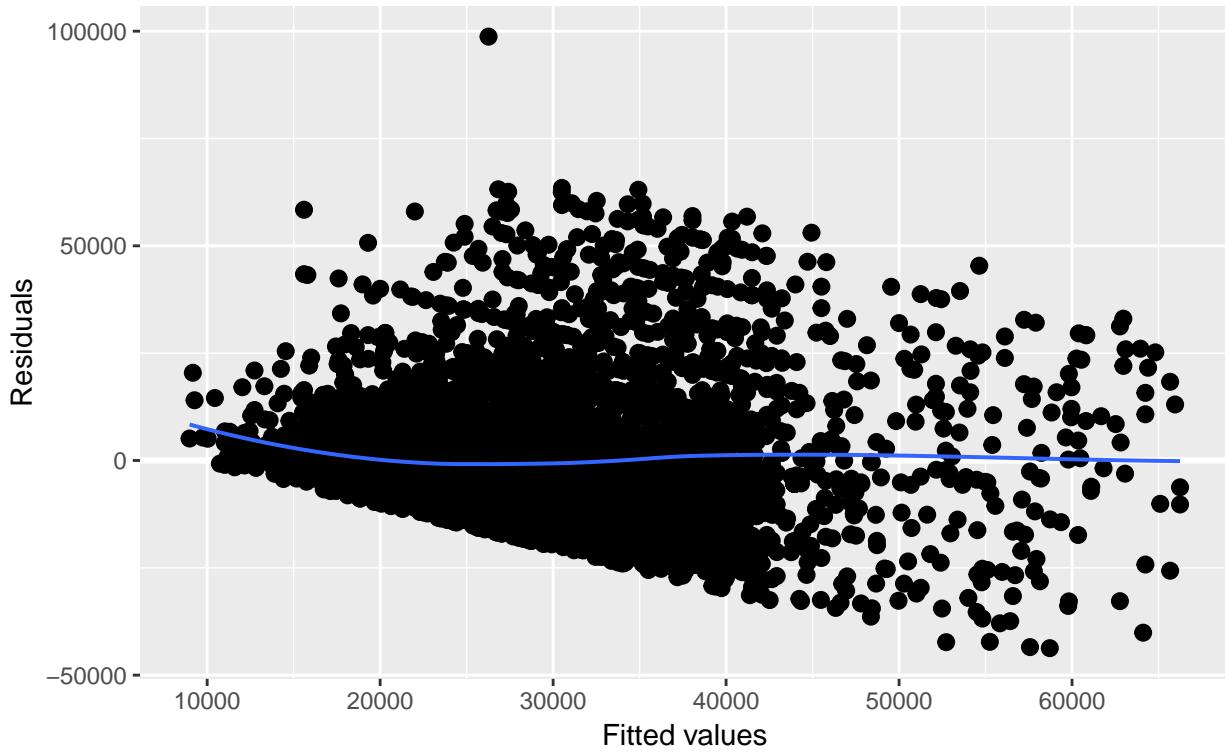
Distribution should look like normal curve



```
##  
## [[4]]
```

Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread



First Model log

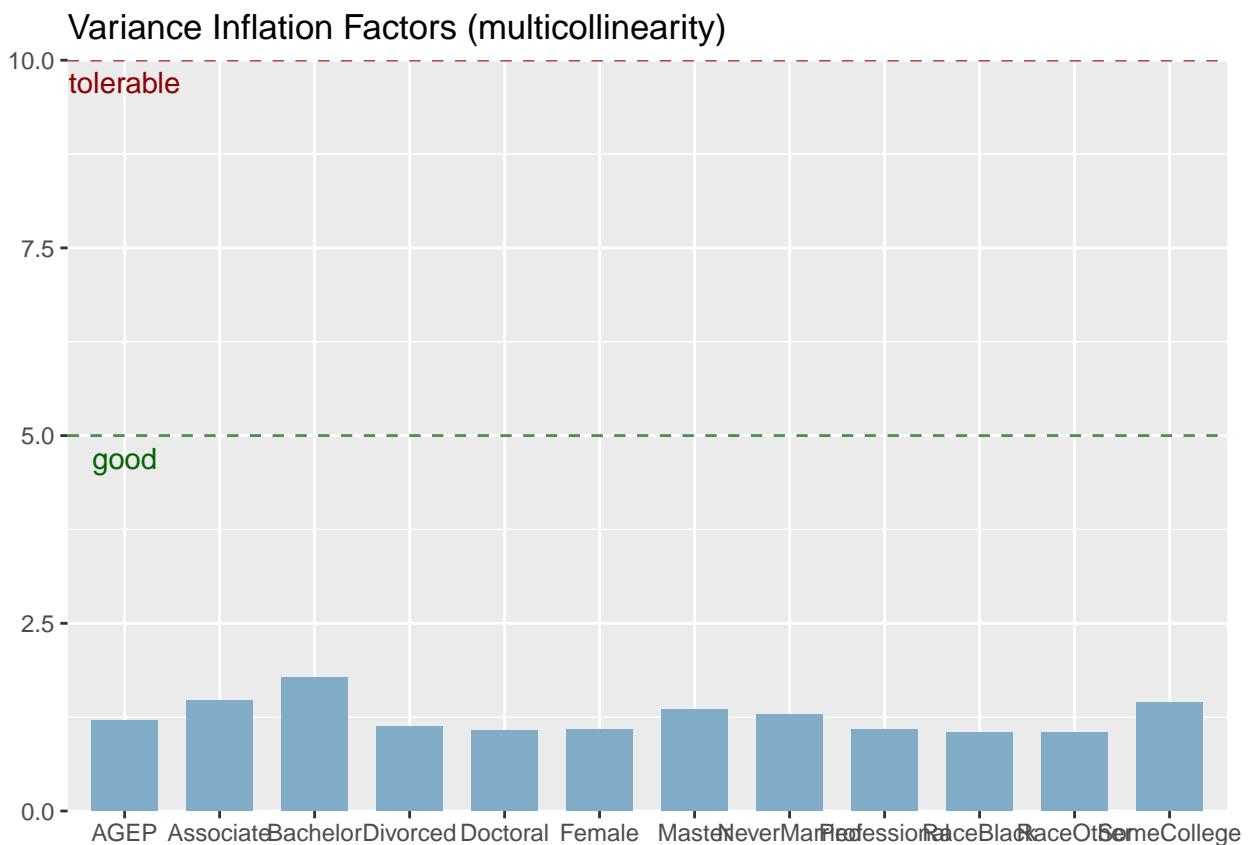
```
## 
## Call:
## lm(formula = log(PERNP) ~ Divorced + NeverMarried + Female +
##     RaceBlack + RaceOther + SomeCollege + Associate + Bachelor +
##     Master + Professional + Doctoral + AGEP, data = ss16ppr)
## 
## Residuals:
##      Min        1Q        Median       3Q        Max 
## -1.56257 -0.30721 -0.03127  0.27682  1.69744 
## 
## Coefficients:
##             Estimate Std. Error t value            Pr(>|t|)    
## (Intercept) 9.5837348  0.0331079 289.470 < 0.0000000000000002 *** 
## Divorced    -0.0401003  0.0163699 -2.450   0.014333 *    
## NeverMarried -0.1035958  0.0155069 -6.681   0.000000000262869 *** 
## Female      -0.1377478  0.0128744 -10.699 < 0.000000000000002 *** 
## RaceBlack    -0.0278243  0.0176511 -1.576   0.115005    
## RaceOther    -0.0570026  0.0173079 -3.293   0.000996 ***  
## SomeCollege   0.1504187  0.0207341  7.255   0.00000000004622 *** 
## Associate    0.1546164  0.0205437  7.526   0.00000000000612 *** 
## Bachelor     0.4212902  0.0175104 24.059 < 0.000000000000002 *** 
## Master       0.5746011  0.0242433 23.701 < 0.000000000000002 *** 
## Professional  0.8184414  0.0440417 18.583 < 0.000000000000002 *** 
## Doctoral     0.9593021  0.0482395 19.886 < 0.000000000000002 *** 
## AGEP        0.0092830  0.0006281 14.780 < 0.000000000000002 *** 
## ---
```

```

## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4453 on 5181 degrees of freedom
## Multiple R-squared:  0.2556, Adjusted R-squared:  0.2539
## F-statistic: 148.3 on 12 and 5181 DF,  p-value: < 0.00000000000000022

## [[1]]

```



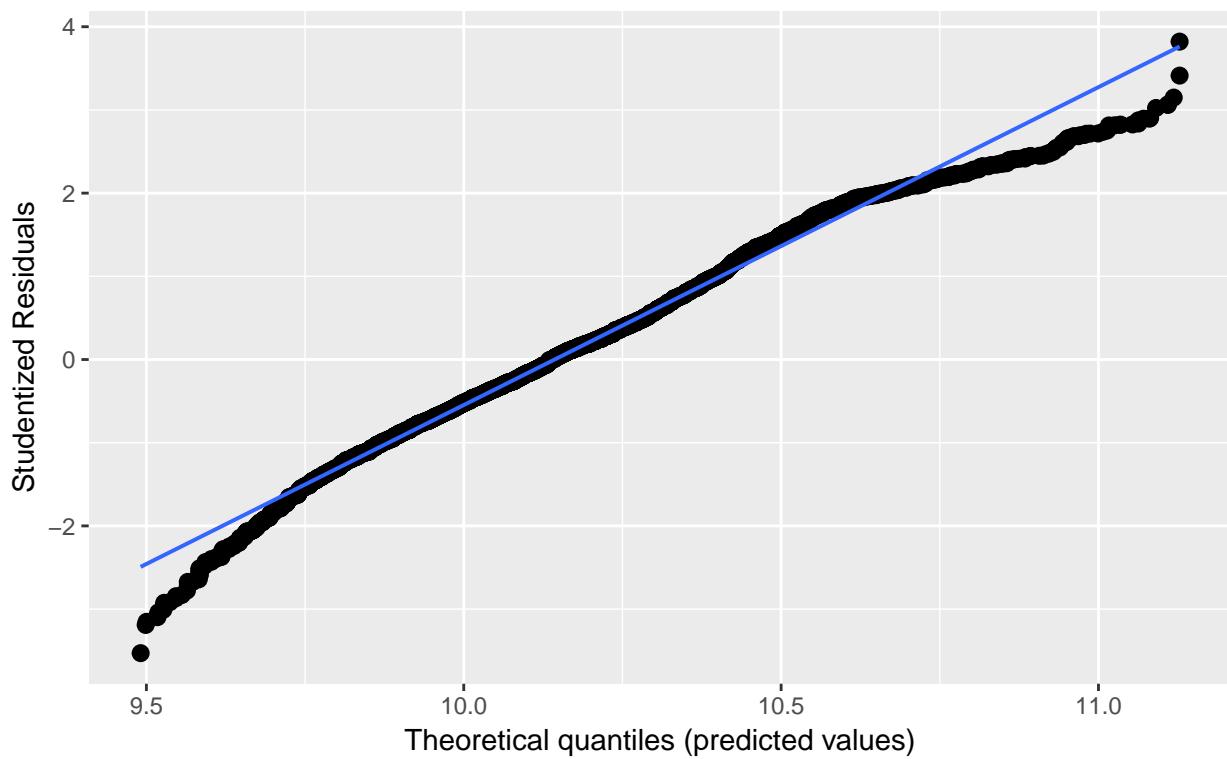
```

## 
## [[2]]

```

Non-normality of residuals and outliers

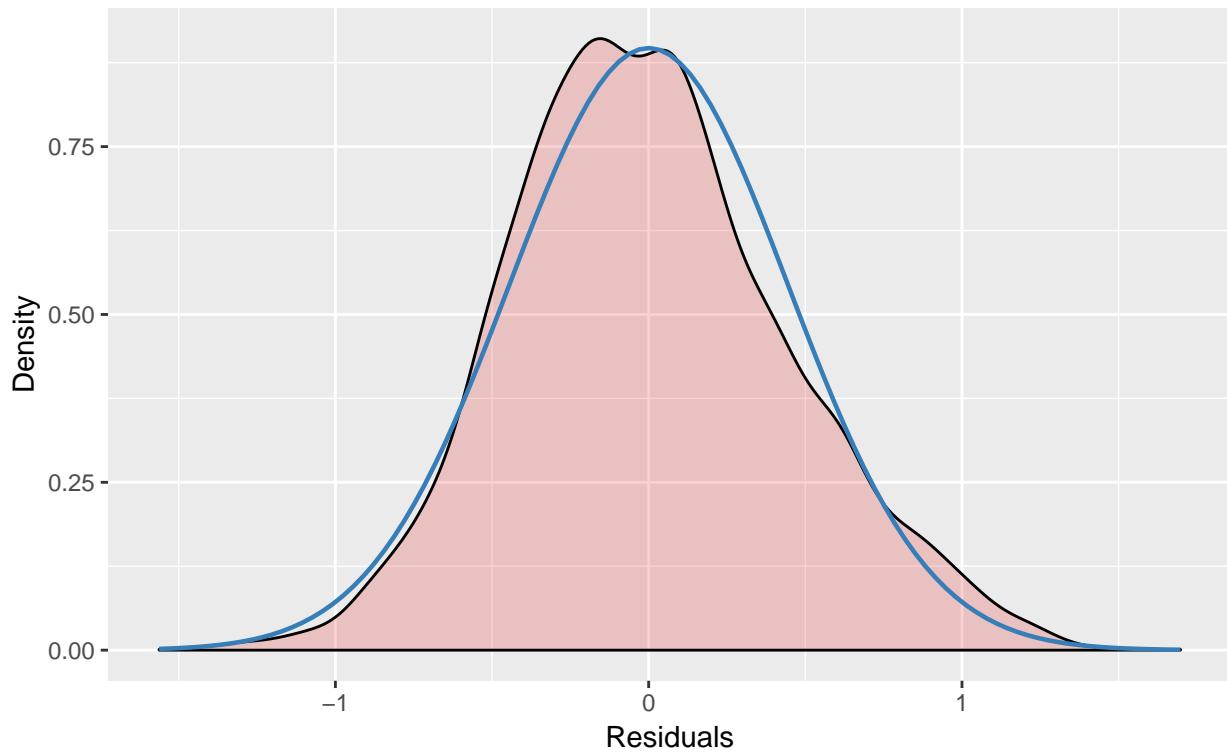
Dots should be plotted along the line



```
##  
## [[3]]
```

Non-normality of residuals

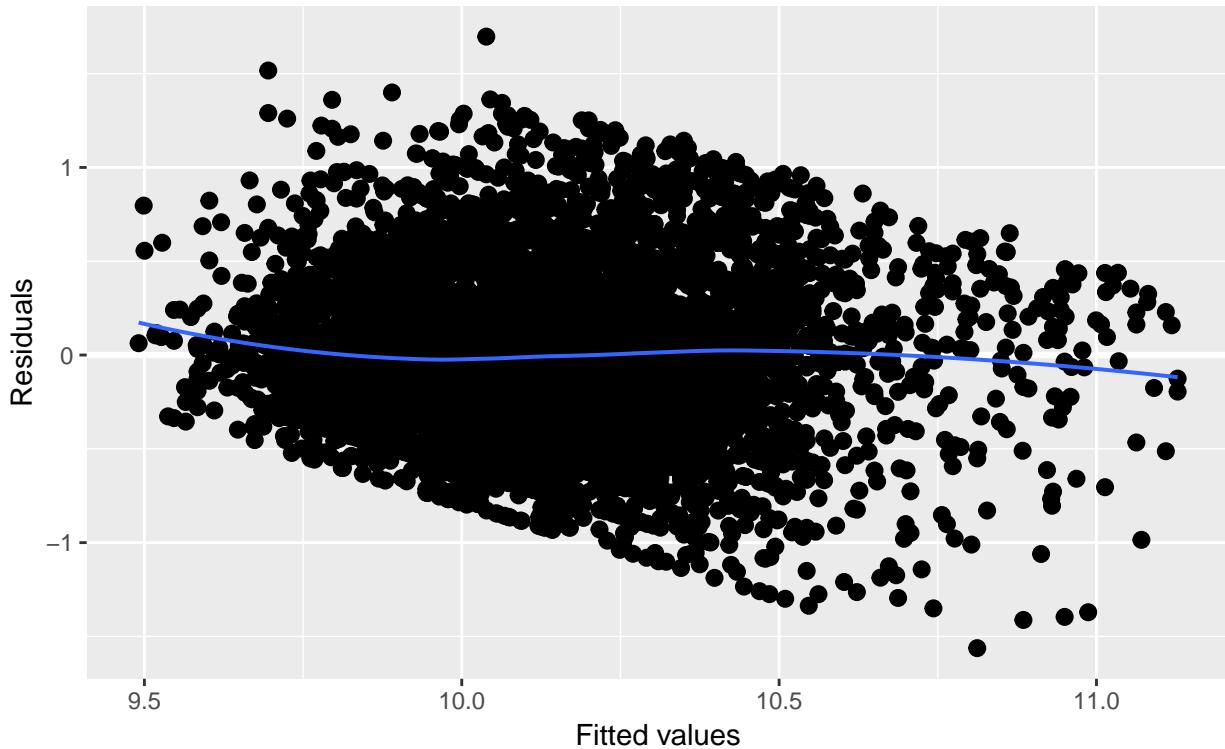
Distribution should look like normal curve



```
##  
## [[4]]
```

Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread



```
##  
## studentized Breusch-Pagan test  
##  
## data: model_1  
## BP = 150.03, df = 12, p-value < 0.0000000000000022  
  
##  
## Call:  
## lm(formula = residuals(model_1) * residuals(model_1) ~ Divorced +  
##       NeverMarried + Female + RaceBlack + RaceOther + SomeCollege +  
##       Associate + Bachelor + Master + Professional + Doctoral +  
##       AGEP, data = ss16ppr)  
##  
## Residuals:  
##      Min        1Q     Median        3Q       Max  
## -0.35125 -0.16505 -0.09434  0.05591  2.68132  
##  
## Coefficients:  
##             Estimate Std. Error t value     Pr(>|t|)  
## (Intercept)  0.0818172  0.0207536  3.942 0.0000817631613 ***  
## Divorced     0.0040528  0.0102614  0.395   0.69289  
## NeverMarried -0.0128944  0.0097204 -1.327   0.18472  
## Female      -0.0475871  0.0080703 -5.897 0.0000000039464 ***  
## RaceBlack    -0.0167529  0.0110645 -1.514   0.13006  
## RaceOther    -0.0316612  0.0108494 -2.918   0.00354 **  
## SomeCollege   0.0280547  0.0129971  2.159   0.03093 *  
## Associate     0.0138192  0.0128778  1.073   0.28327  
## Bachelor     0.0622312  0.0109764  5.670 0.0000000150912 ***
```

```

## Master      0.0855937  0.0151969   5.632 0.0000000187164 ***
## Professional 0.1175606  0.0276074   4.258 0.0000209631899 ***
## Doctoral    -0.0035794  0.0302388  -0.118     0.90578
## AGEP        0.0025946  0.0003937   6.590 0.0000000000483 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2792 on 5181 degrees of freedom
## Multiple R-squared:  0.02888,   Adjusted R-squared:  0.02664
## F-statistic: 12.84 on 12 and 5181 DF,  p-value: < 0.00000000000000022

##             (Intercept)       Divorced  NeverMarried
## (Intercept)  0.00096897458 -0.0000590137114 -0.000239271567
## Divorced    -0.00005901371   0.0002806035543  0.000076438306
## NeverMarried -0.00023927157  0.0000764383065  0.000227761804
## Female      -0.00001938983 -0.0000202896242 -0.000006823602
## RaceBlack   -0.00005767208  0.0000003256039 -0.000003147976
## RaceOther   -0.00005060465  0.0000059955730 -0.000005138531
## SomeCollege -0.00018134425  0.0000021874542 -0.000004786248
## Associate   -0.00017463330  0.0000138116197  0.000018602765
## Bachelor    -0.00014488417  0.0000138548770  0.000013566722
## Master      -0.00015021462  0.0000109086504  0.000023282967
## Professional -0.00019242229 -0.0000153970493 -0.000012022106
## Doctoral    -0.00006535547  0.0000404058824  0.000025382956
## AGEP        -0.00001675146 -0.0000004281187  0.000003500641
##             Female      RaceBlack  RaceOther
## (Intercept) -0.0000193898288 -0.00005767208111 -0.0000506046493
## Divorced    -0.0000202896242  0.00000032560387  0.0000059955730
## NeverMarried -0.0000068236021 -0.00000314797581 -0.0000051385311
## Female      0.0001678745671 -0.00000301045419 -0.0000020131537
## RaceBlack   -0.0000030104542  0.00029740859345  0.0000576934756
## RaceOther   -0.0000020131537  0.00005769347561  0.0002672052588
## SomeCollege -0.0000222074787 -0.00000374116548  0.0000035643799
## Associate   -0.0000342424535  0.00000514604200 -0.0000052188026
## Bachelor    -0.0000568884832  0.00001229020730 -0.0000031019365
## Master      -0.0000718116584  0.00001438505140  0.0000184779941
## Professional -0.0000421288316  0.00002034440471  0.0000008570039
## Doctoral    -0.0000232615426  0.00001381076352  0.0000328791070
## AGEP        -0.0000006931808 -0.00000007316387 -0.0000001337752
##             SomeCollege  Associate   Bachelor
## (Intercept) -0.0001813442499 -0.0001746333004 -0.0001448841672
## Divorced    0.0000021874542  0.0000138116197  0.0000138548770
## NeverMarried -0.0000047862478  0.0000186027650  0.0000135667225
## Female      -0.0000222074787 -0.0000342424535 -0.0000568884832
## RaceBlack   -0.0000037411655  0.0000051460420  0.0000122902073
## RaceOther   0.0000035643799 -0.0000052188026 -0.0000031019365
## SomeCollege 0.0003881019793  0.0001539734247  0.0001552654184
## Associate   0.0001539734247  0.0003700311385  0.0001610121834
## Bachelor    0.0001552654184  0.0001610121834  0.0002936524078
## Master      0.0001576386224  0.0001639894985  0.0001739480839
## Professional 0.0001593868062  0.0001580732303  0.0001647368264
## Doctoral    0.0001431398024  0.0001535854949  0.0001590859022
## AGEP        0.0000009815858  0.0000006660104  0.0000001617824
##             Master  Professional  Doctoral
## (Intercept) -0.0001502146194 -0.0001924222860 -0.000065355470
## Divorced    0.0000109086504 -0.0000153970493  0.000040405882
## NeverMarried 0.0000232829671 -0.0000120221057  0.000025382956

```

```

## Female      -0.0000718116584 -0.0000421288316 -0.000023261543
## RaceBlack    0.0000143850514  0.0000203444047  0.000013810764
## RaceOther     0.0000184779941  0.0000008570039  0.000032879107
## SomeCollege   0.0001576386224  0.0001593868062  0.000143139802
## Associate     0.0001639894985  0.0001580732303  0.000153585495
## Bachelor      0.0001739480839  0.0001647368264  0.000159085902
## Master        0.0006576044680  0.0001667073218  0.000164989373
## Professional   0.0001667073218  0.0026184461935  0.000149920294
## Doctoral       0.0001649893733  0.0001499202943  0.002014638663
## AGEP          0.0000002330796  0.00000013791206 -0.0000002335254
##                         AGEP
## (Intercept) -0.00001675145766
## Divorced     -0.00000042811865
## NeverMarried 0.00000350064071
## Female       -0.00000069318084
## RaceBlack     -0.00000007316387
## RaceOther      -0.00000013377521
## SomeCollege   0.00000098158581
## Associate     0.00000066601039
## Bachelor      0.00000016178242
## Master        0.00000023307964
## Professional   0.00000137912056
## Doctoral      -0.00000233525355
## AGEP          0.00000037964199

## (Intercept) Divorced NeverMarried Female RaceBlack
## 0.0311283565 0.0167512255 0.0150917794 0.0129566418 0.0172455384
## RaceOther SomeCollege Associate Bachelor Master
## 0.0163464142 0.0197003040 0.0192361935 0.0171362892 0.0256437998
## Professional Doctoral AGEP
## 0.0511707553 0.0448847264 0.0006161509

##
## Call:
## lm(formula = log(PERNP, base = exp(1)) ~ Divorced + NeverMarried +
##     Female + RaceBlack + RaceOther + SomeCollege + Associate +
##     Bachelor + Master + Professional + Doctoral + AGEP, data = ss16ppr)
##
## Residuals:
##      Min      1Q      Median      3Q      Max 
## -1.56257 -0.30721 -0.03127  0.27682  1.69744 
##
## Coefficients:
##             Estimate Std. Error t value            Pr(>|t|)    
## (Intercept) 9.5837348  0.0331079 289.470 < 0.000000000000002 *** 
## Divorced    -0.0401003  0.0163699 -2.450   0.014333 *    
## NeverMarried -0.1035958  0.0155069 -6.681   0.000000000262869 *** 
## Female      -0.1377478  0.0128744 -10.699 < 0.000000000000002 *** 
## RaceBlack    -0.0278243  0.0176511 -1.576   0.115005    
## RaceOther     -0.0570026  0.0173079 -3.293   0.000996 ***  
## SomeCollege   0.1504187  0.0207341  7.255   0.000000000004622 *** 
## Associate     0.1546164  0.0205437  7.526   0.000000000000612 *** 
## Bachelor      0.4212902  0.0175104 24.059 < 0.000000000000002 *** 
## Master        0.5746011  0.0242433 23.701 < 0.000000000000002 *** 
## Professional   0.8184414  0.0440417 18.583 < 0.000000000000002 *** 
## Doctoral      0.9593021  0.0482395 19.886 < 0.000000000000002 *** 

```

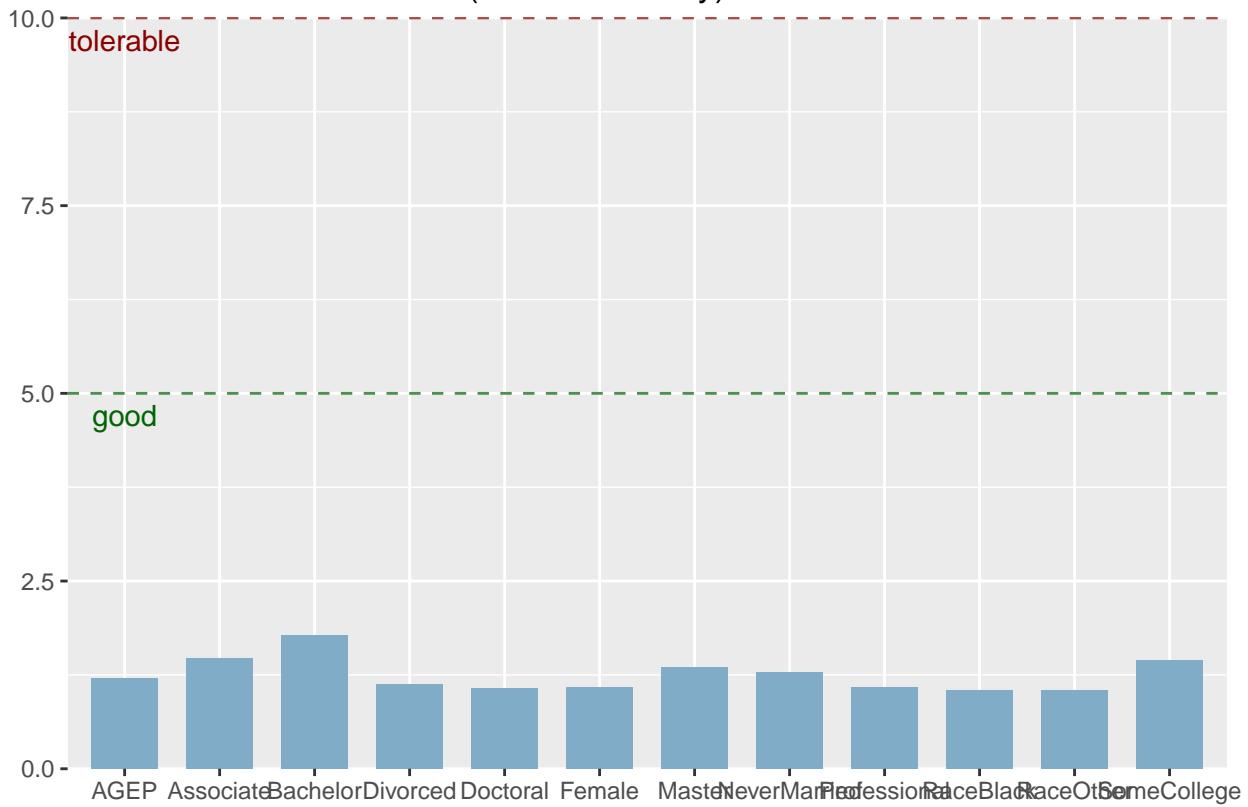
```

## AGEP          0.0092830  0.0006281  14.780 < 0.0000000000000002 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4453 on 5181 degrees of freedom
## Multiple R-squared:  0.2556, Adjusted R-squared:  0.2539
## F-statistic: 148.3 on 12 and 5181 DF,  p-value: < 0.0000000000000022

## [[1]]

```

Variance Inflation Factors (multicollinearity)



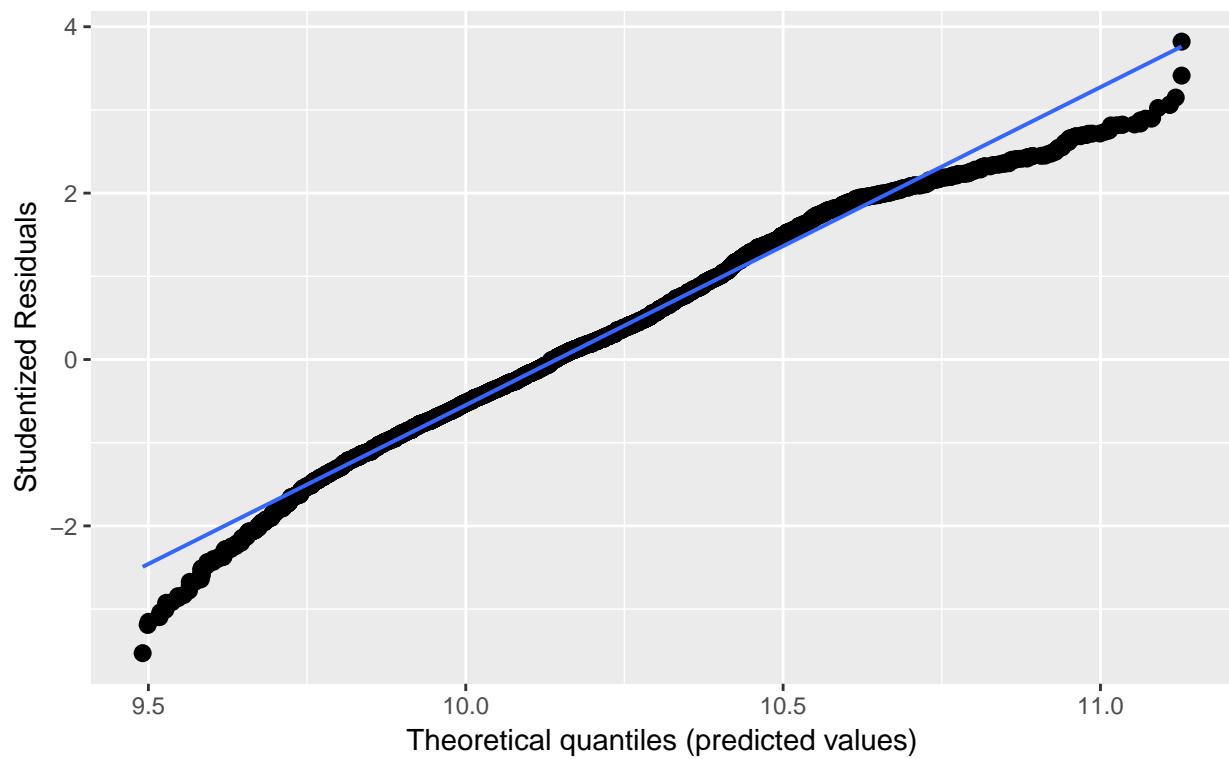
```

## 
## [[2]]

```

Non-normality of residuals and outliers

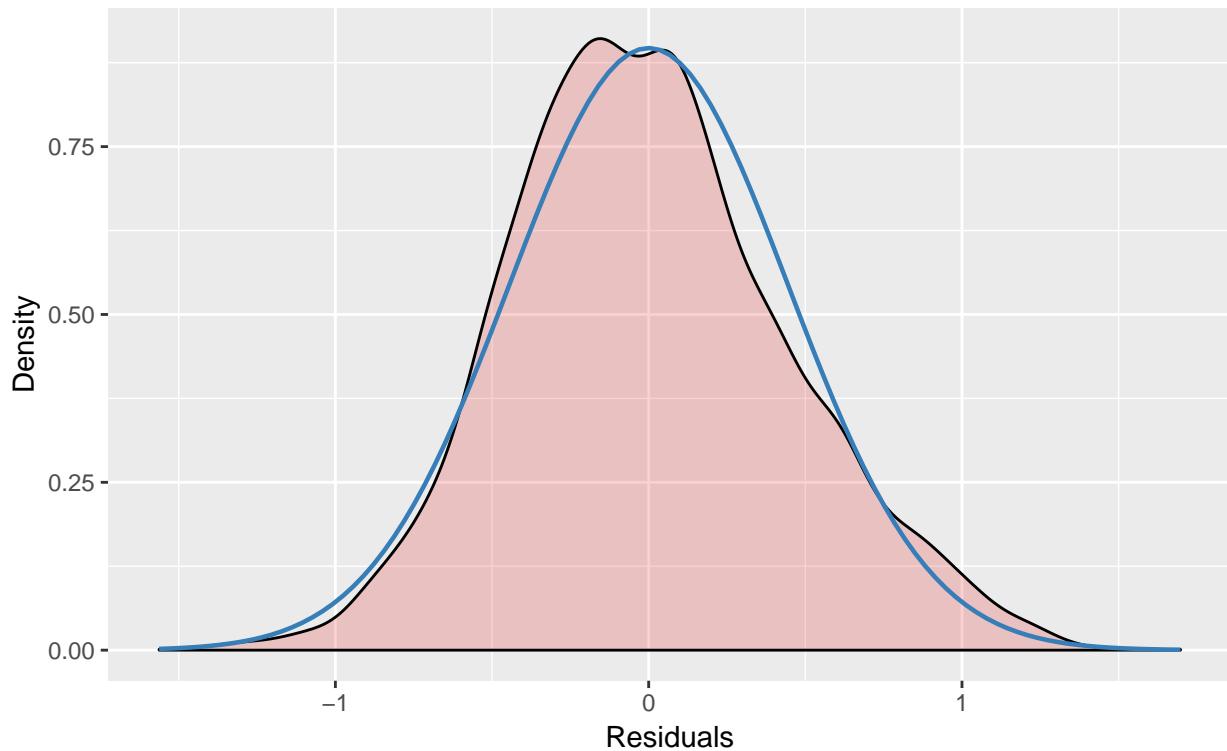
Dots should be plotted along the line



```
##  
## [[3]]
```

Non-normality of residuals

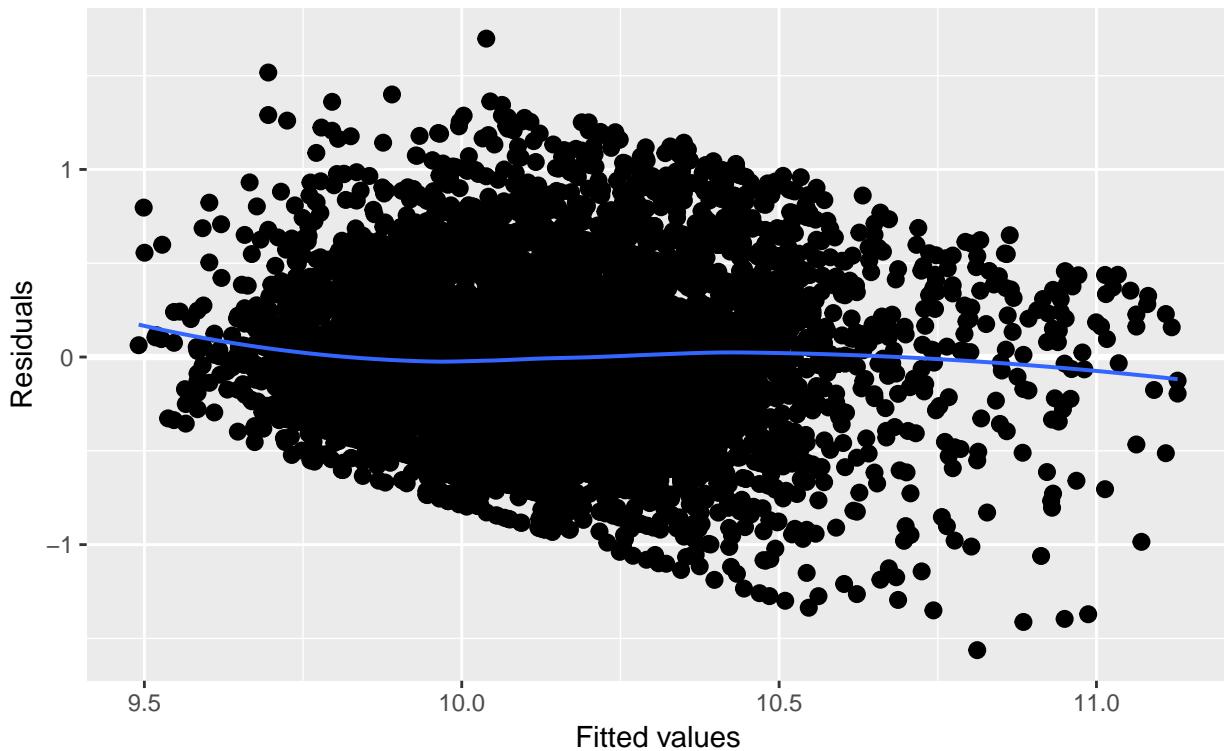
Distribution should look like normal curve



```
##  
## [[4]]
```

Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread



- Coefficients Explanation

- Holding gender, race, education and age constant, married or widowed people makes \$0.04 more than people who divorced or separated on average.
- Holding gender, race, education and age constant, married or widowed people makes \$0.1 more than people who never married on average.
- Holding marriage, race, education and age constant, male makes \$0.14 more than female on average.
- Holding marriage, gender, education and age constant, White makes \$0.03 more than Black on average.
- Holding marriage, gender, education and age constant, White makes \$0.06 more than Other race on average.
- Holding marriage, gender, race and age constant, people have high school education makes \$0.15 less than people have some college education on average.
- Holding marriage, gender, race and age constant, people have high school education makes \$0.15 less than people have associate education on average.
- Holding marriage, gender, race and age constant, people have high school education makes \$0.42 less than people have bachelor's degree on average.
- Holding marriage, gender, race and age constant, people have high school education makes \$0.57 less than people have master's degree on average.
- Holding marriage, gender, race and age constant, people have high school education makes \$0.82 less than people have Professional education on average.
- Holding marriage, gender, race and age constant, people have high school education makes \$0.96 less than people have doctor's degree on average.
- Holding marriage, gender, race and education constant, people make \$0.01 more as age increases on average between the age of 18 to 64.

First Model Updated

$Earning = \beta_0 + Divorced * \beta_1 + NeverMarried * \beta_2 + Female * \beta_3 + RaceBlack * \beta_4 + RaceOther * \beta_5 + SomeCollege * \beta_6 + Associate * \beta_7 + Bachelor * \beta_8 + Master * \beta_9 + Professional * \beta_{10} + Doctoral * \beta_{11} + Age * \beta_{12}$

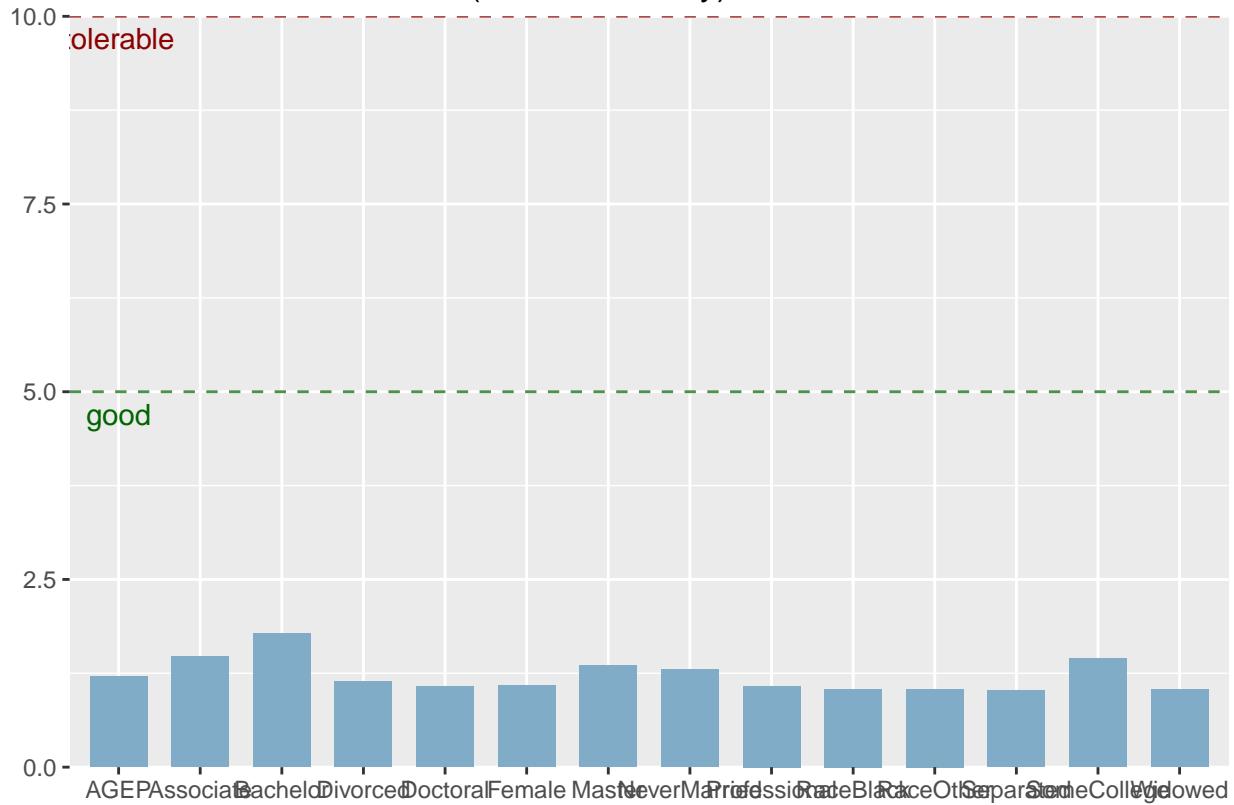
```

## 
## Call:
## lm(formula = PERNP ~ Widowed + Divorced + Separated + NeverMarried +
##     Female + RaceBlack + RaceOther + SomeCollege + Associate +
##     Bachelor + Master + Professional + Doctoral + AGEPE, data = ss16ppr)
## 
## Residuals:
##    Min      1Q Median      3Q     Max 
## -43683   -9228  -2919   5341  98762 
## 
## Coefficients:
##             Estimate Std. Error t value    Pr(>|t|)    
## (Intercept) 12598.97    1110.28 11.348 < 0.000000000000002 *** 
## Widowed     1104.92    1888.02  0.585    0.558422    
## Divorced    -1078.74    571.98 -1.886    0.059353 .  
## Separated    -1833.17   1489.22 -1.231    0.218393    
## NeverMarried -2974.75    520.48 -5.715    0.00000001155 *** 
## Female      -4868.47    432.66 -11.252 < 0.000000000000002 *** 
## RaceBlack     -1178.01    591.36 -1.992    0.046421 *  
## RaceOther     -2141.04    579.98 -3.692    0.000225 ***  
## SomeCollege   4241.63    694.73  6.105    0.00000000110 *** 
## Associate     4150.43    688.45  6.029    0.00000000177 *** 
## Bachelor      12337.16    587.07 21.015 < 0.000000000000002 *** 
## Master        17795.40    812.61 21.899 < 0.000000000000002 *** 
## Professional  28133.37   1476.36 19.056 < 0.000000000000002 *** 
## Doctoral      35674.46   1617.08 22.061 < 0.000000000000002 *** 
## AGEPE         284.94     21.12 13.488 < 0.000000000000002 *** 
## --- 
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 
## 
## Residual standard error: 14920 on 5179 degrees of freedom
## Multiple R-squared:  0.2466, Adjusted R-squared:  0.2446 
## F-statistic: 121.1 on 14 and 5179 DF,  p-value: < 0.0000000000000022 

## [[1]]

```

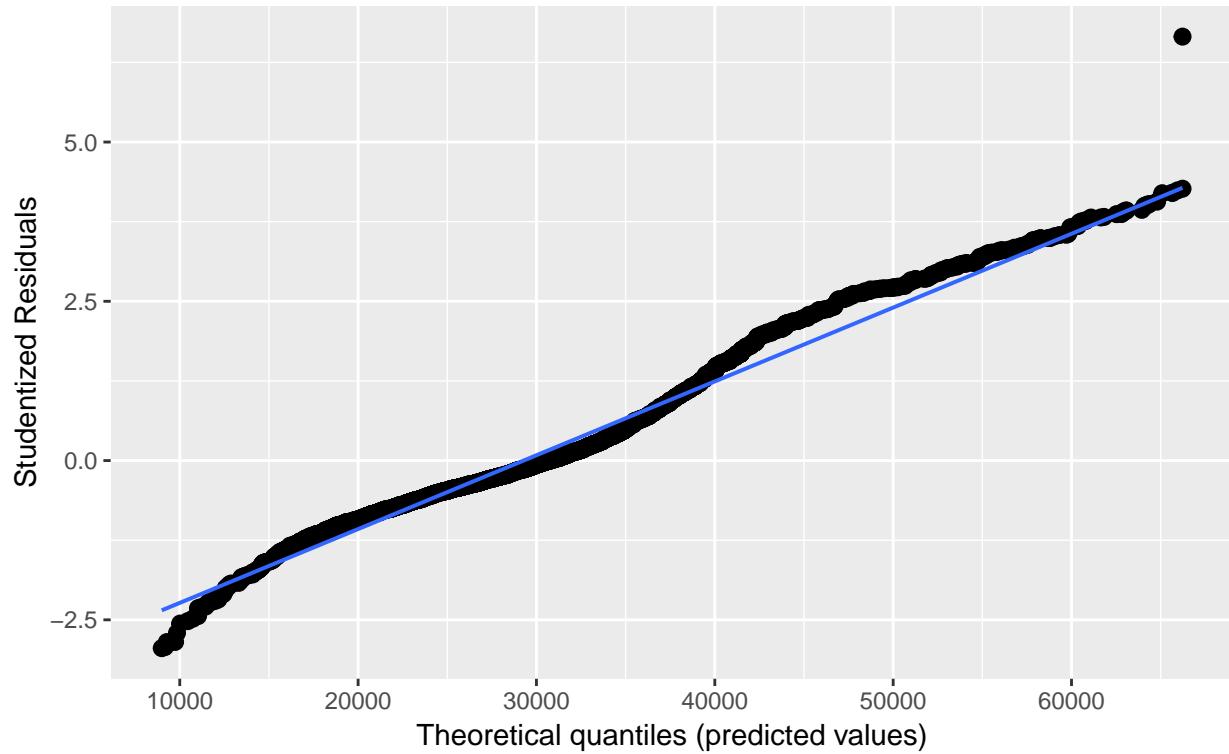
Variance Inflation Factors (multicollinearity)



```
##  
## [[2]]
```

Non-normality of residuals and outliers

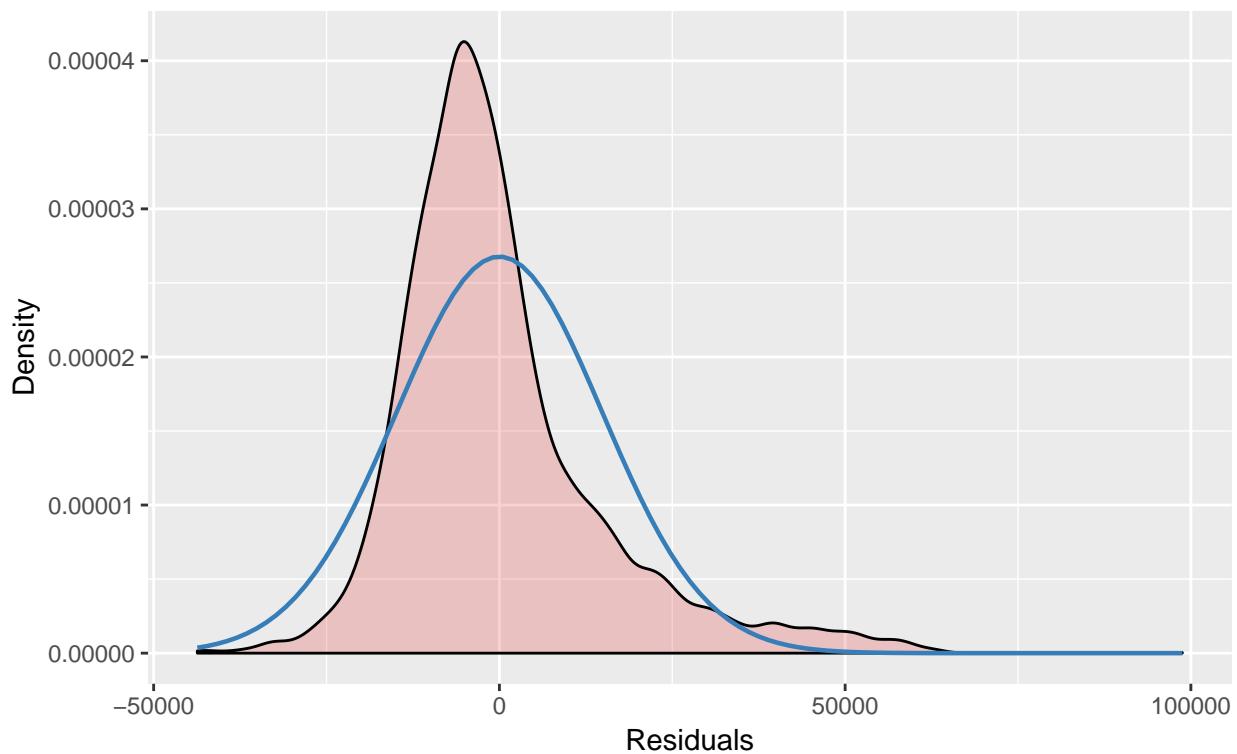
Dots should be plotted along the line



```
##  
## [[3]]
```

Non-normality of residuals

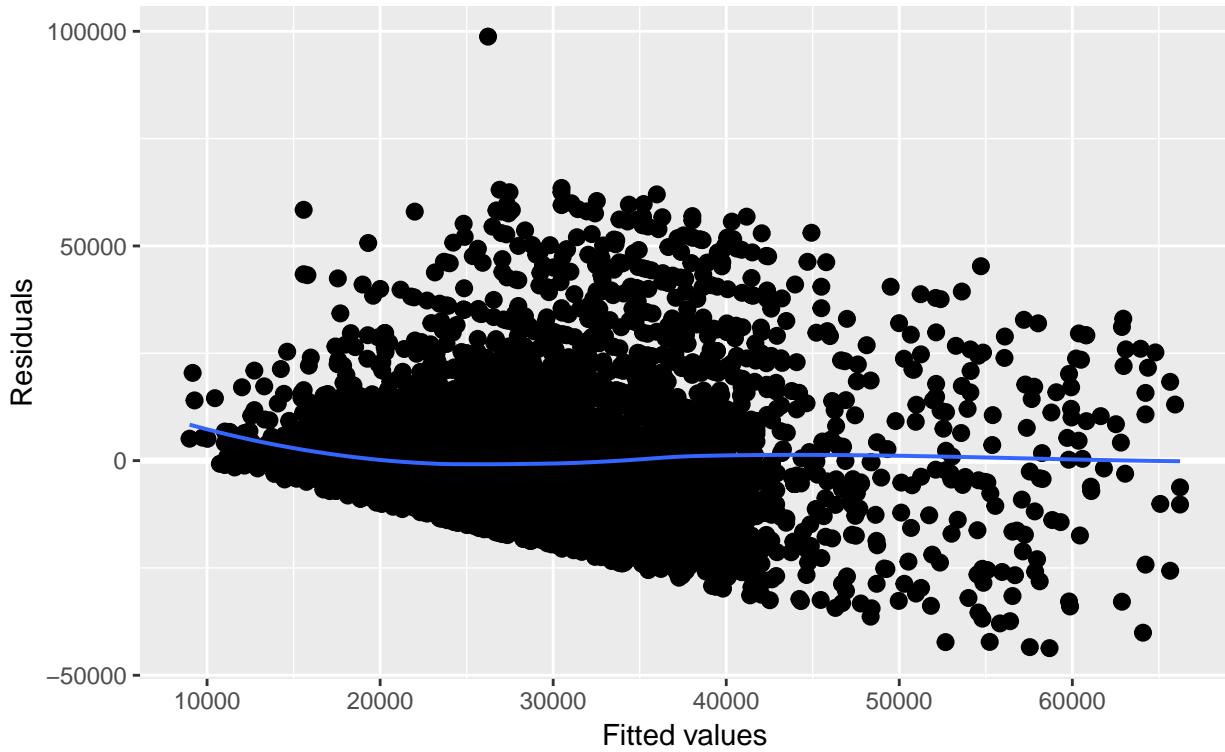
Distribution should look like normal curve



```
##  
## [[4]]
```

Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread



First Model log Updated

```
## 
## Call:
## lm(formula = log(PERNP) ~ Widowed + Divorced + Separated + NeverMarried +
##     Female + RaceBlack + RaceOther + SomeCollege + Associate +
##     Bachelor + Master + Professional + Doctoral + AGEP, data = ss16ppr)
## 
## Residuals:
##      Min        1Q        Median       3Q        Max 
## -1.56195 -0.30715 -0.03111  0.27690  1.69792 
## 
## Coefficients:
##             Estimate Std. Error t value            Pr(>|t|)    
## (Intercept) 9.5841704  0.0331471 289.140 < 0.0000000000000002 *** 
## Widowed     0.0167914  0.0563665   0.298          0.765794    
## Divorced    -0.0391735  0.0170763  -2.294          0.021829 *  
## Separated   -0.0437489  0.0444603  -0.984          0.325162    
## NeverMarried -0.1033310  0.0155387  -6.650          0.000000000323503 *** 
## Female      -0.1380595  0.0129169 -10.688 < 0.0000000000000002 *** 
## RaceBlack    -0.0278297  0.0176550  -1.576          0.115017    
## RaceOther    -0.0570606  0.0173151  -3.295          0.000989 ***  
## SomeCollege  0.1505241  0.0207411   7.257          0.000000000004534 *** 
## Associate    0.1546604  0.0205537   7.525          0.000000000000619 *** 
## Bachelor     0.4214137  0.0175270  24.044 < 0.0000000000000002 *** 
## Master       0.5748312  0.0242603  23.694 < 0.0000000000000002 *** 
## Professional 0.8187333  0.0440766  18.575 < 0.0000000000000002 *** 
## Doctoral     0.9597258  0.0482778  19.879 < 0.0000000000000002 ***
```

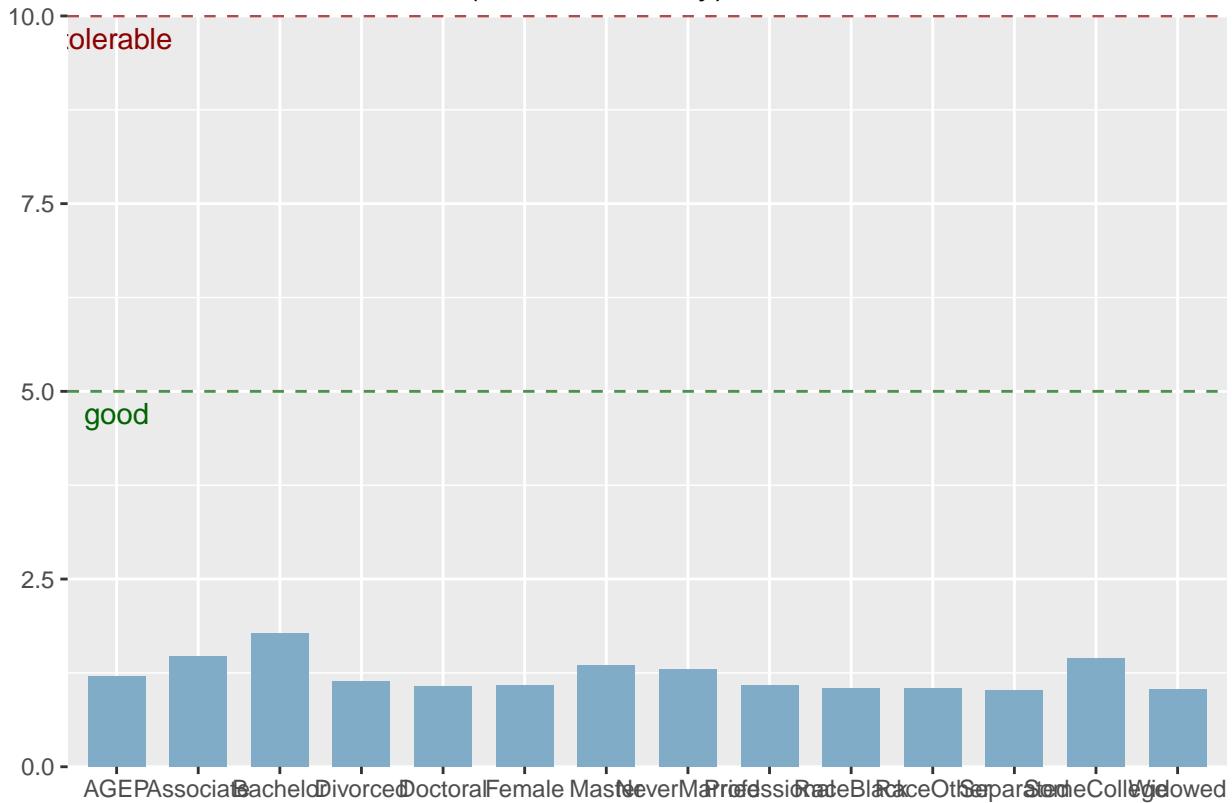
```

## AGEP          0.0092656  0.0006307  14.692 < 0.0000000000000002 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4454 on 5179 degrees of freedom
## Multiple R-squared:  0.2556, Adjusted R-squared:  0.2536
## F-statistic:   127 on 14 and 5179 DF,  p-value: < 0.0000000000000022

## [[1]]

```

Variance Inflation Factors (multicollinearity)



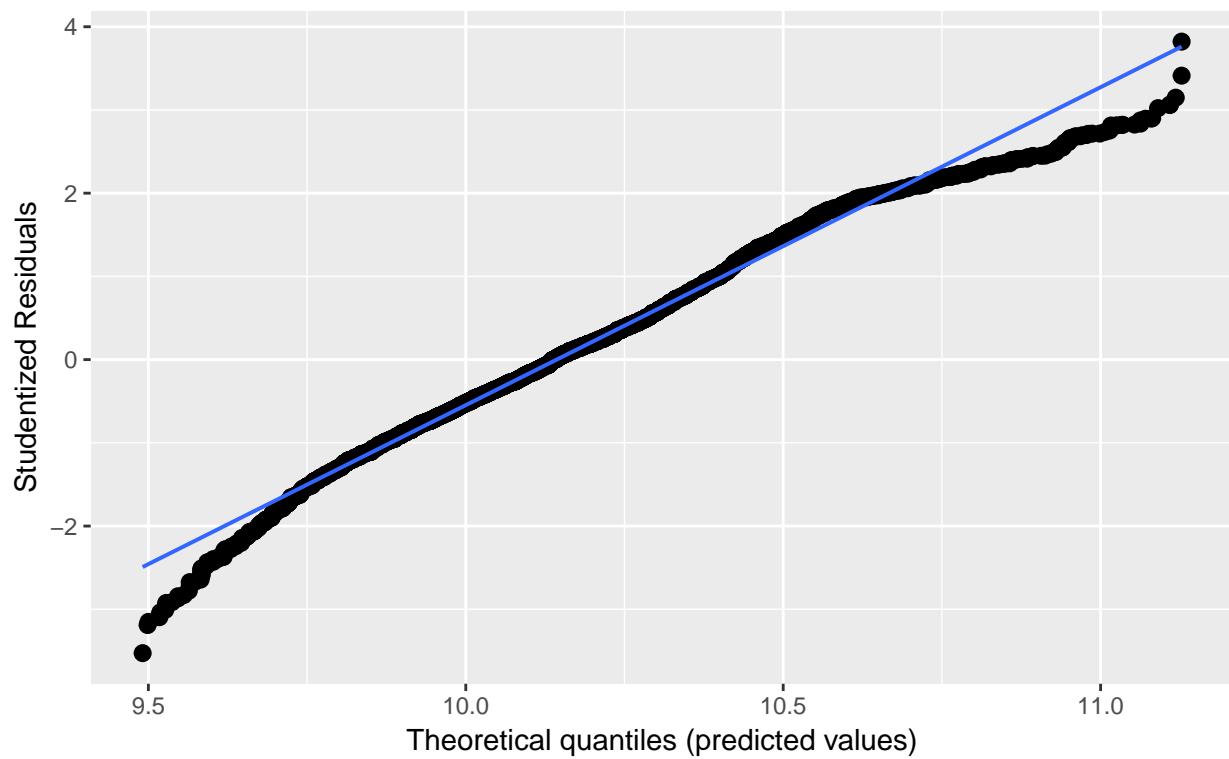
```

## 
## [[2]]

```

Non-normality of residuals and outliers

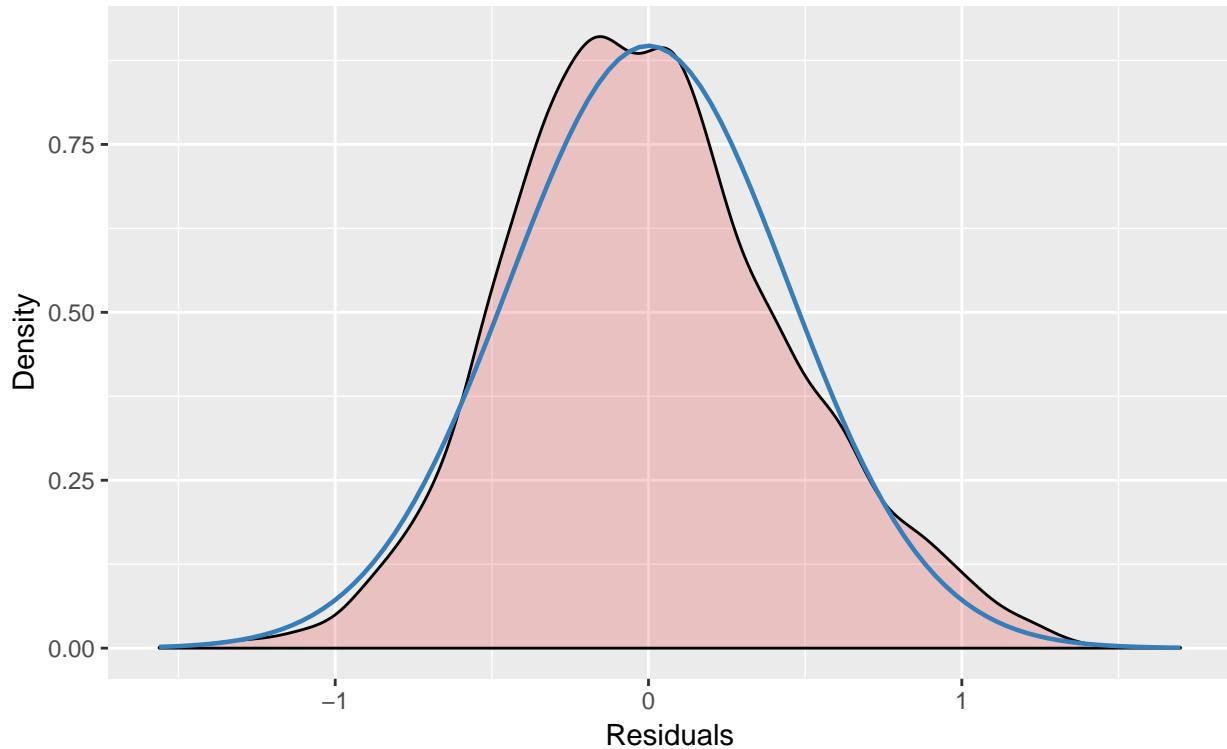
Dots should be plotted along the line



```
##  
## [[3]]
```

Non-normality of residuals

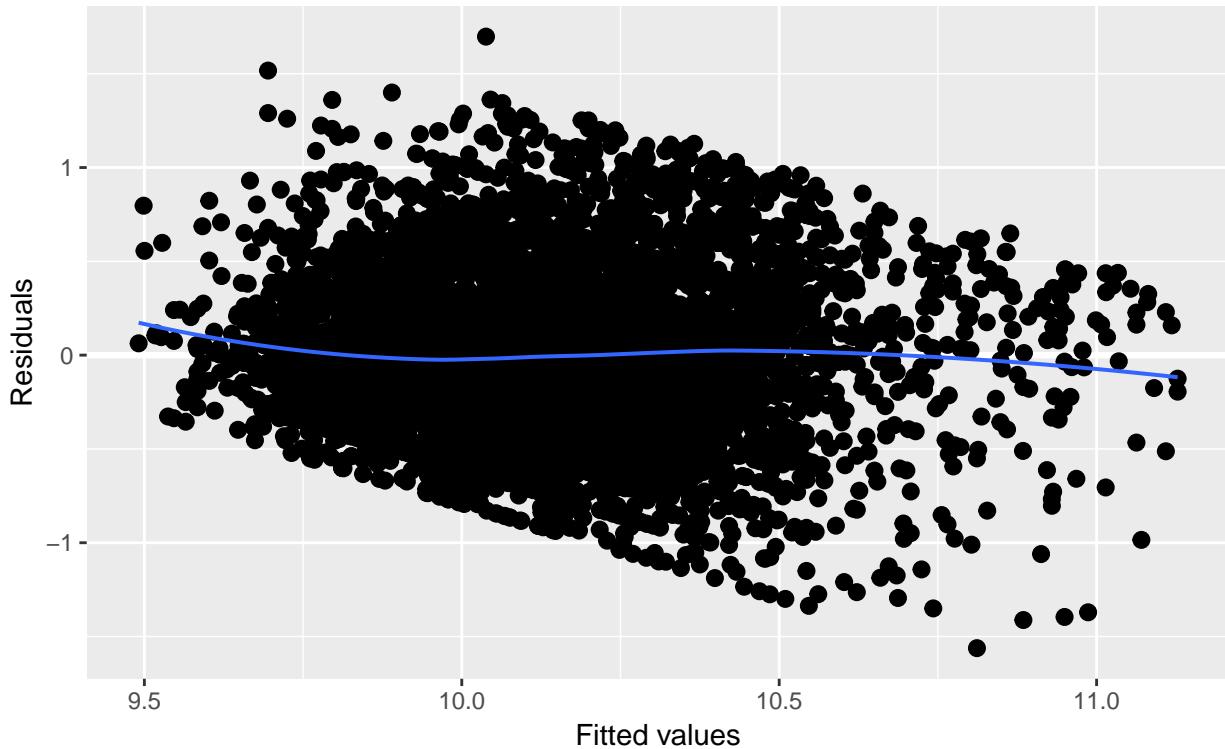
Distribution should look like normal curve



```
##  
## [[4]]
```

Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread



```
##  
## studentized Breusch-Pagan test  
##  
## data: model_1  
## BP = 150.88, df = 14, p-value < 0.0000000000000022  
  
##  
## Call:  
## lm(formula = residuals(model_1) * residuals(model_1) ~ Widowed +  
##     Divorced + Separated + NeverMarried + Female + RaceBlack +  
##     RaceOther + SomeCollege + Associate + Bachelor + Master +  
##     Professional + Doctoral + AGEP, data = ss16ppr)  
##  
## Residuals:  
##      Min       1Q   Median       3Q      Max  
## -0.35054 -0.16502 -0.09412  0.05608  2.68362  
##  
## Coefficients:  
##             Estimate Std. Error t value    Pr(>|t|)  
## (Intercept)  0.0829152  0.0207773  3.991 0.0000667989613 ***  
## Widowed     0.0246863  0.0353317  0.699  0.48477  
## Divorced     0.0067749  0.0107038  0.633  0.52680  
## Separated    -0.0132353  0.0278687 -0.475  0.63487  
## NeverMarried -0.0125341  0.0097400 -1.287  0.19820  
## Female      -0.0481954  0.0080966 -5.953 0.0000000028137 ***  
## RaceBlack    -0.0168606  0.0110665 -1.524  0.12768  
## RaceOther    -0.0317325  0.0108535 -2.924  0.00347 **  
## SomeCollege   0.0282734  0.0130009  2.175  0.02970 *
```

```

## Associate      0.0136946  0.0128835   1.063      0.28785
## Bachelor       0.0622135  0.0109863   5.663  0.0000000156923 ***
## Master         0.0859726  0.0152069   5.654  0.0000000165595 ***
## Professional    0.1176300  0.0276281   4.258  0.0000210267703 ***
## Doctoral        -0.0031366  0.0302615  -0.104      0.91745
## AGEP            0.0025625  0.0003953   6.482  0.0000000000988 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2792 on 5179 degrees of freedom
## Multiple R-squared:  0.02905,   Adjusted R-squared:  0.02642
## F-statistic: 11.07 on 14 and 5179 DF,  p-value: < 0.0000000000000022

##             (Intercept)      Widowed      Divorced
## (Intercept)  0.00097014590  0.0000915746396 -0.0000566607959
## Widowed     0.00009157464  0.0036912778151  0.0000929471473
## Divorced    -0.00005666080  0.0000929471473  0.0003073759755
## Separated    -0.00005283461  0.0000920026043  0.0000843862896
## NeverMarried -0.00023792257  0.0000500100601  0.0000774299269
## Female      -0.00002080306 -0.0000543391909 -0.0000221806573
## RaceBlack    -0.00005735655  0.0000151696378  0.0000002213991
## RaceOther    -0.00005078583 -0.00000055297003 0.0000038683084
## SomeCollege  -0.00018067578  0.0000025268315  0.0000058479750
## Associate    -0.00017425421 -0.0000005982643  0.0000128636083
## Bachelor     -0.00014387998  0.0000215902507  0.0000137163683
## Master       -0.00014892346  0.0000265184856  0.0000141321874
## Professional -0.00019161220  0.0000313122609 -0.0000204746302
## Doctoral     -0.00006426502  0.0000909750730  0.0000343919300
## AGEP          -0.00001682159 -0.0000035483019 -0.0000005057948
##             Separated  NeverMarried      Female
## (Intercept) -0.0000528346117 -0.000237922574 -0.0000208030627
## Widowed     0.0000920026043  0.000050010060 -0.0000543391909
## Divorced    0.0000843862896  0.000077429927 -0.0000221806573
## Separated    0.0018729998045  0.000078998376 -0.0000168111057
## NeverMarried 0.0000789983761  0.000228413115 -0.0000074776430
## Female      -0.0000168111057 -0.000007477643  0.0001686512099
## RaceBlack    0.0000043066840 -0.000002896598 -0.0000032894550
## RaceOther    0.0000217407545 -0.000005230539 -0.0000018436258
## SomeCollege -0.0000289792855 -0.000004898822 -0.0000222921927
## Associate    0.0000206767609  0.000018537187 -0.0000342058177
## Bachelor     0.0000190627054  0.000013793881 -0.0000571894550
## Master       -0.0000119170519  0.000023466197 -0.0000721622108
## Professional 0.0000328193404 -0.000011660720 -0.0000422651152
## Doctoral     0.0001146033770  0.000026782959 -0.0000243690380
## AGEP          -0.0000006814212  0.000003451412 -0.0000006414142
##             RaceBlack      RaceOther      SomeCollege
## (Intercept) -0.00005735654753 -0.000050785831 -0.000180675778
## Widowed     0.00001516963781 -0.000005529700  0.000002526831
## Divorced    0.00000022139907  0.000003868308  0.000005847975
## Separated    0.00000430668399  0.000021740755 -0.000028979286
## NeverMarried -0.00000289659836 -0.000005230539 -0.000004898822
## Female      -0.00000328945500 -0.000001843626 -0.000022292193
## RaceBlack    0.00029734882317  0.000057710355 -0.000003693729
## RaceOther    0.00005771035479  0.000267501582  0.000003286862
## SomeCollege -0.00000369372885  0.000003286862  0.000388431958
## Associate    0.00000533831010 -0.000005152706  0.000153675266
## Bachelor     0.00001251773875 -0.000003101895  0.000155020253

```

```

## Master      0.00001455930051  0.000018277092  0.000157728379
## Professional 0.00002086757531  0.000001242987  0.000158497787
## Doctoral    0.00001456297205  0.000033400328  0.000142518195
## AGEP        -0.00000008871305 -0.000000128387  0.000000970402
##             Associate      Bachelor       Master
## (Intercept) -0.0001742542135 -0.0001438799762 -0.0001489234588
## Widowed     -0.0000005982643  0.0000215902507  0.0000265184856
## Divorced     0.0000128636083  0.0000137163683  0.0000141321874
## Separated    0.0000206767609  0.0000190627054 -0.0000119170519
## NeverMarried 0.0000185371872  0.0000137938815  0.0000234661971
## Female       -0.0000342058177 -0.0000571894550 -0.0000721622108
## RaceBlack    0.0000053383101  0.0000125177387  0.0000145593005
## RaceOther    -0.0000051527057 -0.0000031018945  0.0000182770919
## SomeCollege   0.0001536752660  0.0001550202527  0.0001577283786
## Associate    0.0003699410390  0.0001609674636  0.0001636896995
## Bachelor     0.0001609674636  0.0002937025924  0.0001738364527
## Master        0.0001636896995  0.0001738364527  0.0006577680826
## Professional  0.0001581500076  0.0001650157844  0.0001661484403
## Doctoral     0.0001542023852  0.0001602292820  0.0001653400033
## AGEP         0.0000006588389  0.0000001317305  0.0000001985919
##             Professional      Doctoral       AGEP
## (Intercept) -0.000191612204 -0.000064265025 -0.00001682159111
## Widowed     0.000031312261  0.000090975073 -0.00000354830189
## Divorced    -0.000020474630  0.000034391930 -0.00000050579476
## Separated    0.000032819340  0.000114603377 -0.00000068142118
## NeverMarried -0.000011660720  0.000026782959  0.00000345141201
## Female       -0.000042265115 -0.000024369038 -0.00000064141417
## RaceBlack    0.000020867575  0.000014562972 -0.00000008871305
## RaceOther    0.000001242987  0.000033400328 -0.00000012838701
## SomeCollege   0.000158497787  0.000142518195  0.00000097040205
## Associate    0.000158150008  0.000154202385  0.00000065883892
## Bachelor     0.000165015784  0.000160229282  0.00000013173051
## Master        0.000166148440  0.000165340003  0.00000019859189
## Professional  0.002618552616  0.000152261145  0.00000134724566
## Doctoral     0.000152261145  0.002018320722 -0.00000240790739
## AGEP         0.000001347246 -0.000002407907  0.00000038279077

## (Intercept)      Widowed      Divorced      Separated NeverMarried
## 0.0311471652  0.0607558871  0.0175321412  0.0432781678  0.0151133423
## Female        RaceBlack     RaceOther     SomeCollege  Associate
## 0.0129865781  0.0172438054  0.0163554756  0.0197086772  0.0192338514
## Bachelor      Master       Professional  Doctoral       AGEP
## 0.0171377534  0.0256469897  0.0511717951  0.0449257245  0.0006187009

##
## Call:
## lm(formula = log(PERNP, base = exp(1)) ~ Widowed + Divorced +
## Separated + NeverMarried + Female + RaceBlack + RaceOther +
## SomeCollege + Associate + Bachelor + Master + Professional +
## Doctoral + AGEP, data = ss16ppr)
##
## Residuals:
##      Min      1Q Median      3Q      Max
## -1.56195 -0.30715 -0.03111  0.27690  1.69792
##
## Coefficients:

```

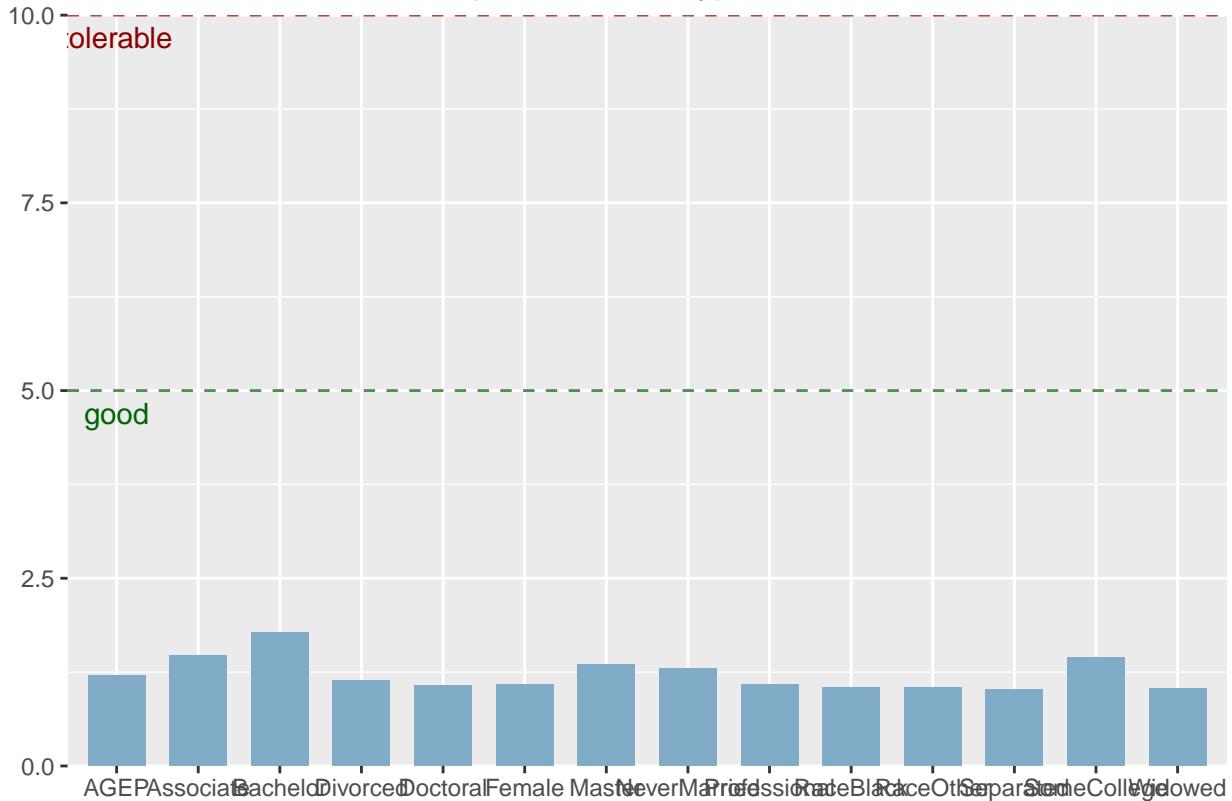
```

##             Estimate Std. Error t value      Pr(>|t|) 
## (Intercept) 9.5841704  0.0331471 289.140 < 0.000000000000002 *** 
## Widowed     0.0167914  0.0563665   0.298          0.765794  
## Divorced    -0.0391735  0.0170763  -2.294          0.021829 *  
## Separated   -0.0437489  0.0444603  -0.984          0.325162  
## NeverMarried -0.1033310  0.0155387  -6.650          0.000000000323503 *** 
## Female      -0.1380595  0.0129169 -10.688 < 0.000000000000002 *** 
## RaceBlack    -0.0278297  0.0176550  -1.576          0.115017  
## RaceOther    -0.0570606  0.0173151  -3.295          0.000989 *** 
## SomeCollege  0.1505241  0.0207411   7.257          0.0000000004534 *** 
## Associate   0.1546604  0.0205537   7.525          0.000000000000619 *** 
## Bachelor    0.4214137  0.0175270  24.044 < 0.000000000000002 *** 
## Master       0.5748312  0.0242603  23.694 < 0.000000000000002 *** 
## Professional 0.8187333  0.0440766  18.575 < 0.000000000000002 *** 
## Doctoral    0.9597258  0.0482778  19.879 < 0.000000000000002 *** 
## AGEP        0.0092656  0.0006307  14.692 < 0.000000000000002 *** 
## --- 
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 
## 
## Residual standard error: 0.4454 on 5179 degrees of freedom 
## Multiple R-squared:  0.2556, Adjusted R-squared:  0.2536 
## F-statistic:    127 on 14 and 5179 DF,  p-value: < 0.0000000000000022 

## [[1]]

```

Variance Inflation Factors (multicollinearity)



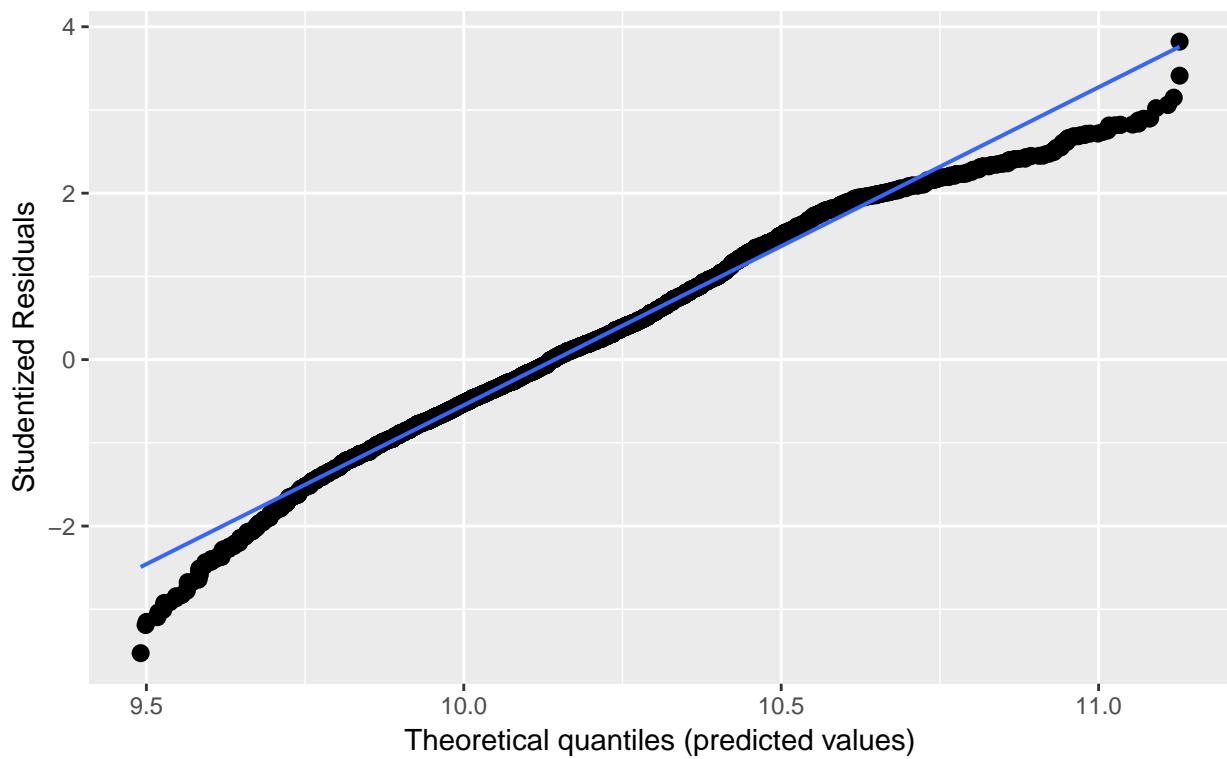
```

## 
## [[2]]

```

Non-normality of residuals and outliers

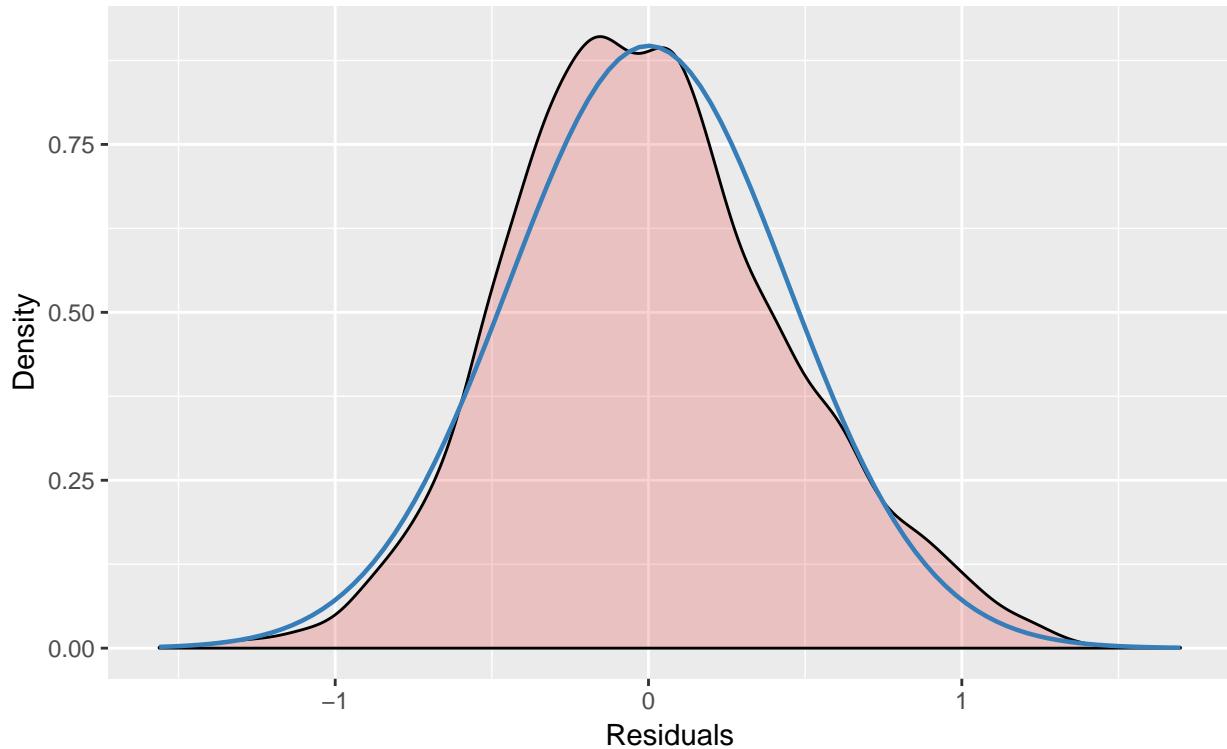
Dots should be plotted along the line



```
##  
## [[3]]
```

Non-normality of residuals

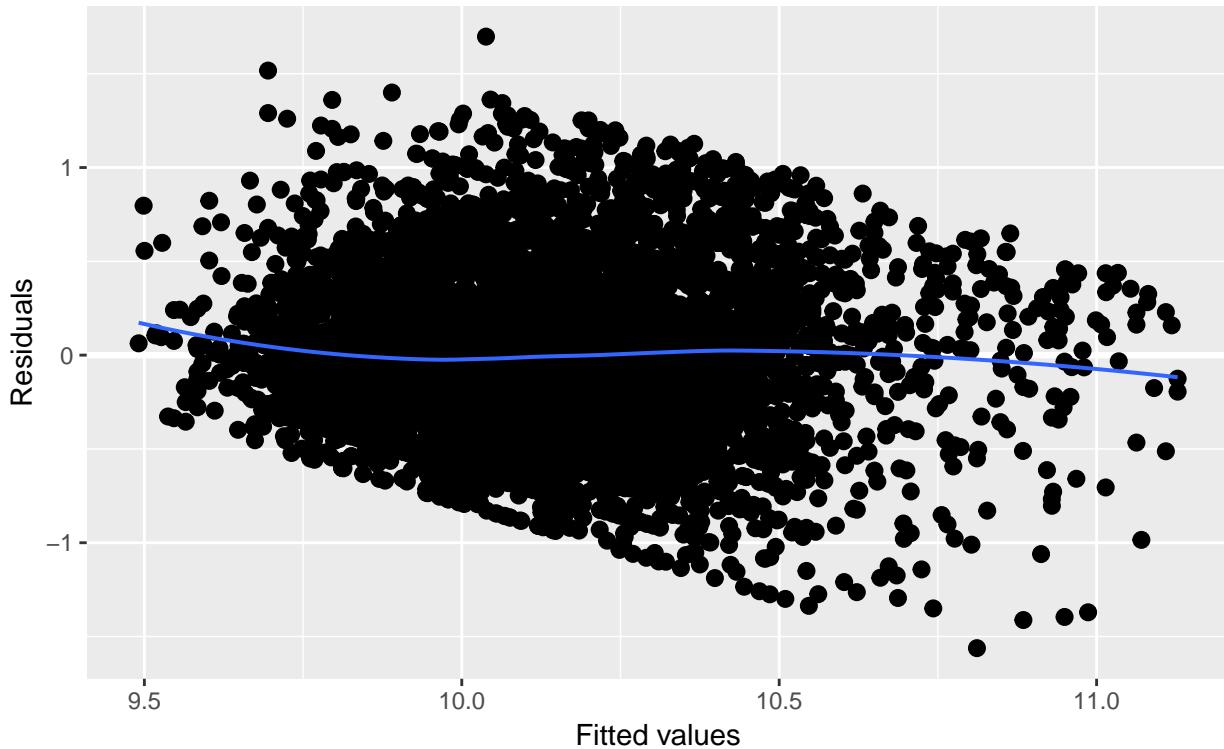
Distribution should look like normal curve



```
##  
## [[4]]
```

Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread



```
##
## Call:
## lm(formula = log(PERNP) ~ Widowed + Divorced + Separated + NeverMarried +
##     Female + RaceBlack + RaceOther + SomeCollege + Associate +
##     Bachelor + Master + Professional + Doctoral + AGEP + I(AGEP * 
##     AGEP), data = ss16ppr)
##
## Residuals:
##      Min        1Q     Median        3Q       Max
## -1.52290 -0.30789 -0.01912  0.27124  1.68875
##
## Coefficients:
##             Estimate Std. Error t value    Pr(>|t|)    
## (Intercept) 9.11528295 0.09910707 91.974 < 0.000000000000002 *** 
## Widowed     0.03913892 0.05641132  0.694    0.487830    
## Divorced   -0.04153000 0.01704302 -2.437    0.014852 *  
## Separated   -0.04691342 0.04436135 -1.058    0.290319    
## NeverMarried -0.08724938 0.01583026 -5.512    0.000000037288679 *** 
## Female      -0.14027030 0.01289439 -10.878 < 0.000000000000002 *** 
## RaceBlack    -0.03080144 0.01762390 -1.748    0.080574 .  
## RaceOther   -0.06017122 0.01728593 -3.481    0.000504 ***  
## SomeCollege  0.14802361 0.02069882  7.151    0.00000000000979 *** 
## Associate    0.14963719 0.02053026  7.289    0.000000000000360 *** 
## Bachelor     0.41572402 0.01752294 23.725 < 0.000000000000002 *** 
## Master       0.56450714 0.02429113 23.239 < 0.000000000000002 *** 
## Professional 0.81600498 0.04397735 18.555 < 0.000000000000002 *** 
## Doctoral     0.96153941 0.04816679 19.963 < 0.000000000000002 *** 
## AGEP        0.03249219 0.00467053  6.957    0.000000000003912 ***
```

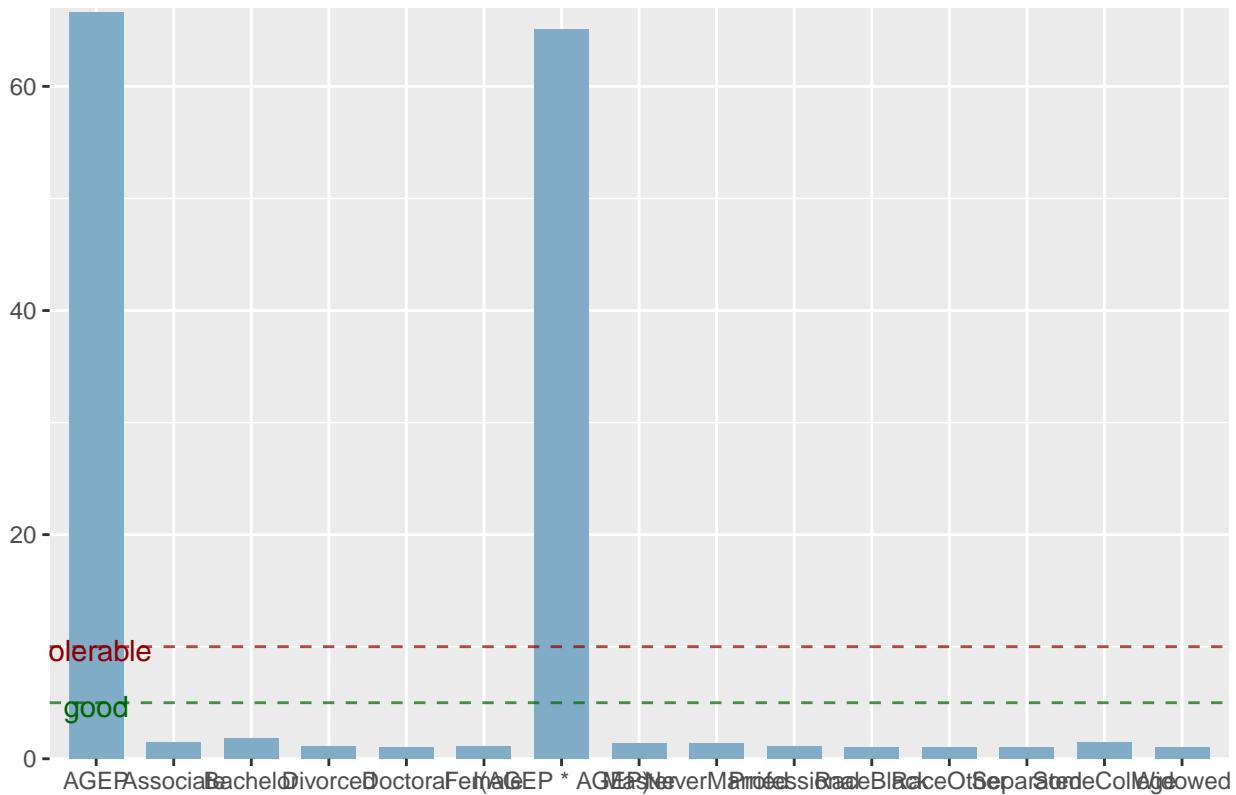
```

## I(AGEP * AGEP) -0.00026877  0.00005355  -5.019      0.000000537461031 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4444 on 5178 degrees of freedom
## Multiple R-squared:  0.2592, Adjusted R-squared:  0.2571
## F-statistic: 120.8 on 15 and 5178 DF,  p-value: < 0.00000000000000022

## [[1]]

```

Variance Inflation Factors (multicollinearity)



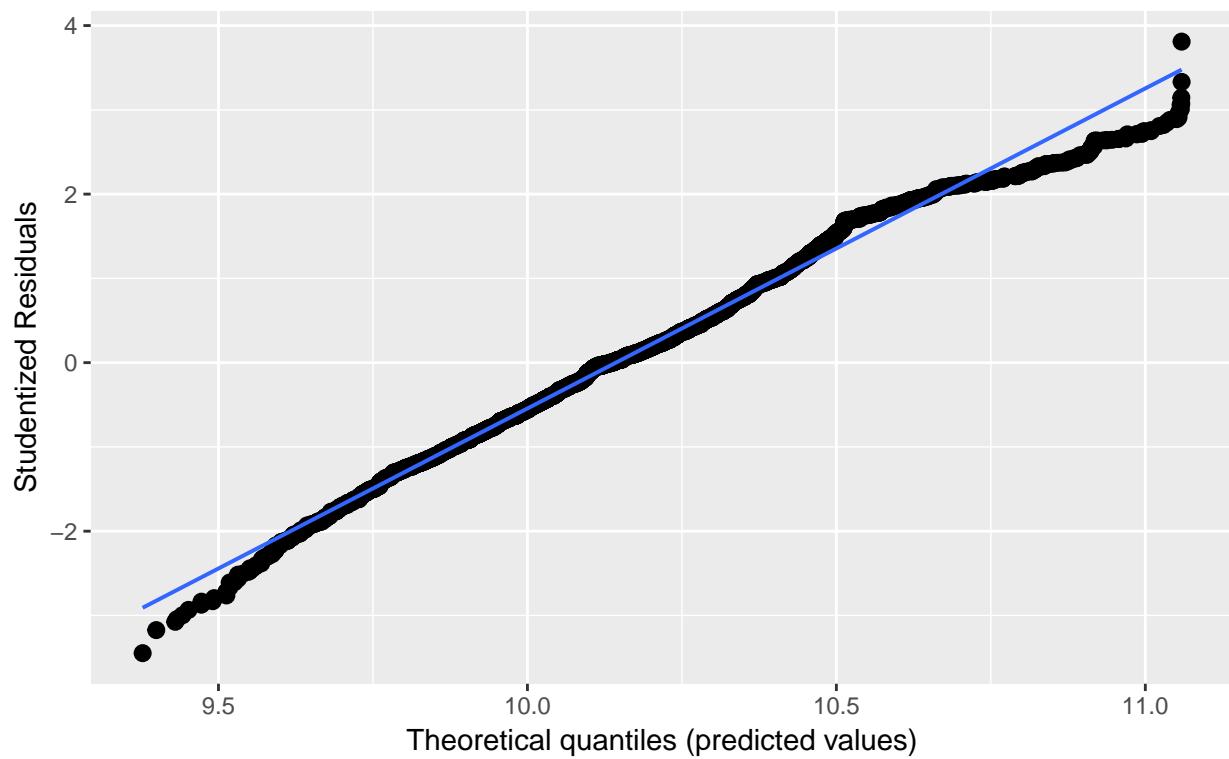
```

## 
## [[2]]

```

Non-normality of residuals and outliers

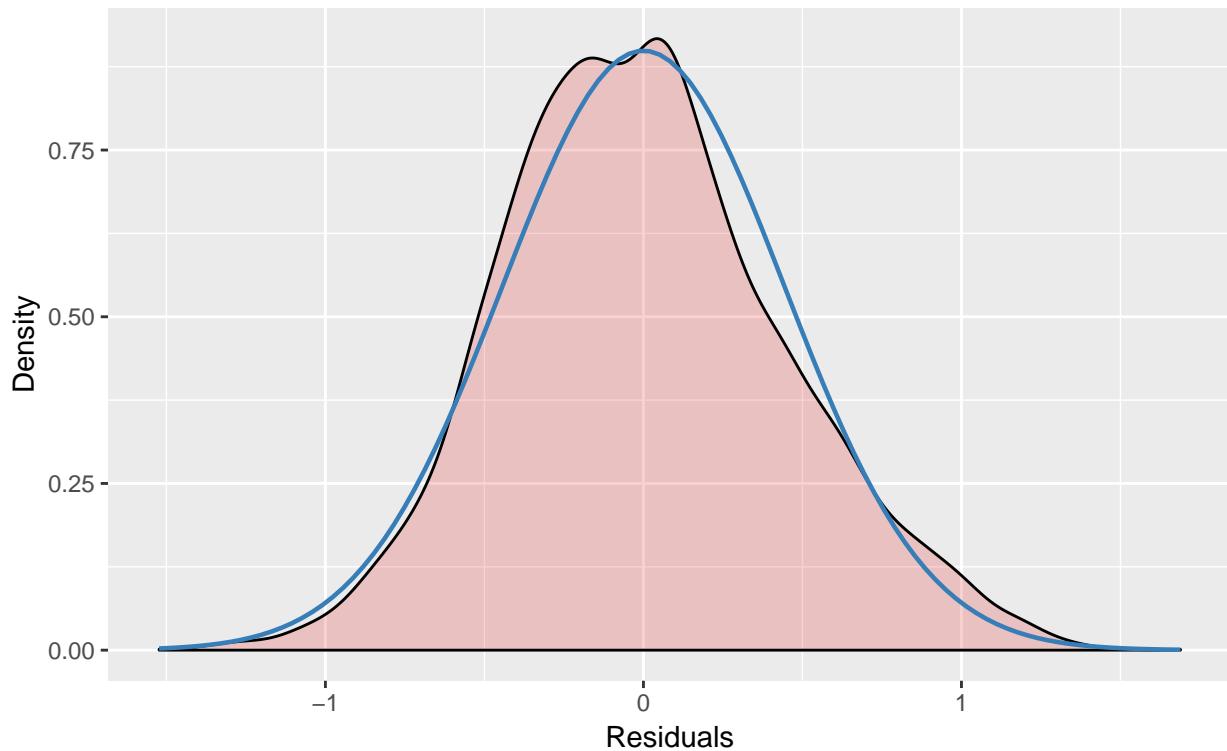
Dots should be plotted along the line



```
##  
## [[3]]
```

Non-normality of residuals

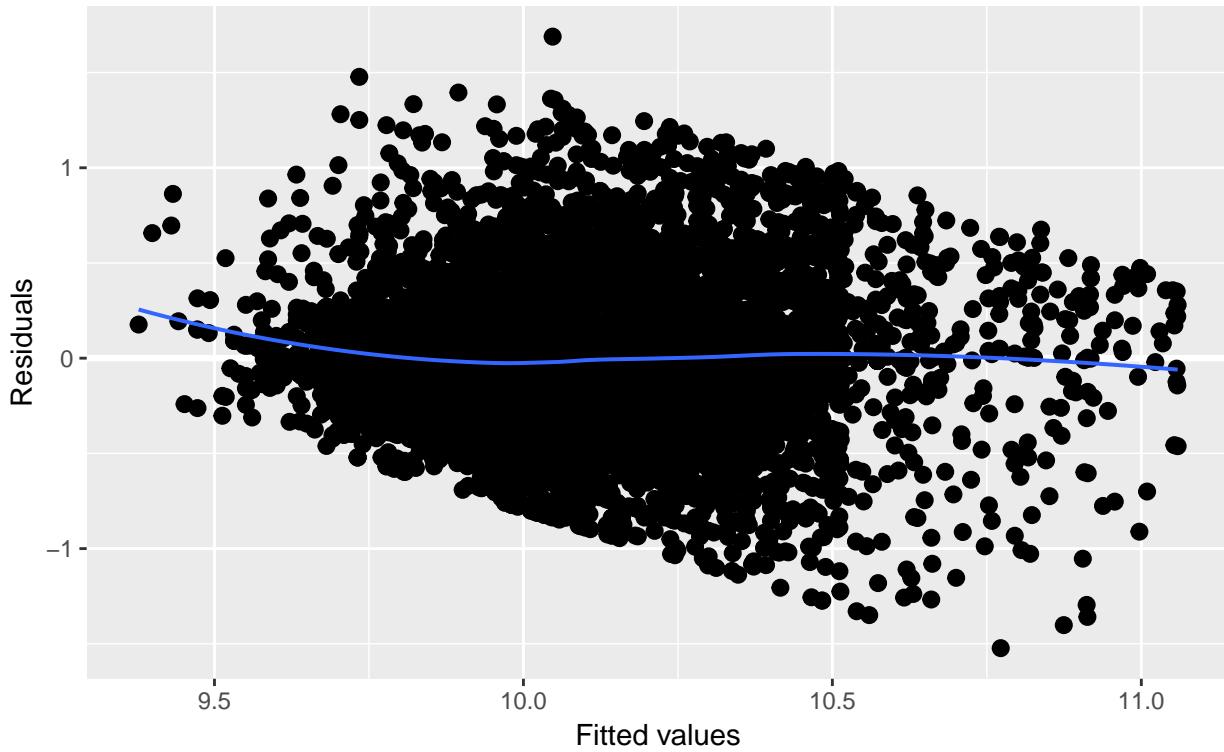
Distribution should look like normal curve



```
##  
## [[4]]
```

Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread



```
##  
## studentized Breusch-Pagan test  
##  
## data: model_1  
## BP = 150.88, df = 15, p-value < 0.0000000000000022  
  
##  
## Call:  
## lm(formula = residuals(model_1) * residuals(model_1) ~ Widowed +  
##     Divorced + Separated + NeverMarried + Female + RaceBlack +  
##     RaceOther + SomeCollege + Associate + Bachelor + Master +  
##     Professional + Doctoral + AGEP + I(AGEP * AGEP), data = ss16ppr)  
##  
## Residuals:  
##      Min       1Q   Median       3Q      Max  
## -0.33235 -0.16559 -0.09190  0.05665  2.65401  
##  
## Coefficients:  
##              Estimate Std. Error t value    Pr(>|t|)  
## (Intercept) -0.05162379  0.06172920 -0.836    0.40303  
## Widowed     0.03226046  0.03513599  0.918    0.35858  
## Divorced    0.00715360  0.01061531  0.674    0.50041  
## Separated   -0.01250577  0.02763063 -0.453    0.65085  
## NeverMarried -0.00625087  0.00985993 -0.634    0.52613  
## Female      -0.04611738  0.00803132 -5.742 0.00000000988 ***  
## RaceBlack    -0.01836739  0.01097711 -1.673    0.09434 .  
## RaceOther   -0.03251919  0.01076660 -3.020    0.00254 **  
## SomeCollege  0.02919167  0.01289233  2.264    0.02360 *
```

```

## Associate      0.01330318  0.01278735   1.040      0.29823
## Bachelor       0.06078120  0.01091423   5.569  0.00000002691 ***
## Master         0.08141733  0.01512982   5.381  0.00000007723 ***
## Professional    0.11130982  0.02739145   4.064  0.00004902242 ***
## Doctoral        0.00113977  0.03000086   0.038      0.96970
## AGEP           0.00908613  0.00290906   3.123      0.00180 **
## I(AGEP * AGEP) -0.00007567  0.00003336  -2.269      0.02334 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 
## Residual standard error: 0.2768 on 5178 degrees of freedom
## Multiple R-squared:  0.02905,   Adjusted R-squared:  0.02624
## F-statistic: 10.33 on 15 and 5178 DF,  p-value: < 0.0000000000000022

##                               (Intercept)          Widowed          Divorced
## (Intercept)      0.008273788689 -0.0005009677161 -0.00002343924884
## Widowed        -0.000500967716   0.0037360883359  0.00008960900790
## Divorced        -0.000023439249  0.0000896090079   0.00030636109669
## Separated        -0.000025562644  0.0000900748952  0.00008391395072
## NeverMarried    -0.000538626763  0.0000720988432  0.00007556940671
## Female          -0.000008523720 -0.0000578536122 -0.00002242706775
## RaceBlack        0.000000854211  0.0000116780621  0.00000007525931
## RaceOther        0.000043391805 -0.0000081301652  0.00000347758248
## SomeCollege     -0.000116918902  0.0000017664451  0.00000617581579
## Associate        -0.000037334460 -0.0000073929044  0.00001278628579
## Bachelor         -0.000021519476  0.0000181086907  0.00001434711158
## Master           0.000028023849  0.0000179898668  0.00001469340715
## Professional     0.000061937343  0.0000229172602 -0.00001835977502
## Doctoral         -0.000147666965  0.0000978504676  0.00003350351556
## AGEP             -0.000390928434  0.0000262056084 -0.00000220430024
## I(AGEP * AGEP)  0.000004437689 -0.0000003489614  0.00000002061972
##                               Separated          NeverMarried          Female
## (Intercept)     -0.00002556264449 -0.0005386267631 -0.000008523719912
## Widowed         0.00009007489519  0.0000720988432 -0.000057853612181
## Divorced        0.00008391395072  0.0000755694067 -0.000022427067751
## Separated        0.00187428217351  0.0000766643152 -0.000017587903559
## NeverMarried    0.00007666431524  0.0002401887440 -0.000008274986091
## Female          -0.00001758790356 -0.0000082749861  0.000167696670342
## RaceBlack        0.00000637180148 -0.0000045546292 -0.000003301748847
## RaceOther        0.00002279114337 -0.0000082999560 -0.000001659744196
## SomeCollege     -0.00002763346460 -0.0000065295241 -0.000021452965426
## Associate        0.00002123862984  0.0000133992770 -0.000032889834082
## Bachelor         0.00002182150672  0.0000092630048 -0.000056175293958
## Master           -0.00000994988510  0.0000168467490 -0.000070487293914
## Professional     0.00003636659348 -0.0000183019262 -0.000039061767595
## Doctoral         0.00011756235735  0.0000295556071 -0.000021695265884
## AGEP             -0.00000207339198  0.0000187515634 -0.000001270450497
## I(AGEP * AGEP)  0.00000001621214 -0.0000001805556  0.000000007628918
##                               RaceBlack          RaceOther          SomeCollege
## (Intercept)     0.00000085421096  0.00004339180522 -0.000116918902
## Widowed         0.00001167806210 -0.00000813016521  0.000001766445
## Divorced        0.00000007525931  0.00000347758248  0.000006175816
## Separated        0.00000637180148  0.00002279114337 -0.000027633465
## NeverMarried    -0.00000455462920 -0.00000829995599 -0.000006529524
## Female          -0.00000330174885 -0.00000165974420 -0.000021452965
## RaceBlack        0.00029563653338  0.00005812788184 -0.000002743806
## RaceOther        0.00005812788184  0.00026711933672  0.000004617354

```

```

## SomeCollege -0.00000274380573 0.00000461735426 0.000387937610
## Associate 0.00000621021365 -0.00000323261993 0.000153364031
## Bachelor 0.00001419545882 -0.00000100914192 0.000154411720
## Master 0.00001557014539 0.00001981660097 0.000157426605
## Professional 0.00002369374841 0.00000271430938 0.000157744127
## Doctoral 0.00001388558732 0.00003059588084 0.000140051571
## AGEP -0.00000306025057 -0.00000481590696 -0.000002265664
## I(AGEP * AGEPE) 0.00000003510357 0.00000005433563 0.000000038472
## Associate Bachelor Master
## (Intercept) -0.0000373344604 -0.00002151947574 0.0000280238491
## Widowed -0.0000073929044 0.00001810869074 0.0000179898668
## Divorced 0.0000127862858 0.00001434711158 0.0000146934071
## Separated 0.0000212386298 0.00002182150672 -0.0000099498851
## NeverMarried 0.0000133992770 0.00000926300480 0.0000168467490
## Female -0.0000328898341 -0.00005617529396 -0.0000704872939
## RaceBlack 0.0000062102137 0.00001419545882 0.0000155701454
## RaceOther -0.0000032326199 -0.00000100914192 0.0000198166010
## SomeCollege 0.0001533640312 0.00015441171974 0.0001574266052
## Associate 0.0003701163611 0.00016133688441 0.0001649602538
## Bachelor 0.0001613368844 0.00029354057387 0.0001747303630
## Master 0.0001649602538 0.00017473036298 0.0006546482961
## Professional 0.0001591068500 0.00016609118859 0.0001693881169
## Doctoral 0.0001505542624 0.00015661072066 0.0001607794324
## AGEPE -0.0000063018298 -0.00000607738770 -0.0000087780080
## I(AGEP * AGEPE) 0.0000000827393 0.00000007352133 0.0000001061811
## Professional Doctoral AGEPE
## (Intercept) 0.0000619373427 -0.00014766696541 -0.0003909284335
## Widowed 0.0000229172602 0.00009785046764 0.0000262056084
## Divorced -0.0000183597750 0.00003350351556 -0.0000022043002
## Separated 0.0000363665935 0.00011756235735 -0.0000020733920
## NeverMarried -0.0000183019262 0.00002955560712 0.0000187515634
## Female -0.0000390617676 -0.00002169526588 -0.0000012704505
## RaceBlack 0.0000236937484 0.00001388558732 -0.0000030602506
## RaceOther 0.0000027143094 0.00003059588084 -0.0000048159070
## SomeCollege 0.0001577441266 0.00014005157079 -0.0000022656643
## Associate 0.0001591068500 0.00015055426238 -0.0000063018298
## Bachelor 0.0001660911886 0.00015661072066 -0.0000060773877
## Master 0.0001693881169 0.00016077943242 -0.0000087780080
## Professional 0.0025597978555 0.00014919362348 -0.0000111849378
## Doctoral 0.0001491936235 0.00204149746786 0.0000017472085
## AGEPE -0.0000111849378 0.00000174720854 0.0000195198350
## I(AGEP * AGEPE) 0.0000001445602 -0.00000004771598 -0.0000002268056
## I(AGEP * AGEPE)
## (Intercept) 0.000004437688837
## Widowed -0.000000348961355
## Divorced 0.000000020619725
## Separated 0.000000016212145
## NeverMarried -0.0000000180555592
## Female 0.000000007628918
## RaceBlack 0.000000035103574
## RaceOther 0.000000054335628
## SomeCollege 0.000000038472003
## Associate 0.000000082739300
## Bachelor 0.000000073521333
## Master 0.000000106181121
## Professional 0.000000144560231

```

```

## Doctoral      -0.000000047715980
## AGEP        -0.000000226805630
## I(AGEP * AGEP)  0.000000002686114

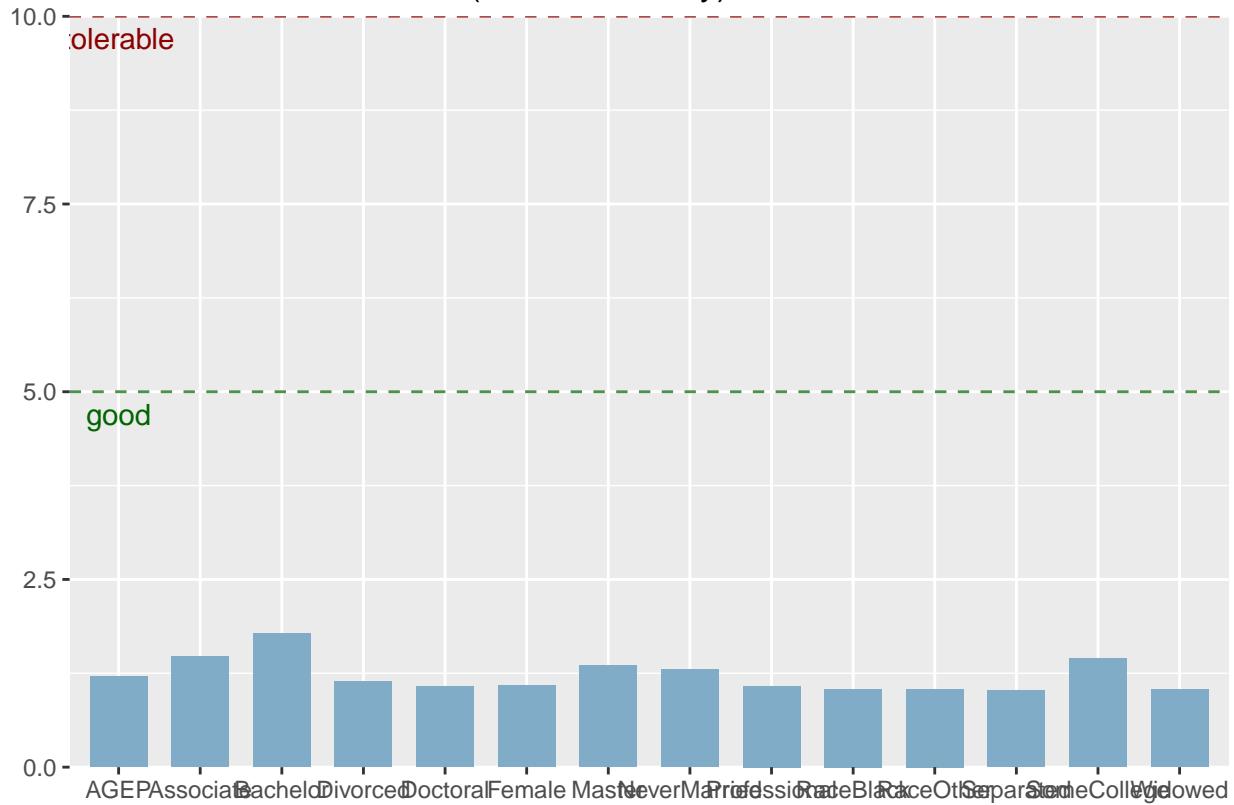
##   (Intercept)     Widowed     Divorced     Separated NeverMarried
## 0.09096036878  0.06112354977  0.01750317390  0.04329298065  0.01549802387
##   Female       RaceBlack    RaceOther SomeCollege Associate
## 0.01294977491  0.01719408426  0.01634378587  0.01969613184  0.01923840849
##   Bachelor      Master Professional Doctoral      AGEP
## 0.01713302582  0.02558609576  0.05059444491  0.04518293337  0.00441812574
## I(AGEP * AGEP)
## 0.00005182774

##
## Call:
## lm(formula = log(PERNP, base = exp(1)) ~ Widowed + Divorced +
##     Separated + NeverMarried + Female + RaceBlack + RaceOther +
##     SomeCollege + Associate + Bachelor + Master + Professional +
##     Doctoral + AGEP, data = ss16ppr)
##
## Residuals:
##    Min      1Q Median      3Q     Max
## -1.56195 -0.30715 -0.03111  0.27690  1.69792
##
## Coefficients:
##             Estimate Std. Error t value            Pr(>|t|)
## (Intercept) 9.5841704  0.0331471 289.140 < 0.0000000000000002 ***
## Widowed     0.0167914  0.0563665   0.298          0.765794
## Divorced    -0.0391735  0.0170763  -2.294          0.021829 *
## Separated   -0.0437489  0.0444603  -0.984          0.325162
## NeverMarried -0.1033310  0.0155387  -6.650          0.000000000323503 ***
## Female      -0.1380595  0.0129169 -10.688 < 0.0000000000000002 ***
## RaceBlack    -0.0278297  0.0176550  -1.576          0.115017
## RaceOther    -0.0570606  0.0173151  -3.295          0.000989 ***
## SomeCollege  0.1505241  0.0207411   7.257          0.0000000004534 ***
## Associate    0.1546604  0.0205537   7.525          0.0000000000619 ***
## Bachelor     0.4214137  0.0175270  24.044 < 0.0000000000000002 ***
## Master       0.5748312  0.0242603  23.694 < 0.0000000000000002 ***
## Professional 0.8187333  0.0440766  18.575 < 0.0000000000000002 ***
## Doctoral     0.9597258  0.0482778  19.879 < 0.0000000000000002 ***
## AGEP         0.0092656  0.0006307  14.692 < 0.0000000000000002 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4454 on 5179 degrees of freedom
## Multiple R-squared:  0.2556, Adjusted R-squared:  0.2536
## F-statistic:  127 on 14 and 5179 DF,  p-value: < 0.0000000000000022

## [[1]]

```

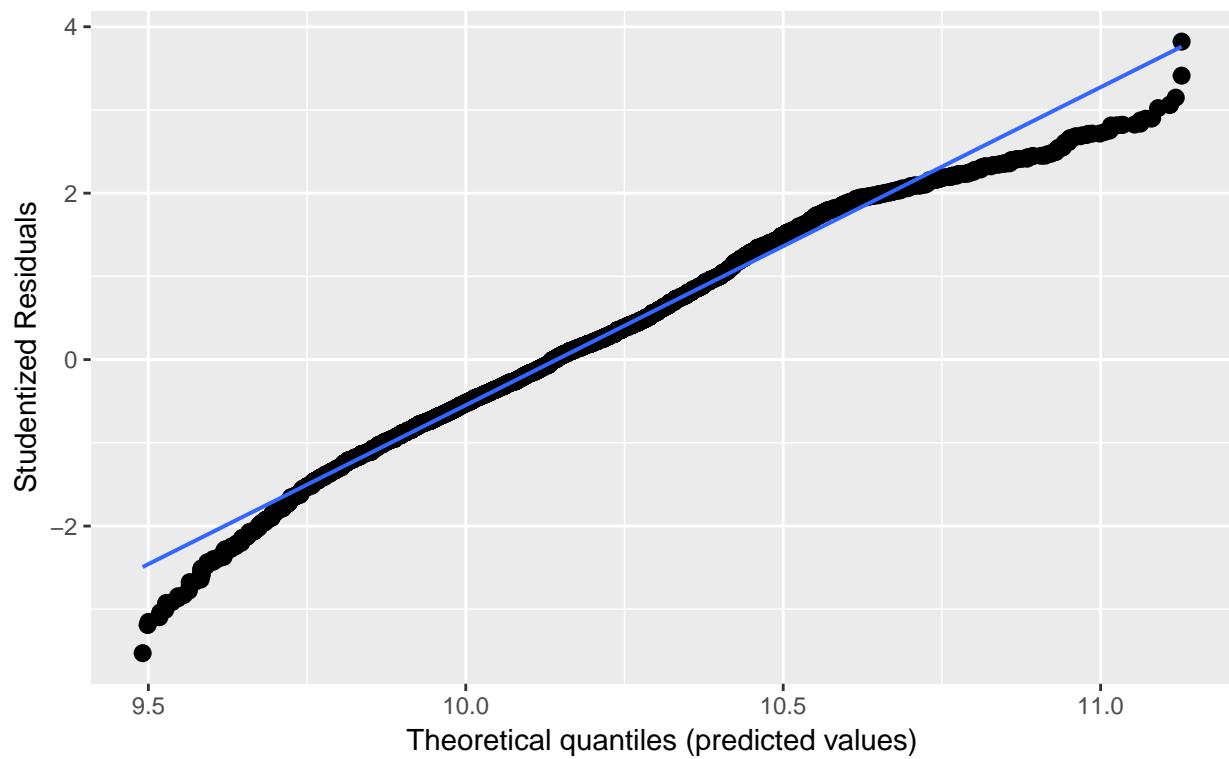
Variance Inflation Factors (multicollinearity)



```
##  
## [[2]]
```

Non-normality of residuals and outliers

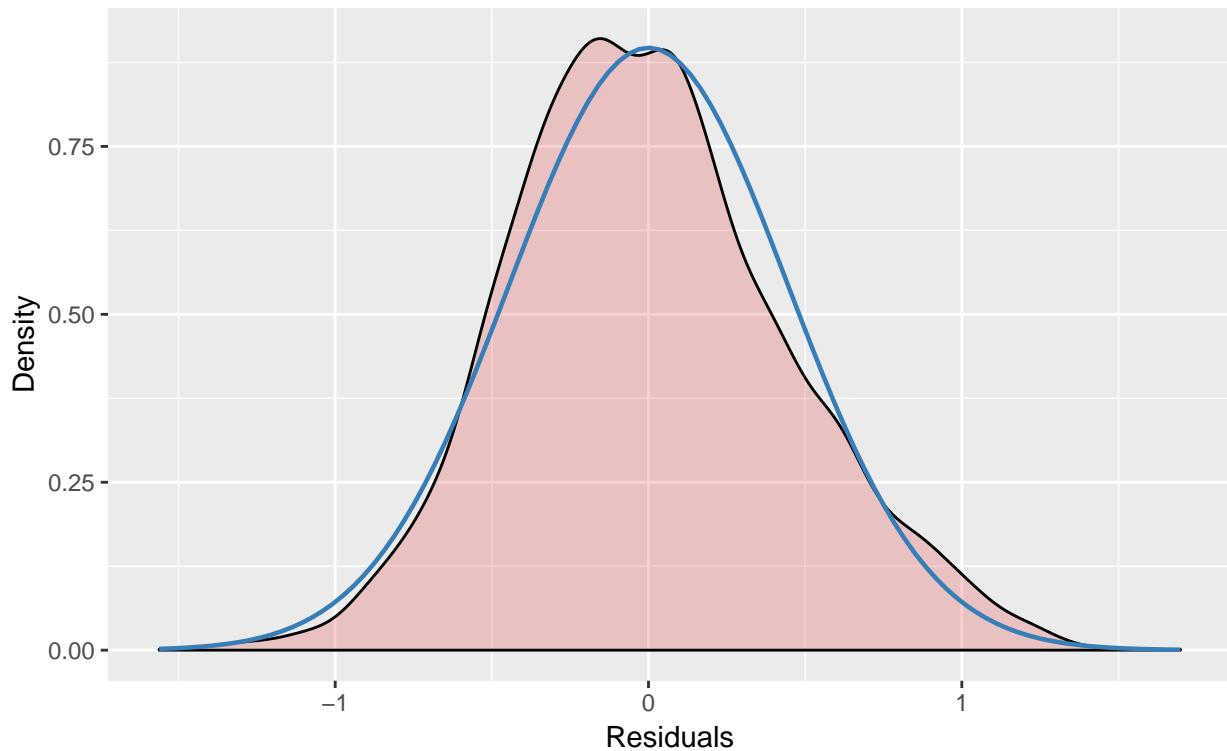
Dots should be plotted along the line



```
##  
## [[3]]
```

Non-normality of residuals

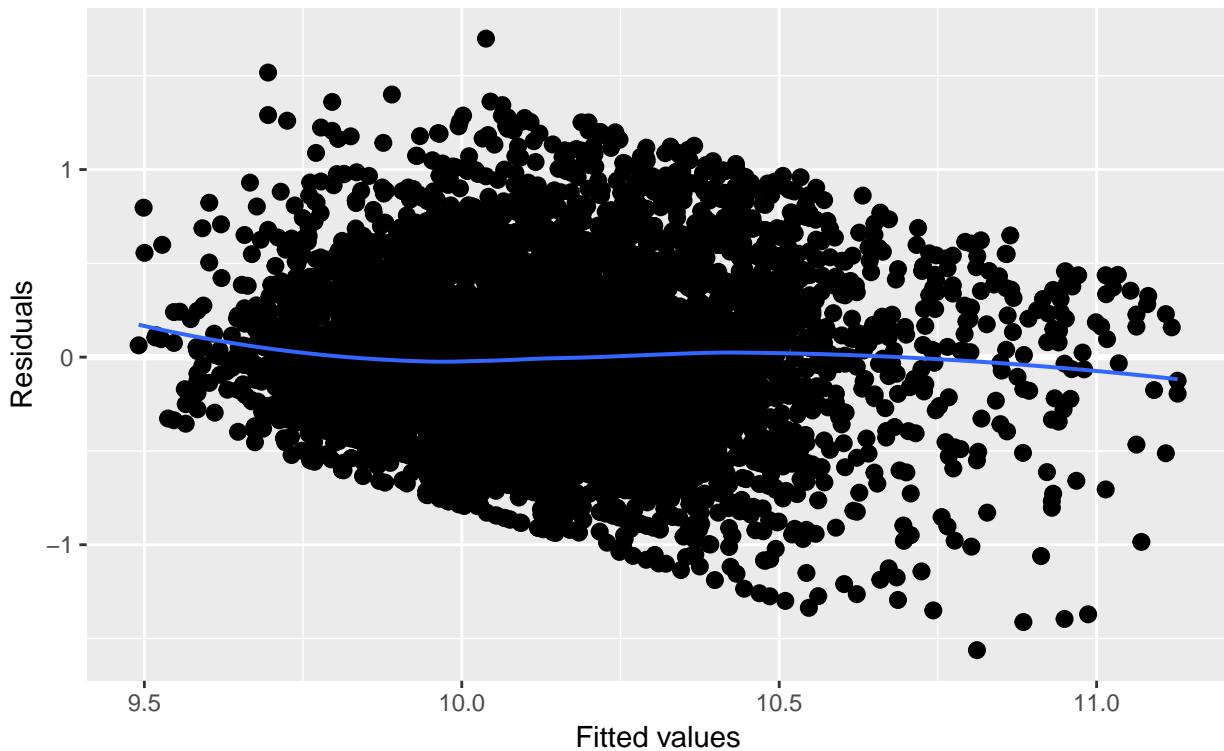
Distribution should look like normal curve



```
##  
## [[4]]
```

Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread



Stratified Model Gender

Gender: Female

```
##
## Call:
## lm(formula = log(PERNP) ~ Widowed + Divorced + Separated + NeverMarried +
##     RaceBlack + RaceOther + SomeCollege + Associate + Bachelor +
##     Master + Professional + Doctoral + AGEP + I(AGEP * AGEP),
##     data = ss16ppr_female)
##
## Residuals:
##      Min       1Q   Median       3Q      Max 
## -1.60623 -0.29348 -0.02351  0.24300  1.44216 
## 
## Coefficients:
##             Estimate Std. Error t value    Pr(>|t|)    
## (Intercept) 9.2908116  0.14197142 65.441 < 0.000000000000002 *** 
## Widowed     0.12617920  0.06182067  2.041     0.041348 *  
## Divorced    -0.00769942  0.02211596 -0.348     0.727765    
## Separated   -0.03799682  0.05852598 -0.649     0.516248    
## NeverMarried -0.03120139  0.02141248 -1.457     0.145196    
## RaceBlack    -0.04721312  0.02432301 -1.941     0.052357 .  
## RaceOther    -0.08455957  0.02373290 -3.563     0.000373 *** 
## SomeCollege   0.12652738  0.03293833  3.841     0.000125 *** 
## Associate    0.13857783  0.03200975  4.329     0.0000155 *** 
## Bachelor     0.38951105  0.02684627 14.509 < 0.000000000000002 *** 
## Master       0.55873934  0.03352996 16.664 < 0.000000000000002 ***
```

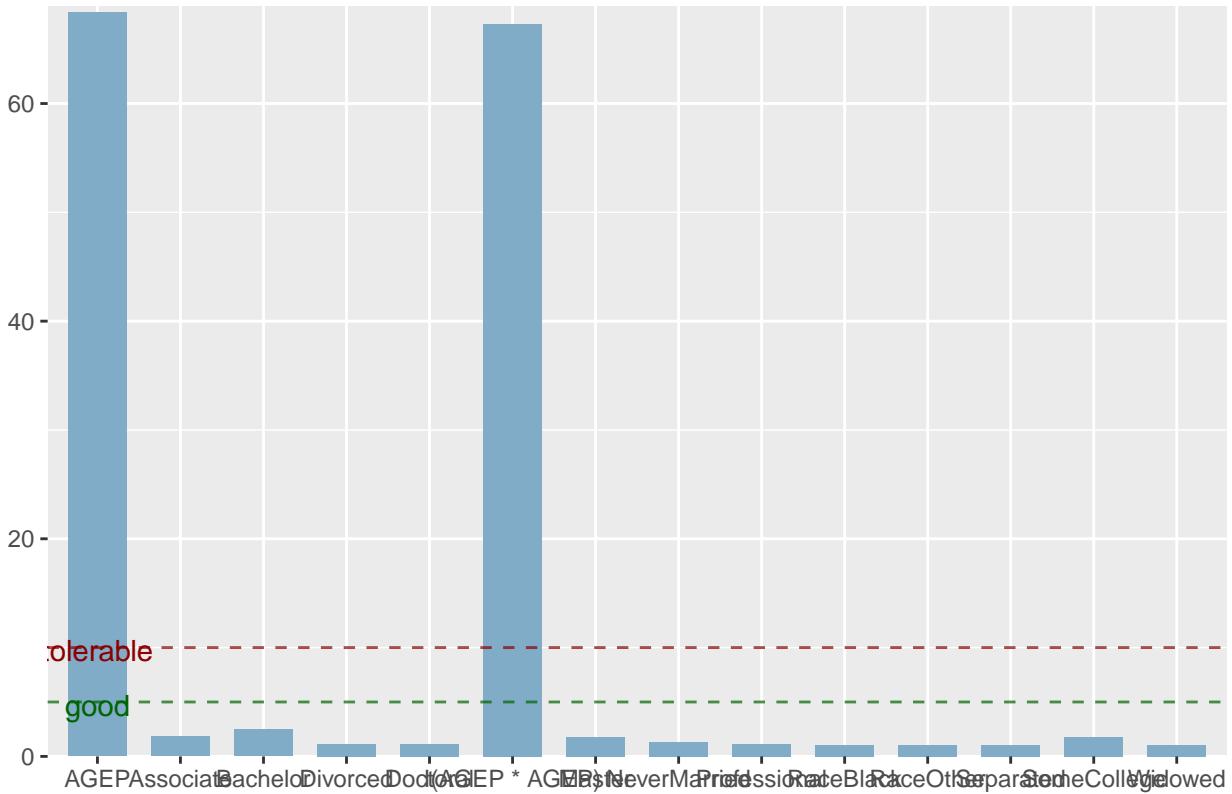
```

## Professional    0.87022193  0.05954679  14.614 < 0.0000000000000002 ***
## Doctoral       0.91227935  0.06429409  14.189 < 0.0000000000000002 ***
## AGEP          0.01640263  0.00666118   2.462           0.013866 *
## I(AGEP * AGEP) -0.00007842  0.00007625  -1.028           0.303816
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4267 on 2552 degrees of freedom
## Multiple R-squared:  0.2492, Adjusted R-squared:  0.245
## F-statistic: 60.49 on 14 and 2552 DF,  p-value: < 0.00000000000000022

## [[1]]

```

Variance Inflation Factors (multicollinearity)



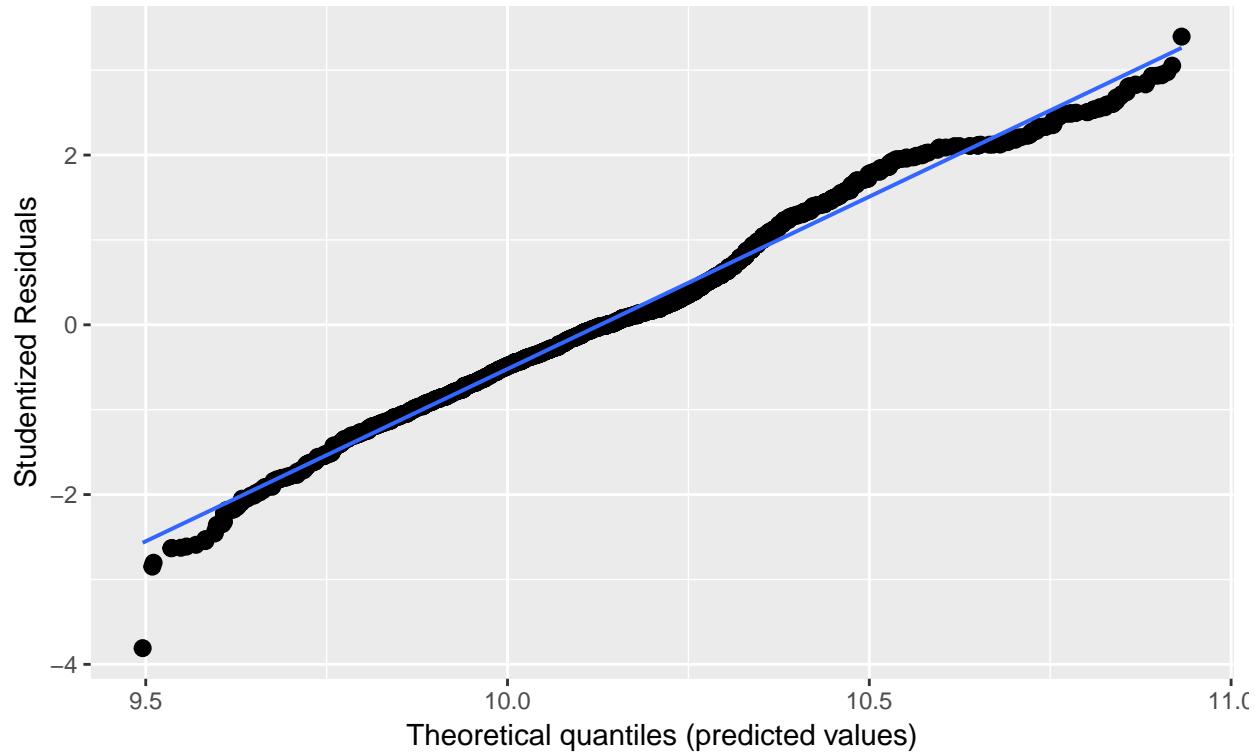
```

## 
## [[2]]

```

Non-normality of residuals and outliers

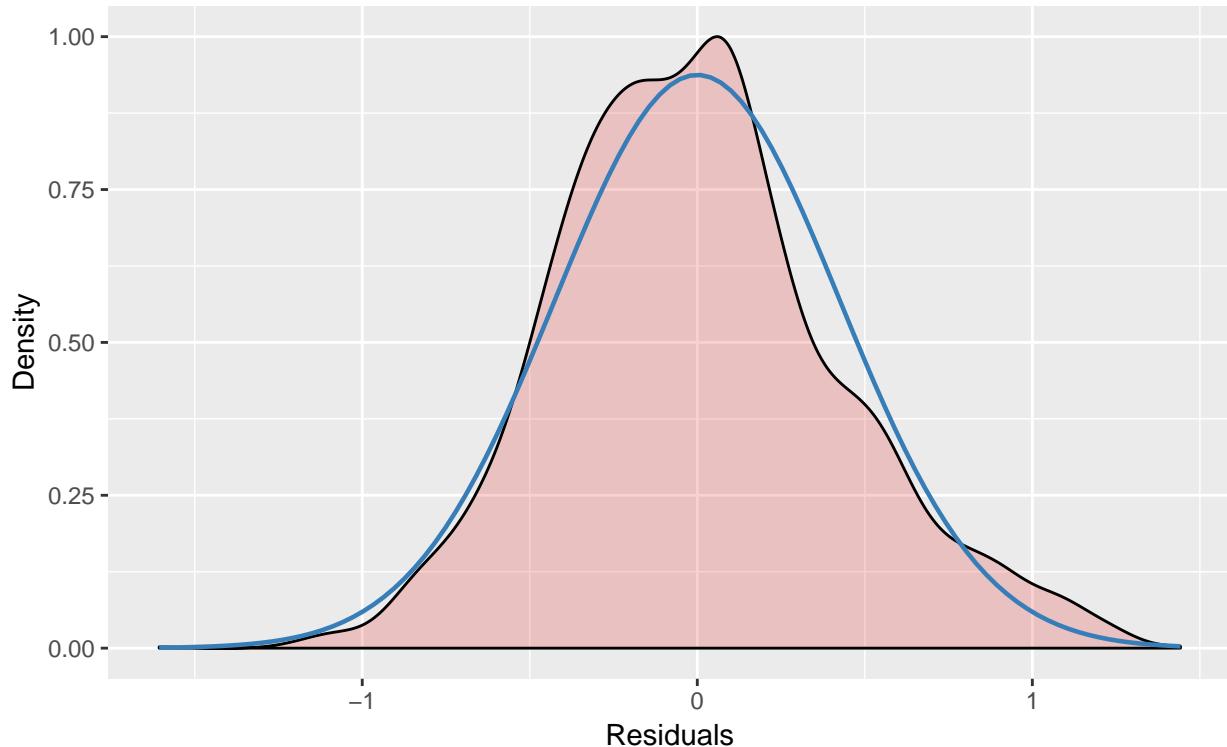
Dots should be plotted along the line



```
##  
## [[3]]
```

Non-normality of residuals

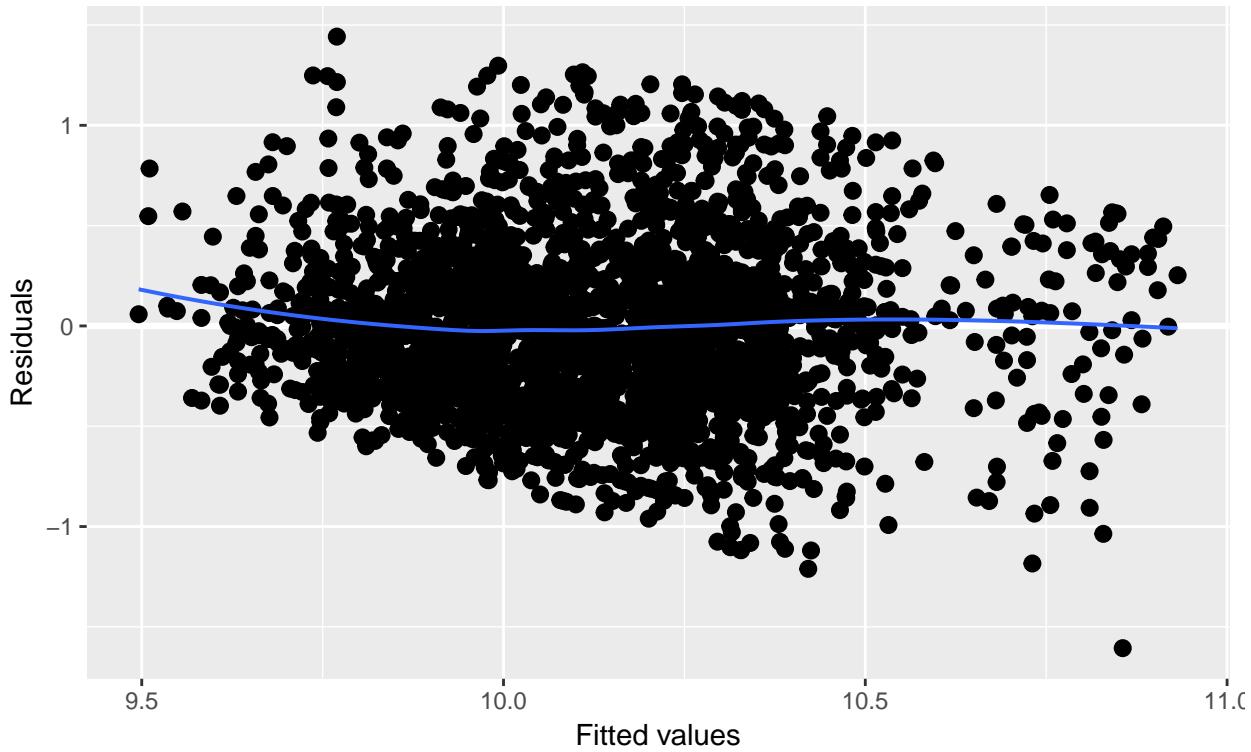
Distribution should look like normal curve



```
##  
## [[4]]
```

Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread



Gender: Male

```
##
## Call:
## lm(formula = log(PERNP) ~ Widowed + Divorced + Separated + NeverMarried +
##     RaceBlack + RaceOther + SomeCollege + Associate + Bachelor +
##     Master + Professional + Doctoral + AGEP + I(AGEP * AGEP),
##     data = ss16ppr_male)
##
## Residuals:
##    Min      1Q      Median      3Q      Max 
## -1.33073 -0.32575 -0.02096  0.30213  1.66547 
## 
## Coefficients:
##             Estimate Std. Error t value     Pr(>|t|)    
## (Intercept) 8.8897325  0.1389042 63.999 < 0.0000000000000002 *** 
## Widowed     -0.2436797  0.1237557 -1.969     0.04905 *    
## Divorced    -0.0777776  0.0264188 -2.944     0.00327 **  
## Separated   -0.0481621  0.0667929 -0.721     0.47093    
## NeverMarried -0.1449325  0.0233668 -6.203     0.0000000064405 *** 
## RaceBlack    -0.0182384  0.0253545 -0.719     0.47200    
## RaceOther    -0.0367754  0.0250006 -1.471     0.14142    
## SomeCollege   0.1563020  0.0270663  5.775     0.00000000861667 *** 
## Associate    0.1459627  0.0273833  5.330     0.00000010640493 *** 
## Bachelor     0.4414121  0.0241685 18.264 < 0.0000000000000002 *** 
## Master       0.5617214  0.0379129 14.816 < 0.0000000000000002 *** 
## Professional  0.7341881  0.0656264 11.187 < 0.0000000000000002 *** 
## Doctoral     1.0162476  0.0729256 13.935 < 0.0000000000000002 ***
```

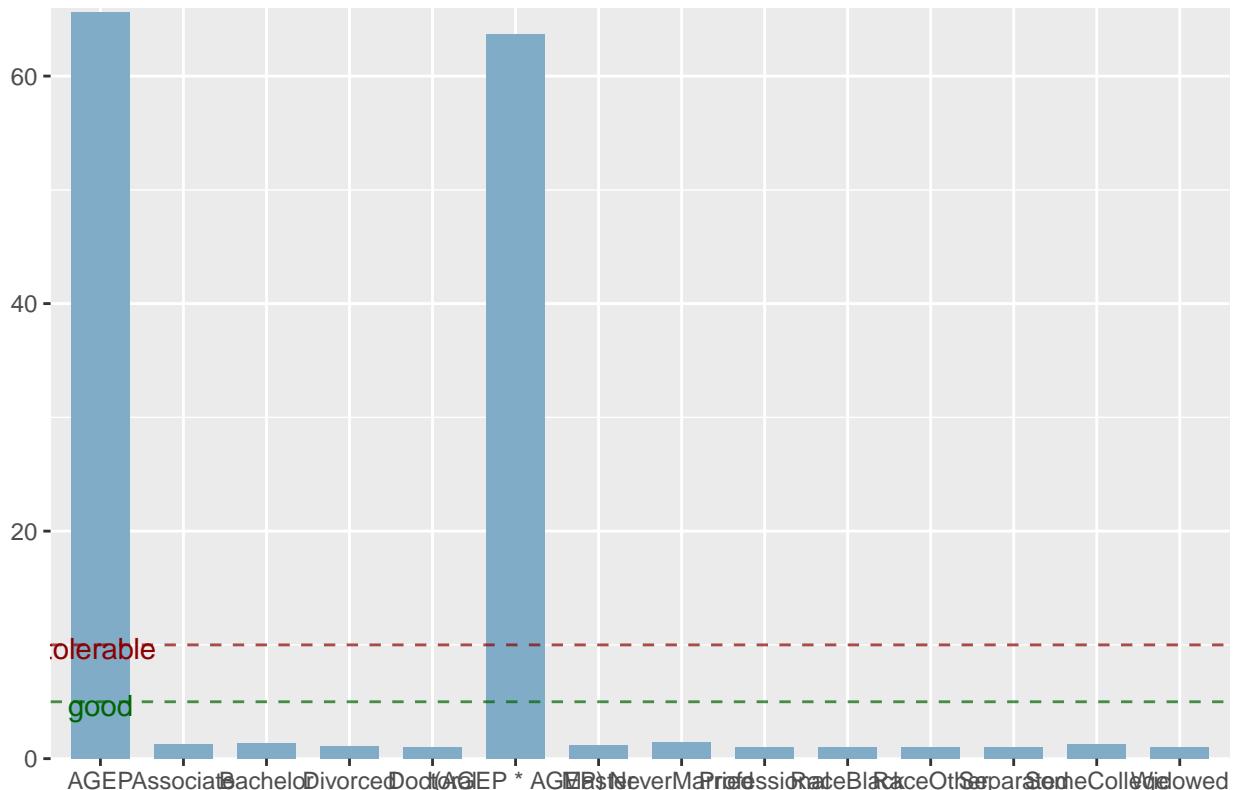
```

## AGEP          0.0452870  0.0065397   6.925      0.000000000000547 ***
## I(AGEP * AGEP) -0.0004275  0.0000751  -5.691      0.00000001400332 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4582 on 2612 degrees of freedom
## Multiple R-squared:  0.2788, Adjusted R-squared:  0.275
## F-statistic: 72.13 on 14 and 2612 DF,  p-value: < 0.0000000000000022

## [[1]]

```

Variance Inflation Factors (multicollinearity)



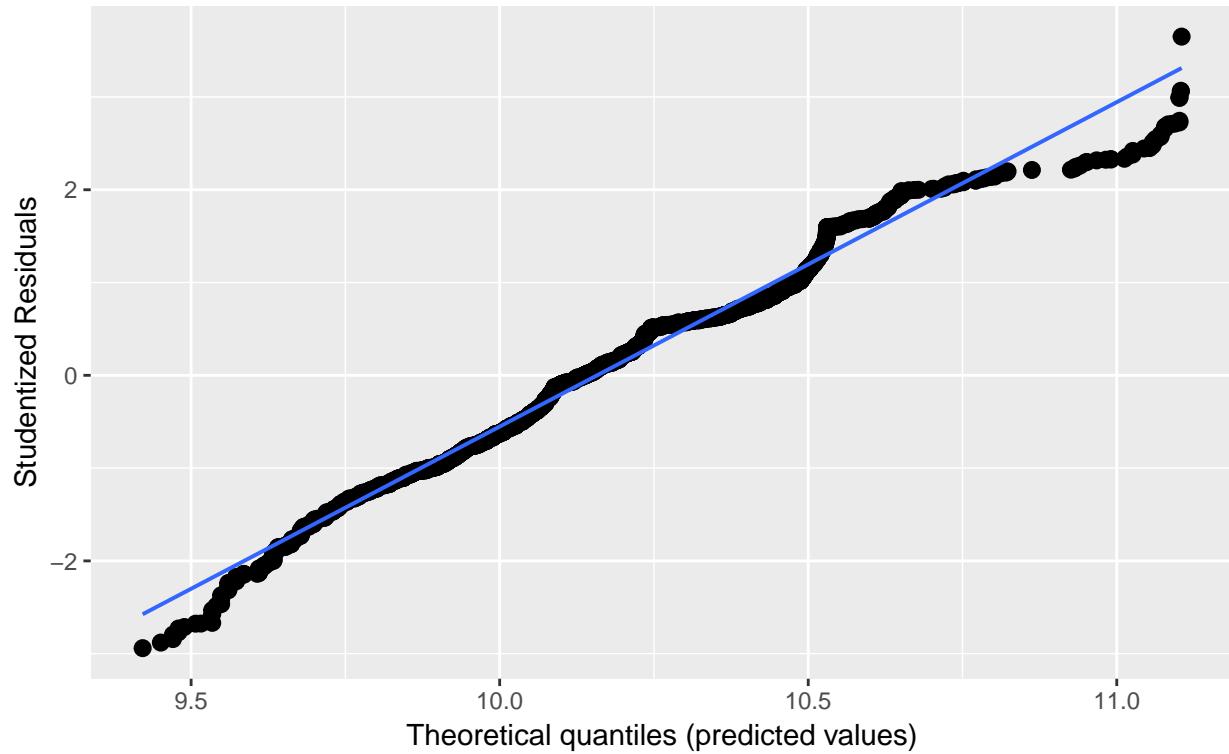
```

## 
## [[2]]

```

Non-normality of residuals and outliers

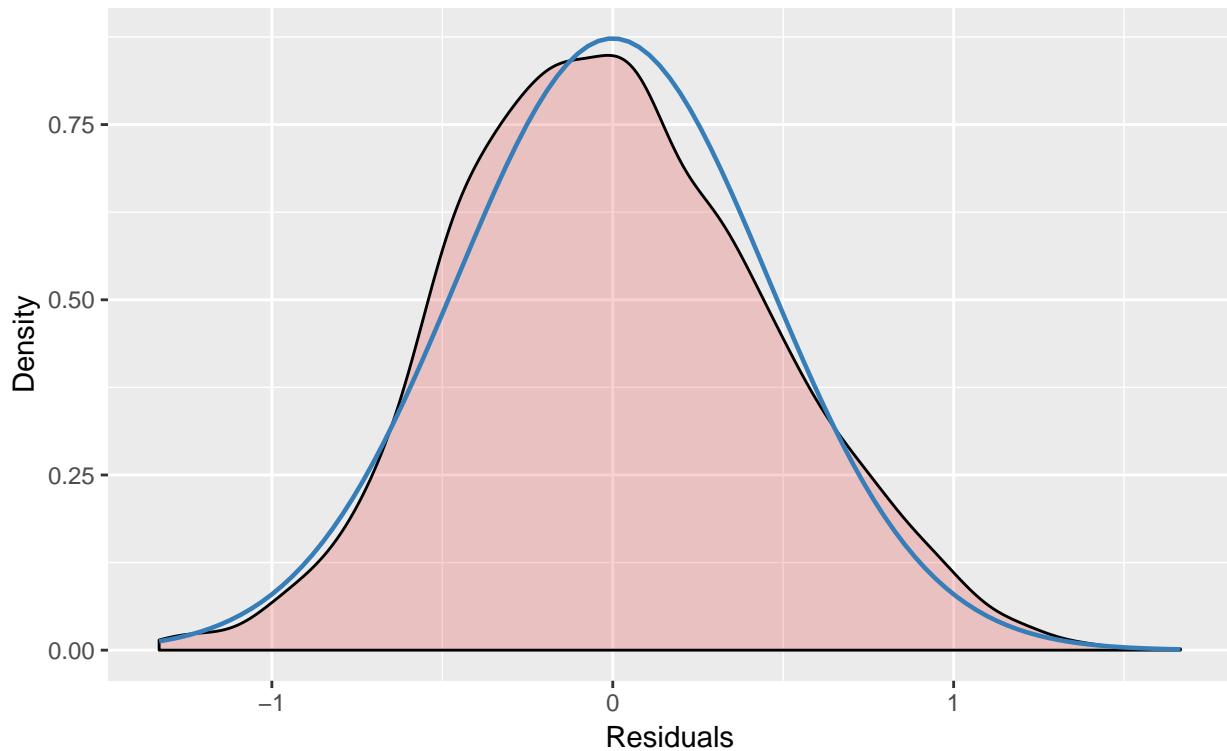
Dots should be plotted along the line



```
##  
## [[3]]
```

Non-normality of residuals

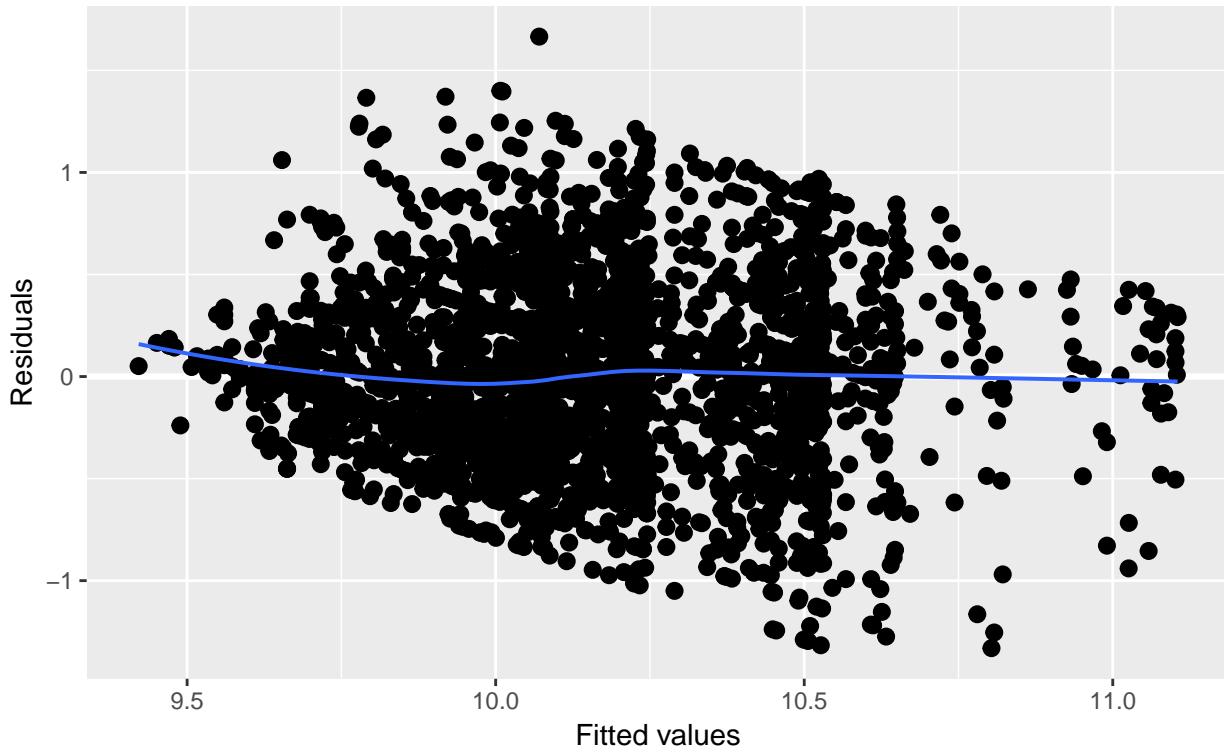
Distribution should look like normal curve



```
##  
## [[4]]
```

Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread



Stratified Model Gender and Marital Status

```
##
## Call:
## lm(formula = log(PERNP) ~ RaceBlack + RaceOther + SomeCollege +
##     Associate + Bachelor + Master + Professional + Doctoral +
##     AGEP + I(AGEP * AGEP), data = ss16ppr_female_married)
##
## Residuals:
##      Min        1Q        Median        3Q       Max
## -1.55478 -0.29352 -0.01869  0.25111  1.31897
##
## Coefficients:
##             Estimate Std. Error t value    Pr(>|t|)
## (Intercept) 9.1720092  0.2405271 38.133 < 0.0000000000000002 ***
## RaceBlack   -0.0637144  0.0367282 -1.735    0.08304 .
## RaceOther   -0.0868137  0.0347892 -2.495    0.01271 *
## SomeCollege 0.1313498  0.0513141  2.560    0.01060 *
## Associate   0.1637067  0.0483936  3.383    0.00074 ***
## Bachelor    0.4098792  0.0409362 10.013 < 0.0000000000000002 ***
## Master      0.6062987  0.0495932 12.225 < 0.0000000000000002 ***
## Professional 0.8389260  0.0858437  9.773 < 0.0000000000000002 ***
## Doctoral    1.0157598  0.0857696 11.843 < 0.0000000000000002 ***
## AGEP        0.0213670  0.0111089  1.923    0.05466 .
## I(AGEP * AGEP) -0.0001342  0.0001241 -1.082    0.27952
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

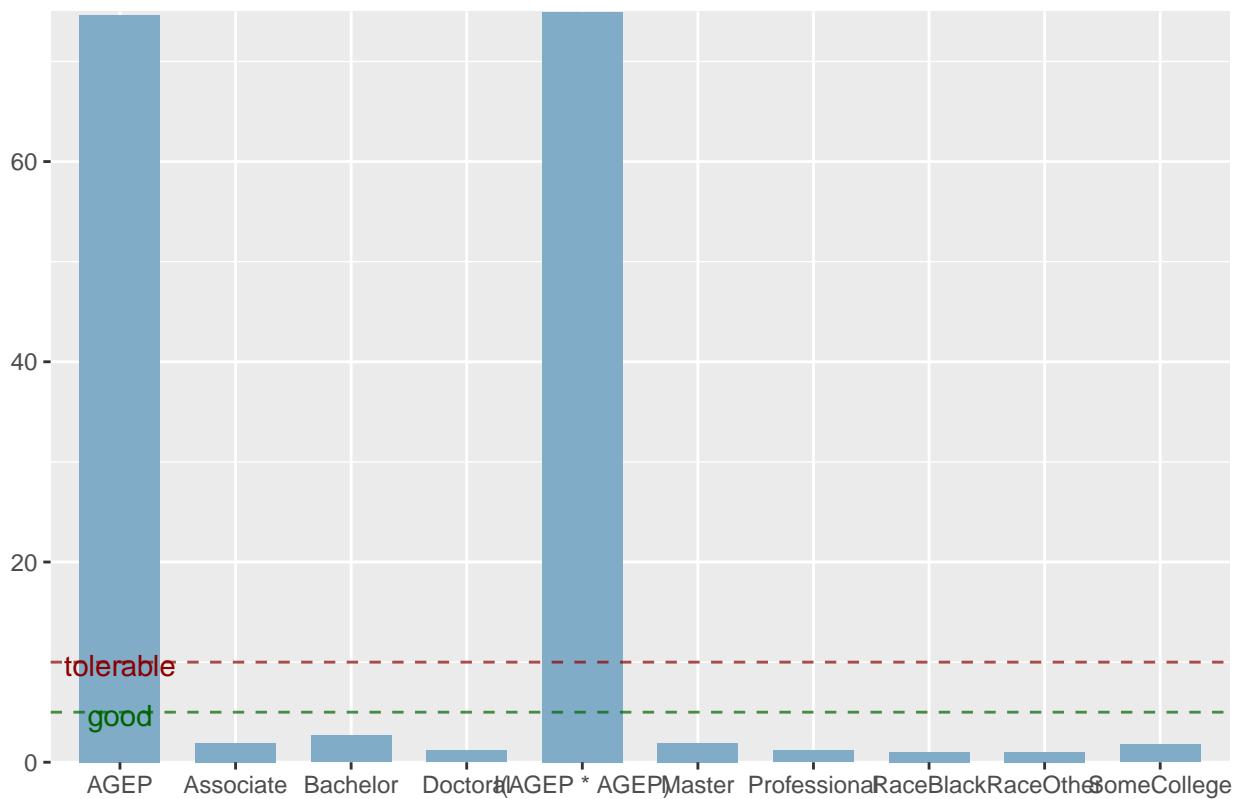
```

## Residual standard error: 0.4332 on 1219 degrees of freedom
## Multiple R-squared:   0.25, Adjusted R-squared:  0.2438
## F-statistic: 40.63 on 10 and 1219 DF, p-value: < 0.00000000000000022

## [[1]]

```

Variance Inflation Factors (multicollinearity)



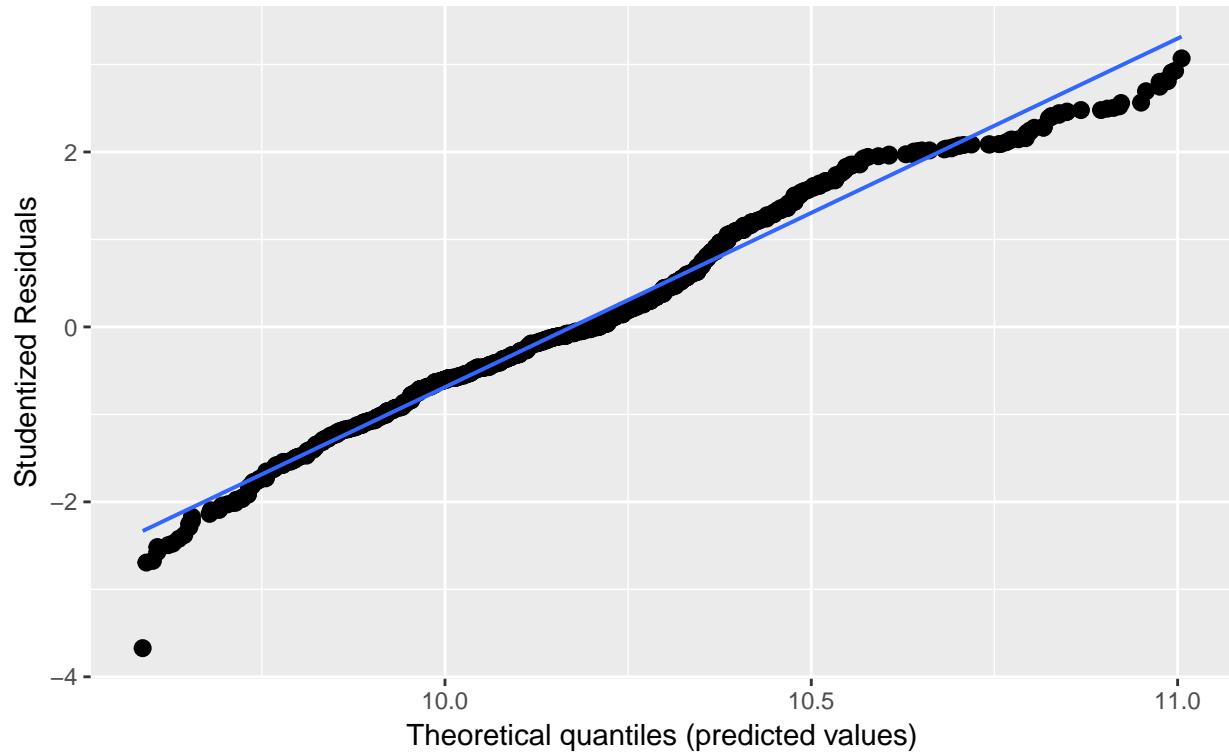
```

## 
## [[2]]

```

Non-normality of residuals and outliers

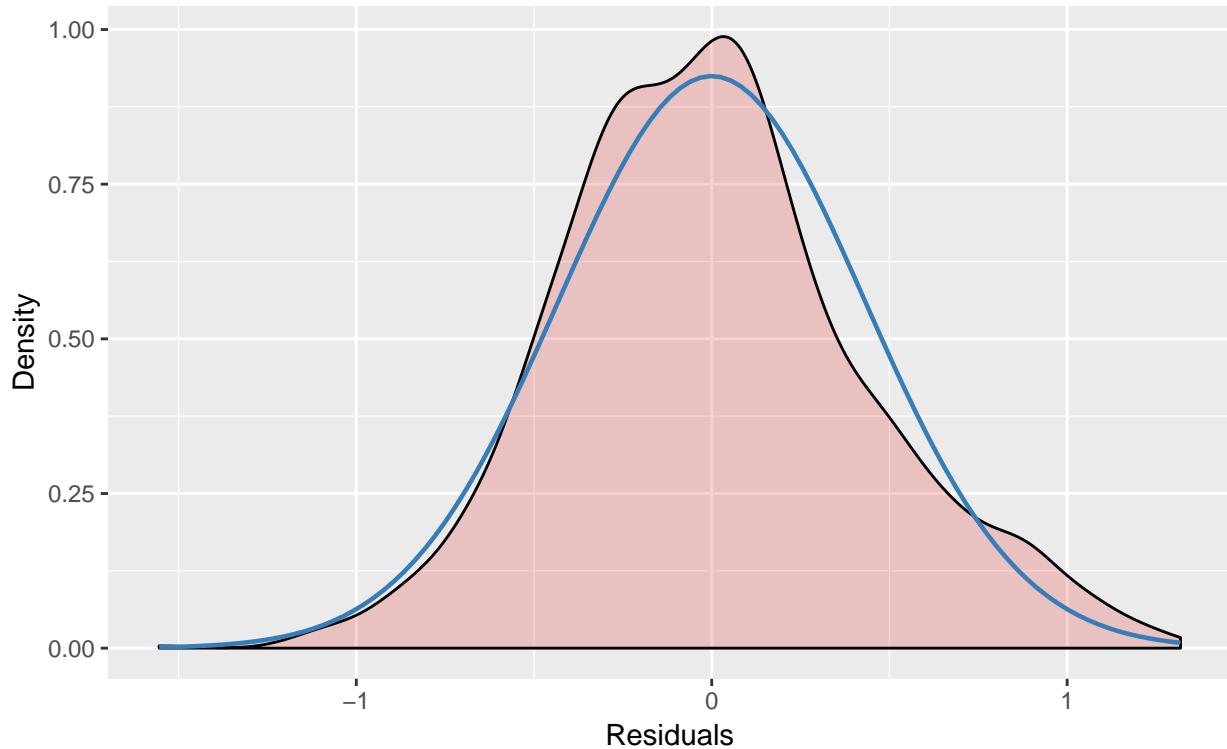
Dots should be plotted along the line



```
##  
## [[3]]
```

Non-normality of residuals

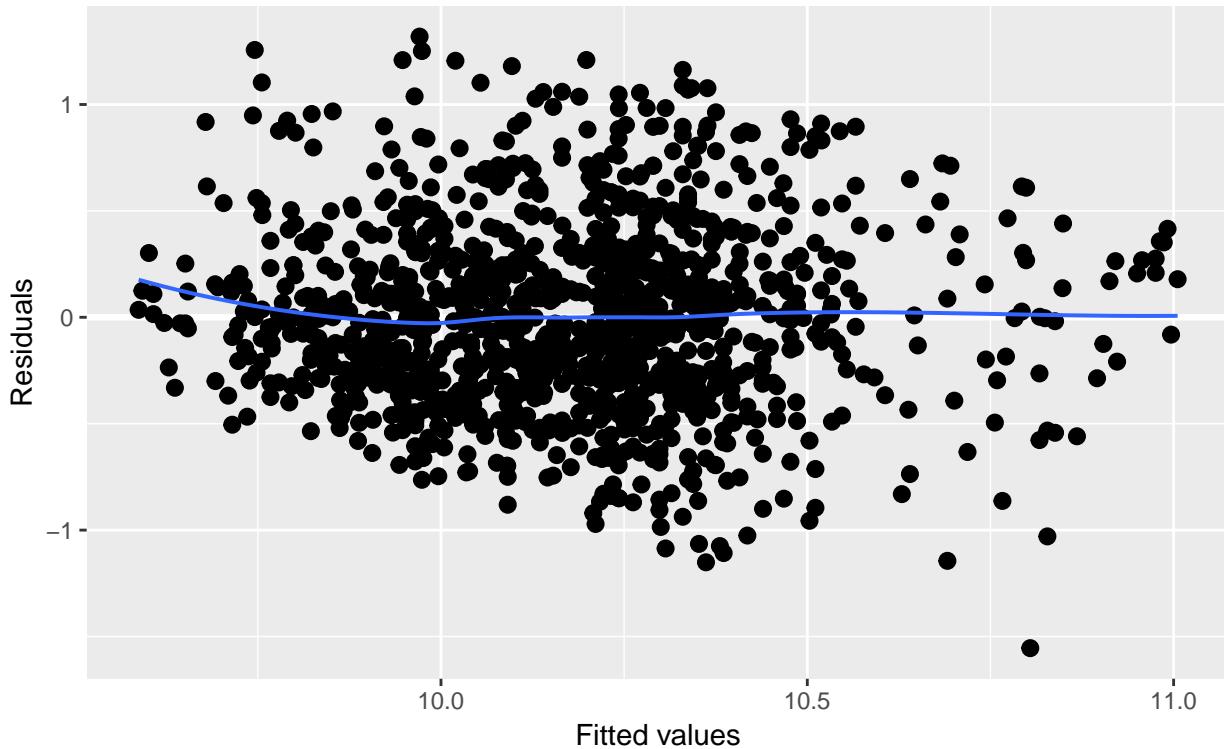
Distribution should look like normal curve



```
##  
## [[4]]
```

Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread

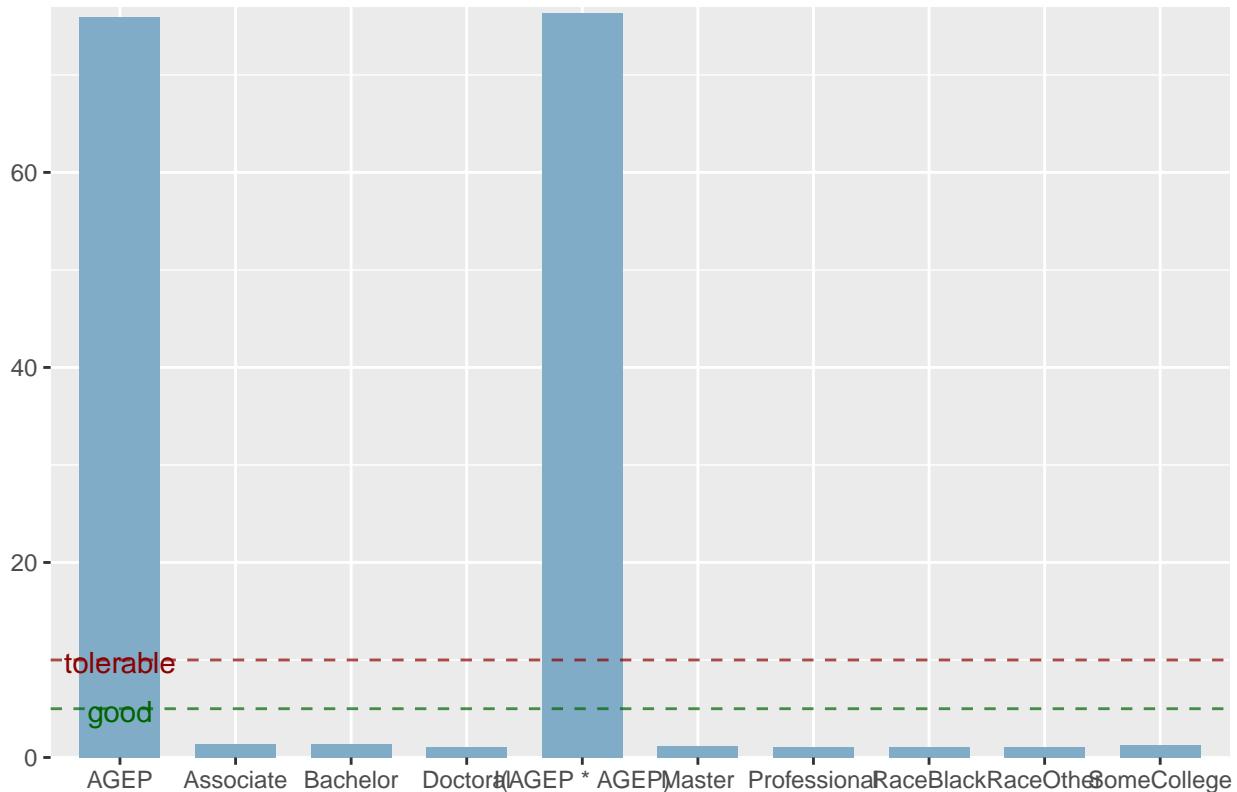


```
##
## Call:
## lm(formula = log(PERNP) ~ RaceBlack + RaceOther + SomeCollege +
##     Associate + Bachelor + Master + Professional + Doctoral +
##     AGEP + I(AGEP * AGEP), data = ss16ppr_male_married)
##
## Residuals:
##    Min      1Q      Median      3Q      Max 
## -1.32725 -0.34827 -0.01552  0.32135  1.67841 
## 
## Coefficients:
##             Estimate Std. Error t value     Pr(>|t|)    
## (Intercept) 8.4402034  0.2416746 34.924 < 0.0000000000000002 *** 
## RaceBlack   -0.0478778  0.0363833 -1.316    0.188413    
## RaceOther   -0.0558527  0.0344643 -1.621    0.105329    
## SomeCollege 0.1580657  0.0408004  3.874    0.000112 ***  
## Associate   0.1683942  0.0373261  4.511    0.0000069765101783 *** 
## Bachelor    0.4308360  0.0341861 12.603 < 0.0000000000000002 *** 
## Master      0.5776253  0.0512940 11.261 < 0.0000000000000002 *** 
## Professional 0.6959261  0.0908428  7.661    0.0000000000000343 *** 
## Doctoral    1.0156701  0.0943040 10.770 < 0.0000000000000002 *** 
## AGEP        0.0659661  0.0110462  5.972    0.0000000029673121 *** 
## I(AGEP * AGEP) -0.0006527  0.0001218 -5.359    0.0000000975062251 *** 
## ---        
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 
## 
## Residual standard error: 0.4729 on 1404 degrees of freedom
## Multiple R-squared:  0.2278, Adjusted R-squared:  0.2223
```

```
## F-statistic: 41.41 on 10 and 1404 DF,  p-value: < 0.00000000000000022
```

```
## [[1]]
```

Variance Inflation Factors (multicollinearity)

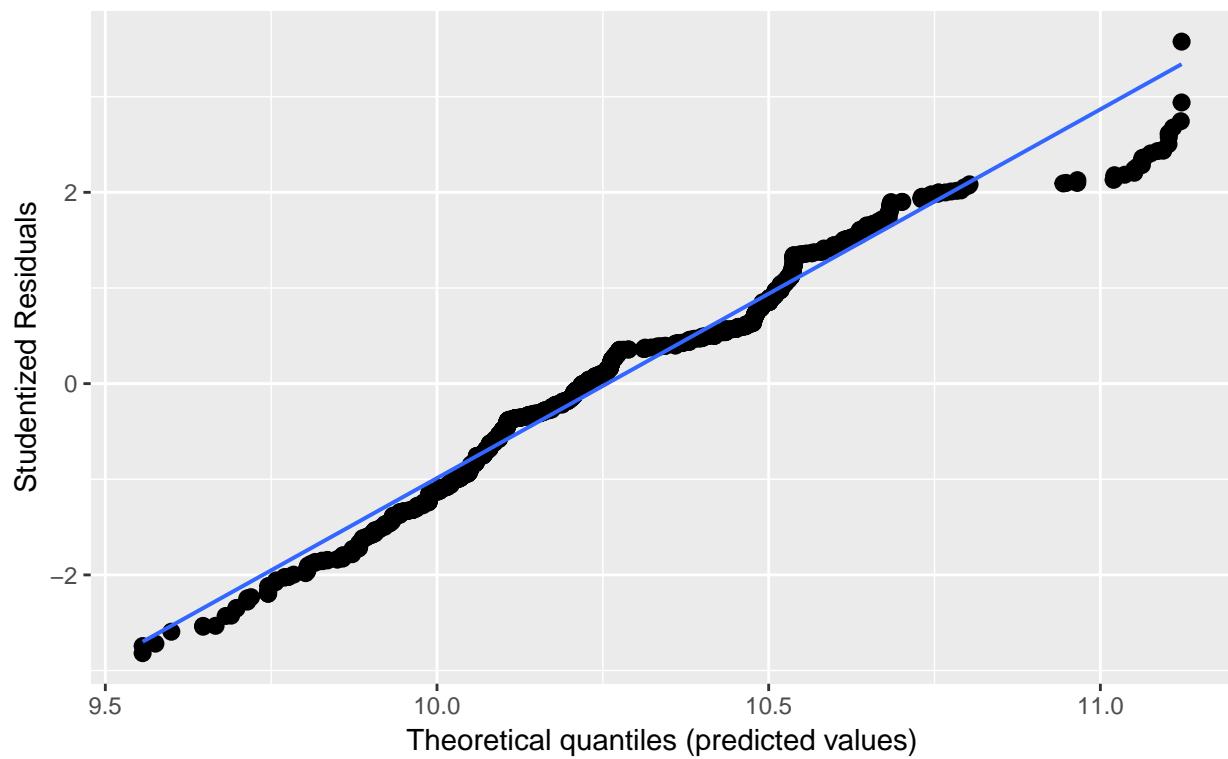


```
##
```

```
## [[2]]
```

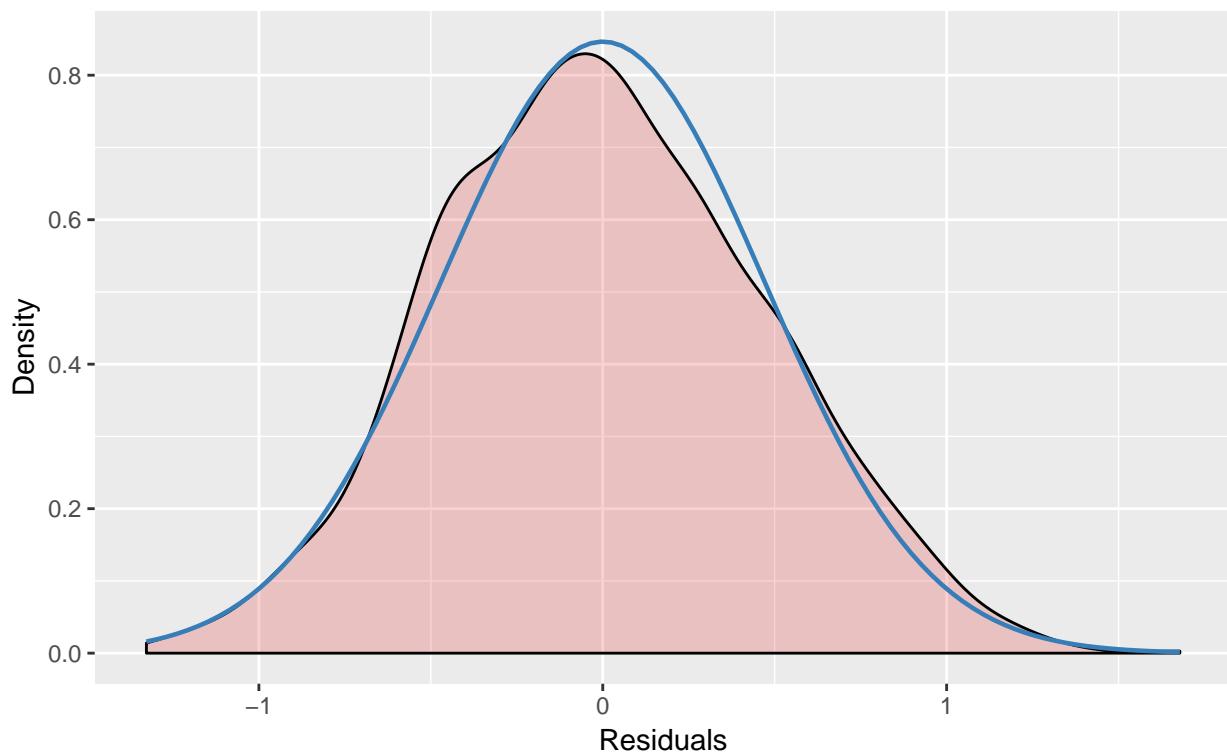
Non-normality of residuals and outliers

Dots should be plotted along the line



```
##  
## [[3]]
```

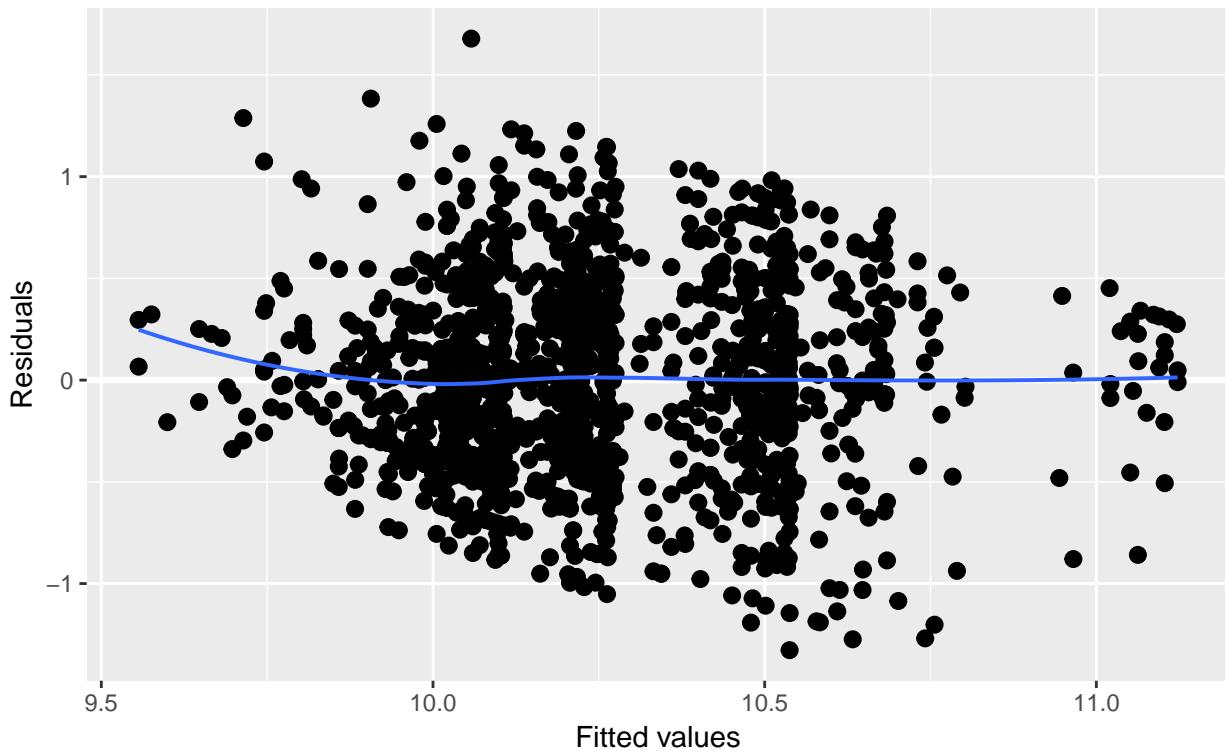
Non-normality of residuals
Distribution should look like normal curve



```
##  
## [[4]]
```

Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread

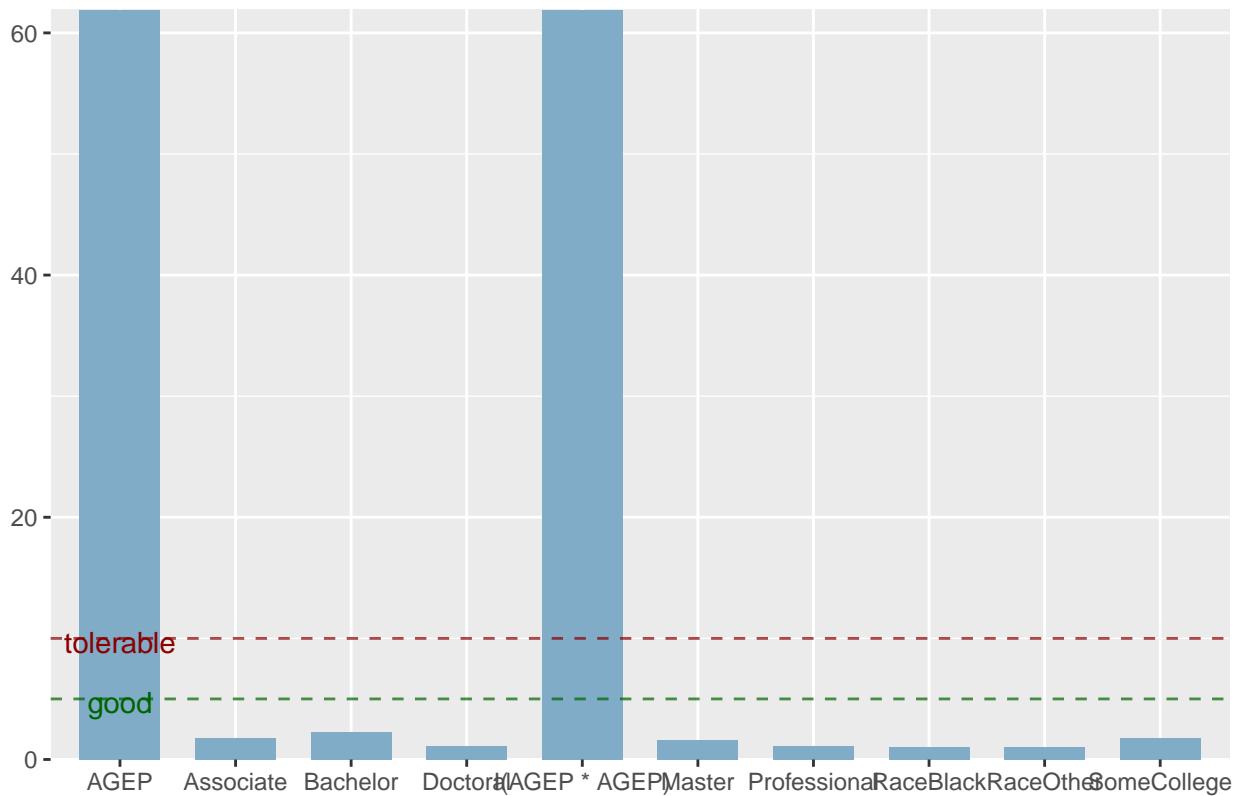


```
##
## Call:
## lm(formula = log(PERNP) ~ RaceBlack + RaceOther + SomeCollege +
##     Associate + Bachelor + Master + Professional + Doctoral +
##     AGEP + I(AGEP * AGEP), data = ss16ppr_female_not_married)
##
## Residuals:
##      Min      1Q Median      3Q      Max 
## -1.1602 -0.2959 -0.0232  0.2406  1.4261 
## 
## Coefficients:
##             Estimate Std. Error t value    Pr(>|t|)    
## (Intercept) 9.33117402  0.16712449 55.834 < 0.0000000000000002 *** 
## RaceBlack   -0.03217391  0.03251136 -0.990    0.32254    
## RaceOther   -0.08187380  0.03253157 -2.517    0.01196 *    
## SomeCollege 0.12159414  0.04303502  2.825    0.00479 **  
## Associate   0.11920581  0.04269351  2.792    0.00531 **  
## Bachelor    0.37168682  0.03557722 10.447 < 0.0000000000000002 *** 
## Master      0.50991570  0.04578896 11.136 < 0.0000000000000002 *** 
## Professional 0.90080564  0.08291503 10.864 < 0.0000000000000002 *** 
## Doctoral    0.75715243  0.09914657  7.637  0.000000000000425 *** 
## AGEP        0.01302898  0.00823340  1.582    0.11378    
## I(AGEP * AGEP) -0.00002810  0.00009705 -0.290    0.77220    
## ---        
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 
## 
## Residual standard error: 0.4213 on 1326 degrees of freedom
## Multiple R-squared:  0.2387, Adjusted R-squared:  0.233
```

```
## F-statistic: 41.59 on 10 and 1326 DF, p-value: < 0.00000000000000022
```

```
## [[1]]
```

Variance Inflation Factors (multicollinearity)

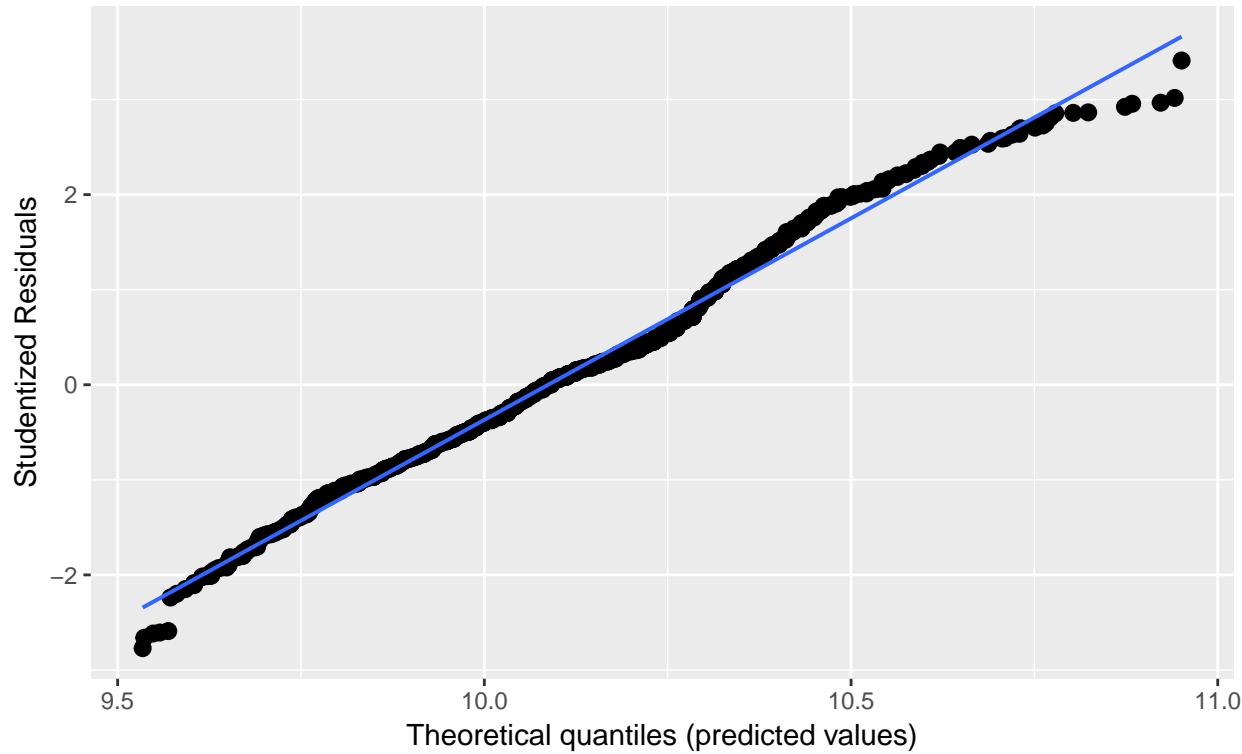


```
##
```

```
## [[2]]
```

Non-normality of residuals and outliers

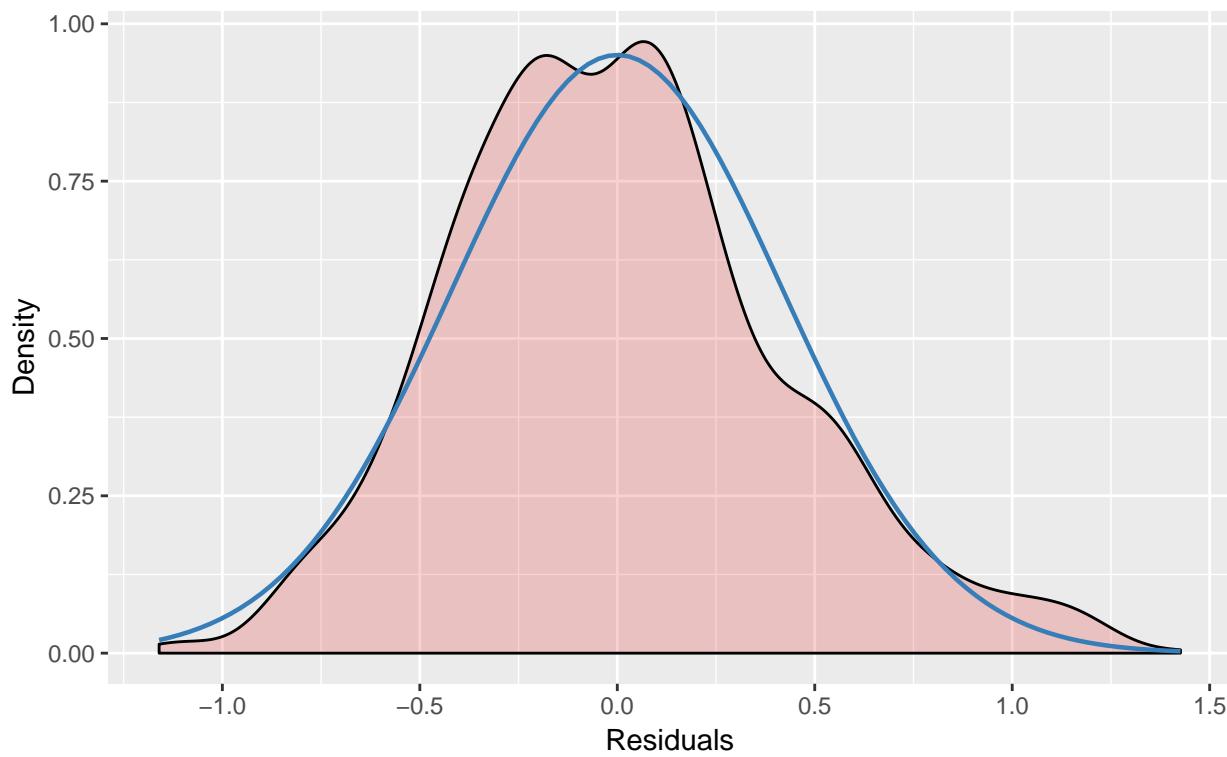
Dots should be plotted along the line



```
##  
## [[3]]
```

Non-normality of residuals

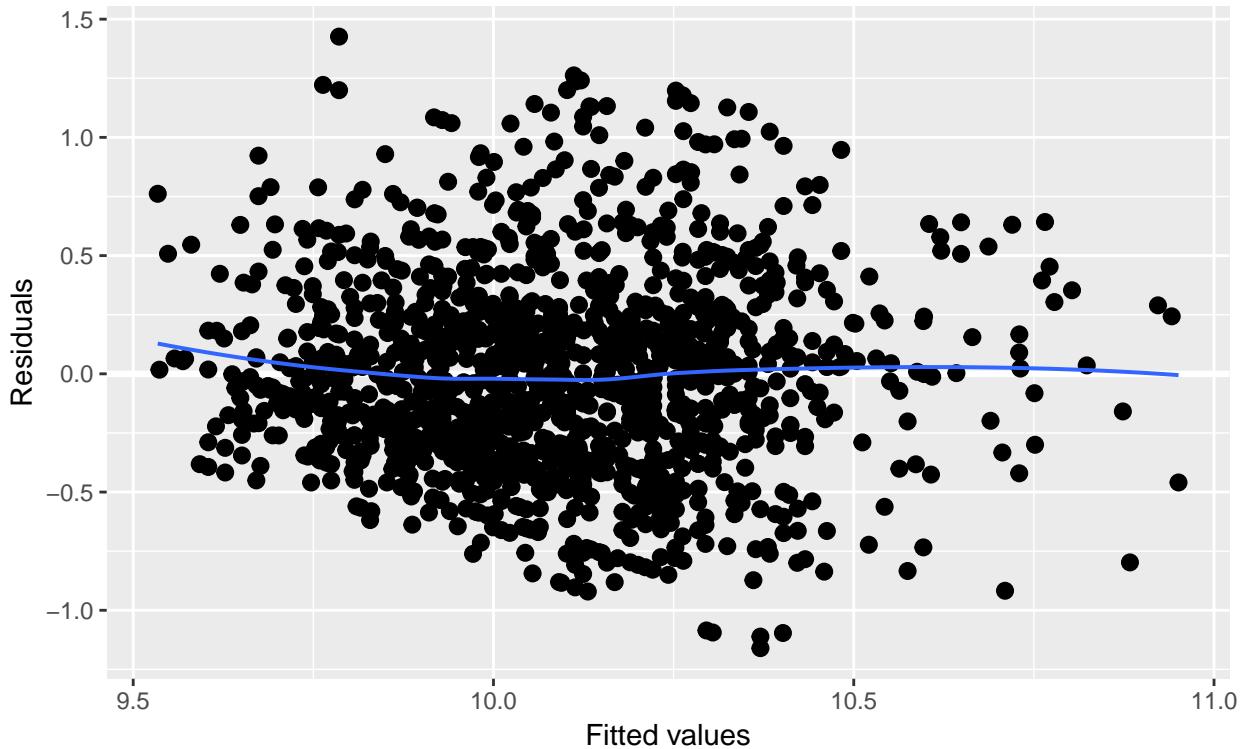
Distribution should look like normal curve



```
##  
## [[4]]
```

Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread

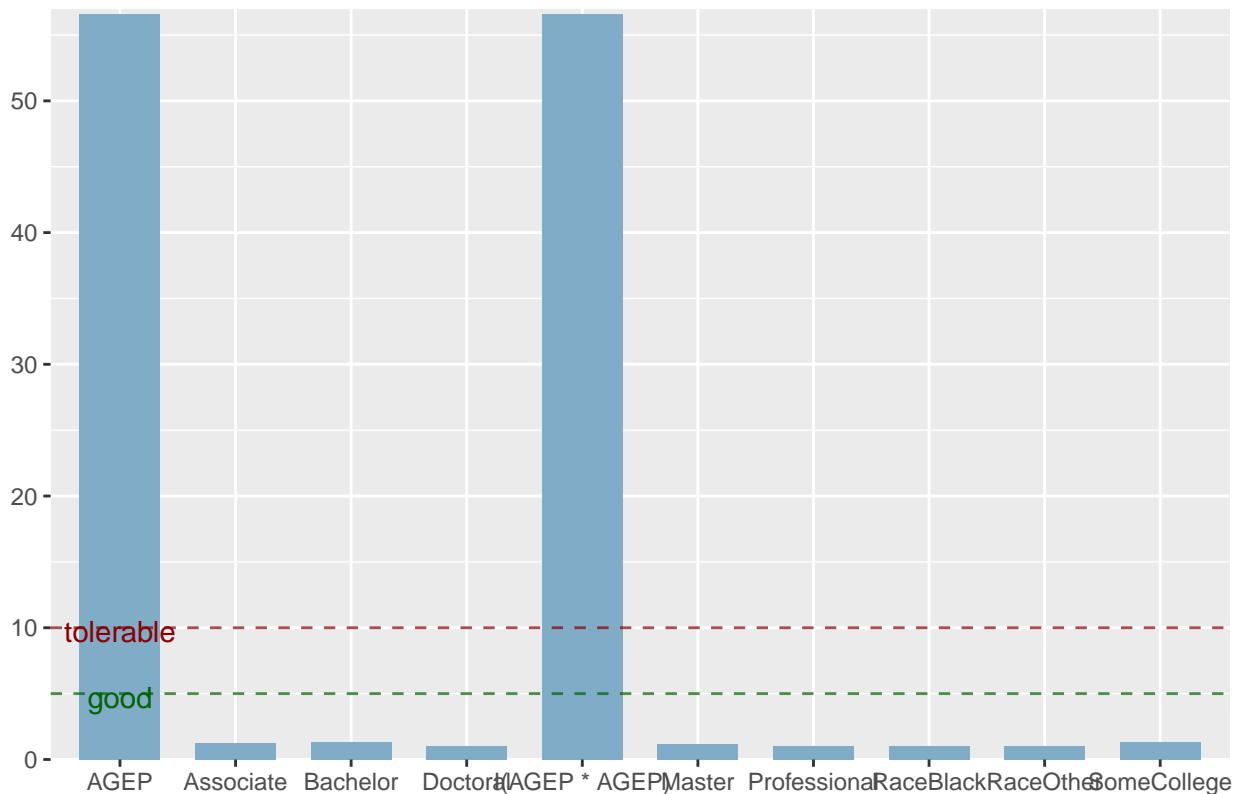


```
##
## Call:
## lm(formula = log(PERNP) ~ RaceBlack + RaceOther + SomeCollege +
##     Associate + Bachelor + Master + Professional + Doctoral +
##     AGEPE + I(AGEP * AGEPE), data = ss16ppr_male_not_married)
##
## Residuals:
##      Min       1Q   Median       3Q      Max 
## -1.30377 -0.31413 -0.02458  0.28299  1.42042
## 
## Coefficients:
##             Estimate Std. Error t value     Pr(>|t|)    
## (Intercept) 8.9266950  0.1683972 53.010 < 0.0000000000000002 *** 
## RaceBlack    0.0038884  0.0354248  0.110    0.91261    
## RaceOther   -0.0121287  0.0364374 -0.333    0.73929    
## SomeCollege  0.1524894  0.0359885  4.237  0.000024366878511482 *** 
## Associate   0.1090423  0.0408747  2.668    0.00774 **  
## Bachelor    0.4498263  0.0341461 13.174 < 0.0000000000000002 *** 
## Master      0.5306844  0.0572634  9.267 < 0.0000000000000002 *** 
## Professional 0.7821081  0.0949574  8.236  0.0000000000000459 *** 
## Doctoral    1.0152022  0.1170752  8.671 < 0.0000000000000002 *** 
## AGEPE       0.0358625  0.0086333  4.154  0.000034986445903157 *** 
## I(AGEP * AGEPE) -0.0003005  0.0001057 -2.842    0.00455 ** 
## ---      
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 
## Residual standard error: 0.4419 on 1201 degrees of freedom
## Multiple R-squared:  0.2765, Adjusted R-squared:  0.2704
```

```
## F-statistic: 45.89 on 10 and 1201 DF, p-value: < 0.00000000000000022
```

```
## [[1]]
```

Variance Inflation Factors (multicollinearity)

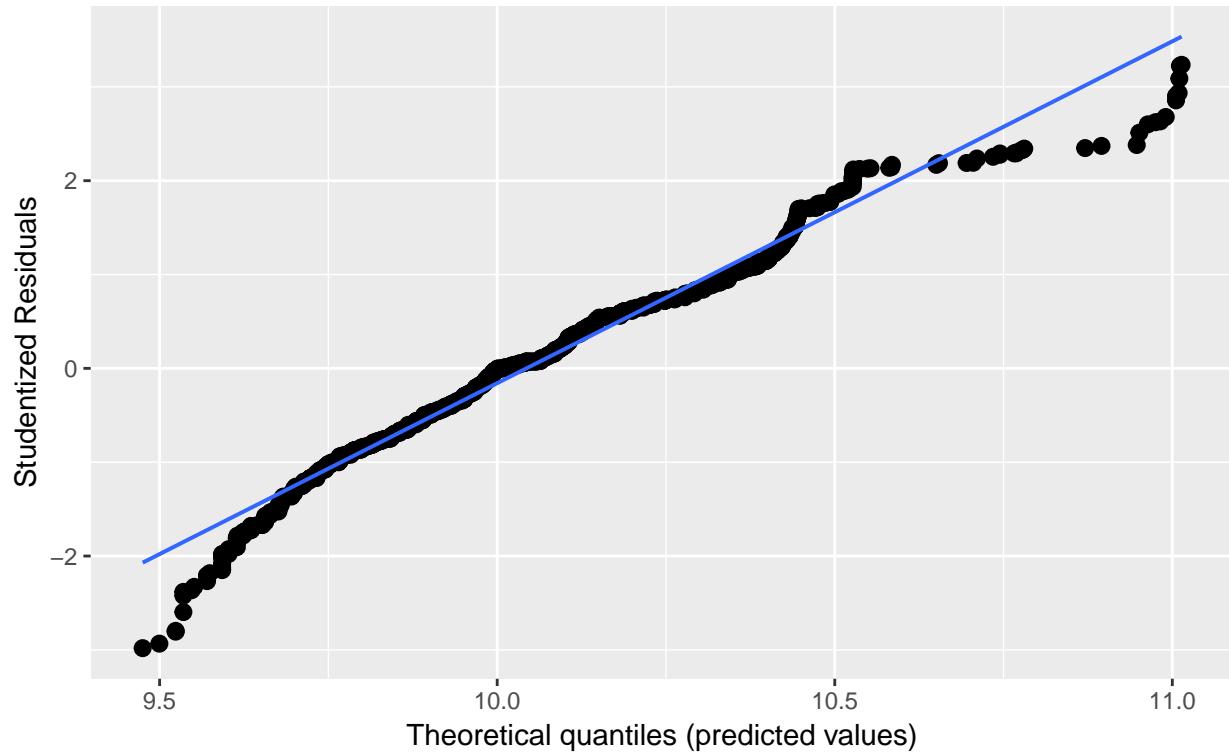


```
##
```

```
## [[2]]
```

Non-normality of residuals and outliers

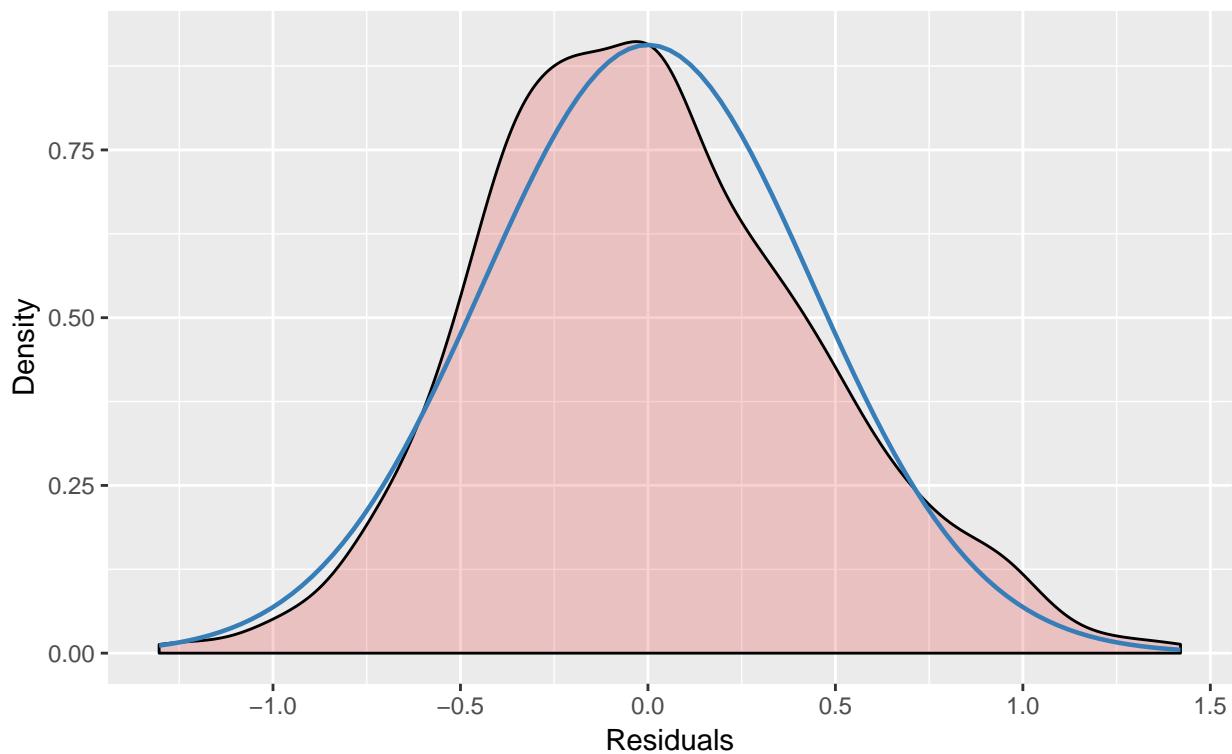
Dots should be plotted along the line



```
##  
## [[3]]
```

Non-normality of residuals

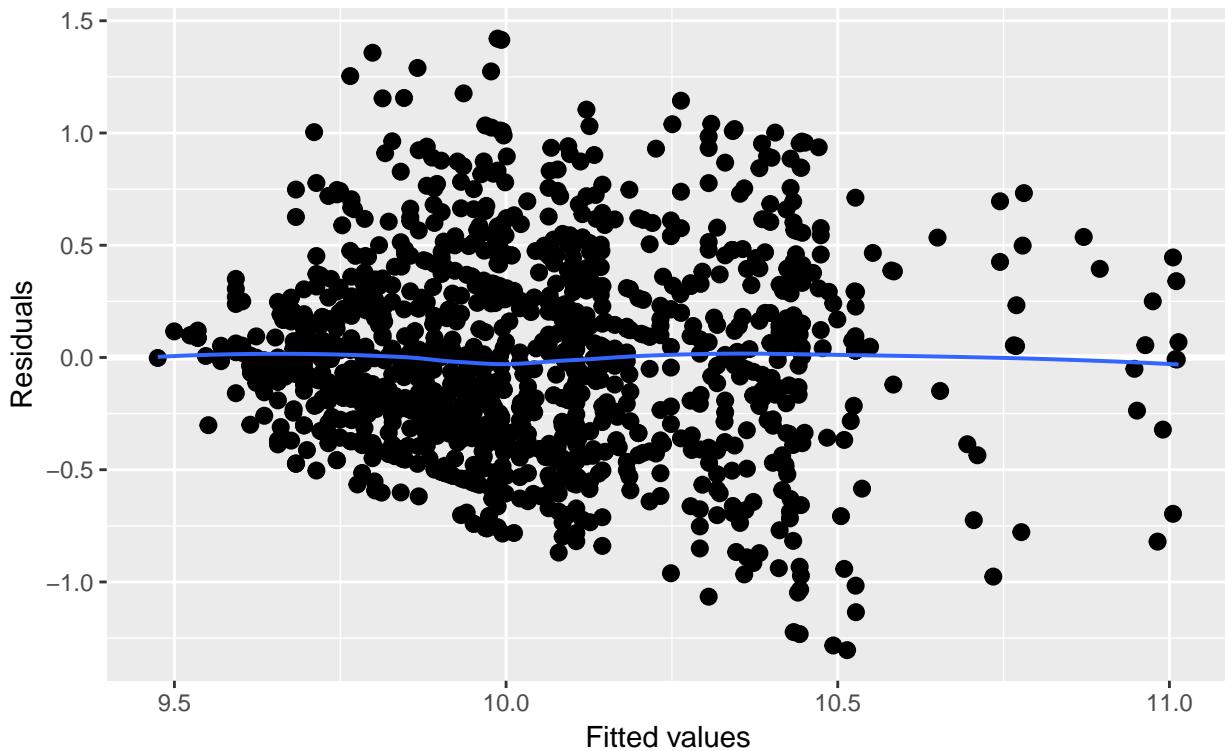
Distribution should look like normal curve



```
##  
## [[4]]
```

Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread

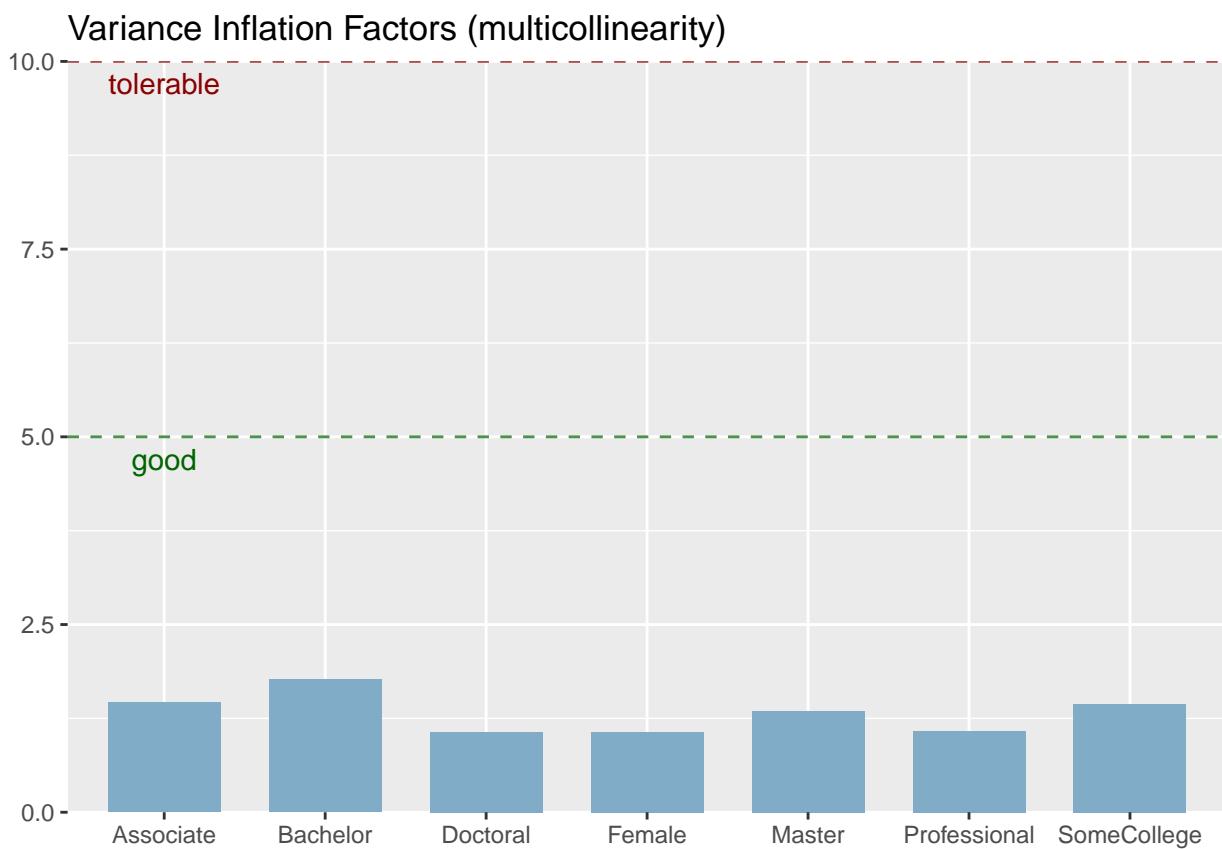


Second Model

$$\text{Earning} = \beta_0 + \text{Female} * \beta_1 + \text{SomeCollege} * \beta_2 + \text{Associate} * \beta_3 + \text{Bachelor} * \beta_4 + \\ \text{Master} * \beta_5 + \text{Professional} * \beta_6 + \text{Doctoral} * \beta_7$$

```
## 
## Call:
## lm(formula = PERNP ~ Female + SomeCollege + Associate + Bachelor +
##      Master + Professional + Doctoral, data = ss16ppr)
## 
## Residuals:
##    Min     1Q Median     3Q    Max 
## -38674 -9557 -3538  5761 101580 
## 
## Coefficients:
##             Estimate Std. Error t value     Pr(>|t|)    
## (Intercept) 23420.3    472.7  49.544 < 0.000000000000002 *** 
## Female     -4680.9    442.5 -10.579 < 0.000000000000002 *** 
## SomeCollege  3254.4    713.8   4.559     0.0000052485 *** 
## Associate    3916.5    708.4   5.529     0.0000000338 *** 
## Bachelor    12148.9    603.5  20.130 < 0.000000000000002 *** 
## Master     17854.4    836.3  21.350 < 0.000000000000002 *** 
## Professional 28253.5   1521.5  18.570 < 0.000000000000002 *** 
## Doctoral    37519.8   1663.3  22.557 < 0.000000000000002 *** 
## --- 
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

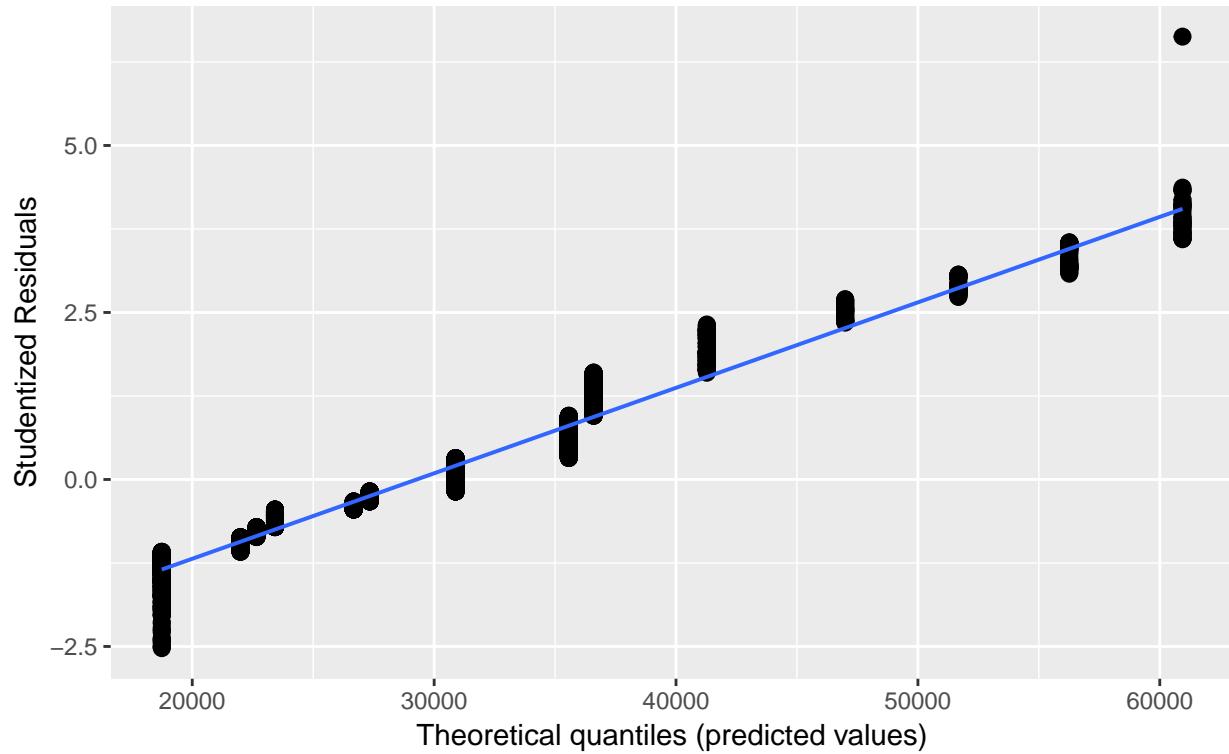
```
## Residual standard error: 15390 on 5186 degrees of freedom
## Multiple R-squared:  0.197, Adjusted R-squared:  0.1959
## F-statistic: 181.7 on 7 and 5186 DF, p-value: < 0.00000000000000022
## [[1]]
```



```
##
## [[2]]
```

Non-normality of residuals and outliers

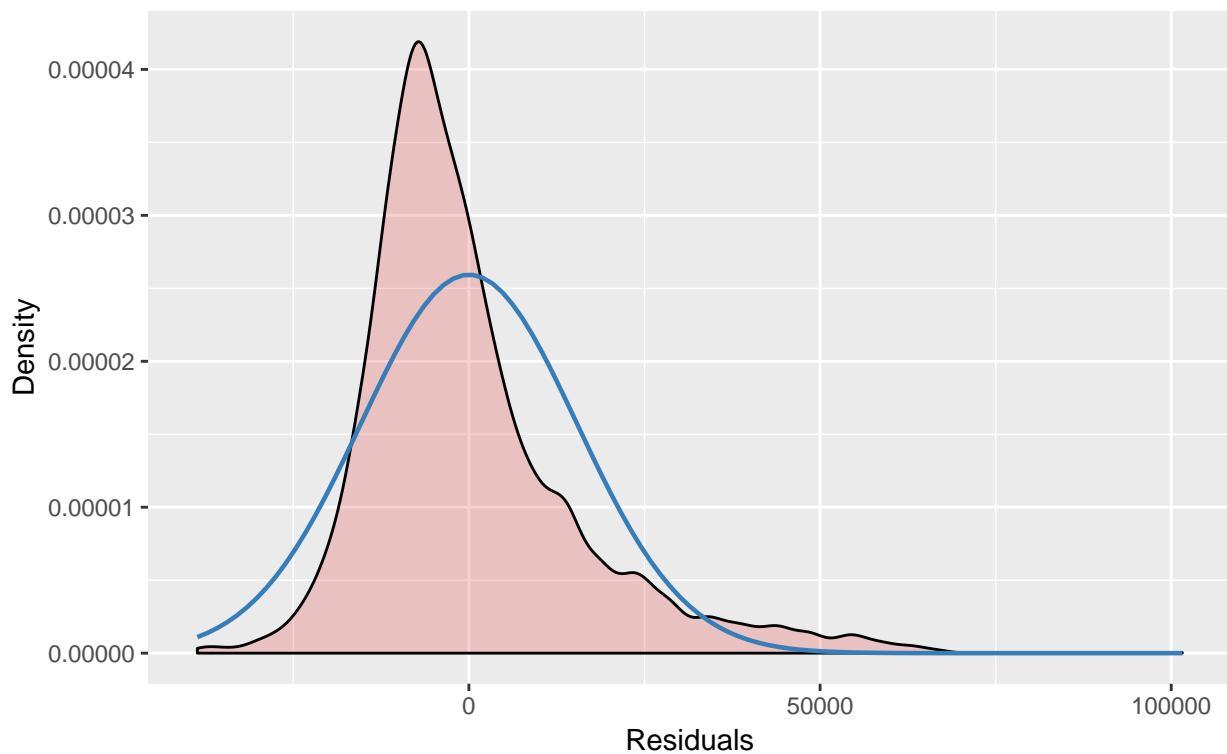
Dots should be plotted along the line



```
##  
## [[3]]
```

Non-normality of residuals

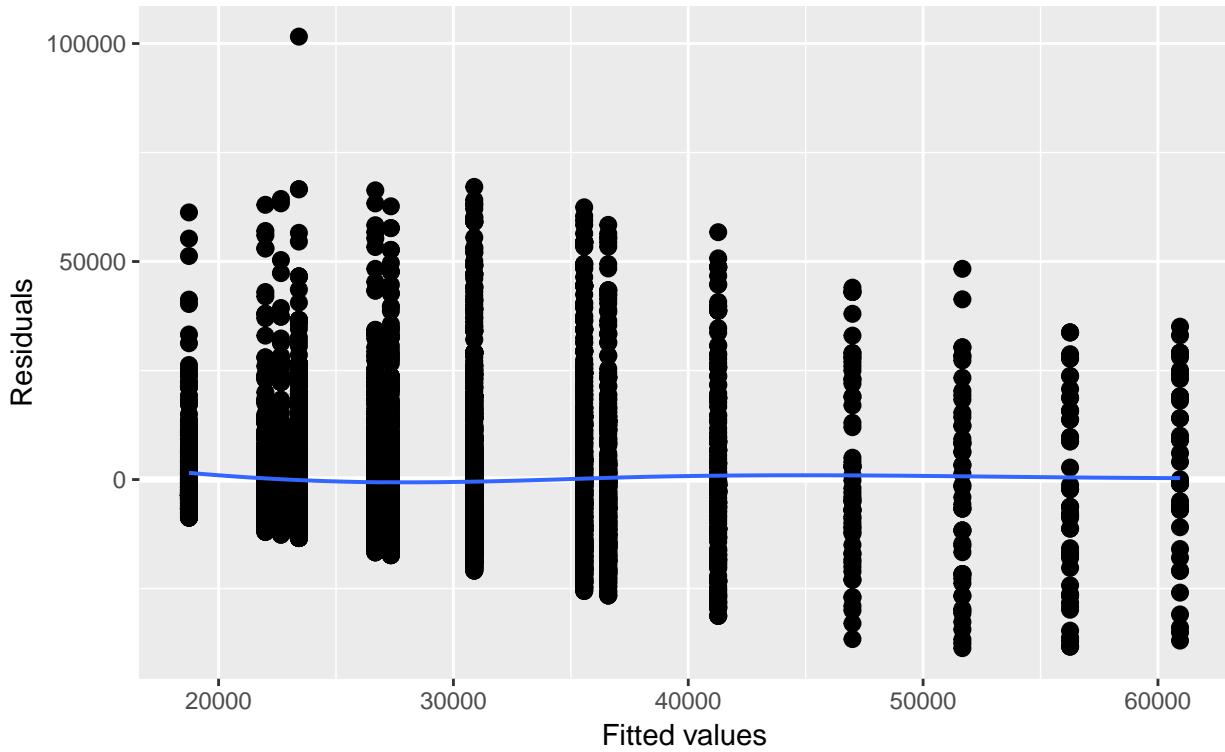
Distribution should look like normal curve



```
##  
## [[4]]
```

Homoscedasticity (constant variance of residuals)

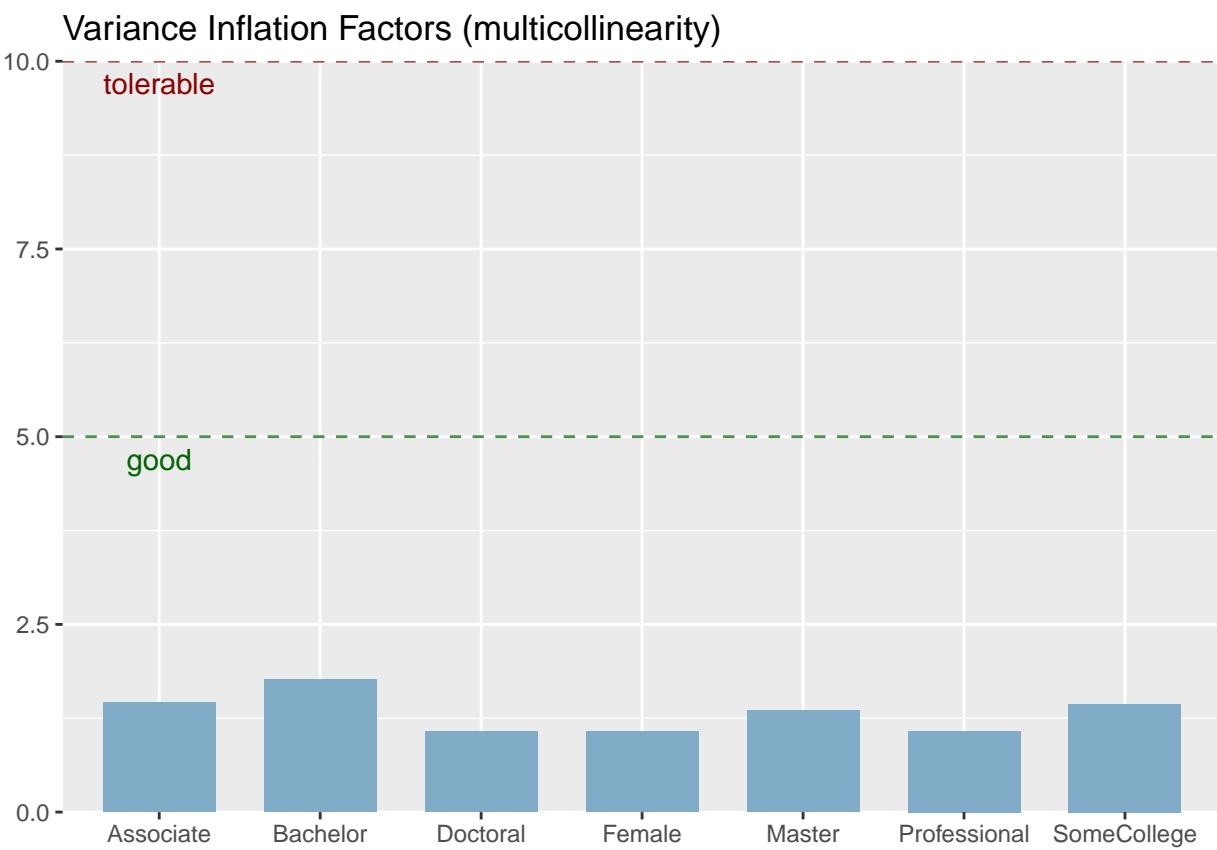
Amount and distance of points scattered above/below line is equal or randomly spread



Second Model log

```
## 
## Call:
## lm(formula = log(PERNP) ~ Female + SomeCollege + Associate +
##      Bachelor + Master + Professional + Doctoral, data = ss16ppr)
## 
## Residuals:
##       Min     1Q   Median     3Q    Max 
## -1.37759 -0.32163 -0.03395  0.29310  1.79864 
## 
## Coefficients:
##             Estimate Std. Error t value            Pr(>|t|)    
## (Intercept) 9.93743   0.01420 699.976 < 0.0000000000000002 *** 
## Female     -0.13243   0.01329 -9.966 < 0.0000000000000002 *** 
## SomeCollege 0.11836   0.02144  5.521  0.00000003524980 *** 
## Associate   0.14704   0.02127  6.911  0.00000000000538 *** 
## Bachelor    0.41489   0.01812 22.891 < 0.0000000000000002 *** 
## Master      0.57651   0.02511 22.955 < 0.0000000000000002 *** 
## Professional 0.82216   0.04569 17.993 < 0.0000000000000002 *** 
## Doctoral    1.01987   0.04995 20.416 < 0.0000000000000002 *** 
## --- 
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 
## 
## Residual standard error: 0.4623 on 5186 degrees of freedom 
## Multiple R-squared:  0.1972, Adjusted R-squared:  0.1961 
## F-statistic: 181.9 on 7 and 5186 DF,  p-value: < 0.0000000000000002
```

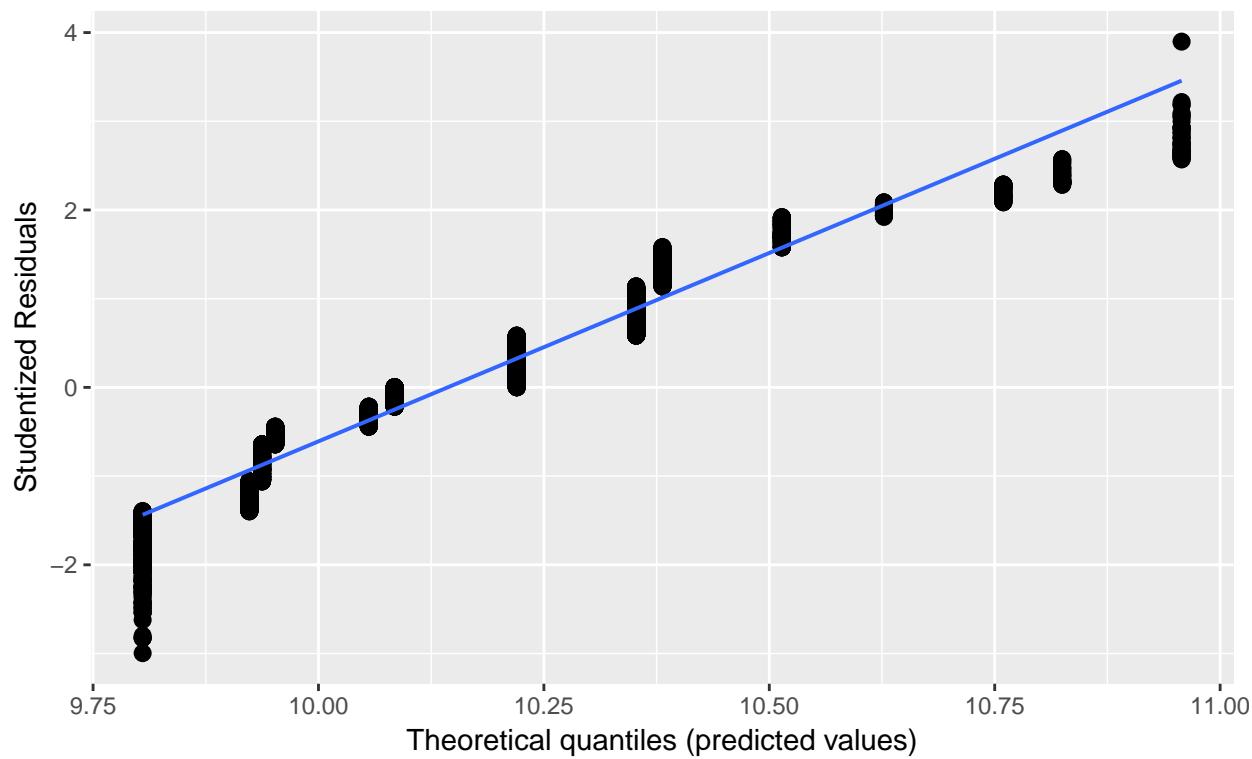
```
## [[1]]
```



```
##  
## [[2]]
```

Non-normality of residuals and outliers

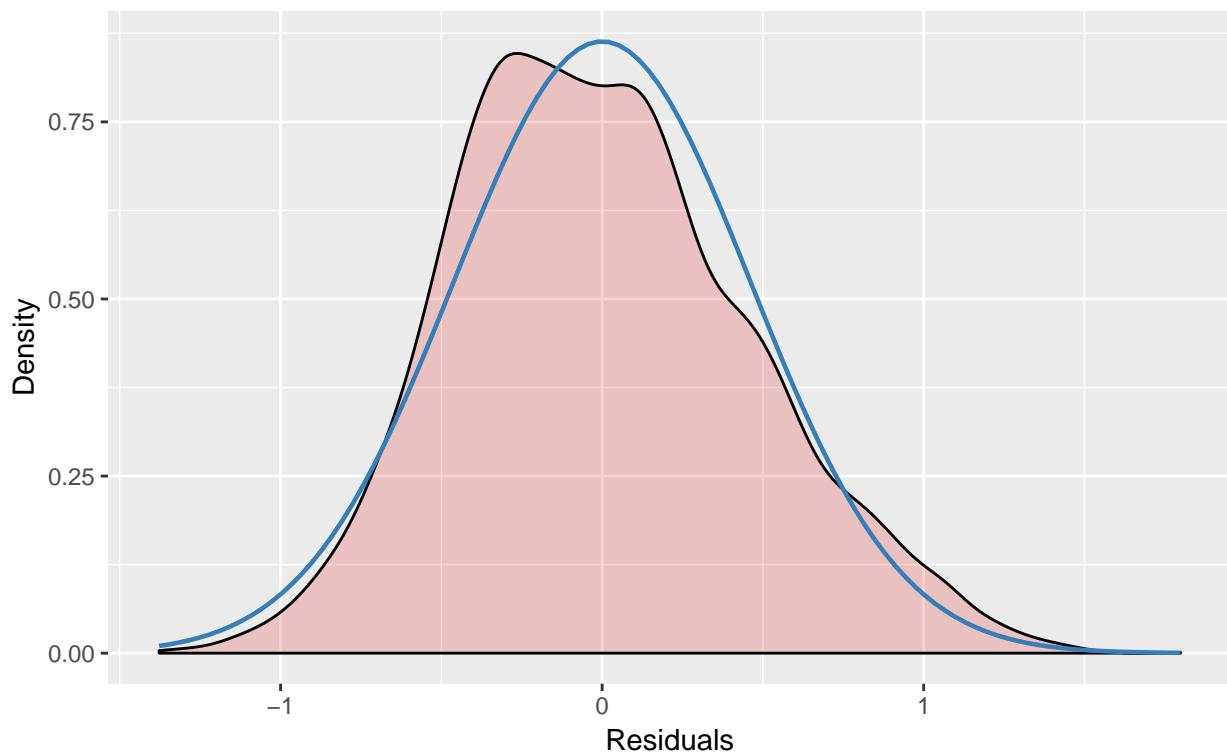
Dots should be plotted along the line



```
##  
## [[3]]
```

Non-normality of residuals

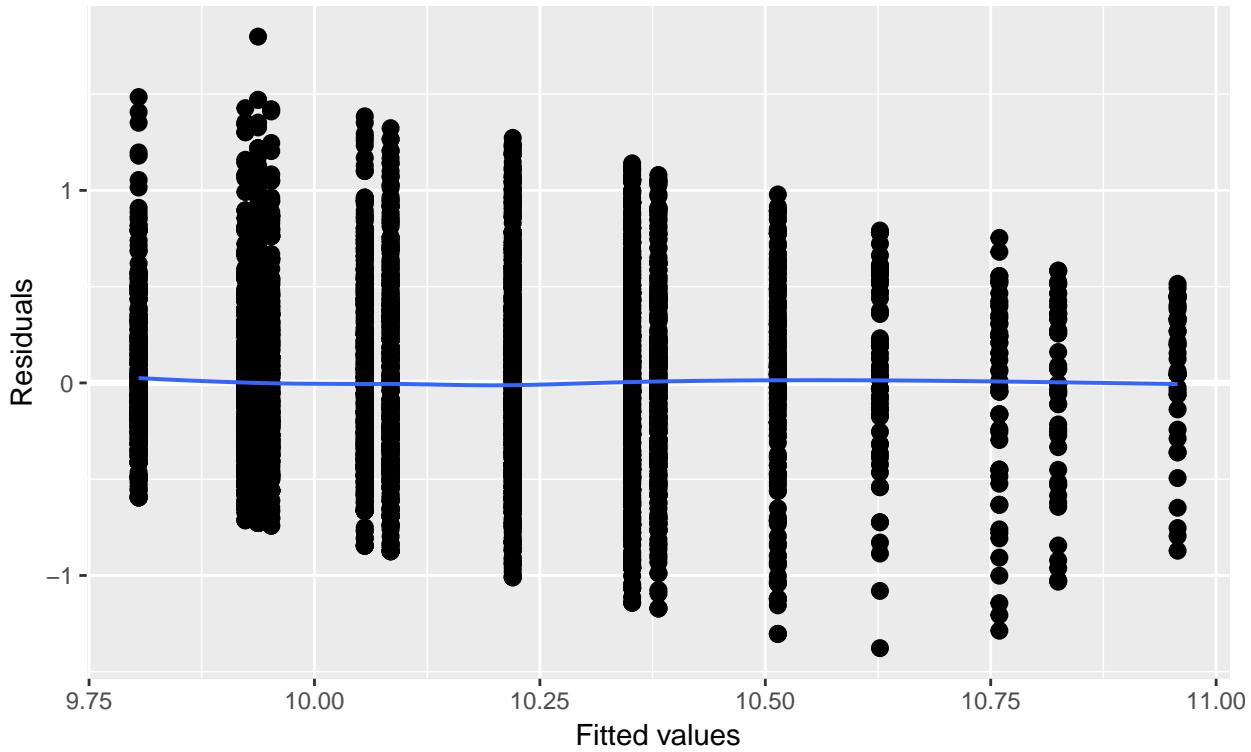
Distribution should look like normal curve



```
##  
## [[4]]
```

Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread



```
##  
## studentized Breusch-Pagan test  
##  
## data: model_2  
## BP = 78.911, df = 7, p-value = 0.0000000000002296  
  
##  
## Call:  
## lm(formula = residuals(model_2) * residuals(model_2) ~ Female +  
##       SomeCollege + Associate + Bachelor + Master + Professional +  
##       Doctoral, data = ss16ppr)  
##  
## Residuals:  
##      Min        1Q     Median        3Q       Max  
## -0.28940 -0.18047 -0.09612  0.07301  3.04031  
##  
## Coefficients:  
##             Estimate Std. Error t value     Pr(>|t|)  
## (Intercept)  0.194784  0.008971 21.713 < 0.000000000000002 ***  
## Female      -0.053504  0.008397 -6.372    0.000000000203 ***  
## SomeCollege   0.032547  0.013546  2.403     0.01631 *  
## Associate    0.028656  0.013443  2.132     0.03308 *  
## Bachelor     0.073184  0.011453  6.390    0.000000000180 ***  
## Master       0.089456  0.015870  5.637    0.000000018236 ***  
## Professional 0.094742  0.028874  3.281     0.00104 **  
## Doctoral     0.027039  0.031565  0.857     0.39171  
## ---  
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```

## 
## Residual standard error: 0.2921 on 5186 degrees of freedom
## Multiple R-squared:  0.01519,   Adjusted R-squared:  0.01386
## F-statistic: 11.43 on 7 and 5186 DF,  p-value: 0.0000000000000001798

##          (Intercept)      Female  SomeCollege Associate
## (Intercept) 0.00017724886 -0.00006224039 -0.00014834318 -0.00014380009
## Female     -0.00006224039  0.00017683110 -0.00002105735 -0.00003518107
## SomeCollege -0.00014834318 -0.00002105735  0.00041669751  0.00016017373
## Associate   -0.00014380009 -0.00003518107  0.00016017373  0.00040538723
## Bachelor    -0.00013581638 -0.00005704603  0.00016269897  0.00016726629
## Master      -0.00013232433 -0.00006804978  0.00016411323  0.00016927229
## Professional -0.00014198163 -0.00003886716  0.00016047058  0.00016376173
## Doctoral    -0.00014861108 -0.00001612630  0.00015738763  0.00015989848
##          Bachelor      Master  Professional Doctoral
## (Intercept) -0.00013581638 -0.00013232433 -0.00014198163 -0.0001486111
## Female     -0.00005704603 -0.00006804978 -0.00003886716 -0.0000161263
## SomeCollege 0.00016269897  0.00016411323  0.00016047058  0.0001573876
## Associate   0.00016726629  0.00016927229  0.00016376173  0.0001598985
## Bachelor    0.00031036741  0.00017787218  0.00016844207  0.0001610706
## Master      0.00017787218  0.00067652717  0.00017102690  0.0001631623
## Professional 0.00016844207  0.00017102690  0.00247092010  0.0001587464
## Doctoral    0.00016107058  0.00016316235  0.00015874640  0.0022224417

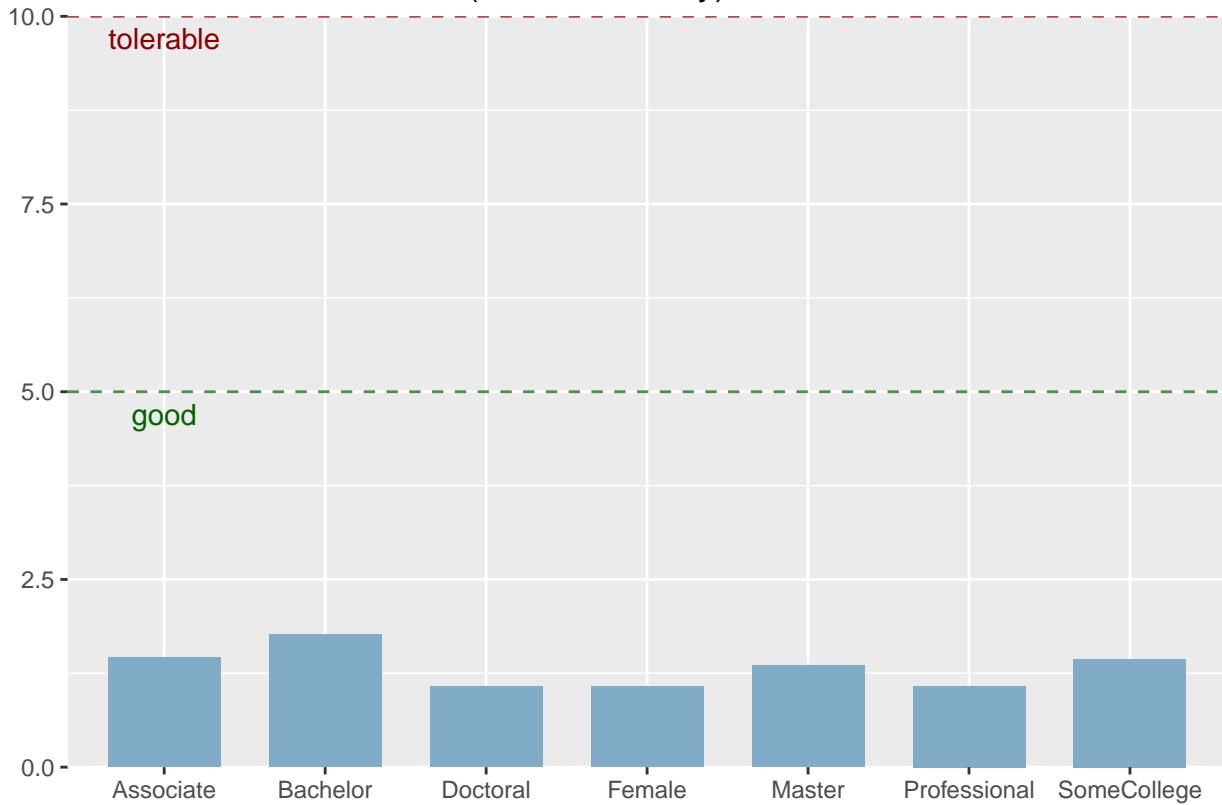
##  (Intercept)      Female  SomeCollege Associate      Bachelor
## 0.01331348  0.01329779  0.02041317  0.02013423  0.01761725
##      Master Professional      Doctoral
## 0.02601014  0.04970835  0.04714278

## 
## Call:
## lm(formula = log(PERNP, base = exp(1)) ~ Female + SomeCollege +
##     Associate + Bachelor + Master + Professional + Doctoral,
##     data = ss16ppr)
## 
## Residuals:
##       Min     1Q   Median     3Q    Max 
## -1.37759 -0.32163 -0.03395  0.29310  1.79864 
## 
## Coefficients:
##             Estimate Std. Error t value            Pr(>|t|)    
## (Intercept) 9.93743   0.01420 699.976 < 0.0000000000000002 *** 
## Female     -0.13243   0.01329 -9.966 < 0.0000000000000002 *** 
## SomeCollege 0.11836   0.02144  5.521   0.00000003524980 *** 
## Associate   0.14704   0.02127  6.911   0.00000000000538 *** 
## Bachelor    0.41489   0.01812 22.891 < 0.0000000000000002 *** 
## Master      0.57651   0.02511 22.955 < 0.0000000000000002 *** 
## Professional 0.82216   0.04569 17.993 < 0.0000000000000002 *** 
## Doctoral    1.01987   0.04995 20.416 < 0.0000000000000002 *** 
## --- 
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 
## 
## Residual standard error: 0.4623 on 5186 degrees of freedom
## Multiple R-squared:  0.1972, Adjusted R-squared:  0.1961 
## F-statistic: 181.9 on 7 and 5186 DF,  p-value: < 0.0000000000000022 

## [[1]]

```

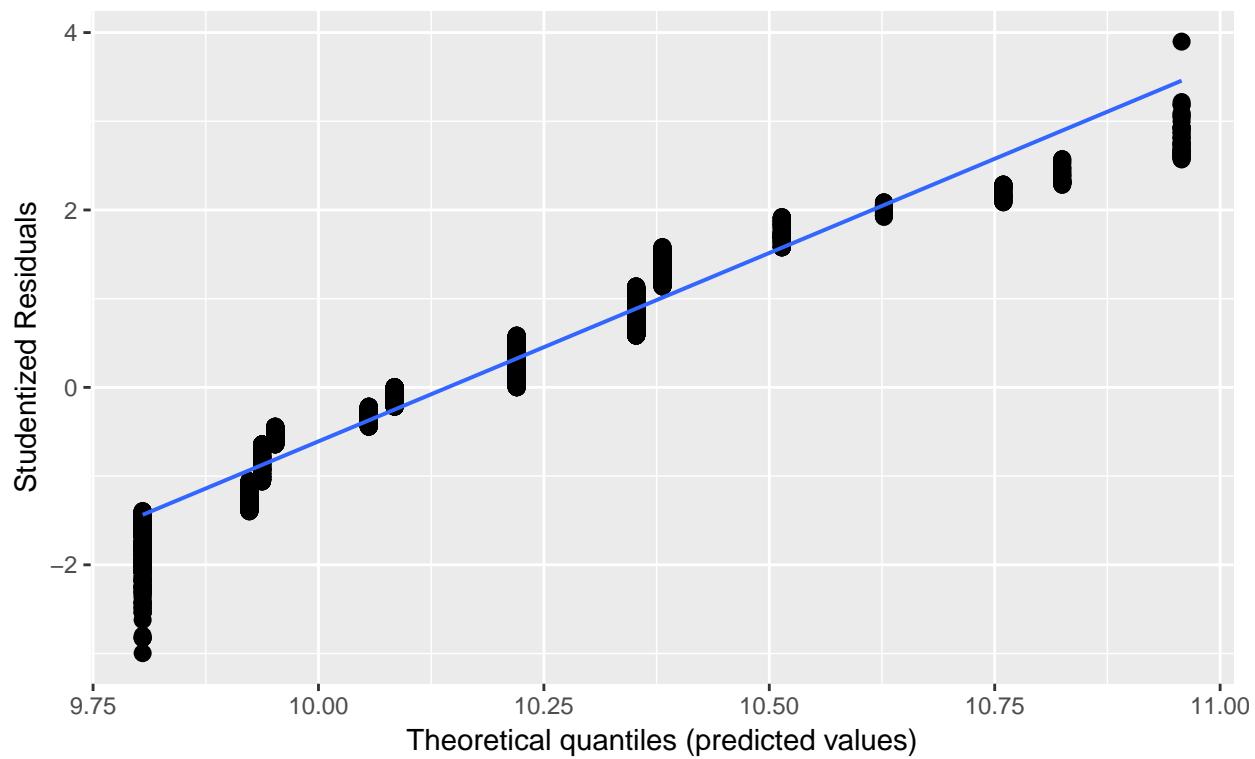
Variance Inflation Factors (multicollinearity)



```
##  
## [[2]]
```

Non-normality of residuals and outliers

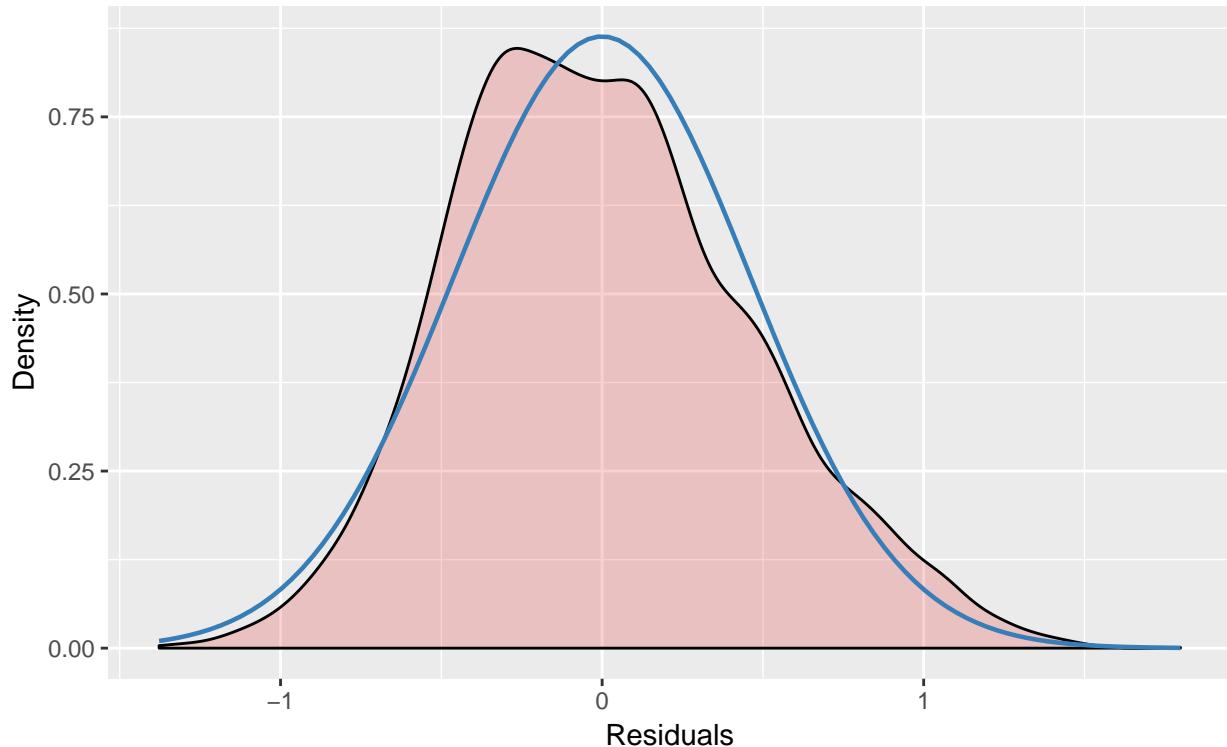
Dots should be plotted along the line



```
##  
## [[3]]
```

Non-normality of residuals

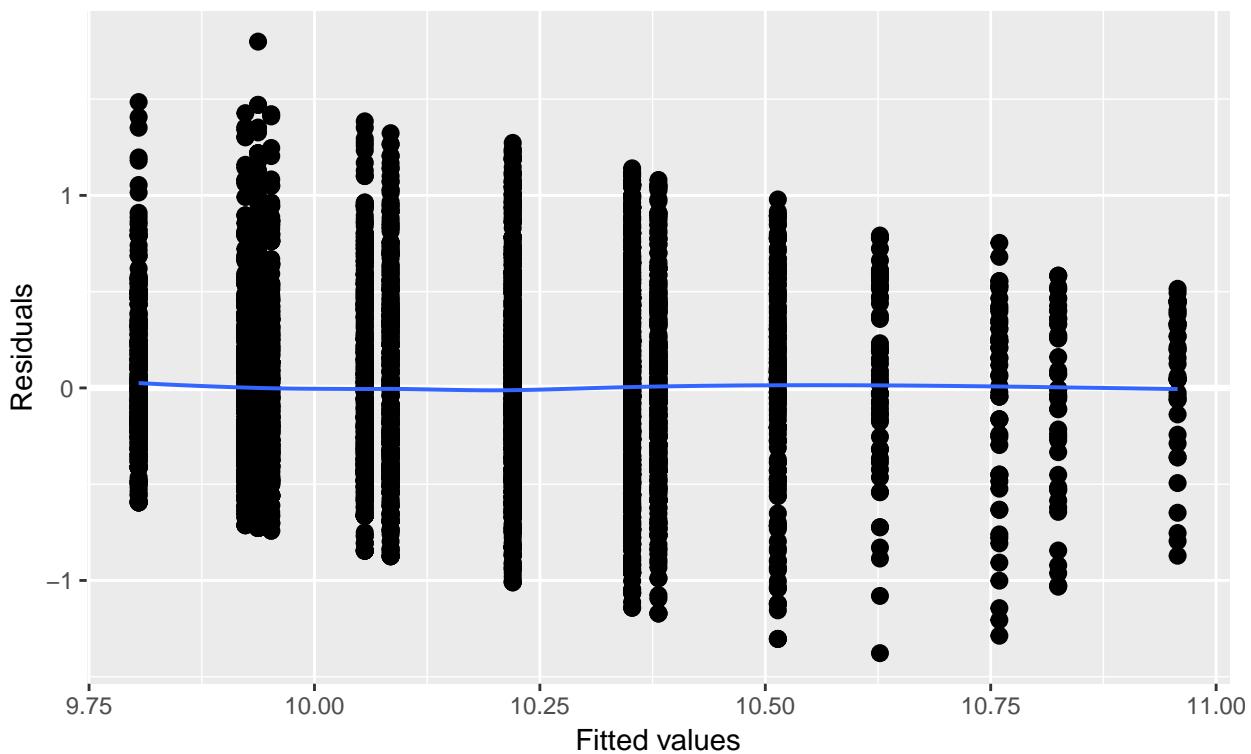
Distribution should look like normal curve



```
##  
## [[4]]
```

Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread



- Coefficients Explanation

- Holding education constant, male makes \$0.14 more than female on average.
- Holding gender constant, people have high school education makes \$0.15 less than people have some college education on average.
- Holding gender constant, people have high school education makes \$0.15 less than people have associate education on average.
- Holding gender constant, people have high school education makes \$0.42 less than people have bachelor's degree on average.
- Holding gender constant, people have high school education makes \$0.56 less than people have master's degree on average.
- Holding gender constant, people have high school education makes \$0.82 less than people have Professional education on average.
- Holding gender constant, people have high school education makes \$0.96 less than people have doctor's degree on average.